

# Learning

Basic Cognitive Processes

# Definition of Learning

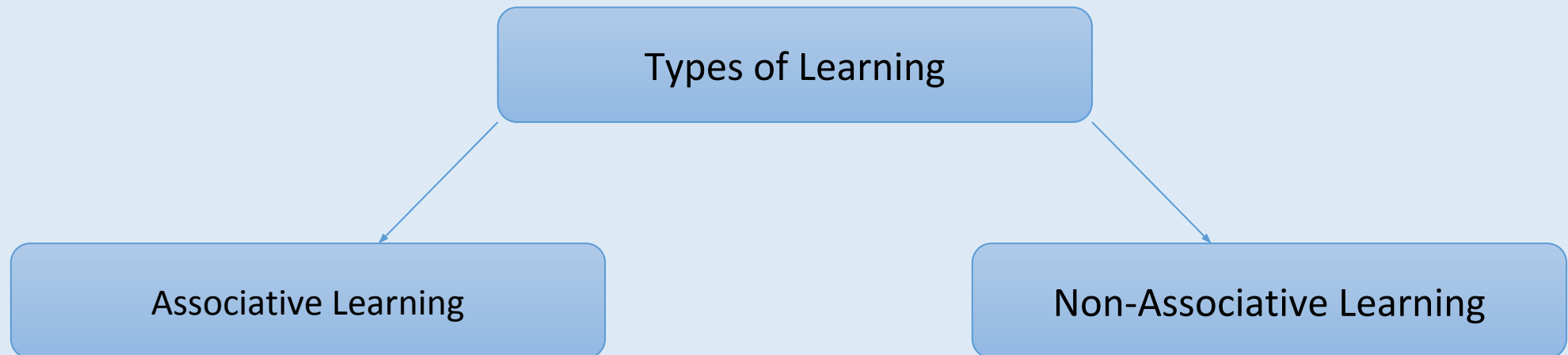
- “Learning is defined as a relatively permanent change in behavior that occur as a result of experience.”

(Atkinson & Hilgard p. 225)

- Learning is a change in behavior—better or worse.
- It is a change that takes place through practice or experience, but changes due to growth or maturation are not learning.
- This change in behavior must be relatively permanent, and it must last a fairly long time.
- Learning is a continuous and gradual process.
- Learning may occur consciously or unconsciously.
- Behavior change due to maturation and temporary conditions are not included.

# Definition of Learning

- **Stimulus** – External or internal change which generates the response of the body – situation, events, signals, cues, etc.
- **Response** – Reaction shown by the body



# Non-Associative Learning

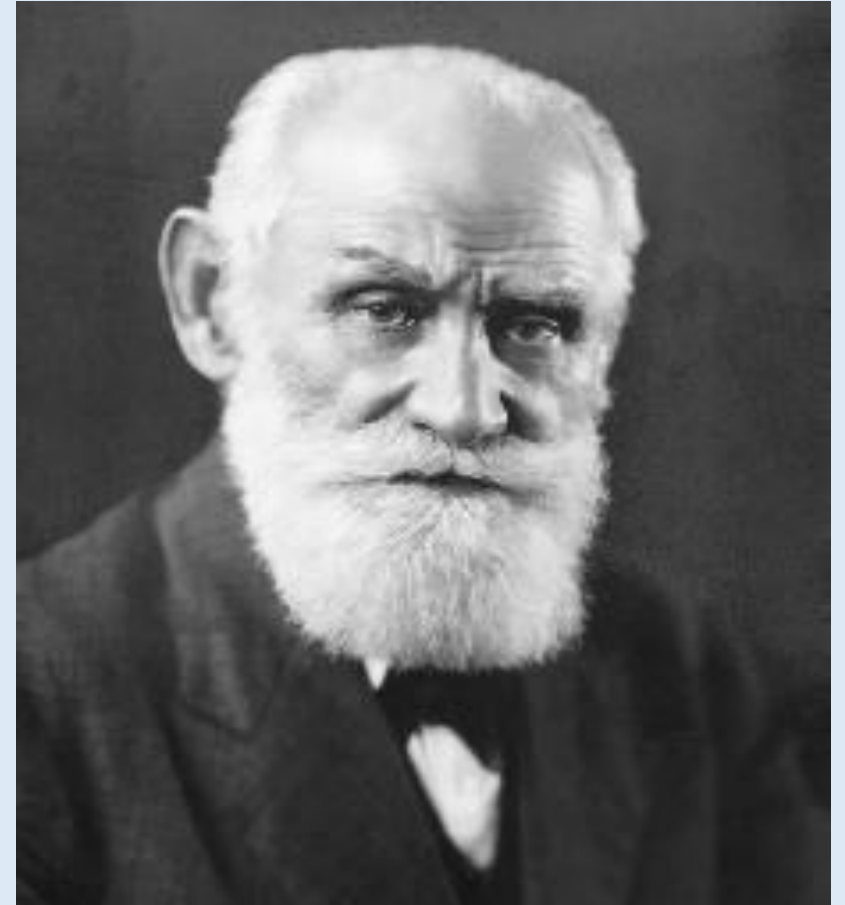
- Learning about a single stimulus.
  - Those instances in which behavior toward a stimulus changes in the absence of any apparent associated stimulus or event (such as a reward or punishment).
1. **Habituation** – Decline in responding to a repeatedly presented stimulus.
  2. **Sensitization** – an increase in a behavior response to intense stimulus.  
Sensitization typically occur when noxious or fearful stimuli are presented.

