

Operant Conditioning

B. Operant Conditioning

Operant Conditioning is Learning through voluntary behavior and its consequences.

It is learning in which behavior is strengthened if followed by reinforcement or diminished if followed by punishment.

The consequences can be: Neutral, reinforcement, or punishment.

Principles of Operant Conditioning

1. Reinforcement refers to any process that strengthens a particular behavior—that is, increases the chances that the behavior will occur again.

- ***Positive reinforcement***: a method of strengthening behavior by following it with a pleasant stimulus.
- ***Negative reinforcement***: *Negative reinforcement* is a method of strengthening a behavior by following it with the removal or omission of an unpleasant stimulus.

1. **Escape**: In *escape*, performing a particular behavior leads to the removal of an unpleasant stimulus.
2. **Avoidance**: In *avoidance*, performing a behavior to avoid unpleasant consequences prior to exposure.

Principles of Operant Conditioning

2. Punishment weakens a behaviour, reducing the chances that the behavior will occur again.

- **Positive**: involves reducing a behavior by delivering an unpleasant stimulus if the behavior occurs.
- **Negative**: involves reducing a behavior by removing a pleasant stimulus if the behavior occurs.

Schedules of reinforcement

Ratio schedules (response based)

Interval schedules (time based)

	Definitions	Response rates	Example	
Fixed ratio (FR)	Reinforcement occurs after a predetermined number of responses	High rate of response, but a brief drop-off just after reinforcement	You receive a free flight from your frequent flyer program after accumulating a given number of flight miles.	
Variable ratio (VR)	Reinforcement occurs after a varying number of responses	High response rate, no pause after reinforcement, and very resistant to extinction	Slot machines are designed to pay out after an average number of responses (maybe every 10 times), but any one machine may pay out on the first responses, then seventh, then the twentieth.	
Fixed Interval (FI)	Reinforcement occurs after a fixed period of time	Responses tend to increase as the time for the next reinforcement is near, but drop off after reinforcement and during interval	You receive a monthly paycheck. Rat's behavior is reinforced with a food pellet when (or if) it presses a bar after 20 seconds have elapsed.	
Variable interval (VI)	Reinforcement occurs after varying periods of time	Relatively low, but steady, response rates because respondents cannot predict when reward will come	Your professor gives pop quizzes at random times throughout the course. Rat's behavior is reinforced with a food pellet after a response and a variable unpredictable interval of time.	

Principles of Operant Conditioning

3. **Shaping** is an operant conditioning procedure in which reinforcers guide actions closer and closer toward a desired behavior.
- By giving rewards only for desired behaviors and ignoring all other responses, researchers and animal trainers gradually shape complex behaviors.
 - For example, to teach a rat to press a lever that is over its head, the trainer can first reward any upward head movement, then an upward movement of at least one inch, then two inches, and so on, until the rat reaches the lever.

Cognitive Learning Theory

- Cognitive learning theory focuses on the thought processes that underlie learning.
- Rather than concentrating solely on external stimuli, responses, and reinforcements, Cognitive-Learning theorists focus on the unseen mental processes that occur during learning.
- It has two forms: Latent and Insight learning.

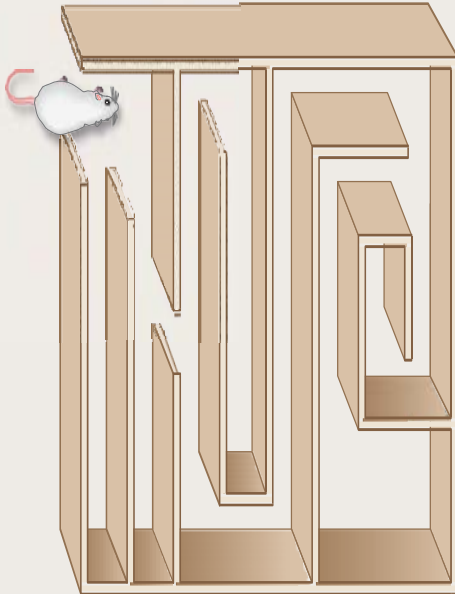
A. Latent Learning

- Latent learning is learning that occurs but is not evident in behavior until conditions for its appearance are favorable.
- Latent learning refers to learning that takes place without reinforcement

