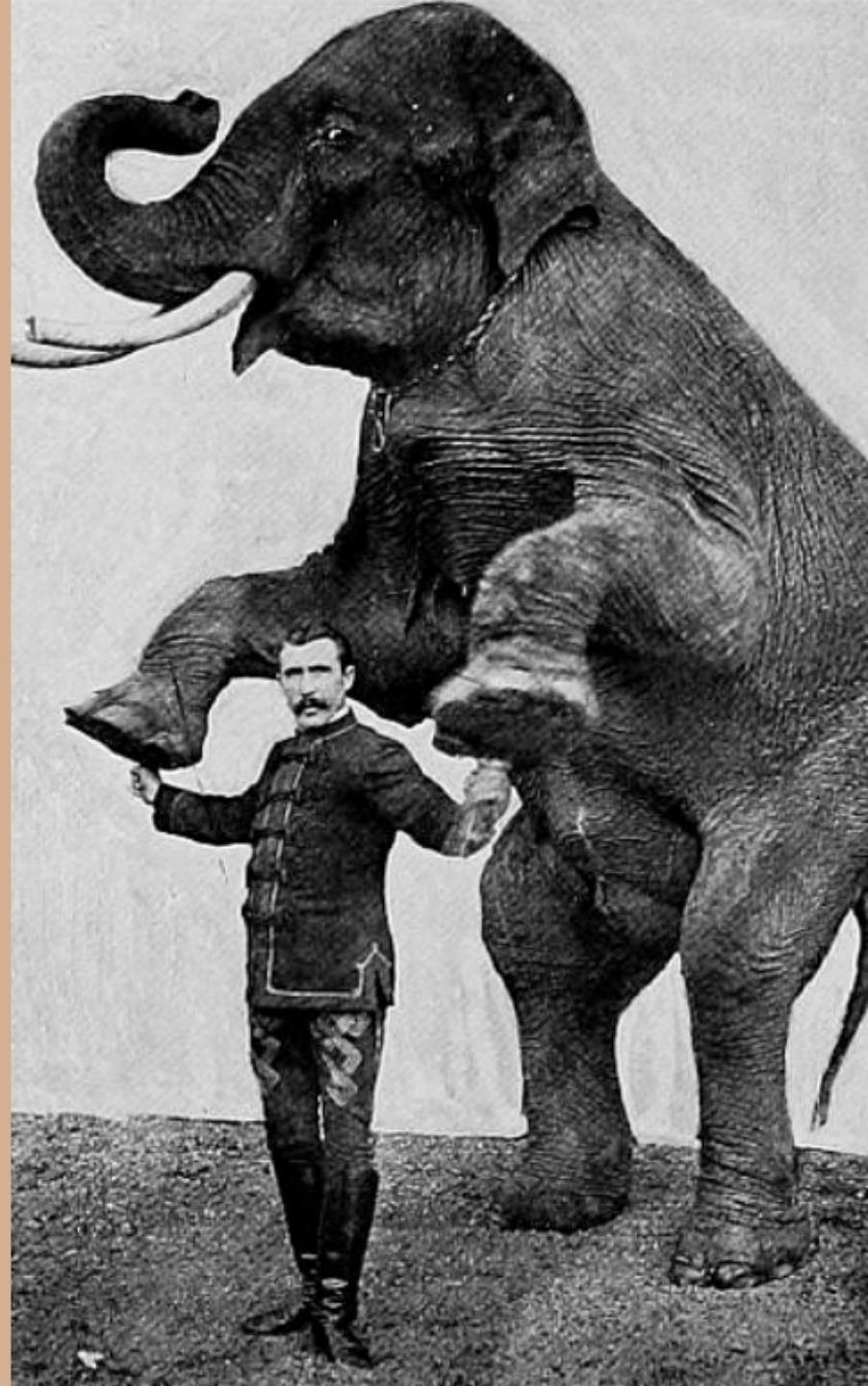


#07 Learning

*It is possible to make wolves retreat from sheep and
to train pigeons to play ping pong.*



- Learning

- A relatively permanent change in behavior (or behavioral capacity or potential) brought about by experience