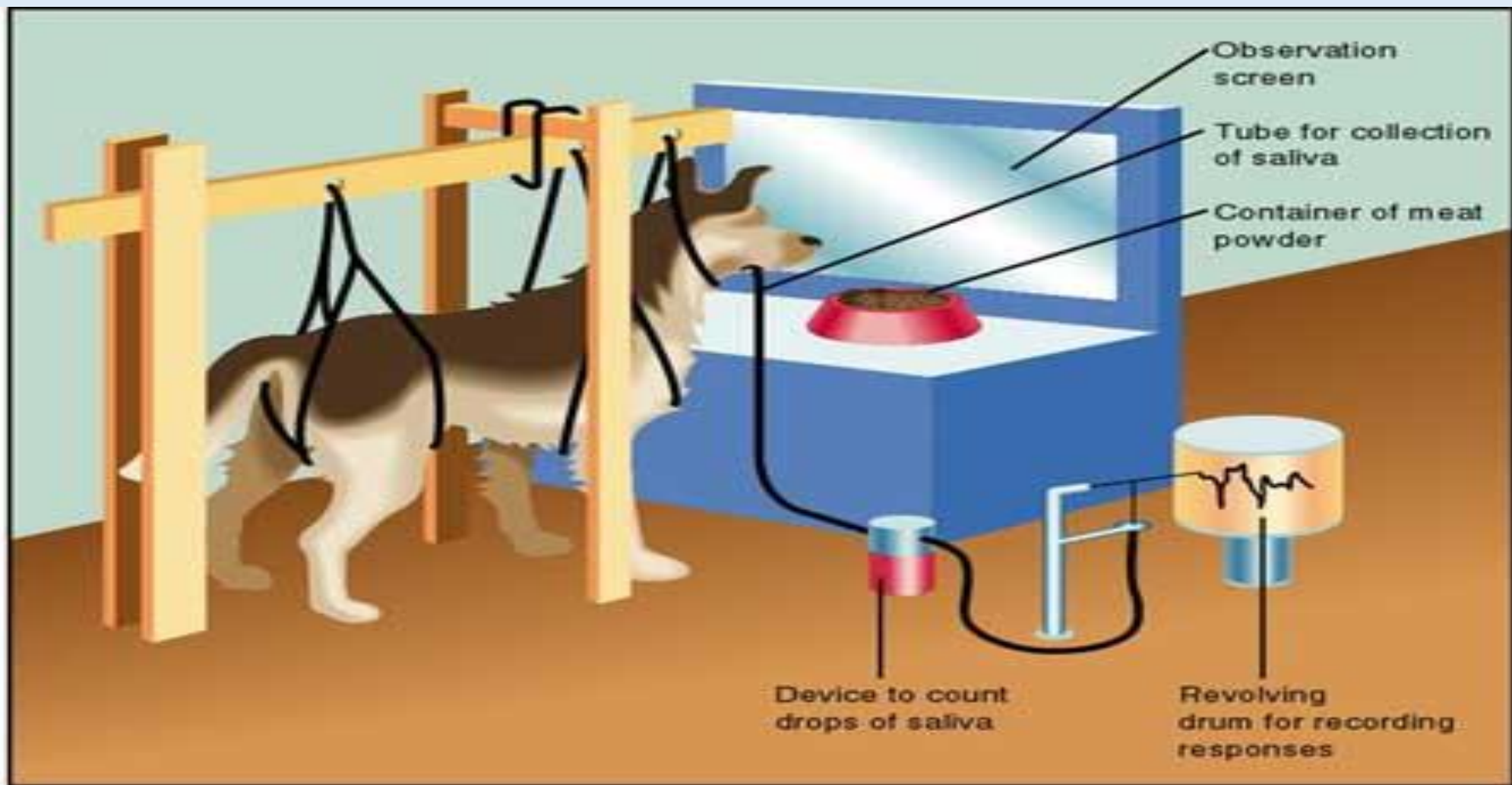
# Associative Learning

- Learning relationship among events (Association)
- **Classical Conditioning** – is a learning process in which a previously neutral stimulus become associated with another stimulus through repeated paring with that stimulus.
- **Instrumental Conditioning** – a learning process in which behavior is modified by the reinforcing or inhibiting effect of its consequence.

