Instinctive drift is the tendency to return to an evolutionarily selected behavior.

Aside from preparedness, genetic influences probably play a role in the acquisition of certain phobias. Individuals with a dog phobia don't differ from those without a dog phobia in their number of negative experiences with dogs, such as bites (DiNardo et al., 1988). Moreover, only about half of people with a dog phobia have ever had a scary encounter with a dog; the same holds for people with many other phobias. These results make it unlikely that classical conditioning alone can explain all cases of phobia. Instead, some people may be predisposed genetically to develop phobias *given* a history of certain classical conditioning experiences (Czajkowoski et al., 2011; Kendler et al., 1992).

Instinctive Drift

Animal trainers Marian and Keller Breland taught pigeons, chickens, raccoons, pigs, and a host of other creatures to perform a variety of tricks—much like those we might see on David Letterman's Stupid Pet Tricks segment—for circuses and television advertisers. As students of B. F. Skinner at Harvard, they relied on traditional methods of operant conditioning to shape their animals' behavior.

In the process of their animal training adventures, the Brelands discovered that their little charges didn't always behave as anticipated. In one case they tried to train raccoons to drop tokens into a piggy bank. Although they successfully trained the raccoons to pick up the coins using food reinforcement, they soon ran headfirst into a surprising problem. Despite repeated reinforcement for dropping the coins into the piggy bank, the raccoons began rubbing the coins together, dropping them, and rubbing them together again instead.

The raccoons had reverted to an innate behavior, namely, rinsing. They were treating the tokens like pieces of food, like the small hard shells they extract from the beds of ponds and streams (Timberlake, 2006). Breland and Breland (1961) referred to this phenomenon as **instinctive drift:** the tendency for animals to return to innate behaviors following repeated reinforcement. Researchers have observed instinctive drift in other animals, including rats (LeFrancois, 2011; Powell & Curley, 1984). Psychologists don't fully understand the reasons for such drift. Nevertheless, instinctive drift suggests that we can't fully understand learning without taking into account innate biological influences, because these influences place limits on what kinds of behaviors we can train through reinforcement.

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Assess Your Knowledge — FACT or FICTION?

1. Many conditioned taste aversions are acquired in only a single trial. **True / False**
2. Most research suggests that the assumption of equipotentiality is false. **True / False**
3. The phenomenon of preparedness helps explain why virtually all major phobias are equally common in the general population. **True / False**
4. With progressively more reinforcement, animals typically drift further and further away from their instinctive patterns of behavior. **True / False**

Answers: **1.** T (p. 233); **2.** T (p. 234); **3.** F (p. 235); **4.** F (p. 236)

Learning Fads: Do They Work?

6.12 Evaluate popular techniques marketed to enhance learning.

If you've made it all the way to this point in the chapter (congratulations!), you know that learning new information is hard work. Perhaps because learning new things requires so much time and effort on our part, many mental health professionals have marketed a motley assortment of techniques that supposedly help us to learn more quickly, or more easily, than we currently do. Do these newfangled methods work? We'll find out by examining four popular techniques.

instinctive drift
tendency for animals to return to innate behaviors following repeated reinforcement

Sleep-Assisted Learning

Imagine that you could master all of the information in this book while getting a few nights of sound sleep. You could pay someone to audio-record the entire book, play the recording over the span of several weeknights, and you'd be all done. You could say goodbye to those late nights in the library or dorm room reading about psychology.

As in many areas of psychology, hope springs eternal. Many proponents of *sleep-assisted learning*—learning new material while asleep—have made some extraordinary claims regarding this technique's potential. For example, on Amazon.com, we can download various audio clips that can purportedly help us to learn languages, stop procrastinating, lose weight, or boost our self-confidence, all while we're comfortably catching up on our *zzzzs*.

These assertions are certainly quite remarkable. Does the scientific evidence for sleep-assisted learning stack up to its proponents' impressive claims?

EXTRAORDINARY CLAIMS
Is the evidence as strong as the claim?

As is so often the case in life, things that sound too good to be true often are. Admittedly, the early findings on sleep-assisted learning were encouraging. One group of investigators exposed sailors to Morse code (a shorthand form of communication that radio operators sometimes use) while asleep. These sailors mastered Morse code 3 weeks faster than did other sailors (Simon & Emmons, 1955). Other studies from the former Soviet Union seemingly provided support for the claim that people could learn new material, such as tape-recorded words or sentences, while asleep (Aarons, 1976).

