Chapter 2
Approaches to Learning and Teaching

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Learning Outcomes

2.1 Explain applied behavioral analysis and how teachers can use it in classrooms to increase desirable behaviors and decrease undesirable behaviors.

2.2 Provide an overview of how teachers can use cognitive strategy instruction (CSI) to teach academic, cognitive, or social skills.

2.3 Describe social learning practices and executive functioning; then list several practices that might influence both executive processing and academic outcomes.

Meaghan knew by the time she was a senior in college that she wanted to be a special education teacher, but was close to finishing her psychology degree and did not want to change majors. Instead, Meaghan completed her undergraduate degree in psychology and then returned to school part-time to pursue a degree with certification in special education. While going to school part-time, she was also working as a teaching assistant in a middle school. Fortunately, much of what she learned in psychology was directly applicable to the work she was doing with a team of special education teachers. She had learned a great deal about various learning theories as a psychology major and, in particular, how to use applied behavior analysis. Now, much of what she was asked to implement as schoolwide behavior support was based on the applied behavior analysis she had learned as an

undergraduate. She understood the importance of looking for positive behaviors and providing reinforcement to students when they exhibited them. She also understood how to be consistent in her application of rules. Furthermore, her coursework that addressed cognitive behavioral theories also assisted her in effectively implementing many of the cognitively based math and reading strategies that she was encouraged to use by the special education teachers. All in all, the longer she worked as a special education teaching assistant, the more she appreciated her strong background in learning theory.

This chapter highlights some of the critical features of learning as they relate to delivering effective instruction and providing classroom management. We link specific models such as applied behavior analysis to practices in the classroom to facilitate understanding and designing effective behavioral and academic learning practices. These practices guide teachers in modifying their teaching to promote effective and efficient learning. The chapter is sequenced to move from less to more cognitively oriented models. Many of the general principles presented in this chapter will be applied to specific content areas in subsequent chapters. As you read this chapter, we encourage you to think about students you know who are not succeeding in school and who have learning and behavior problems. How are their learning patterns and habits explained by the various approaches to learning described in this chapter? What general teaching principles do the different approaches suggest to help such students? How can technology assist in the teaching–learning process?

Applied Behavior Analysis

What is applied behavioral analysis (ABA), and how can teachers use it to improve the academic and social behavior of their students? Teachers and other professionals who use applied behavior analysis understand that many behaviors of their students are learned and therefore these students can be taught new behaviors. With applied behavior analysis, the focus is on identifying observable behaviors and manipulating the antecedents and consequences of these behaviors to change behavior. Applied behavior analysis is a highly scientific approach to designing instruction and evaluating its effects.

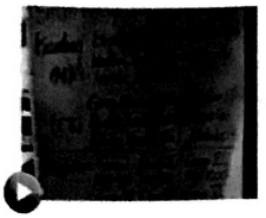
Manipulating Antecedents

An *antecedent* is an environmental event or stimulus that precedes a behavior and influences the probability that the behavior will recur in the future. For example, students learn that when the teacher pulls the cart with the video machine on it to the front of the room, that behavior serves as an antecedent to watching a film. Teachers learn that a change in their classroom structure might be an antecedent for students' exhibiting higher levels of classroom behavior problems. Antecedents influence desirable and undesirable behaviors. It is relatively easy for teachers to manipulate antecedents to change student behaviors. Teachers can do this by analyzing the environment and identifying factors that contribute to desirable and undesirable behaviors. By identifying and changing these factors, teachers can increase student learning and minimize or eliminate antecedents that interfere with successful learning. In observing antecedent behaviors, the teacher usually considers instructional content, classroom schedule, classroom rules, classroom arrangement, and peer interactions. Teachers can also teach students "cues" that serve as antecedents for expected behaviors. For example, the teacher can point to the clock as a cue that students have limited time to complete an activity or can clap her hands as a signal that she expects students to move to new groups.

Instructional Content Teachers can consider a number of ways to manipulate instructional content to control behavior: make activities more interesting, incorporate student preferences, reduce task difficulties or length, provide choices, and develop functional or age-appropriate activities. By modifying educational programs, teachers can prevent students' inappropriate or undesirable behavior and establish a pleasant classroom environment. For example, Blair (1996) found that incorporating the students' activity preferences into circle time and academic activities in a preschool/kindergarten essentially eliminated the undesirable behavior of young students who had significant behavior problems. Another example is the teacher who realized that students would begin fooling around when waiting in line to transition to recess or lunch. She decided to give students a question related to their work that they would have to solve with a partner while waiting in line.

Classroom Schedule A well-designed schedule allows everyone to predict what will occur during the school day and assist with the allocation of instructional time. Teachers can involve students in planning the daily schedule. In addition, it is important to avoid revising a schedule because changes can be disruptive, undermining students' ability to predict what will happen during the day. If changes are made to the schedule, posting them in a visible place is useful. Some students with special needs will require an individual schedule as well as the one provided to the class as a whole. They may be required to attend support services such as speech and language supports or occupational therapy. A written card for each student with a list of these activities each day can be very useful.

MyLab Education
Video Example 2.1
In this video, a sixth-grade teacher offers suggestions for establishing a consistent classroom schedule that meets diverse student needs.



Classroom Rules When properly developed and stated, carefully selected rules can contribute to a positive classroom atmosphere. They help students understand what will and will not be accepted in the classroom. It is important to select a limited number of rules to make it easier for students to remember them. Seek the class's input on the rules to increase students' commitment to following them. State rules positively to help students identify the acceptable behavior, and post the rules so students can refer to them.

MyLab Education
Video Example 2.2
In this video, a veteran teacher explains how her school developed a schoolwide system of rules that apply in classrooms and other areas of the school. Why is such a systematic approach especially important for students with behavior problems?

Classroom Arrangement Noises and crowding in a classroom sometimes increase undesirable behaviors. Arranging the furniture in the classroom to partition some areas can reduce noise levels, and limiting the number of students in any area can reduce crowding. It is also useful to know what spaces in the room are individual and which ones are for group interaction as well as resources that are available to all students (e.g., computer center) and ones that are restricted.

See Chapter 4 for additional information on classroom arrangement and sample room arrangements.

Peer Interactions The classroom and the school are important social communities, and peer interactions play a significant role in determining the levels of desirable and undesirable behaviors. Teachers can facilitate peer interaction by pairing students who have good social skills with students who have more difficulty in prosocial skills, encouraging interaction between students with and without disabilities, and teaching prosocial skills to decrease inappropriate behaviors and to increase appropriate behaviors.

For more information on teaching prosocial skills, refer to Chapter 4.

Increasing Desirable Behaviors Through Consequences

During the past few weeks, Ms. Glenn has focused on teaching Marjorie, Sheila, and Ali subtraction with regrouping. During this time, she demonstrated many of the principles by using 10 packs of sticks. Today, the students apply the principles on the chalkboard. Ms. Glenn then asks the students to practice the skills independently by completing a math sheet with 12 subtraction-with-regrouping problems. She watches them complete the first problem correctly. Now she needs to teach another group, yet she wants to be sure that these three students will continue to work on their math.

Progress Monitoring According to principles of applied behavior analysis, behavior is influenced by the consequences that follow it. Ms. Glenn needs to decide what consequences will follow appropriate math performance to maintain or increase its occurrence. She tells Marjorie, Sheila, and Ali, "If you get nine or more problems correct on this math sheet, I will let you have 5 minutes of free time in the Fun Corner." Free time in the Fun Corner is a big reinforcement for all three students, and they accurately complete the math sheet while she works with other students.

Teachers can apply four principles in attempting to maintain or increase behavior:

1. The behavior must already be in the student's repertoire. In the preceding example, Ms. Glenn's students knew how to perform the math task. To maintain or increase social or academic behaviors, the teacher must first be sure that the student knows how to perform the target behaviors.
2. A consequence must follow the precise behavior to be changed or must be linked to the behavior through language. For example, the teacher may say, "Because you completed all of your math assignments this week, I'll let you select a movie to watch."
3. A reinforcer is whatever follows a behavior and maintains or increases the rate of the behavior. For example, you may use a point system to reinforce the academic or social behaviors you are hoping to maintain or increase. Ms. Feinstein was hoping to increase the time that Justin (a seventh grader identified with learning disabilities) spent completing his social studies activities and so was giving him points for working on this task that he could exchange for a night without homework.
4. To be most powerful, reinforcement should occur immediately following the behavior.