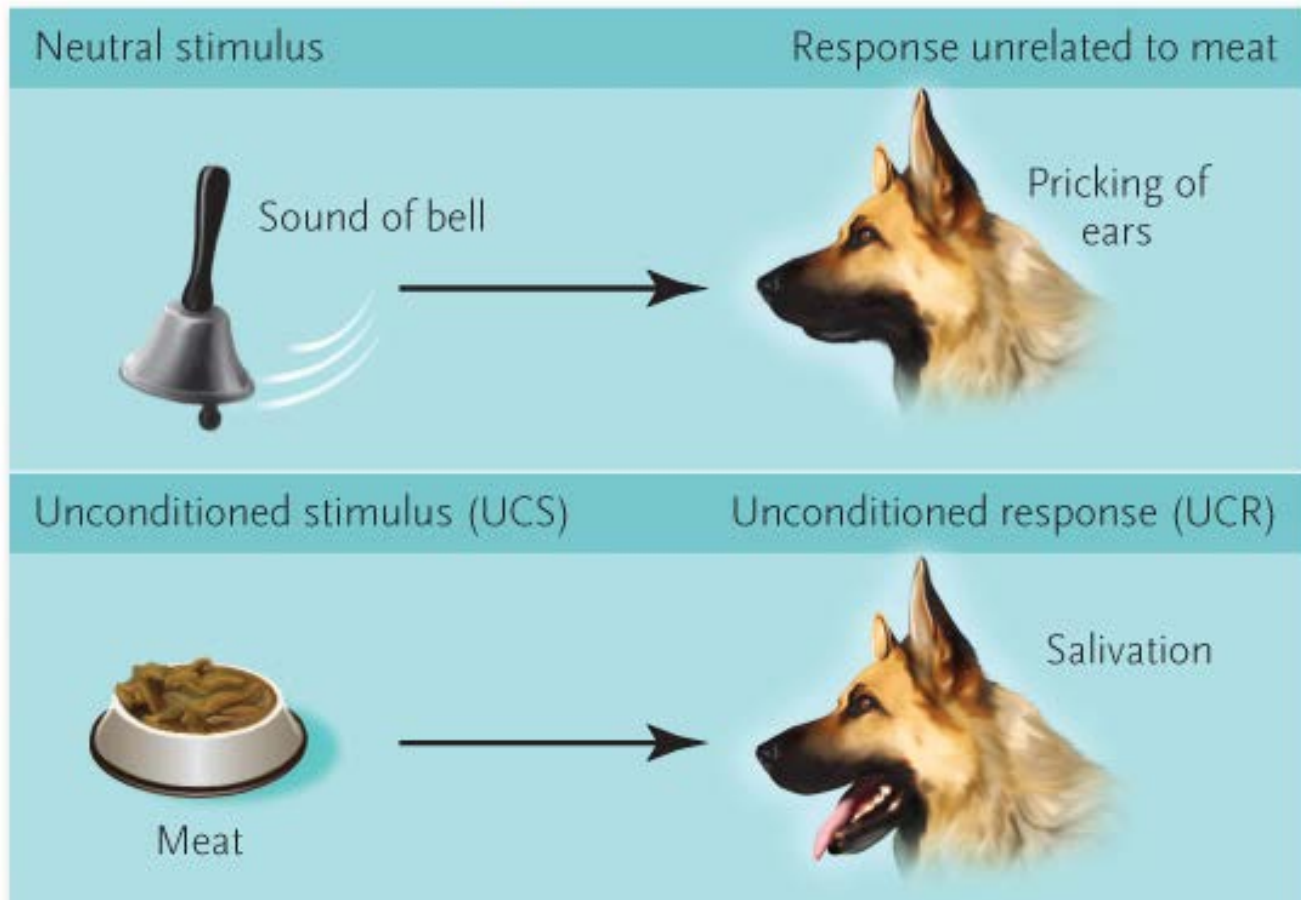
CLASSICAL CONDITIONING

- Classical conditioning
 - A type of learning in which a neutral stimulus comes to bring about a response after it is paired with a stimulus that naturally brings about that response



Dogs normally salivate only when food is present. If the sound of bell is paired with food repeatedly, eventually the dog salivates even to the sound of bell. They have “learned” a new response.