# Classical Conditioning

- Conditioned – learned
- Unconditioned – unlearned
- Russian Physiologist Ivan P. Pavlov
- Early 1990's – Mechanism of Digestion
- Nobel Prize in 1904





# Classical Conditioning

- All learning occurs through interactions with the environment
- The environment shapes behavior

## Pavlov's Experiment

- **Unconditioned Response (UR)** – unlearned response elicited by taste of food.
- **Unconditioned Stimulus (US)** – automatic response without prior conditioning.
- **Neutral Stimulus (NS)** – stimulus that cannot cause salivation.
- **Conditioned Response (CR)** – learned response



## Before Conditioning

  
Unconditioned  
stimulus

  
Unconditioned response

  
Neutral stimulus

  
No response

## During Conditioning



  
Unconditioned response

## After Conditioning

  
Conditioned  
stimulus

  
Conditioned response

# Key Principles of Classical Conditioning

1. **Acquisition** – Response is established and gradually strengthen. **NS** is repeatedly paired with **US**.
2. **Extinction** – Occurrences of a conditioned response decreases or disappears. **CS** is not paired with **US**.
3. **Spontaneous Recovery** – Sometimes a learned response can suddenly reemerge even after a period of extinction.
4. **Stimulus Generalization** – Is the tendency for **CS** to evoke similar responses after the response has been conditioned.
5. **Stimulus Discrimination** – Is the ability to differentiate between a **CS** and other stimuli that have not been paired with an **US**.

# Applications of Classical Conditioning

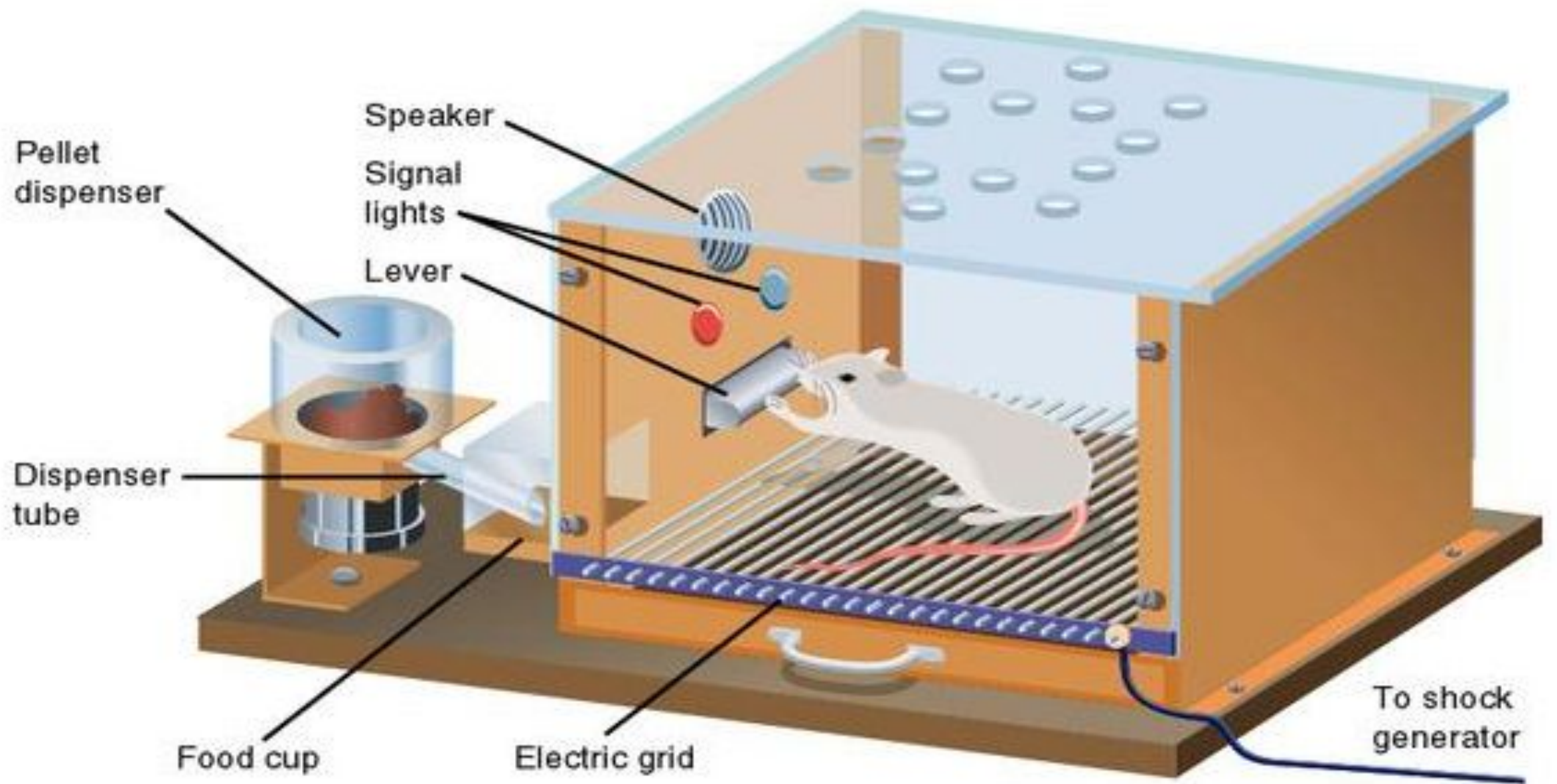
- Treatment of phobias, alcoholism, addictions and other unwanted behavior
- Training animals to show desired behavior