Thus, to increase the frequency or strength of a behavior, we can manipulate the consequence that follows the behavior.

Web Resources
See the following website for an overview of applied behavior analysis from the Association for Behavior Analysis International at **www.abainternational.org**.

Reinforcement Reinforcement is the most significant way to increase desirable academic or social behaviors. There are two types of reinforcement: positive and negative; both increase responding. How do they differ? The major difference between positive and negative reinforcement is that *positive reinforcement* is the *presentation* of a stimulus to increase responding, whereas *negative reinforcement* is the *removal* of a stimulus to increase responding.

MyLab Education
Video Example 2.3
The teacher in this video provides positive reinforcement to individuals and to groups of students who listen and respond appropriately.

Positive reinforcement increases responding by following the behavior with activities, objects, food, and social rewards that are associated with increasing the behavior. Toys, games, and privileges such as helping the teacher or having extra recess time are examples of positive reinforcers. Also, teacher attention or positive comments can be positive reinforcers.

Negative reinforcement increases responding by removing a stimulus. For example, if the teacher turned off the music in the classroom and students' work activity increased, then removing the noise of the music would have served as a negative reinforcement for the class. Ms. Jacob turned her back and walked away from Juline when she was making inappropriate noises. This was a removal of Ms. Jacob's positive attention and it increased Juline's use of appropriate rather than inappropriate noise.

The practice of negative reinforcement is often misused because the term *negative* is misinterpreted to mean harmful or bad, and therefore, the implication is that positive reinforcement is good and negative reinforcement is bad. Negative reinforcement simply means taking away something unpleasant if a specific behavior is exhibited. If a teacher scowls at a student until the student works, removing the scowl is negative reinforcement. The learning that takes place through negative reinforcement is avoidance learning. A common use in schools is the completion of work assignments to avoid staying after school. Students often use negative reinforcement with adults. An example is a child who throws a temper tantrum until he or she gets what he or she wants.

The effectiveness of a reinforcement program depends on selecting reinforcers that actually increase the target behavior. One way teachers can make sure that they use appropriate reinforcers for each student is to develop a reinforcer preference checklist for identifying reinforcers. Activities and events that a student selected when given a wide choice are more likely to be strongly reinforcing. To prevent students from being satiated with the reinforcer, reinforcement menus are recommended. Instead of providing one reinforcer over time, giving a choice of reinforcers increases their value and prevents satiation. Remember, knowing what is reinforcing to each student is a valuable resource to teachers, as it arms them with valuable means of improving academic and social behaviors for that student. Not all students find the same things reinforcing, so there is value in having a reinforce preference list for each of your students.

Many teachers are concerned that using reinforcers can prepare students for being "bribed" or "paid" to exhibit the desired behaviors. However, many students with behavior disorders have little experience using appropriate behaviors, so reinforcers can serve as a means to motivate them to practice appropriate behaviors. In using reinforcers with your students, it is important to start with more *intrinsic reinforcers*, such as using activities that are reinforcing to the student (e.g., listening to music, coloring), and move to more *tangible reinforcers* such as tokens and food only as necessary. For example, a hierarchy of reinforcers, ranging from internal self-reinforcement ("I did a good job") to more extrinsic or tangible reinforcers such as choosing from a toy store, are presented in Apply the Concept 2.1.

How do you decide which reinforcers you should use? Selecting reinforcers is a critical decision because it influences their effectiveness. Consider the following suggestions when selecting reinforcers:

- Observe and record behaviors and events that are reinforcing to the student. For example, some students like to have their hands or face touched with a feather, other students like verbal praise, and some students like to have time with their friends.
- Consider the age and interests of the person whose behavior you want to improve, and consider what is reinforcing to that person.
- After you consider what you know about the person—the age, interests, and likes and dislikes—identify a list of potential reinforcers.
- Use the behaviors the person likes to engage in as reinforcers for the behaviors liked less.
- Interview the person about what is liked and would be reinforcing to that person.
- Try something new as a reinforcer.
- Consider using reinforcers that occur naturally in the environment.
- Be sure to keep a record of the target behavior and the extent to which it is influenced by the reinforcers.

2.1 Apply the Concept

Classroom Reinforcers: Intrinsic (Internal) to Extrinsic (Concrete, Tangible)

Reinforcer	Examples
Self-managed reinforcers	Checks for raising hand, stars for not fighting at lunch, charting behavior
Positive recognition by student	I did a good job; I'm working hard; I'm listening to the teacher.
Positive contact from teacher or students	Standing near student, patting student's desk, providing opportunities for student's friends to sit near student
Positive feedback from teacher	"You are working hard." "You are focusing on the lesson." "I really like the way you cooperated."
Post names of students with improved behavior	Provide a place in the classroom or school where the names of students displaying improved behavior are posted.
Privileges related to the target behavior	Student who is reducing fighting at recess is given more recess time for not fighting. Student who is focusing on completing work is given less homework for completing work.
Privileges not related to the target behavior	Running errands for the teacher, free time, opportunities to socialize with friends
Tangible rewards, including food, tokens, materials	Raisins, crackers, school materials such as pencils or paper, tokens to exchange for toys or other items of value

Secondary Reinforcers A *secondary reinforcer* is a previously neutral behavior that is paired with a reinforcer and therefore takes on reinforcing properties of its own. Thus, if the teacher always calls a student up to the teacher's desk before rewarding the student, then being called to the teacher's desk becomes a secondary reinforcer.

Sincere praise and attention are the most frequently used secondary reinforcers. Teachers are often quite skillful at using such subtle but effective secondary reinforcers as a hand on the shoulder, a pat on the head, a smile, or a wink. Many teachers position themselves carefully in the room to be near students whose behavior they want to reinforce with their attention. Apply the Concept 2.2 provides options for letting students know you value their good work and behavior.

Recall earlier when we talked about reinforcers, we discussed that ideally teachers use the least intrusive, or intrinsic, reinforcers (e.g., teaching students to recognize their achievements). However, times often occur when special education teachers need to use more extrinsic reinforcers (e.g., toys, privileges). Sometimes teachers manage these externalizing reinforcers by initiating a token reinforcement system. A *token system* is one in which the teacher gives coupons, chips, points, or stars to students if they exhibit target behaviors. For example, the teacher may give tokens to students for listening and not disrupting