A Before Conditioning

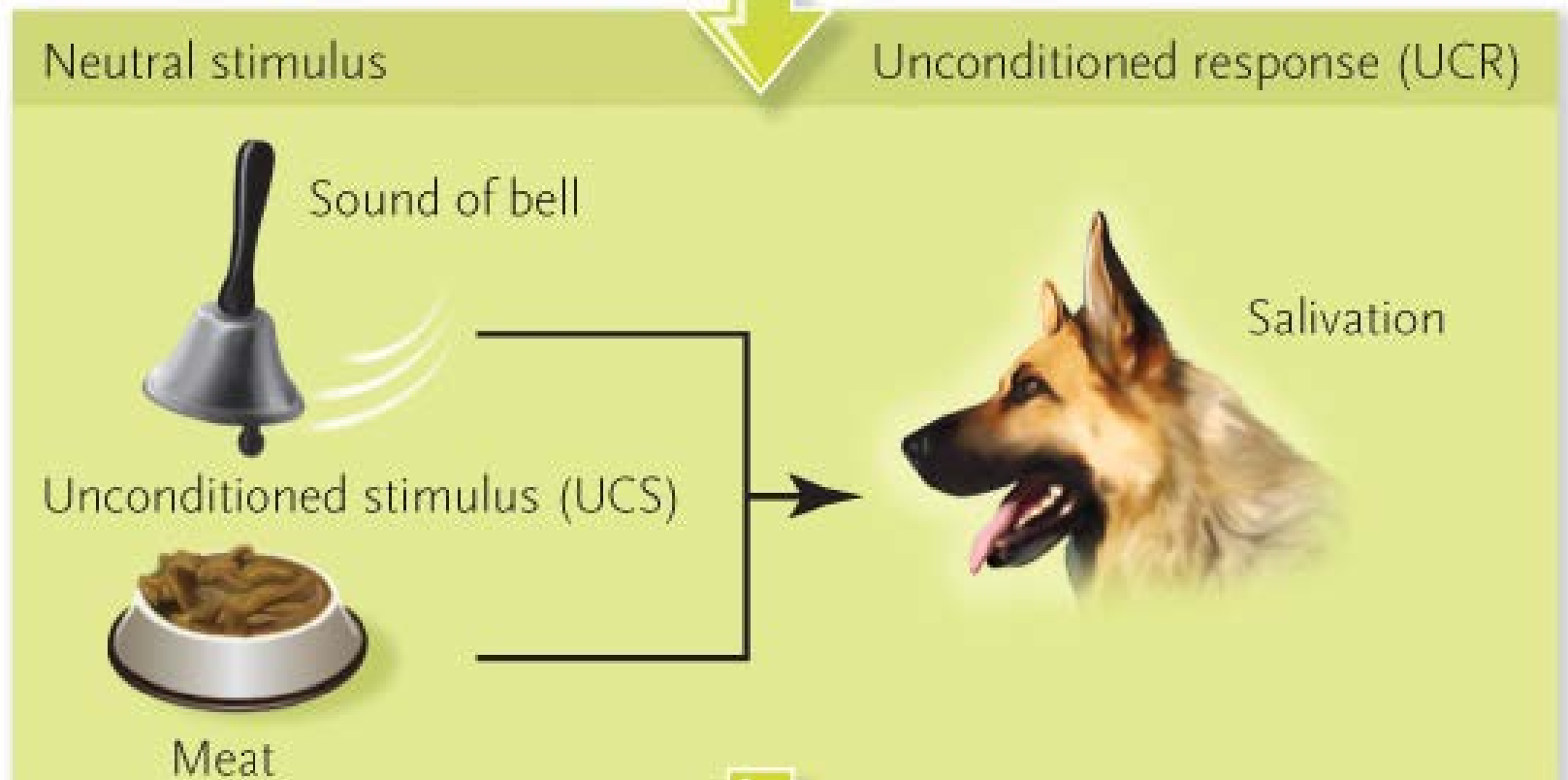


Neutral stimulus: a stimulus that, before conditioning, does not naturally bring about the response

Unconditioned stimulus: a stimulus that naturally brings about a response without having been learned

Unconditioned response: a response that is natural

B During Conditioning



C After Conditioning

Conditioned stimulus (CS)