Nevertheless, these early positive reports neglected to rule out a crucial alternative explanation: The recordings may have awakened the subjects. The problem is that almost all of the studies showing positive effects didn't monitor subjects' electroencephalograms (EEGs; see Chapter 3) to ensure they were asleep while listening to the tapes (Druckman & Bjork, 1994; Druckman & Swets, 1988; Lilienfeld et al., 2010). Better-controlled studies that monitored subjects' EEGs to make sure they were asleep offered little evidence for sleep-assisted learning. So to the extent that sleep-learning recordings "work," it's probably because subjects hear snatches of them while drifting in and out of sleep. As for that quick fix for reducing stress, we'd recommend skipping the audio recordings and just getting a good night's rest.

RULING OUT RIVAL HYPOTHESES
Have important alternative explanations for the findings been excluded?

Answers are located at the end of the text.

SLEEP-ASSISTED LEARNING

evaluating **CLAIMS**

When you think of learning, what's the first thing that pops into your head—textbooks, classrooms, or late-night study sessions? For proponents of sleep-assisted learning, it might be a cozy bed. Numerous websites and books claim that you can master a foreign language, become a better public speaker, and even improve your marriage while you're sound asleep. Let's evaluate some of these claims, which are modeled after actual ads for sleep-assisted learning products.

"Join the *thousands of people* who have increased their learning."

Does the fact that thousands of people believe in a claim make it true? What logical fallacy does this ad commit (see Chapter 1)?

"Sleep learning is a more efficient way to learn because *the information flows directly to our subconscious mind.* (While your conscious mind relaxes!)"

What's the problem with this extraordinary claim?

"Risk-free, 100% money-back *guarantee*."

We should be skeptical of guarantees, as virtually no psychological technique is foolproof.

"Designed using *proven research* conducted all over the world …"

What questions should you ask about how this research was conducted? Can we assume that "proven" means the research has been replicated?

"Use your brain's full potential. The average mind uses only *5% of its* capacity."

Is there scientific support for the claim that we use only a small portion of our brain (see Chapter 3)?

At the same time, there may be a tiny core of truth in claims regarding sleep-assisted learning. Recent evidence demonstrates that while asleep, participants can acquire classically conditioned responses to smells. When investigators repeatedly paired tones with specific odors—which elicited sniffing—while participants slept, participants later sniffed to the tones alone when awake (Arzu et al., 2012). Still, this is a far cry from the claims made by proponents of sleep-assisted learning: The fact that we can learn classically conditioned associations while asleep doesn't mean that we can learn new facts—let alone new languages—while asleep.

Accelerated Learning

Still other companies promise consumers ultrafast techniques for learning. These methods, known as Superlearning or Suggestive Accelerative Learning and Teaching Techniques (SALTT), supposedly allow people to pick up new information at anywhere from 25 to several hundred times their normal learning speeds (Wenger, 1983). SALTT relies on a mixture of several techniques, such as generating expectations for enhanced learning (telling students they'll learn more quickly), getting students to visualize information they're learning, playing classical music during learning, and breathing in a regular rhythm while learning (Lozanov, 1978). When combined, these techniques supposedly allow learners to gain access to intuitive aspects of their minds that otherwise remain inaccessible.

EXTRAORDINARY CLAIMS ▶
Is the evidence as strong as the claim?

RULING OUT RIVAL HYPOTHESES ▶
Have important alternative explanations for the findings been excluded?

Again, however, the evidence for the effectiveness of SALTT and similar methods doesn't come close to matching the extraordinary claims (Della Sala, 2006). Almost all studies show that SALTT doesn't produce enhanced learning (Dipamo & Job, 1990; Druckman & Swets, 1988). Even when researchers have reported positive results for SALTT, these findings have been open to rival explanations. That's because many of the studies conducted on SALTT compared this method with a control condition in which students did little or nothing. As a result, the few positive results reported for SALTT could be attributable to placebo effects (see Chapter 2), especially because one of the major components of SALTT is raising learners' expectations (Druckman & Swets, 1988).