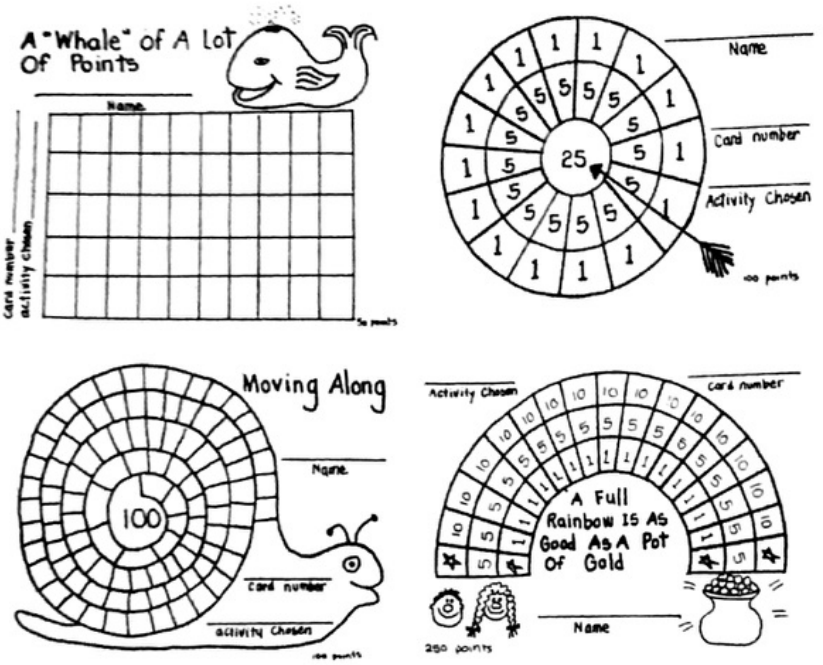
2.2 Apply the Concept

35 Ways to Say "Very Good"

1. Exactly right.
2. Keep working on it—you're getting better.
3. You outdid yourself today.
4. Great!
5. You figured that out fast!
6. Good work!
7. You really make my job fun.
8. Fantastic!
9. I knew you could do it!
10. You are doing much better today.
11. Way to go!
12. Perfect!
13. That's the way to do it!
14. You are good.
15. Congratulations!
16. You got that down pat.
17. Wow!
18. That's right!
19. That's much better.
20. Wonderful!
21. That's quite an improvement!
22. That's great!
23. One more time and you will have it.
24. Tremendous!
25. You did it that time.
26. You've got your brain in gear today.
27. Nothing can stop you now.
28. Terrific!
29. Now you have it!
30. You make it look easy.
31. Sensational!
32. Good for you!
33. You are learning fast.
34. I hope you can tell how much you are learning.
35. Share your good work with your family when you go home today.

Figure 2.1 Forms for Recording Points Earned in a Token Economy

SOURCE: P. Kaplan, J. Kohfeldt, and K. Sturla, *It's Positively Fun: Techniques for Managing the Learning Environment* (Love, 1975), pp. 15–16. Reproduced by permission of Love Publishing Company.



others, for doing homework, for completing work on time, and for working well with others. Tokens are symbols in that they usually have little inherent value but can be exchanged for valuable things or privileges. Token systems can be simple, such as receiving stars for completing writing assignments, with each star worth 3 minutes of extra recess. Figure 2.1 presents several cards that teachers can use with younger students to record points. Token economies can also be quite complicated, as in a level system with rewards and privileges that vary according to the level of behavioral control the student exhibits. Students are assigned to levels contingent on their behavior. Being raised or lowered to a different level occurs as students accumulate points. Points are awarded and deducted for a full range of behaviors. More complicated token systems are typically used to manage aggressive behaviors displayed by severely disturbed students.

Shaping If reinforcement increases the rate of behavior, what does a teacher do if a target behavior is occurring at a very low rate or not at all?

For example, Mr. Kladder's goal is to shape Rhonda's behavior so that she is performing multiplication facts quickly and automatically. During the initial teaching phase, Mr. Kladder rewards Rhonda for computing 3×5 by adding five 3s. After Rhonda demonstrates that she can perform this behavior with a high degree of accuracy, Mr. Kladder no longer reinforces her for adding the numbers but reinforces her only for skip-counting 5, 10, 15, and then writing the answer. After Rhonda is successfully able to skip-count, she is reinforced for computing the answer in her head and writing it down. Now Mr. Kladder begins to give Rhonda timed tests in which she is reinforced only for beating her best time. Mr. Kladder is *shaping* Rhonda's behavior by reinforcing responses that more and more closely approximate the target response.

The Premack Principle If one activity occurs more frequently than another, the more frequently occurring activity can be used as a reinforcer to increase the rate of the less frequently occurring activity (Premack, 1959). For example, Adam more frequently participates in outdoor play than in writing stories. His teacher can make outdoor play contingent on completing writing assignments. Using the Premack principle has several advantages for teachers, including ease of use and relying on events that are already occurring in the classroom. For example, a teacher might determine that a student with learning problems really likes reading, sort of likes math, and really does not like spelling. The teacher could then use reading as contingent on completing spelling. A more appropriate list for most students with learning and behavior problems might include 5 minutes of free time contingent on completing spelling. Reinforcing activities such as talking quietly with friends or listening to music can be used to increase the rate of less desirable activities such as completing a book report.

Group Contingencies Group contingencies can be used to increase desirable behavior or decrease undesirable behavior. When *group contingencies* are used, a group of students

is either reinforced or loses reinforcement, contingent on the behavior of the entire group or of a target student in the group. For example, a teacher could establish a 20-minute block of free time at the end of the school day. Every time the noise level in the classroom exceeds the teacher's limits, she subtracts 1 minute from the allocated free time. Group contingencies can also be used to change the behavior of a particular student in the class. For instance, Carla is a 12-year-old student with behavior problems who has been mainstreamed into a sixth-grade class. During Carla's first couple of weeks in the class, she continually got into fights with her classmates during recess. The teacher told the class that she would extend their recess by 10 minutes if Carla did not get into any fights during recess. The class included Carla in their group play, and fighting was eliminated. However, group contingencies being dependent on the behavior of an individual does have its dangers. The individual could use his or her position to manipulate the behavior of others in the class. It is also possible that the individual will view himself or herself negatively because of this position.

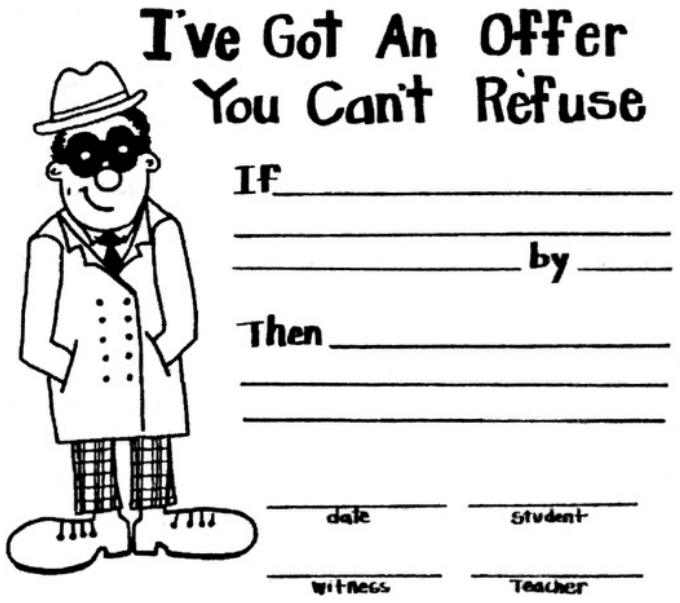
Axelrod (1998) defines group contingencies by identifying a 10-step program for their use:

1. Select only one behavior to change.
2. Carefully specify in a written format the behavior that you want to change.
3. Determine through careful observation how often and when the behavior occurs.
4. Think about what might be reinforcing to all members of the group.
5. Decide what the group contingency will be that will cause the reinforcer to be used.
6. Be sure to identify a behavior that everyone in the group can perform.
7. Provide the reinforcer contingent on a reasonable improvement in the target behavior.
8. Let each member of the group as well as the group as a whole know when they are behaving appropriately.
9. Monitor the progress of the group and each member of the group.
10. Revise the program as needed.

Contingency Contracting *Contingency contracting* is an agreement between two or more persons that specifies their behaviors and consequences. A common example of a contingency contract is the agreement between parent and child regarding an allowance. The child agrees to perform certain behaviors in return for a specified amount of money each week. The contingency contract should specify who is to do what, when, under what conditions, and for what consequences (see Figure 2.2).

Figure 2.2 Sample Contingency Contract Form

SOURCE: P. Kaplan, J. Kohfeldt, and K. Sturla, *It's Positively Fun: Techniques for Managing the Learning Environment* (Love, 1975), p. 21. Reproduced by permission of Love Publishing Company.



Decreasing Undesirable Behaviors Through Consequences

Unfortunately, some students manifest behaviors that interfere with their learning or the learning of others. Techniques for decreasing these undesirable behaviors include extinction, differential reinforcement, response cost, punishment, and time-out.

Extinction *Extinction* is the removal of reinforcement following a behavior. For example, a teacher wants to extinguish a student's shouting out answers in class. She determines that telling the student to raise his hand is reinforcing the shouting behavior. She knows this because the shouting out continues, and she recognizes that the student finds her attention (commenting on his shouting out) is reinforcing to him. To extinguish shouting out, the teacher removes the reinforcer (saying "Raise your hand" to the student) and ignores the student's shouting out. It is challenging for the teacher to ignore the inappropriate behavior, especially since the student shouts out more for several days before the shouting out declines considerably.