Sound of bell



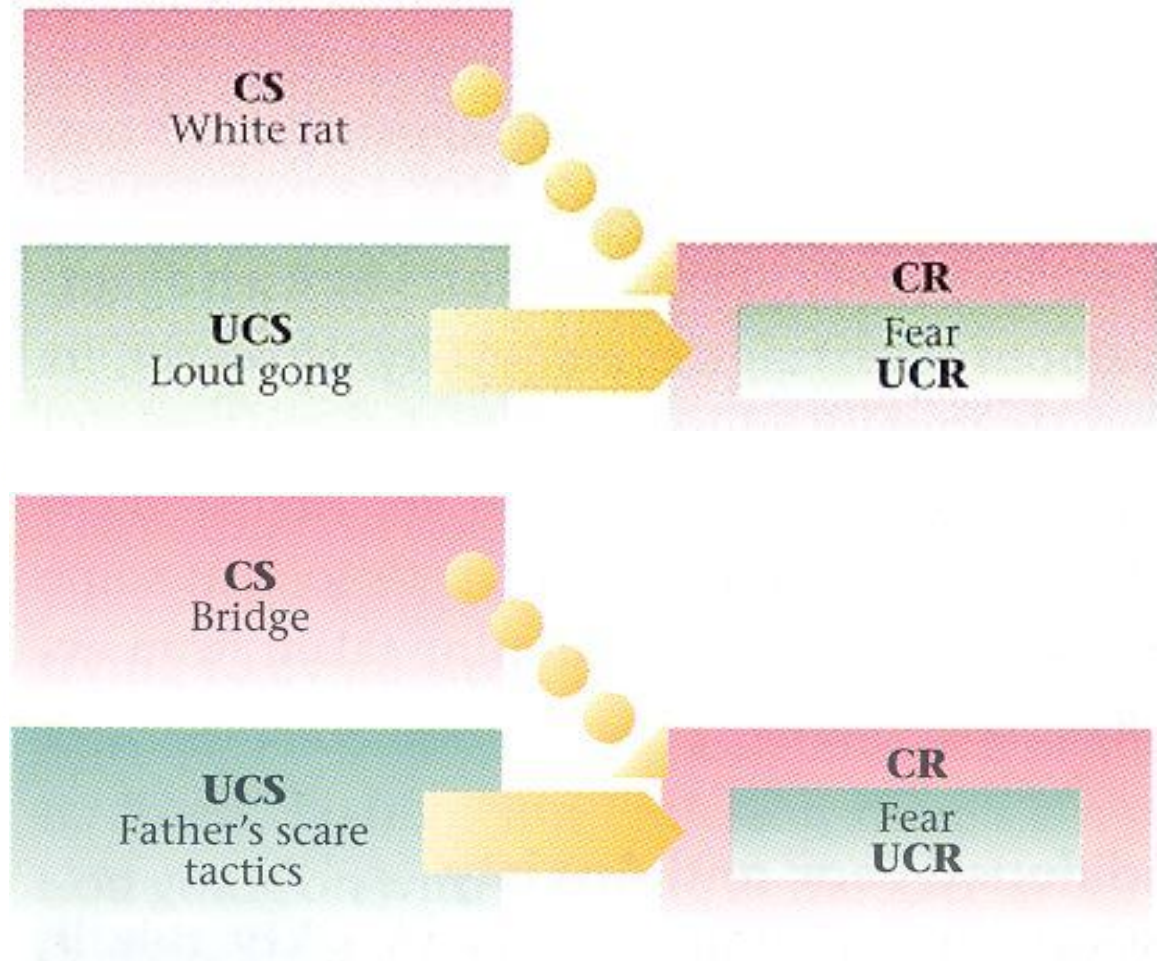
Conditioned response (CR)