Tolman's Maze Experiment

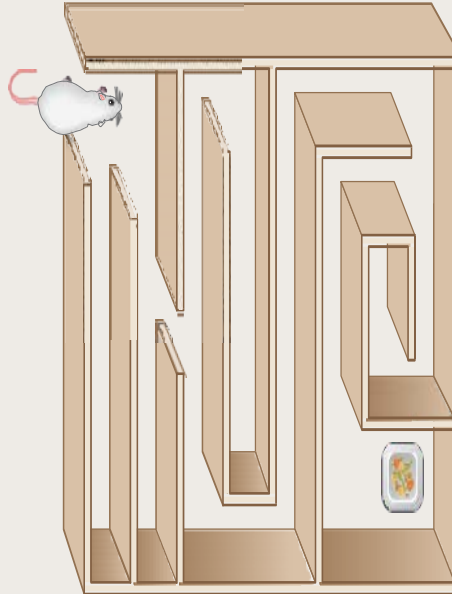
- 1** One group of rats is put through trials running in a maze with a goal box that never has any food reward as reinforcement.

Trial 1



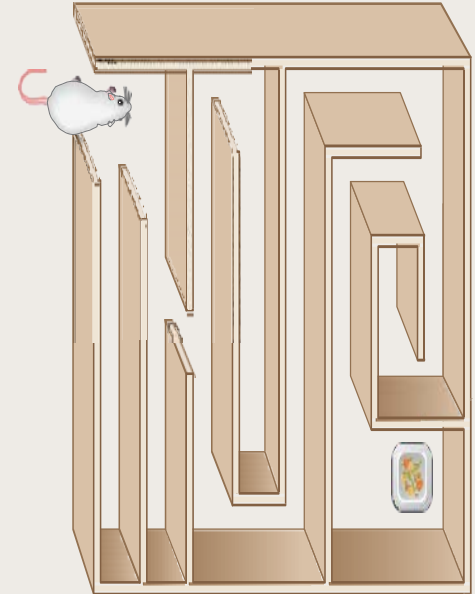
- 2** A second group of rats is put through trials in a maze with a goal box that always has food reinforcement.

Trial 1



- 3** A third group of rats is put through trials in a maze that has food reinforcement only after the first 10 trials.

Trial 11



- Cognitive-map – a mental representation of spatial locations and directions.

B. Insight Learning

Insight Learning is a sudden understanding or realization of how a problem can be solved.

It's not the result of trial and error, conditioning of particular behaviors, or the result of observing someone else attempting the problem.

It is a completely cognitive experience that requires the ability to visualize the problem and the solution internally.

Observational Learning

Observational Learning

Learning new behaviors or information by watching and imitating others (also known as social learning, modeling, or vicarious learning).



Observational Learning

Observational learning can be encouraged through **three** forms of reinforcement:

Direct reinforcement: Reproducing the behaviors of models and receive direct reinforcement.

Vicarious reinforcement: Observing models vicariously(in our imagination) reinforced for a particular behavior and then increase production of that behavior.

Self-reinforcement: Controlling own reinforcers.