Extinction can be an effective means of decreasing undesirable behaviors, but it is often slow and can be impractical for many behaviors that occur within the classroom because the reinforcers for the undesirable behavior are often difficult for the teacher to control. For example, the student who continually shouted out in class was being reinforced not only by the classroom teacher's attention ("Raise your hand"), but also by other students who attended to him when he shouted out. A teacher who wants to reduce this behavior through extinction has to eliminate

both the teacher's reinforcement and the reinforcement of others in the class. To compound the difficulty, slip-ups by a teacher or students intermittently reinforces the behavior and maintains it for a long time.

Another characteristic of extinction is its effect on the rate at which the target behavior continues to occur. During extinction, the target behavior will increase in rate or intensity before decreasing. Thus, a teacher who is attempting to eliminate tantrums through extinction will observe the tantrums occurring more frequently at first, lasting longer, and perhaps even being louder and more intense than before extinction. If the teacher continues to withhold reinforcement, usually attention, the rate and intensity will decrease, and tantrums can be eliminated. For this reason, it is extremely important to chart behavior when using extinction. To document behavior change, take *baseline data*, a record of the frequency and/or duration of the behavior before implementing the intervention, and continue to record data after intervention is implemented.

Although extinction can be an effective way to decrease undesirable behaviors, it requires patience and the ability to control all of the reinforcers. Ignoring, the most frequently applied form of extinction in the classroom, is an important skill for teachers to learn. Four points to remember about using ignoring as a means of decreasing undesirable behavior are the following:

1. Ignoring can be effective when the behavior is being reinforced by teachers or students who are willing to discontinue reinforcement.
2. If a teacher attempts to eliminate a behavior through ignoring, the behavior must be ignored *every* time it occurs.
3. Ignoring will not be effective if the behavior is being maintained by other reinforcers, such as the attention of selected classmates.
4. Remember that it is important to both ignore the undesirable behavior and reinforce the desired behavior that is incompatible with the undesired one. In the example of a student "shouting out," the incompatible behavior is hand raising. The teacher would both want to ignore the "shouting out" and reinforce the student when raising his hand.

Differential Reinforcement *Differential reinforcement* involves strengthening one set of responses in contrast to another. It is an effective procedure for developing a positive behavior management plan. The main advantage of differential reinforcement is that positive consequences are used to reduce the strength of undesirable behavior. Therefore, negative side effects associated with punishment procedures are avoided. Differential reinforcement can take several forms.

Differential Reinforcement of Incompatible Behaviors and Alternative Behaviors Differential reinforcement of incompatible behaviors (DRI) involves identifying desirable behaviors. Reinforcement is then provided contingent on the occurrence of the targeted desirable behaviors. For example, while ignoring the out-of-seat behavior of a student, the teacher targets and reinforces the desirable behavior that is incompatible with it—in this case, in-seat behavior. Therefore, when Scott is sitting in his seat, the teacher is quick to catch his appropriate behavior and reinforce it. In addition, the teacher would intermittently reinforce Scott for being in his seat. In the case of DRI, the new response (incompatible behavior) is selected because it represents an incompatible alternative to the disruptive behavior; the two behaviors cannot occur simultaneously. In differential reinforcement of alternative behaviors (DRA), the alternative behavior is not necessarily incompatible with the disruptive response, and it can occur at the same time as the undesirable behavior. The goal of using DRA is to strengthen a range of appropriate behaviors that teachers will attend to naturally, thereby reinforcing a broad repertoire of appropriate behavior. Careful planning should ensure that the reinforcers selected are sufficiently attractive and delivered with sufficient frequency to motivate student performance while removing reinforcers from the undesirable behavior. Both DRI and DRA ensure that new behaviors are fostered at the same time that undesirable behaviors are being diminished.

Differential Reinforcement of Other Behaviors Differential reinforcement of other behaviors (DRO) is the reinforcement of the nonoccurrence of target behavior during a specified time period; reinforcers are delivered following time intervals when the target behavior does not occur. For example, a teacher may allow a student free time at the end of each 30-minute scheduled period when no target behavior occurred. Therefore, determining the length of the reinforcement period before using DRO is important. Brief intervals of 1 to 10 minutes may be selected for high-rate behaviors, and intervals up to a day in length may be used for low-rate behaviors. DRO may be most effective when used in combination with a DRA procedure by reinforcing occurrences of alternative behavior as well as providing reinforcement for intervals when a zero rate of the target behavior occurred. When combined with other methods, DRO can be a powerful procedure.

Regardless of the type of differential reinforcement, reinforcing behavior through consequences requires the teacher to do the following:

1. Identify the behavior that is to change (interfering behavior).
2. Identify the desirable behavior that is incompatible with the interfering behavior.
3. Stop reinforcing the interfering behavior.
4. Reinforce the desirable behavior.

Response Cost *Response cost* is a procedure in which a specified amount of a reinforcer is removed after each occurrence of the target behavior. Withdrawal of favored activities and tangible reinforcers is a common response strategy for young children. For example, a student is not allowed to play during free-choice session because of her aggression toward peers. One of the most common response-cost strategies for older students is the withdrawal of tokens following a target behavior. For example, say that students earn 20 points for completing each assignment throughout the day. Points can be exchanged for primary reinforcers at the end of the day. Engaging in a target behavior may result in a response cost of 30 points. Response cost is an aversive procedure that should be used carefully because it can inadvertently be used to punish positive behaviors. For example, teachers may be tempted to ask students to complete additional work if assignments are completed before the end of the class period, but additional work requirements may act as a response cost for early assignment completion.

Punishment *Punishment*, the opposite of reinforcement, is following a behavior with a consequence that decreases the strength of the behavior or reduces the likelihood that the behavior will continue to occur. Unfortunately, punishment does not ensure that desired behavior will occur. For example, a student who is punished for talking in class might stop talking but may not attend to his studies for the remainder of the day. Punishment is less effective in the long run than positive reinforcement, and thus punishment should be avoided if possible (Wheeler & Richey, 2014).

Many significant arguments can be made against the use of punishment:

- Punishment is ineffective in the long run.
- Punishment often causes undesirable emotional side effects, such as fear, aggression, and resentment.
- Punishment provides little information about what to do, teaching the individual only what not to do.
- The person who administers the punishment is often associated with it and also becomes aversive.
- Punishment frequently does not generalize across settings; thus it needs to be readministered.
- Fear of punishment often leads to escape behavior.

If there are so many arguments against using punishment, why is it so often chosen as a means for changing behavior? Many explanations can be offered, including lack of familiarity with the consequences of punishment and the inability to effectively use a more positive approach. Also, punishment is often reinforcing to the punisher, reducing the occurrence of the undesirable behavior, therefore reinforcing its use.

The use of punishment is not suggested, and instead teachers are encouraged to identify ways of positively reinforcing appropriate behaviors.

Time-Out *Time-out* involves removing a student from the opportunity to receive any reinforcement. For example, to impose a time-out, the teacher asks a student to sit in the hall during the remainder of a lesson, or asks a young child to leave a group, or asks a student to sit in a quiet chair until she is ready to join the group.

Unfortunately, time-out is frequently used inappropriately. The underlying principle behind the successful use of time-out is that the environment the student is leaving must be reinforcing and the time-out environment must be without reinforcement. This is not as easy to achieve as one might think. For example, when Elizabeth was talking and interfering with others during a science lesson, her teacher thought she would decrease Elizabeth's behavior by sending her to time-out, which was a workstation in the back of the room, away from the group. The teacher became discouraged when Elizabeth's inappropriate behavior during science class increased in subsequent lessons rather than decreased. A likely explanation is that Elizabeth did not enjoy science class and found sitting in the back of the room, looking at books, reinforcing. The efficacy of time-out is strongly influenced by environmental factors. If the environment the student is leaving is unrewarding, then time-out is not an effective means of changing the student's behavior. Time-outs should be used judiciously and with the following considerations: (1) find a place such as a "think chair" and introduce the student to the place at a time when the inappropriate behavior is not being practiced; (2) specify the amount of time spent in time-out, keeping it relatively brief (e.g., several minutes); (3) be sure to set the timer and ask the student to leave time-out as soon as the time is up; and (4) stay cool and welcome the student back to the group.