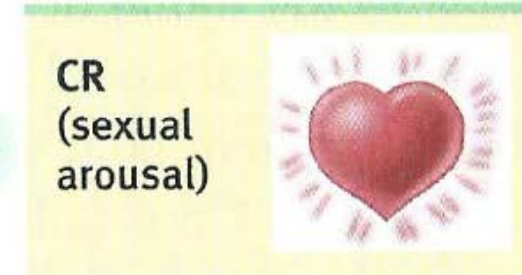
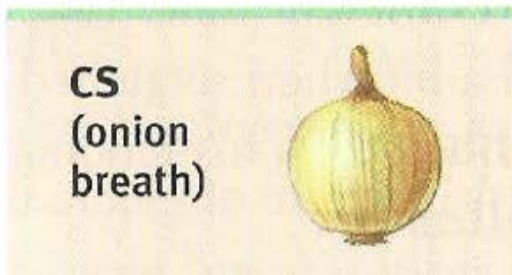
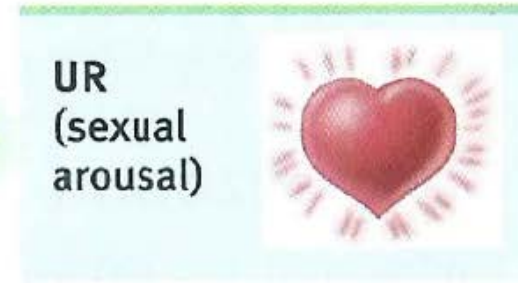
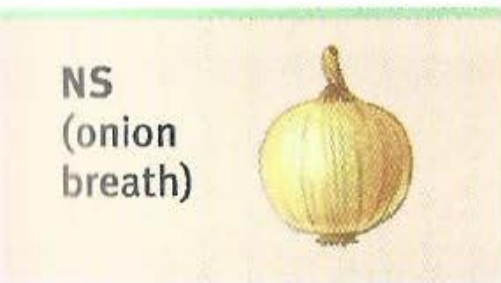
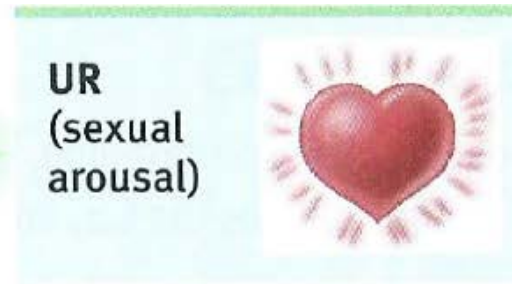
Salivation

Conditioned stimulus: a once-neutral stimulus that has been paired with an unconditioned stimulus to bring about a response formerly caused only by the unconditioned stimulus

Conditioned response: a response that, after conditioning, follows a previously neutral stimulus



Why do we fear some objects? See the “Little Albert” experiment (Watson, 1927).



Through classical conditioning, humans may acquire unexpected responses to a stimulus (e.g., sexual arousal in response to onion smell, parental warmth in response to McDonald's logo).

■ Extinction

- Occurs when a previously conditioned response decreases in frequency and eventually disappears because the conditioned stimulus is no longer paired with the unconditioned stimulus

- Stimulus generalization
 - Occurs when an organism that has learned a response to the conditioned stimulus responds in the same way to a similar stimulus

Little Albert feared not only white rats but also other furry things such as rabbits, dogs, fur coats, and Santa Claus masks.



- Stimulus discrimination
 - Occurs when an organism that has learned a response to the conditioned stimulus does not respond in the same way to a similar stimulus

Your dog has learned to salivate to your footsteps but not to your father's.



■ Applications

- **Aversive therapy**: Reducing the frequency of an undesired behavior (e.g., gambling, sexual deviance, smoking) by pairing an aversive stimulus (e.g., pain, bitter taste, nausea) with it

