Reinforcement: Shaping

Shaping: The reinforcement of successive approximations of a desired behavior

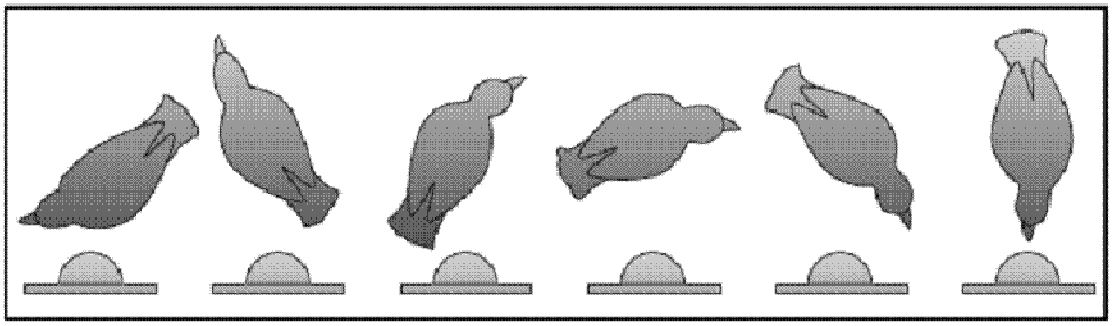
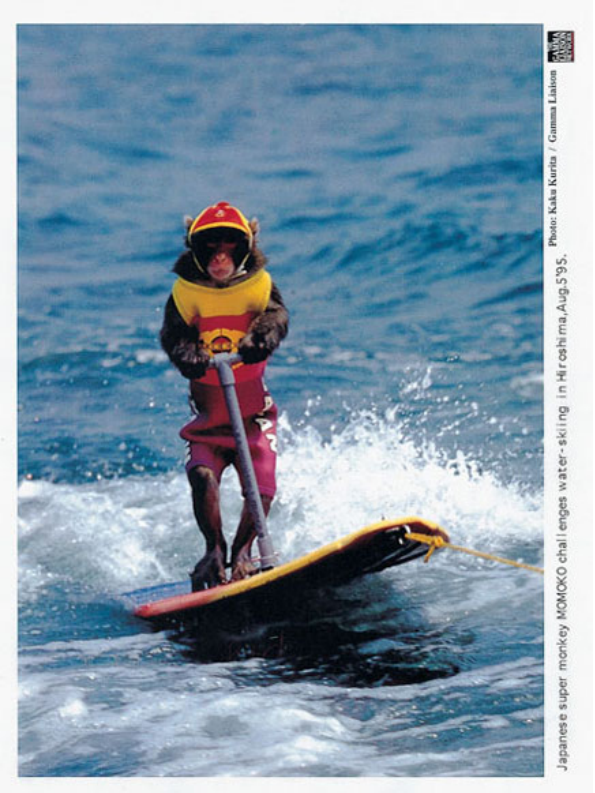


Figure 5-6 *Shaping clockwise turns. As viewed from above, a pigeon is shown at points at which its behavior was reinforced. At first (extreme left figure), any turn to the right produced food. After this, reinforcement required successively closer approximations of a complete circle. The first complete circle appeared after about 15 minutes of shaping. (Figures drawn by Diane Chance from photographs by Paul Chance.)*

A natural surfer? No. This boogie boarding terrier underwent many learning trials and received rewards for many successive approximations of this behavior before it became a skilled wave rider.

Shaping



Practical Uses for Shaping

A teacher can praise a student's first efforts at printing the alphabet even though the letters are barely recognizable. Once the student can easily make these crude approximations, the teacher can require something better for reinforcement until the student prints the letter clearly (page 170).

A rehabilitation therapist may place relatively mild demands on a patient at first and congratulate them for the patient achieving them. When the patient becomes comfortable with the required task, the therapist can raise the standard slightly (page 170).

A person with agoraphobia (fear of public places) may be afraid of leaving their home. The therapist may reinforce them

- For going to the front door
- Then, opening the front door
- Then, going through the front door
- Then, standing on the porch

And continuing until the person is able to leave the house.

Why is Learning About Shaping Important?