Teachers who use secluded time-out areas or contingent restraint (holding the student down plus withdrawal, exclusion, and seclusion) should be aware of the legal implications of such intervention and should obtain the necessary authorization from school administrators and from parents or guardians. Contingent restraint is considered a last option procedure and is typically used to decrease self-injurious behavior or aggressive behavior in individuals with autism or cognitive disabilities (Hersen et al., 2005).

A position paper on the use of behavior reduction strategies has been issued by the Council for Children with Behavior Disorders (CCBD, 2002). Recommended procedures for successfully implementing time-out are listed in Apply the Concept 2.3.

Stages of Learning

One way to apply the principles of learning is through considering the stages of learning. The *stages of learning* (see Figure 2.3) are the levels a student moves through in acquiring proficiency in learning (Bryant, Bryant, & Smith, 2015). For example, the first stage of learning, *entry*, is the level of

2.3 Apply the Concept

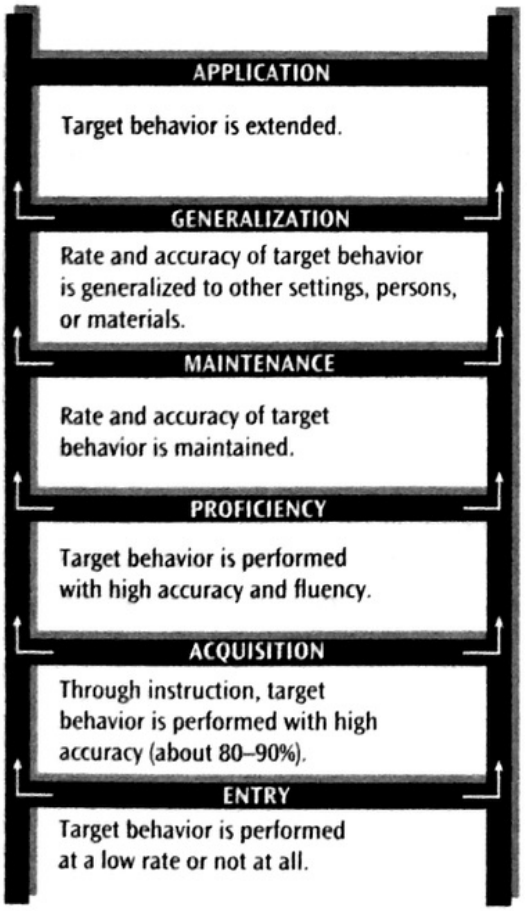
Guidelines for Implementing Time-Out

Time-out, like punishment, is recommended as a *last* resort. Teachers are advised to discuss this intervention with school administrators and parents before implementing it, and should follow these steps:

1. Students should be told in advance which behaviors will result in time-out.
2. The amount of time students will be in time-out should be specified ahead of time.
3. The amount of time students are provided time-out should be brief (1 to 5 minutes).
4. Students should be told once to go to time-out. If a student does not comply, the teacher should unemotionally place the student in time-out.
5. Time-out must occur every time the target undesirable behavior occurs.
6. Contingencies should be set in advance for students who fail to comply with time-out rules.
7. The time-out area requires ongoing monitoring by an adult.
8. When time-out is over, the student is welcomed back to the group.
9. Look for opportunities to reinforce positive behaviors that occur after time-out.

Figure 2.3 Stages of Learning

SOURCE: Based on Rivera, D. P., and Smith, D. D. (1997). *Teaching Students with Learning and Behavior Problems*, 3rd ed. Boston, MA: Allyn & Bacon.



performance the student is currently exhibiting. These are the learning behaviors the student currently demonstrates, such as reading words correctly at 40 words per minute. During the second stage, *acquisition*, the components of the target behavior are sequenced into teachable elements. Each teachable element is taught to mastery through a high rate of reinforcement, shaping, and consistent use of cues. For example, the teacher conducts a task analysis of the behaviors the student needs to acquire proficiency, such as reading 100 sight words automatically and without error. To break this into parts, the teacher may organize word lists into 10 sight words in a list with activities to practice these sight words until the student is proficient. When the behavior is occurring at a high level of accuracy, the focus of the learning is on *proficiency*. During this stage, the teacher's goal is to increase the student's accuracy and fluency in performing the behavior. For example, the student now can read all 100 words and the teacher may give the student 90 seconds to read the word list correctly, keeping track of time and accuracy with a goal to reducing time and increasing accuracy over a 3-week period. At the next stage, *maintenance*, the goal is for the behavior to be maintained at the target level of accuracy and proficiency with intermittent reinforcement and a reduction in teacher assistance and cues. The next stage is *generalization*, in which the target behavior transfers across settings, persons, and materials. Generalization may be a separate skill that needs to be taught. Apply the Concept 2.4 provides further information on how to teach for generalization. At the final stage, *application*, the learner is required to extend and use the learning in new situations. Application is a difficult skill for special learners, and the teacher's role is to demonstrate and provide a range of opportunities for applying the newly acquired skill.

Hall and Hall (1998) provide helpful suggestions about how to handle the potential problems that occur with time-out. Several of their suggestions follow:

- Add time to a student's time-out for refusing to go to time-out or displaying other inappropriate behaviors such as screaming, yelling, and kicking.
- Students should be required to clean up any mess made during time-out before they return from time-out.

2.4 Apply the Concept

Teaching to Generalize

Assuming that most students will need to "generalize" the strategies learned to other settings, what can teachers do to ensure generalization occurs?

1. Increase students' knowledge of when to use the practices they have learned and how to "reinforce" themselves for using them in other settings. For example, ask students to keep a log of when they practice independently, and provide reinforcement.
2. Teach students how to develop and apply their own reinforcers for using strategies appropriately. For example, "I remembered to use my cue cards. I now remember better what I read and am more likely to get a good grade."
3. Provide opportunities for students to practice the instructional practices within the materials needed to generalize their use. For example, students who have learned to complete math problems with support in the resource room are asked to apply the same problem-solving practices to math problems in the general education classroom.
4. Observe students in other settings where use of the strategies would be valuable. Provide cues for use, and reinforce appropriate practices.
5. Systematically support students as they generalize and extend practices to other settings. For example, if students have learned a behavioral practice of "returning to their turtle shell" as a way to stop and think about how they feel before they act, guide students to applying this practice not just in the classroom but also during free time or in the lunch room.

- Be sure to have a backup consequence if a student refuses to go to time-out and the amount of time added reaches 30 minutes (usually considered the maximum amount).
- Do not argue with individuals when they either try to talk you out of time-out or indicate that you have no right to put them in time-out. Ignore their comments.
- If the inappropriate behavior involves two students and it is not possible to determine the source of the problem, do not argue; put both students in time-out.
- Be sure to chart the effects of time-out so that you can determine whether it is working. If negative consequences result from time-out, including poor attitude and response, develop another approach to resolving the behavior problem.

Cognitive Strategy Instruction

How is cognitive strategy instruction (CSI) used to teach academic, cognitive, or social skills? CSI integrates ideas from behavioral, social, and cognitive learning theories and assumes that cognitive behavior (thinking processes), like observable behaviors, can be changed. This model of instruction is based on the earlier work from social learning theory (Bandura, 1977, 1986) and cognitive behavior approaches (Meichenbaum, 1977; see **www.NACBT.org**). CSI incorporates principles of behavioral learning but adds principles from social learning theory and cognitive theory that are important to consider when the goal of instruction is to change the way the student thinks. In numerous research studies, CSI has been shown to be particularly effective with students who have learning problems—especially in mathematics (Donker, De Boer, Kostons, van Ewijk, & Van der Werf, 2014; Swanson, 1999a, 1999b).