■ Applications

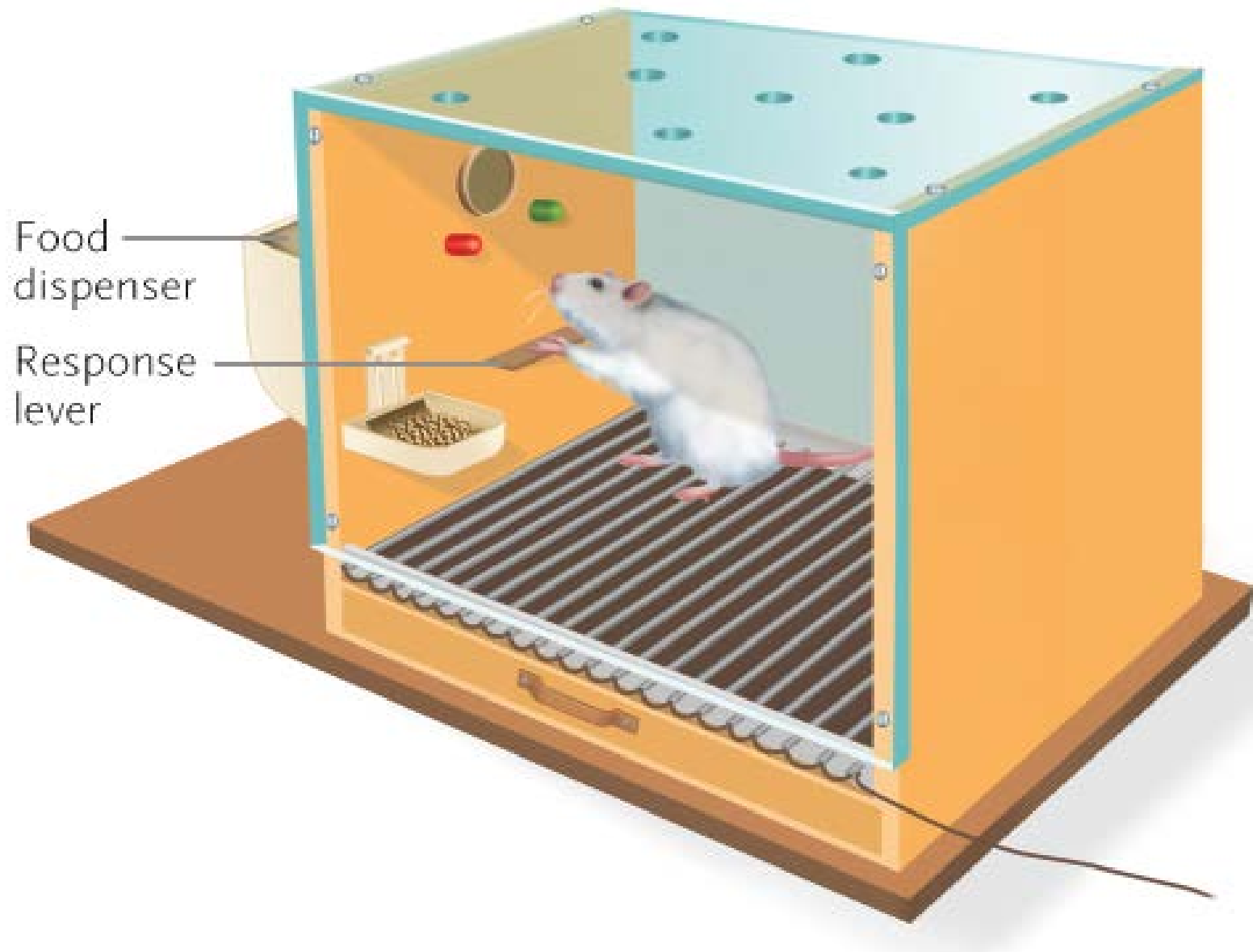
- **Conditioned taste aversion:** Occurs when an organism subject has learned to respond to the taste of a food with symptoms caused by a toxic or poisonous substance
- Used in wildlife management; the organism may still want to eat the food, but the body reacts reflexively

OPERANT CONDITIONING

- Operant conditioning
 - A type of learning in which a voluntary response is strengthened or weakened, depending on its favorable or unfavorable consequences
 - Organisms deliberately “operate” on the environment to produce desirable results

- Operant conditioning
 - **Reinforcement**: Consequences of a behavior that strengthen its probability (primary: e.g., water, food; secondary: e.g., money, power)
 - **Punishment**: Consequences of a behavior that weaken its probability

Intended Result	When Stimulus is Added, the Result is . . .	When Stimulus is Removed or Terminated, the Result is . . .
Increase in behavior (reinforcement)	<p>Positive reinforcement</p> <p>giving a child a treat when he/she is polite to a stranger</p>	<p>Negative reinforcement</p> <p>removing strict parental controls on the internet when a child completes his/her work to satisfaction</p>
Decrease in behavior (punishment)	<p>Positive punishment</p> <p>spanking a child when he/she throws a tantrum</p>	<p>Negative punishment</p> <p>seizing a child's phone or toys for his/her indiscipline in class</p>