Discovery Learning

RULING OUT RIVAL HYPOTHESES ▶
Have important alternative explanations for the findings been excluded?

As we've discovered throughout this text, learning how to *rule out rival explanations* for findings is a key ingredient of scientific thinking. But science educators haven't always agreed on how to teach this crucial skill.

One increasingly popular way of imparting this knowledge is *discovery learning:* giving students experimental materials and asking them to figure out the scientific principles on their own (Klahr & Nigram, 2004). For example, a psychology professor who's teaching operant conditioning might set her students up with a friendly rat, a maze, and a plentiful supply of cheese and ask them to figure out which variables affect the rat's learning. For instance, does the rat learn the maze most quickly when we reinforce it continuously or only occasionally?

Nevertheless, as David Klahr and others have shown, the old-fashioned method of *direct instruction,* in which we simply tell students how to solve problems, is usually more effective and efficient than discovery learning (Alfieri et al., 2011). In one study, investigators examined third- and fourth-graders' ability to isolate the variables that influence how quickly a ball rolls down a ramp, such as the ramp's steepness or length. Only 23 percent of students assigned to a discovery learning condition later solved a slightly different problem on their own, whereas 77 percent of students assigned to a direct instruction condition did (Klahr & Nigram, 2004).

That's not to say that discovery learning has no role in education, as in the long-term it may encourage students to learn how to pose scientific questions on their own (Alferink, 2007; Kuhn & Dean, 2005). But because many students may never figure out how to solve certain scientific problems independently, it's ill-advised as a stand-alone approach (Kirschner, Sweller, & Clark, 2006; Mayer, 2004).

Learning Styles

The view that students with certain learning styles benefit from specific types of instructional materials is popular in educational psychology. Yet scientific research provides little evidence for this belief.

Few claims about learning are as widespread as the belief that all individuals have their own distinctive **learning styles**—their preferred means of acquiring information. According to proponents of this view, some students are "analytical" learners who excel at breaking down problems into different components, whereas others are "holistic" learners who excel at viewing problems as a whole. Still others are "verbal" learners who prefer to talk through problems, whereas others are "spatial" learners who prefer to visualize problems in their heads (Cassidy, 2004; Desmedt & Valcke, 2004). Some educational psychologists have claimed to boost learning dramatically by matching different methods of instruction to students' learning styles. According to them, children who are verbal learners should learn much faster and better with written material, children who are spatial learners should learn much faster and better with visual material, and so on.

Appealing as these assertions are, they haven't stood the test of careful research (Lilienfeld et al., 2009; Pashler et al., 2009; Rohrer & Paschler, 2012). For one thing, it's difficult to assess learning style reliably (Snider, 1992; Stahl, 1999). As we'll recall from Chapter 2, *reliability* refers to consistency in measurement. In this case, different measures designed to assess people's learning styles often yield very different answers about their preferred mode of learning. In part, that's probably because few of us are purely analytical or holistic learners, verbal or spatial learners, and so on; most of us are a blend of multiple styles. Moreover, studies have generally revealed that tailoring different methods to people's learning styles doesn't result in enhanced learning (Kavale & Forness, 1987; Kratzig & Arbuthnott, 2006; Tarver & Dawson, 1978). Instead, most research shows that certain teaching approaches, like setting high standards for students and providing them with the motivation and skills to reach these standards, work best regardless of students' learning styles (Geake, 2008; Zhang, 2006). Like a number of other fads in popular psychology, the idea of learning styles seems to be more fiction than fact (Alferink, 2007; Pashler et al., 2009; Stahl, 1999).

Assess Your Knowledge — FACT or FICTION?

1. Sleep-assisted learning techniques only work if subjects stay completely asleep during learning. **True / False**
2. The few positive results for accelerated learning in the SALTT program may be due to placebo effects. **True / False**
3. Discovery learning tends to be more efficient than direct instruction for solving most scientific problems. **True / False**
4. There's little evidence that matching teaching methods to people's learning styles enhances learning. **True / False**

Answers: **1.** F (p. 237); **2.** T (p. 238); **3.** F (p. 238); **4.** T (p. 239)

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learning style
an individual's preferred or optimal method of acquiring new information