Let's look at how Ms. Neal helps Marlow and his classmates better understand the science concepts and textbook she is using in her seventh-grade resource science class. Even though Marlow, a student with behavior disorders, can identify most of the words in the text, he remembers only a few details from what he reads. Ms. Neal wants to teach Marlow and his classmates how to understand and remember the major points of a reading. She decides that if she wants to teach the students this cognitive behavior, she will have to give them a consistent set of steps to use in completing the process, in much the same way that we use a consistent set of steps to tie shoes. She also knows that for the students to learn what to do, they need to observe someone else. But how can she do this?

First, she selects the steps she wants to teach Marlow and the other students to use when they read their science text. Next, she and the students discuss the strategies the students currently use and their effectiveness. They also discuss the importance of improving their skills and the payoff for improvement. Ms. Neal then tells the students about the steps she uses when she reads. To model these steps, she reads and explains what she is thinking (i.e., cognitive modeling). Then she talks them through the steps as the students try them. Finally, Ms. Neal gives the students lots of opportunities to practice the steps when reading their textbooks, encouraging them at first to say the steps aloud as they work through them. She provides feedback on how they are doing, and she teaches them how to evaluate their own performance.

Using these systematic techniques, Ms. Neal finds that in several weeks Marlow and his classmates are improving

in their ability to remember the important information from their science text. In addition, they are beginning not to rely so much on the strategy she taught them. It is almost as if they are using it automatically, without having to consciously remember to use it. Ms. Neal believes that she has taught her students a good strategy for thinking about what they are reading and that she has changed their cognitive behavior (thinking processes). To promote generalization, Ms. Neal discusses with Marlow and his classmates other opportunities they have for using the strategy. The students begin keeping a list, on the board, of occasions when the strategy can be used. They also begin using the strategy on these different occasions (e.g., reading the newspaper during current events, reading other textbooks, editing each others' stories and essays) and discussing how useful the strategy was in helping them.

Common Features of Cognitive Strategy Instruction

CSI has been used to develop a range of academic and social skills. Common features of CSI include strategy steps, modeling, self-regulation, verbalization, and reflective thinking.

Strategy Steps A series of steps are usually identified for the student to work through when solving a problem or completing a task. These steps are based on an analysis of the cognitive and observable behaviors needed to complete the task. Before Ms. Neal began teaching, she determined the steps in the reading strategy she wanted to teach Marlow and his classmates.

Modeling In CSI, modeling is used as a primary means of instruction. Modeling can be a very effective teaching technique. With CSI, students are asked not only to watch observable behaviors as the instructor performs a task, but also to listen to the teacher's self-talk. In this way, the teacher models both observable behaviors and the unobservable thinking processes associated with those behaviors. Being able to model thinking processes is an important component for teaching such cognitive skills as verbal math problem solving, finding the main idea in a paragraph, editing written work, and solving social problems. In most instances, the person who does the modeling is the teacher or a peer, but video and puppets have also been used.

MyLab Education
Video Example 2.4
The teacher in this video models the think-aloud procedure in her fourth-grade class during a reading lesson. She explains the importance of the modeling strategy for teaching and demonstrating cognitive thinking skills.

Self-Regulation Self-regulation refers to learners monitoring their thinking and actions through language mediation. Students first use language to mediate their actions by overtly engaging in self-instruction and self-monitoring. Later, this language mediation becomes covert.

Using self-regulation, students act as their own teachers. Students are expected to take active roles in the learning process and to be responsible for their own learning. Although they work under the guidance of a teacher, students are expected to monitor their learning, change or modify strategies when difficulties arise, evaluate their performance, and in some cases provide self-reinforcement.

Self-regulation implies that students develop organizing, planning, evaluating, and goal-setting behaviors that help them regulate their academic learning and/or their behavior. For example, related to academic tasks such as math and reading, students effectively organize their learning tasks and goals, set timelines for accomplishing their goals, establish procedures for evaluating their progress, and have mechanisms for applying strategies to help them learn and meet their goals. Similarly, related to behavior, students who use self-regulation are aware of the behaviors that they are monitoring (e.g., shouting out in class) and identify practices for ensuring that they can meet these goals (e.g., holding up a red card so the teacher knows that they have something very important to say) and practices for monitoring their success. Students may monitor their own behavior and establish either independently or with support from the teacher mechanisms for reinforcing themselves as they achieve goals.

Peer monitoring and support can be extremely useful in increasing appropriate behavior. For example, peers can be taught to help students monitor their behavior and record it (D. H. Anderson, Fisher, Marchant, Young, & Smith, 2006). Peers can be exceedingly helpful in group support and as reinforcers to maintain appropriate behaviors.

In reviewing self-regulation outcome research conducted with students who have behavior disorders, numerous studies indicate that self-regulation procedures can be extremely effective in enhancing both the academic and social behavior of students (J. R. Nelson, Smith, Young, & Dodd, 1991; Oxford, 2016; Vohs & Baumeister, 2016).

Verbalization Verbalization is typically a component of self-instruction and self-monitoring in which overt verbalization or self-talk, that is, talking aloud about the practices to help guide their use, is faded to covert verbalization, that is, saying the practices in one's own head or using them without requiring verbalization. Many CSI programs rely on a talk-aloud or think-aloud technique (e.g., Cromley & Willis, 2016; Rosenzweig et al., 2011; Swanson, 1999b). After listening to the teacher think aloud as he performs the targeted processes and task, students are encouraged to talk aloud as they initially learn

the strategy. For example, Ramon might say the following as he completes a two-digit subtraction problem without regrouping: "Start at the ones place, and take the bottom number away from the top. Write the answer in the ones place. Now go to the tens place. Do the same thing." Usually, these overt verbalizations occur only during the initial stages of learning. As the strategy becomes more automatic, students are encouraged to think to themselves instead of thinking aloud.

In addition to verbalization about the learning processes, students are also encouraged to make self-statements about their performance—for example, "That part is done. Now go to the next part" or "I'm getting much faster at this" or "I need to think about all my choices before I decide."

Learning to think aloud as a mechanism to support students' understanding of how to think about their learning and behavior is a difficult task. Try the following practices to facilitate thinking aloud with your students:

1. Model self-talk and self-statements as you perform the tasks.
2. Start with tasks in which the students are somewhat proficient. Later, as students become comfortable with self-talk, you can switch to tasks in which you want them to acquire more proficiency.
3. Develop and use cue cards to help students remember the steps they are to talk through.
4. Facilitate students' transition to "thinking in their head" and then to automatic use of the practices.

As an example of the third method, see Figure 2.4 for the cue cards that teachers can use to guide students through reading comprehension practices. The cue cards can be reminders of what to think about when students are reading complex texts.

Reflective Thinking Reflective thinking requires students to take the time to think about what they are doing. Teaching students who have learning and behavior problems to stop and think is an important skill to include in instruction. Many students with learning and behavior problems act without considering the consequences and demonstrate limited and ineffective strategies for approaching academic tasks and social situations. They approach these tasks and situations in a disorganized, haphazard way, often without thinking about the consequence of their actions. In using cognitive strategy instruction, teachers assist students in using reflective thinking.

The specificity of the questions and cues can be important for success. For example, teachers can cue students about behavior before going to lunch (e.g., What are the three things we do at lunch?) or cue them about writing (e.g., remember to reread what you wrote, and circle the words that you need help spelling).

Figure 2.4 Cue Cards Used for Teaching Reading Comprehension

Card #1.

Sometimes kids disagree and no one knows about it. They keep it between themselves. However, that was certainly not the case with Melodee and Monika. Everybody knew that they could not be in the same place at the same time and not wrangle with each other. Even their parents knew about what they were like when they were together. It wasn't just competitions either. It was a deeper problem.

Stop at the end of each paragraph. Ask yourself, "What's happening?" If you need to reread to refine your answer, do so.

Card #2.

Sometimes kids disagree and no one knows about it. They keep it between themselves. However, that was certainly not the case with Melodee and Monika. Everybody knew that they could not be in the same place at the same time and not wrangle with each other. Even their parents knew about what they were like when they were together. It wasn't just competitions either. It was a deeper problem.