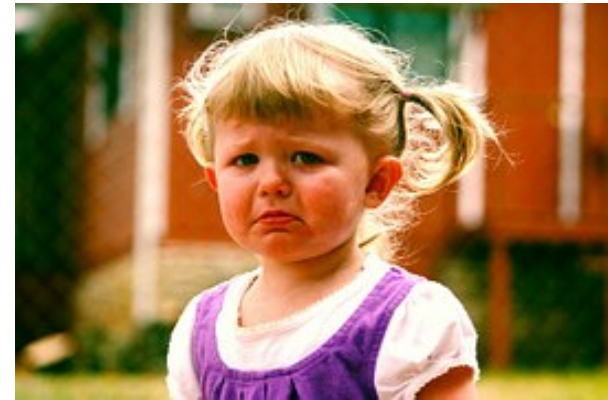


Operant chamber (or Skinner box): A small enclosure in which an animal can make a specific response that is recorded while the consequences of the response are systematically controlled

■ Extinction

- Weakening and eventually disappearance of a learned response occurs when a response is no longer reinforced

Temper tantrum may eventually disappear when it no longer attracts parents' attention or rewards.

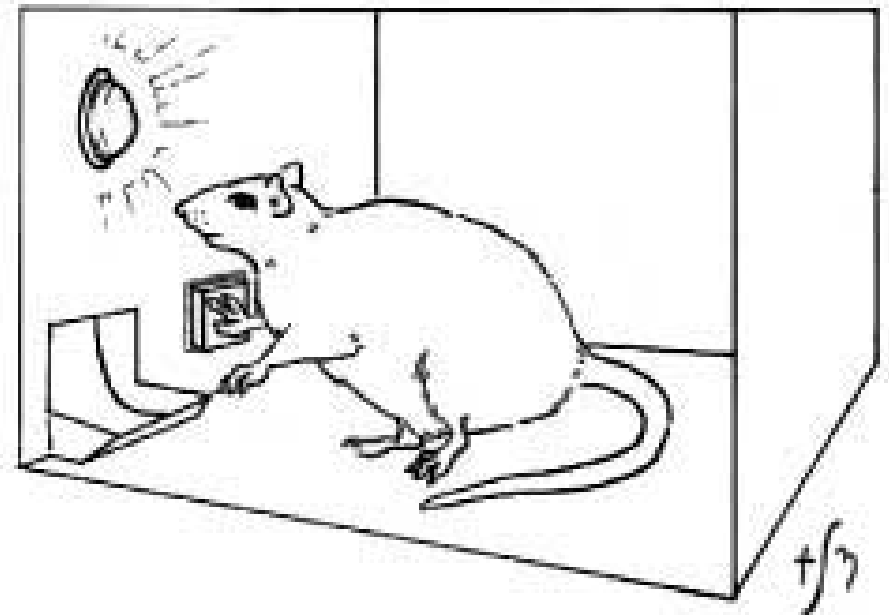


■ Shaping

- The process of teaching a complex behavior by reinforcing closer and closer approximations of the desired behavior
- Necessary when an organism does not, on its own, emit the desired response

Training a rat to press a lever using shaping:

1. simply turning toward the lever
2. only stepping toward the lever
3. only moving to within a specified distance from the lever
4. only touching the lever with any part of the body, such as the nose
5. only touching the lever with a specified paw
6. only depressing the lever partially with the specified paw
7. only depressing the lever completely with the specified paw will be reinforced



- Applications
 - **Token system:** Tangible reinforcement in the form of tokens awarded upon performance of a desired behavior; the tokens can later be exchanged for desired objects or privileges

- Applications

- **Contingency contracting:** Agreement between a therapist and a client stating the behavioral goals and specifies the reinforcement if such goals are achieved and the punishment if not achieved