Four Key Factors in Observational Learning

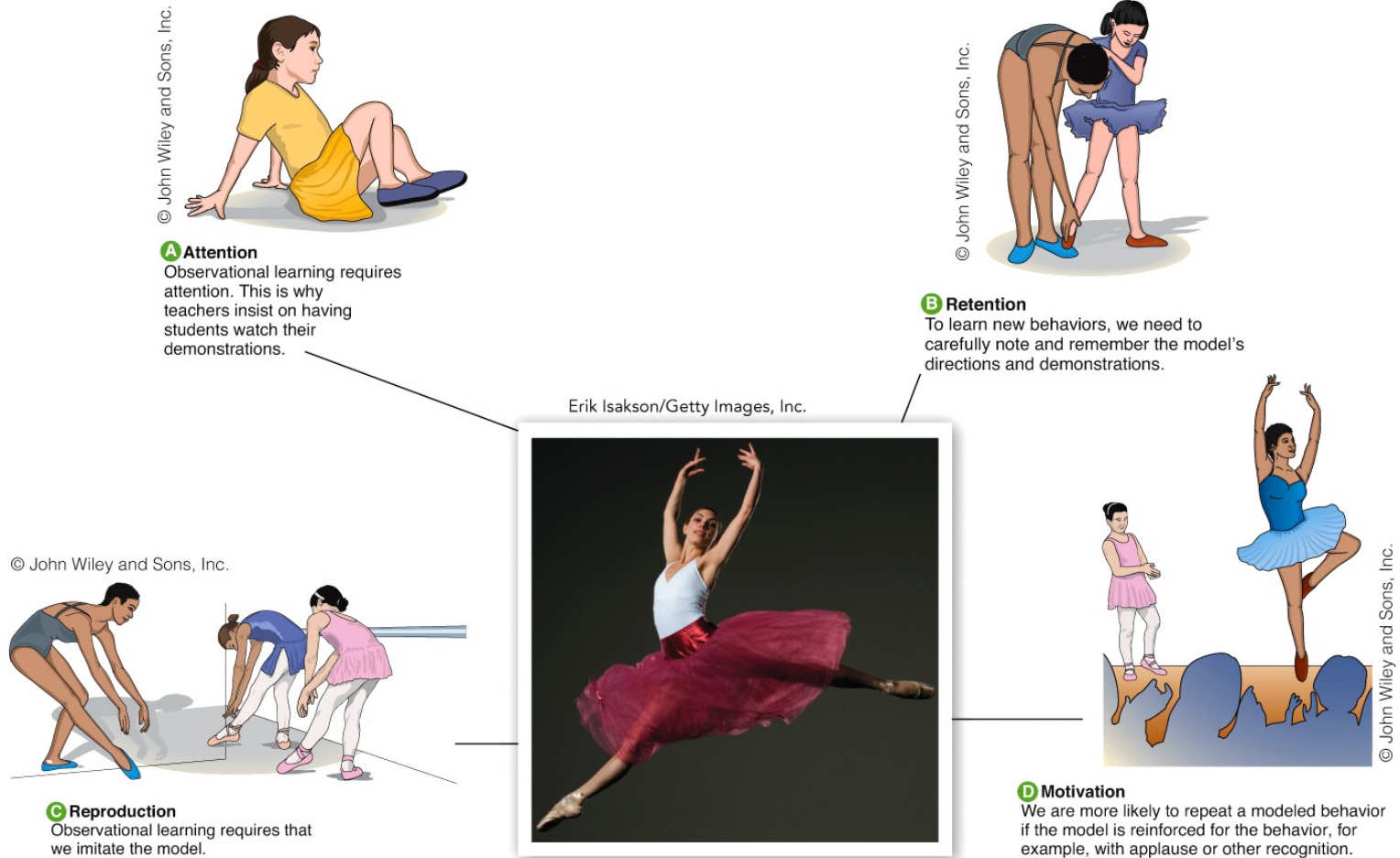


Figure 6.15

A. Attention

- First, the observer must pay ***attention*** to the crucial details of the model's behavior.
- A young girl watching her mother bake a cake will not be able to imitate this behavior successfully unless she pays attention to many important details—ingredients, quantities, oven temperature, baking time, and so on.

B. Retention

- ***Retention***—the observer must be able to remember the behavior until it is time to use it.
- If the person forgets important details, he or she will not be able to successfully imitate the behavior.

C. Reproduction

- Third, the observer must have physical ability and coordination needed for *reproduction* of the behavior.
- The young girl must have enough strength and dexterity to mix the ingredients, pour the batter, and so on, in order to bake a cake on her own.

D. Motivation

- Finally, the observer must have the ***motivation*** to imitate the model.
- If learners expect that imitating the behavior will not lead to reward or might lead to punishment, they are less likely to imitate the behavior.