Write or underline words that you do not know. Reread sentences around the word to see if you can figure it out.

Card #3.

Sometimes kids disagree and no one knows about it. They keep it between themselves. However, that was certainly not the case with Melodee and Monika. Everybody knew that they could not be in the same place at the same time and not wrangle with each other. Even their parents knew about what they were like when they were together. It wasn't just competitions either. It was a deeper problem.

Stop at the end of the reading and ask yourself, "What are the big ideas of what I've read?"

2.5 Apply the Concept

Guidelines for Assessing Strategy Effectiveness

1. Does the student use the strategy independently?
2. Does the student perceive that the strategy helps him or her succeed?
3. Has the student modified the strategy for his or her own use?
4. Does the student use the strategy in other settings?
5. How likely is the student to continue using the strategy?

Teaching Implications of Cognitive Strategy Instruction

CSI is designed to actively involve students in learning. General guidelines to consider for actively engaging students in learning include the following:

- Analyze the target behavior you want to see students using, and be sure that you model or describe it carefully to students.
- Determine what strategies students are already using, and encourage them to continue or describe how to apply them to the expected task.
- Select strategy steps that are as similar as possible to the strategy steps that good problem solvers use. Make them simple and easy to remember.
- Work with students to develop strategy steps that they can and will use.
- Teach prerequisite skills.
- Teach strategy steps, using modeling, self-instruction, and self-regulation.
- Give explicit feedback.
- Teach strategy generalization.
- Help students maintain the strategy.

Guidelines for monitoring the effects of instruction (see Apply the Concept 2.5) reflect an increasing observation that students with learning and behavior problems benefit from applying practices that assist them in focusing their attention and thinking on the task. In particular, success has been documented in applying self-regulation practices in three areas: improving social behavior, reading comprehension, and writing. For example, in writing, students who think aloud as they write and set goals for how they will improve their writing make better progress in writing (Mason, Reid, & Hagaman, 2012). As discussed in Apply the Concept 2.6, researchers at the Center for Research on Learning at the University of Kansas have developed a learning strategy curriculum as well as a number of task-specific strategies (e.g., finding the main idea, decoding unknown words, test taking, listening, and taking notes) that employ CSI.

2.6 Apply the Concept

Application of Cognitive Strategy Instruction: The Learning Strategies Curriculum

Can the principles of CSI be applied to academic tasks in such a way that adolescents with learning disabilities can succeed in performing the skills required for secondary school settings? The Strategies Intervention Model (Bulgren, Deshler, & Lenz, 2007; Deshler, Ellis, & Lenz, 1996) is a comprehensive example of a series of research-based instructional practices based on CSI.

The goal of the Strategies Intervention Model is "to teach learning disabled adolescents strategies that will facilitate their acquisition, organization, storage, and retrieval of information, thus allowing them to cope with the demands of social interaction" (Alley & Deshler, 1979, p. 8). Learning strategies are techniques, principles, or routines that enable students to learn to solve problems and complete tasks independently. Strategies include how a person thinks and acts when planning, executing, and evaluating performance on a task and its outcomes. Broadly, a learning strategy (1) includes a general approach to solving a set of problems, (2) promotes goal-directed behavior, (3) teaches selection of appropriate procedures, (4) guides implementation of a procedure, (5) shows how to monitor progress, (6) can be controlled, and (7) provides and focuses on cues to take action. Learning strategies instruction focuses on how to learn and how to use what has been learned.

The Learning Strategies Curriculum (Lenz, 2006) contains three strands of academic, task-specific strategies. The Acquisition Strand enables students to gain information from written materials and includes such strategies as the Word Identification Strategy (Lenz, Schumaker, Deshler, & Beals, 1993) and the Paraphrasing Strategy (Schumaker, Denton, & Deshler, 1993). The Storage Strand consists of strategies to assist students in organizing, storing, and retrieving information. The First-Letter Mnemonic Strategy (Nagel, Schumaker, & Deshler, 1994) is an example of a

Storage Strategy. The Expression and Demonstration of Competence Strand contains strategies that enable students to complete assignments, express themselves, and take tests. The Test Taking Strategy (Hughes, Schumaker, Deshler, & Mercer, 1993), the Paragraph Writing Strategy (Lyerla, Schumaker, & Deshler, 1994), and the Error Monitoring Strategy (Schumaker, Nolan, & Deshler, 1994) are examples of strategies that assist students in taking tests, writing cohesive paragraphs, and editing written work.

Each strategy uses a teaching model that incorporates principles of cognitive behavior modification. The stages in the model are the following:

Acquisition

Stage 1 Pretest and Make Commitments

- Obtain measure(s) of current functioning.
- Make students aware of inefficient/ineffective habits.
- Obtain students' commitments to learn.

Stage 2 Describe the Strategy

- Ensure that students have rationales for strategy use.
- Ensure that students know characteristics of situations for when and where to use the strategy.
- Describe results that can be expected.
- Supervise goal setting.
- Describe and explain the strategy steps.
- Present the remembering system.

Stage 3 Model the Strategy

- Demonstrate the entire strategy, thinking aloud.
- Involve the students in a demonstration.

Stage 4 Elaboration and Verbal Rehearsal

- Assist students to verbally rehearse the strategy steps and what each step means.
- Require students to memorize the strategy.

Stage 5 Controlled Practice and Feedback

- Supervise practice in easy materials.
- Provide positive and corrective feedback.
- Move from guided practice to independent practice.
- Require mastery.

Stage 6 Advanced Practice and Feedback

- Supervise practice in materials from regular coursework.
- Provide positive and corrective feedback.
- Fade prompts and cues for strategy use and evaluation.
- Move from guided practice to independent practice.
- Require mastery.

Stage 7 Confirm Acquisition, and Make Generalization Commitments

- Obtain measure(s) of progress.
- Make students aware of progress.
- Obtain the students' commitment to generalize.

Phase I: Orientation

- Discuss situations, settings, and materials in which the strategy can be used.
- Evaluate appropriateness of the strategy in various settings and materials.
- Identify helpful aspects of the strategy and adjustments.
- Make students aware of cues for using the strategy.

Phase II: Activation

- Program the students' use of the strategy in a variety of situations.
- Provide feedback.
- Reinforce progress and success.

Phase III: Adaptation

- Identify cognitive processes.
- Discuss how the strategy can be modified to meet differing demands.
- Assist students in applying the modifications.

Phase IV: Maintenance

- Set goals related to long-term use.
- Conduct periodic reviews.
- Identify self-reinforcers and self-rewards.
- Provide feedback.

Social Learning and Interactive Dialogue

Learning is a social event in which language plays an important role. Applying this concept, teachers and students discuss what they are learning, reading, and thinking. These discussions are purposeful and occur between students in small groups, between teacher and students in small and large groups, and between peers. Such interactive dialogue or instructional conversations between teachers and learners provide language models and tools for guiding one's inner talk about learning and extend thinking about reading, writing, and content learning (Markee, 2015; Moll, 2010). Initially, a

See Chapter 8 for more on processes students can use to check their understanding.

more expert person may model the self-talk and vocabulary related to the cognitive processes. However, this gives way to a collaborative or interactive dialogue in which the learner assumes increasing responsibility. This type of teaching allows for the instruction of cognitive and metacognitive strategies within purposeful, meaningful discussions and provides a means for selecting, organizing, and relating the content matter being discussed. For example, in reciprocal teaching (Burns, Maki, Karich, & Coolong-Chaffin, 2017; Oczkus, 2010; Palincsar & Brown, 1984), a technique designed to foster comprehension and comprehension monitoring, the teacher and students take turns leading dialogues that focus on their knowledge of the information they are studying and on the processes they are using for understanding and for checking their understanding.