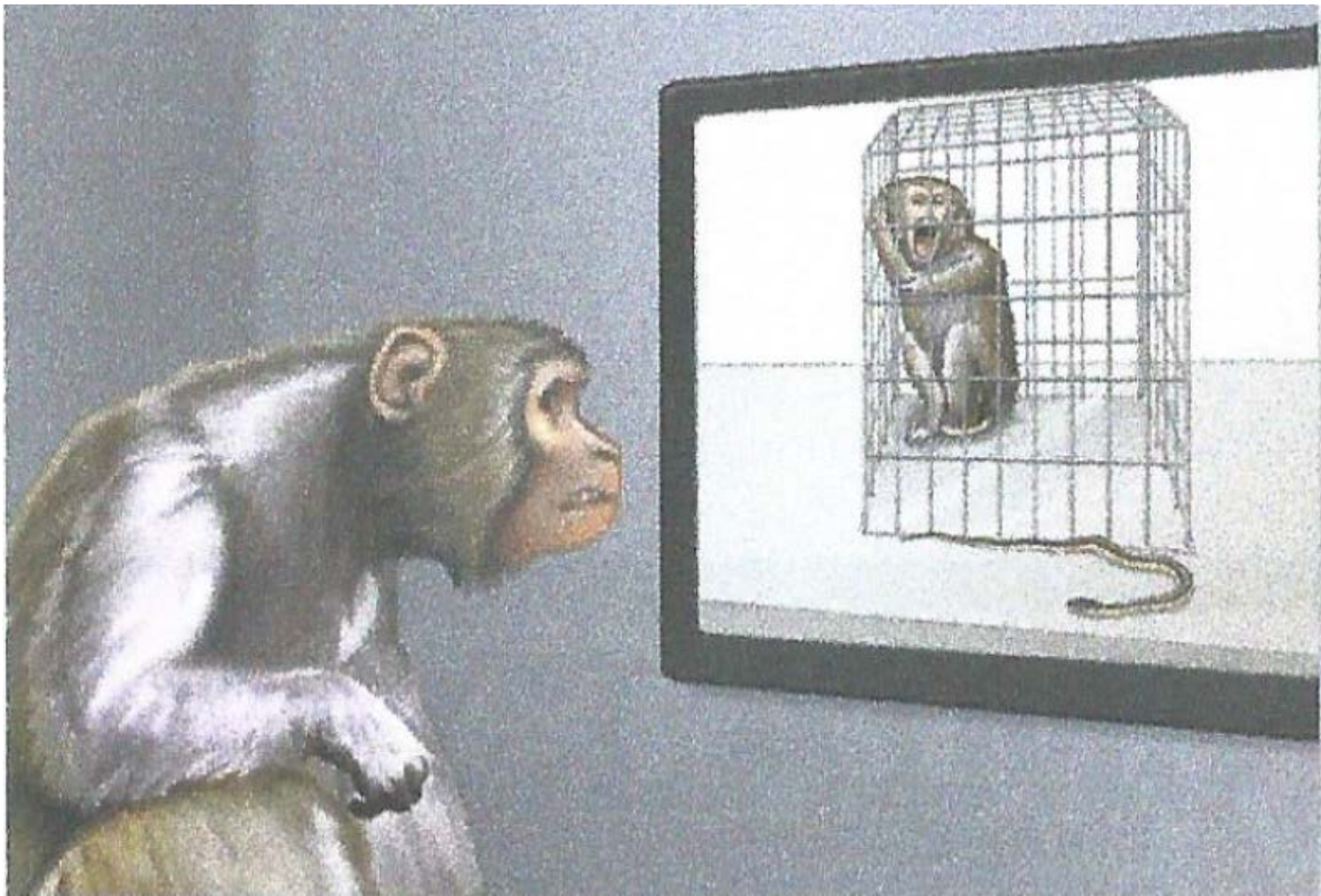
OBSERVATIONAL LEARNING

■ Observational learning

- A process in which an individual learns new responses by observing the behavior of others
- Learning without reinforcement and direct experience



After seeing an adult wildly hitting an inflatable punching toy (“Bobo Doll”), young children mimicked the aggression behavior almost identically (Bandura et al., 1963).



Lilenfeld et al. (2013)

Animals exhibit observation learning too. For example, lab-reared monkeys who had no previous exposure to snakes viewed a video of fellow monkeys reacting with fear to snakes. These monkeys subsequently showed fear of snakes too (Mineka & Cook, 1993).



Observational learning is used in psychotherapy. Example: children who feared dogs observed a model (“Fearless Peer”) playing with a dog. Afterwards, these children were more likely to approach a dog than were children with such observation (Bandura et al., 1967).