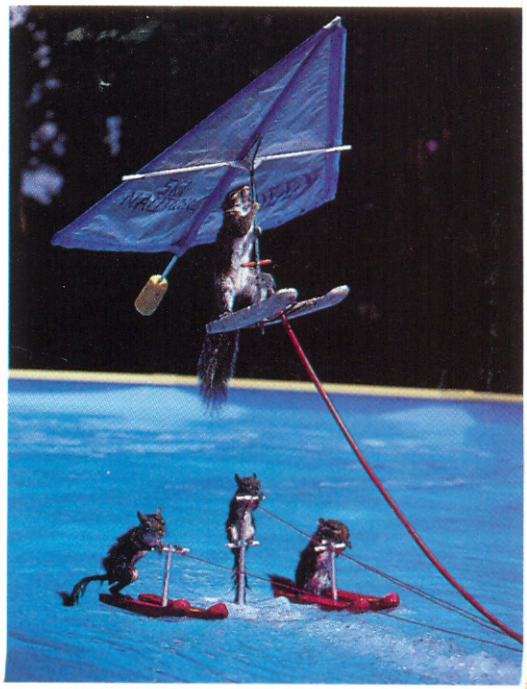
People often unwittingly shape undesirable behavior in their children. Tantrums, for example are typically the products of shaping.

A tired parent may give in to a child's repeated requests "to shut them up."

- On the next occasion, the parent may resist giving into the child's usual demands. The child responds by becoming louder or crying (or a new tactic, throwing things on the ground). The parent yields to avoid causing a scene.
- On subsequent occasions, determined to regain control, the parent may refuse to comply when the child cries or shouts, but gives in when the child produces buglelike wails.

The parents gradually demand more and more outrageous behavior for reinforcement, and the child eventually engages in full-fledged tantrums (page 171).

Often parents and other adults attribute tantrums and other annoying behavior to character flaws (and underestimate situational factors). "He's so immature!" they may say, or "What a willful child!" The children themselves seldom understand the shaping process any better than their parents and may often grow up attributing their misbehavior to immaturity, temperament, or other internal traits, just as their parents had. But the child had merely done what was required for reinforcement (page 171).



SHAPING AND CHAINING

The dual processes of shaping and chaining help explain the development of complex behaviors in animals, including these water-skiing squirrels.

Tips for Shapers (page 172)

The success of shaping depends primarily on the skill of the trainer. Those who attempt shaping and are unsuccessful often attribute lack of success to the animal being trained, but the skills (not intelligence) of the trainer.

What are the differences between good and bad shapers? Good shapers reinforce small steps (page 172).

- Trainers who get poor results often require too much at once. After reinforcing the rat's turning toward the lever, the poor trainer may wait for the rat to walk over to the lever; the more successful trainer waits only for the rat to take a single step in the direction of the lever.
- Good trainers provide immediate reinforcement. Poor trainers often hesitate slightly before reinforcing an approximation—often explaining, "I wanted to see if he'd do more." The successful trainer reinforces the instant the desired approximation occurs.
- Good shapers provide small reinforcers. Shaping laboratory animals usually involves the mechanical delivery of a uniform amount of food, one or two food pellets for a rat, a few pieces of grain for a pigeon.
    - With large amounts of food, the animal takes a long time to eat it. If you give a child candy or toys to reinforce each approximation, these reinforcers are apt to become the focus of attention. A simple "Well-done!" or even "That's better is more effective.

- Good shapers reinforce the best approximation available. The trainer may work out a shaping plan in advance that includes five or ten distinct approximations of lever pressing that are to be reinforced. The poor trainer will stick to that plan NO MATTER what, reinforcing approximation D only after approximations A, B, and C have been reinforced. The more successful trainer will use the plan as nothing more than a rough guide. If the rat skips a few intermediate steps, that's fine. The good trainer will reinforce any progress toward the goal. If you get lucky, go with it.
- Good trainers back up when necessary. Learning doesn't always progress smoothly. The trainer who is willing to lower the standard when necessary will progress more rapidly than one who insists on waiting for something better.