A synthesis of the most productive conversations (Soter et al., 2008) reveals that both teacher- and student-led discussions benefit when

- Students productively use the "talk-time" for extended periods.
- Teachers prompt students to discuss texts by asking open-ended questions (i.e., questions that do not have a *yes* or *no* answer) that are related closely to the text and are engaging.
- Teachers ask authentic questions that are linked to the text, resulting in greater elaboration of talk by students, which results in higher-level thinking about the text.
- Teachers promote discussions that highlight a more analytic approach rather than provide extensive opportunities for students to express themselves in less analytic ways.
- Teachers provide students with opportunities to discuss with each other what they are reading and learning.
- Teachers provide students with the expectation that they will ask questions of the class as well as give answers.

Scaffolded Instruction

As the expert, the teacher has the role of providing temporary and adjustable support as students develop new skills, strategies, and knowledge. Ideally, the teacher provides only those necessary instructional supports that permit the student to both take advantage of what they already know and acquire additional learning to facilitate their mastery. The instruction is referred to as *scaffolded instruction* (Archer & Hughes, 2011; Riccomini, Morano, & Hughes, 2017).

The concepts of scaffolding and zones of proximal development were explained in Chapter 1.

MyLab Education

Video Example 2.5

The middle school teacher in this video discusses ways to scaffold learning for students at various learning levels. What strategies does he suggest?

Actively engaging students in the process of solving problems rather than as passive members of the instructional classroom is associated with improved outcomes (Doabler et al., 2017; Gallimore et al., 2009). For example, in a 5-year study conducted by Gallimore and colleagues, teachers who used an inquiry-focused protocol (students were actively engaged in solving problems related to literacy and numeracy) had several key outcomes, including improved student performance and greater perceptions of accountability on the part of the teachers. These outcomes were more likely to occur when teachers worked in teams with shared interests in outcomes.

What are some key practices for scaffolding instruction? Though scaffolding instruction varies by age and content, some of the following practices are useful (Fiullo & Dimino, 2017; van De Pol, Volman, & Beishuizen, 2010).

- Initially provide more teacher support and then fade support as a student's proficiency increases.
- Increase transfer of independent learning.
- Use diagnostic strategies to inform instruction.
- Provide adequate explaining, modeling, and feedback.
- Use questions to guide instruction and feedback.
- Use teacher think-alouds to demonstrate how you solve the problem or understand the concept.

The University of Kansas Center for Research on Learning requires that persons planning to implement the Learning Strategies Curriculum obtain training. Also, the **Iris Modules** provide an in-depth description of learning strategies. This teaching model relies heavily on modeling, self-instruction, and self-regulation. It encourages students to assume an active and collaborative role in learning.

This model has many instructional implications, but the following four are particularly important:

1. Instruction is designed to facilitate scaffolding and cooperative knowledge sharing among students and teachers within a context of mutual respect and critical acceptance of others' knowledge and experiences.
2. Learning and teaching should be meaningful, socially embedded activities.

3. Instruction should provide opportunities for mediated learning, with the teacher or expert guiding instruction within the students' zones of proximal development.
4. Students' experiences, backgrounds, and knowledge can provide the basis on which learning is built.

Executive Functioning, or Metacognition

The specific processes in the information-processing system (i.e., attention, perception, working memory, and long-term memory) are controlled or coordinated by what has been referred to as *executive functioning* (see Figure 2.5). For example, as learners, we must decide which stimuli to attend to (e.g., the book we are reading and/or the smell of the apple pie baking), whether to rely more on feature analysis or context and prior knowledge when perceiving information, what memory strategies are most effective for keeping the information active in working memory, and what is an effective and efficient way to store the information so we can retrieve it later. Actively considering and controlling the way we think about our learning and the attention and practices we use when learning allow us to control the learning process.

This executive functioning has also been referred to as *metacognition* (Beran, 2012; Flavell, 1976). Metacognition is generally expressed as how we think about our thinking, our understanding. Metacognition has two components:

1. An awareness of what skills, strategies, and resources are needed to perform a cognitive task.
2. The ability to use self-regulatory strategies to monitor the thinking processes and to undertake fix-up strategies when processing is not going smoothly.

In many ways, metacognition is similar to the concepts of self-evaluation and self-regulation that we presented in the previous section on CSI. Metacognition requires learners to monitor the effectiveness of their learning and, on the basis of feedback, regulate learning by activating task-appropriate strategies. Read the short essay in Apply the Concept 2.7, and see how you use your metacognition.

Students with learning and behavior problems often demonstrate difficulties with metacognition. For example, the essay that you read in Apply the Concept 2.7 was also read by groups of seventh graders, some of whom had reading disabilities and others who were average achievers. They were asked to read the essay and decide whether it made sense. Although most of the average-achieving students recognized the inconsistency, most of the students with learning disabilities reported that the essay had nothing wrong with it (Bos & Filip, 1984). Teaching students to monitor their reading comprehension and to ask themselves questions while they read to ensure understanding is an important part of engaging executive processing.

When students use their metacognition while learning, they are aware of when things make sense (e.g., I understand how mitosis works when cells divide), in contrast to not using their metacognition and passively listening but not wondering about what they understand or don't understand. Students who are not actively using their metacognition do not know what they don't understand. For this reason, these students often do not have questions when the teacher asks, "Does this make sense? Is there anything I can clarify?" Asking good questions suggests that learners are actively engaged in the learning process and are monitoring what they don't understand. Thus, good teaching often requires not just asking what questions the learner has but also asking students to tell what they know about the key construct or idea. Based on what they tell, teachers can ask or follow up with critical knowledge that may not have been stated.

2.7 Apply the Concept

Comprehension Monitoring

Read the following short essay:

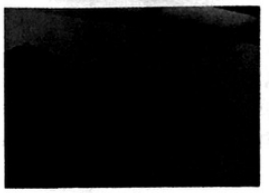
> There are some things that almost all ants have in common. For example, they are all very strong and can carry objects many times their own weight. Sometimes they go very, very far from their nest to find food. They go so far away that they cannot remember how to go home. So, to help them find their way home, ants have a special way of leaving an invisible trail. Everywhere they go, they put out an invisible chemical from their bodies. This chemical has a special odor. Another thing about ants is they do not have noses to smell with. Ants never get lost. (Bos & Filip, 1984, p. 230)

As you read the first part of this essay, you probably read along smoothly and quickly, comprehending the information and confirming that in fact what you were reading made sense. However, when you read the last couple of lines of the essay, you probably slowed your reading rate, possibly went back and reread, and/or stopped and thought about what you were reading. If these are the types of cognitive strategies in which you engaged, then you were using your executive functioning, or metacognition, to monitor your information-processing system.

MyLab Education Self-Check 2.1
MyLab Education Self-Check 2.2
MyLab Education Self-Check 2.3
MyLab Education Application Exercise 2.1: Reinforcement

MyLab Education Application Exercise 2.2: Scaffolding Learning

MyLab Education Application Exercise 2.3: Activating Prior Knowledge



Summary

- Applied behavior analysis (ABA) is based on the understanding that behaviors are learned. In this way, individuals can either unlearn undesirable behaviors or be taught new behaviors. The first step in helping students learn and use appropriate behaviors is to manipulate antecedents, or to attend to the events or stimuli that precede certain behaviors. When undesirable behaviors do occur, using consequences can help students to unlearn or replace selected behaviors.
- Cognitive strategy instruction (CSI) is a systematic approach to teaching students to use "their thinking" about their learning to organize and monitor acquisition of learning or skill development using active involvement of students in the learning process. Examples of strategies or skills that are taught in CSI include finding the main idea, decoding unknown words, taking notes, or using a sequence for writing a narrative or a strategy for approaching mathematical problem solving. In brief, the teacher selects a target strategy, works with the student to develop the strategy steps, and gives feedback. Social learning practices are based on the notion that learning occurs through interactions between the student and the teacher and the student and other students. Therefore, an emphasis is placed on language as a teaching tool and the instructional conversations that occur between teachers and students (as well as between students). This method also focuses on students' resources or background knowledge, language, and culture.
- Social learning and executive functioning recognize that learning is related to such processes as memory and cognition; thus, how we understand, recall, and organize information is relevant to our retention and understanding. Examples of instructional features that incorporate these theories are activating prior knowledge; relating new learning to existing schemas; and teaching and monitoring the use of metacognitive strategies to organize task completion and to check for understanding.

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