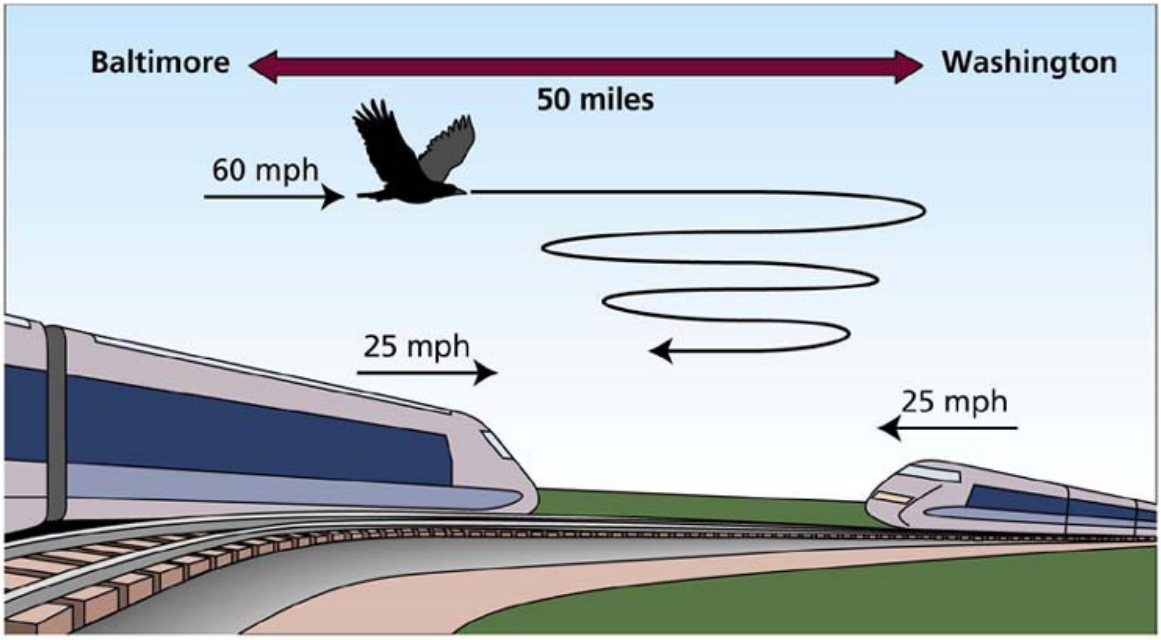
Problem Solving

There are many factors associated with problem solving such as

- mental representation,
- sufficient background knowledge (it is more difficult to solve nuclear engineering problems if you don't have a background in something that involves physics)
- attempting a variety of solutions that do not work (most solutions that don't work are not psychologically available),
- persistence (related to internal locus of control, high achievement motivation, learned industrious, and intrinsic motivation)
- solving a variety of problems (see Connections by James Burke) and seeing a analogy between how others solved a problem and how it can relate to your current problem
- and learning history.

Mental Representations and Problem Solving

Train A leaves Baltimore for its 50 mile trip to Washington D.C. at a constant speed of 25 mph. At the same time, train B leaves Washington D.C. bound for Baltimore at the same speed of 25 mph.



A crow that happened on a methamphetamine lab and sampled its product leaves Baltimore at the same time as train A, flying above the tracks toward Washington D.C. at a speed of 60 mph. When the crow encounters train B, it turns and flies toward train A, then instantly reverses its direction and flies back to train B. This supercharged bird continues this sequence until Train A and Train B meet midway between Baltimore and Washington D.C.

How far has the crow flown?

Mental Representations: Barriers for Insight

Horse problem

A man bought a horse for $60 and sold it for $70. Then he bought the same horse for $80 and sold it again for $90.

- Write down how much money was made in both transactions combined.

Techniques to solve the problem:

- Carry out a simulation with money to see what the actual results are.
- Add up the total amount of money paid out and compare it with the total amount of money paid in.
- Change the mental representation of the problem (see below).

The method you use should all lead to the same answer. When in doubt about an answer to a problem, try different techniques. If they come to different answers, there is a problem with one of your methods that need to be examined.

> A man bought a horse for $60 and sold it for $70. Then he bought firewood for $80 and sold it for $90. How much money did he make in both transactions combined?

Hotel Problem

A hotel detective was making his rounds through the corridors of the hotel. As he passed by a room, he heard a voice behind the closed door. The voice yelled, "Don't shoot John!" Immediately afterwards, the detective heard a gun discharge. He immediately broke into the room and encountered the following scene.

> *A dead woman was lying on the floor. Next to her was a gun. Three people were standing around her. They were a judge, a soldier, and a mail carrier. The detective immediately arrested the mail carrier for murder.*

Based on the information provided, how did the hotel detective know to arrest the mail carrier?

If you know the answer, raise your hand, and I will tally how many people know the answer. **DO NOT** reveal how you know the answer. We may need to create a visual representation to help solve the problem.

How does the representation affect your ability to solve the problem?

Creativity and Insightfulness

There are many definitions of creativity. One common theme in the definition is novelty.

It appears that reinforcing novel behavior produces novel behavior (see passage on page 181 and 182 about Malia the porpoise). As a corollary, punishing novel behavior decreases novel behavior.

Reinforcement for novel behavior has been demonstrated with

- Porpoises at Ocean Science Theater,
- Pigeons,
- 4th and 5th graders when asked to think of uses for various objects such as a can, brick or pencil,
- 1st and 2nd graders building new things with blocks (reinforcement took the form of praise)

Creativity requires lots of ideas. Many of these ideas won't pan out. Trying new things requires us to take the initiative, taking safe risks, having self-confidence, high achievement motivation, and open to new experiences.

Creativity and Insightfulness

When people are reinforced for completing a task (compared to those who were not promised a reinforcement), the two different groups appear to have no difference in creative solutions.

It appears that how you use rewards and reinforcement influence creativity.

- If you reinforce creative behavior, creative behavior increases
- If you reinforce the completion of a task, it appears to have no effect or reduced levels of creativity.

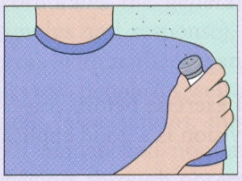
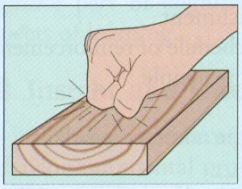
Why are people inclined to be less creative when promised a reinforcement (page 183)?

It is proposes that in our society, creativity is not always appreciated (page 183). We are risk averse to that is different. When we are offered a reinforcement for performing a task, the surest way of pleasing the person and receiving the promised reward is to perform the task in a conventional way. If there is no reinforcement at stake, then one can afford to be creative (page 183).

Superstitious Behavior

Superstitious behavior is any behavior that occurs even though it does not produce its intended consequences.

TABLE 19.6 COMMON WESTERN SUPERSTITIONS

Behavior	Superstition
 **Wedding plans:** *Why do brides wear something old and something borrowed?*	The something old is usually clothing that belongs to an older woman who is happily married. Thus, the bride will supposedly transfer that good fortune to herself. Something borrowed is often a relative's jewelry. This item should be golden, because gold represents the sun, which was once thought to be the source of life.
 **Spilling salt:** *Why do some people throw a pinch of salt over their left shoulder?*	Years ago, people believed good spirits lived on the right side of the body and bad spirits on the left. When a man spilled salt, he believed his guardian spirit had caused the accident to warn him of evil nearby. At the time, salt was scarce and precious. Therefore, to bribe the spirits who were planning to harm him, he would quickly throw a pinch of salt over his left shoulder.
 **Boasting, making a prediction, or speaking of good fortune:** *Why do some people knock on wood?*	Down through the ages, people have believed that trees were homes of gods, who were kind and generous if approached in the right way. A person who wanted to ask a favor of the tree god would touch the bark. After the favor was granted, the person would return to knock on the tree as a sign of thanks.

What are other common superstitious behaviors?

Superstitious Behavior

B.F. Skinner tested the hypothesis that superstitious behavior occurs through accidental reinforcement.

Pigeons who were doing received food at a random time period. Whatever behavior they were doing at the time, many of them repeated this behavior in hopes of receiving food.

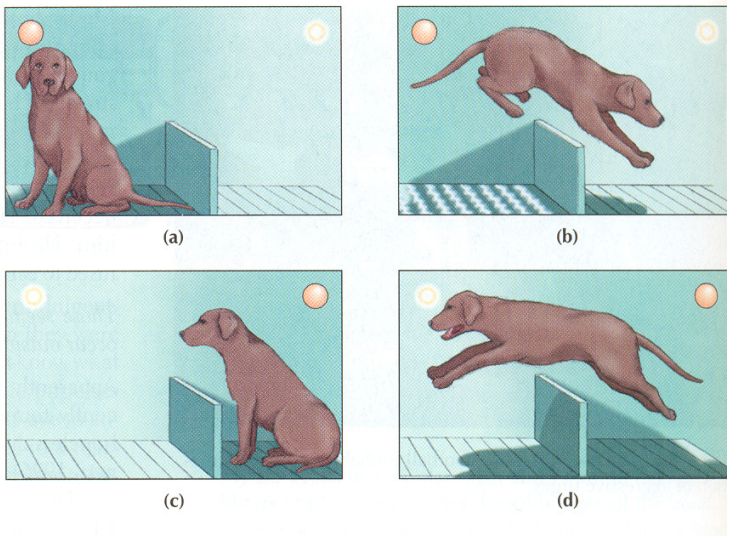
Whether it is fixing a car (see anecdote on page 187) or receiving marbles dispensed from a Bobo, the mechanical clown, pressing keys or using mud to treat snakebite.

While most superstitious behaviors are innocuous, some may be harmful. It may lead us to some behaviors we think will produce a particular outcome.

- However, if there is no link between our behavior and the outcome, we may need to develop new strategies to address our problems. If not, learned helplessness may occur.
- Some superstitious behaviors may lead to the extinction of animals. Ground rhino horns has not been demonstrated as an effective aphrodisiac

Learned Helplessness

Seligman wanted to classically conditioned dogs to associate a tone to the pain of an electric shock. In order to do this, the dogs were harnessed and could not avoid electric shocks. It was expected that the dogs would be undergoing operant conditioning (negative reinforcement) to avoid the electric shocks.



• **FIGURE 12.6** In the normal course of escape and avoidance learning, a light dims shortly before the floor is electrified *(a)*. Since the light does not yet have meaning for the dog, the dog receives a shock (non-injurious, by the way) and leaps the barrier *(b)*. Dogs soon learn to watch for the dimming of the light *(c)* and to jump before receiving a shock *(d)*. Dogs made to feel "helpless" rarely even learn to escape shock, much less to avoid it.

However, when the harnesses were removed, the dogs did nothing to escape the electric shocks. Another group of dogs that were never harnessed learned to avoid electric shocks by jumping over a barrier.

The dog's reacted by being passive and not escaping the electric shocks when unharnessed. Martin Seligman described this behavior as learned helplessness.

Learned helplessness: A phenomenon in which repeated exposure to inescapable, uncomfortable, or uncontrollable aversive events produce passive behavior.

They developed the cognitive expectation that their behavior would have no effect on the outcome

Learned Helplessness: Martin Seligman and the Dogs:

The dogs are Harnessed → Electric Shocks are delivered → The dogs tried to escape, but cannot

Then…

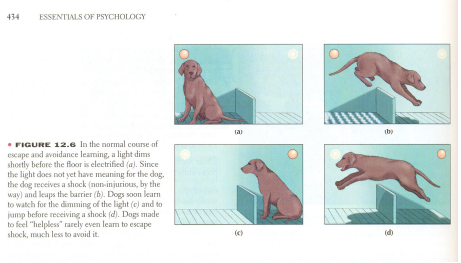

434 ESSENTIALS OF PSYCHOLOGY

FIGURE 12.6 In the normal course of escape and avoidance learning, a light dims shortly before the floor is electrified (*a*). Since the light does not yet have meaning for the dog, the dog receives a shock (non-injurious, by the way) and leaps the barrier (*b*). Dogs soon learn to watch for the dimming of the light (*c*) and to jump before receiving a shock (*d*). Dogs made to feel "helpless" rarely even learn to escape shock, much less to avoid it.

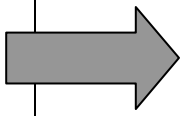
The dogs are unharnessed → Electric shocks are delivered → The dogs do not try to escape and acted passive

Dogs don't try to escape an adverse condition (even when they can) because they have learned in the past that any attempt doesn't help.

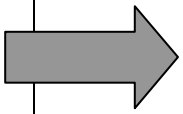
Learned Helplessness and Voting:

Fewer people are turning out to vote

People vote for candidates based on how they feel about the candidate and not on issues



Politicians are elected on an emotional appeal and not on issues voters want addressed and lobbyists have a strong influence on voting.



Political issues do not get addressed.

The next time people try to vote…

What are “real-life” examples of learned helplessness (and perhaps their cause)?

- Political process: People are becoming discouraged with the political process and not turning out to vote because nothing gets done.
- Weight loss programs: There are many weight loss programs (including those that use hypnosis—Chapter 4) that are ineffective that they discourage people.
- Cell phones and driving: The reason why driving while talking on cell phones is due to divided attention. This problem is still present with hands free phones and may reduce a small portion of the problem, but not a majority of the problems.
- Studying for class: Students with poor study skills or are using **in**effective strategies start to give up on their classes and resign themselves to poor grades.
- Stopping Attacks on American Troops: American troops are under constant attack by Iraqis. Killing Saddam Huessin’s sons (Uday and Kusay) will probably lead to learned helplessness because it fails to understand why our troops are not seen as liberators.

What are common examples where learned helplessness can occur?

- “War on Terrorism”
- Banking crisis of 2008
- Dealing with problems of CEOs and CFOs “cooking the books”
- Dating
- Getting a job
  - Not having the job skills or connections
  - Rules not being applied equally or fairly
  - Rules created to bias a particular group based on criteria irrelevant to the job.
- Improving our marriage or relationship
- Abusive relationships