# Instrumental Conditioning

- Association between a response and its consequences.
- Learning occurs through rewards and punishments for behavior.

## Skinner's Experiments

- **Neutral operants** – responses from the environment that neither increase nor decrease the probability of a behavior being repeated.
- **Reinforcers** – responses from the environment that increase the probability of a behavior being repeated. Reinforcers can be either positive or negative.
- **Punishers** – responses from the environment that decrease the likelihood of a behavior being repeated. Punishment weakens behavior.



- Acquisition – response reinforced
- Extinction – response not reinforced

## Reinforcement and Punishment

- Reinforcement – refers to the process whereby the delivery of an stimulus increases the probability of behavior.
- Punishment – is the converse of reinforcement: it decreases the probability of a behavior.



# 4 Consequences of Behaviour

## Positive Reinforcement:

Consequence *adds* something;  
future likelihood of behaviour increases



**Behaviour:** Studied for test  
**Consequence:** Got an A+  
**Impact:** Will study for the next test

## Positive Punishment:

Consequence *adds* something;  
future likelihood of behaviour decreases



**Behaviour:** Attempted the half-pipe  
**Consequence:** Sustained a head injury  
**Impact:** Realized you're too old for this! Won't try again.

## Negative Reinforcement:

Consequence *removes* something;  
future likelihood of behaviour increases



**Behaviour:** Took out the trash  
**Consequence:** Foul smell in house went away  
**Impact:** Will continue to discard smelly trash

## Negative Punishment:

Consequence *removes* something;  
future likelihood of behaviour decreases



**Behaviour:** Driving recklessly  
**Consequence:** License taken away  
**Impact:** Less likely to drive recklessly in future

# Schedules of Reinforcement

	<b>Ratio - Skill Response / Behavior</b>	<b>Time Interval</b>
<b>Fixed</b>	Reinforcement provided after a specific number of responses. <i>(e.g., when the toddler turns the page in a book every time or every 3<sup>rd</sup> time)</i>	Reinforcement provided after a specified length of time <i>(e.g., after 2 min of the toddler sitting quietly in the car seat)</i>
<b>Variable</b>	Reinforcement provided after average number of responses <i>(e.g., when the toddler turns the page in a book mom praises verbally about every 4-6 page turned)</i>	Reinforcement provided after an average amount of time <i>(e.g., after about every 2-5 min of the toddler sitting quietly in the car seat)</i>



# Schedules of Reinforcement

## Reinforcement Schedules Compared

SCHEDULE OF REINFORCEMENT	RESPONSE RATE	PATTERN OF RESPONSES	RESISTANCE TO
Fixed-ratio schedule	Very high	Steady response with low ratio. Brief pause after each reinforcement with very high ratio.	The higher the ratio, the more resistance to extinction.
Variable-ratio schedule	Highest response rate	Constant response pattern, no pauses.	Most resistance to extinction.
Fixed-interval schedule	Lowest response rate	Long pause after reinforcement, followed by gradual acceleration.	The longer the interval, the more resistance to extinction.
Variable-interval schedule	Moderate	Stable, uniform response.	More resistance to extinction than fixed-interval schedule with same average interval.

# Criminal Behavior and Learning Theories

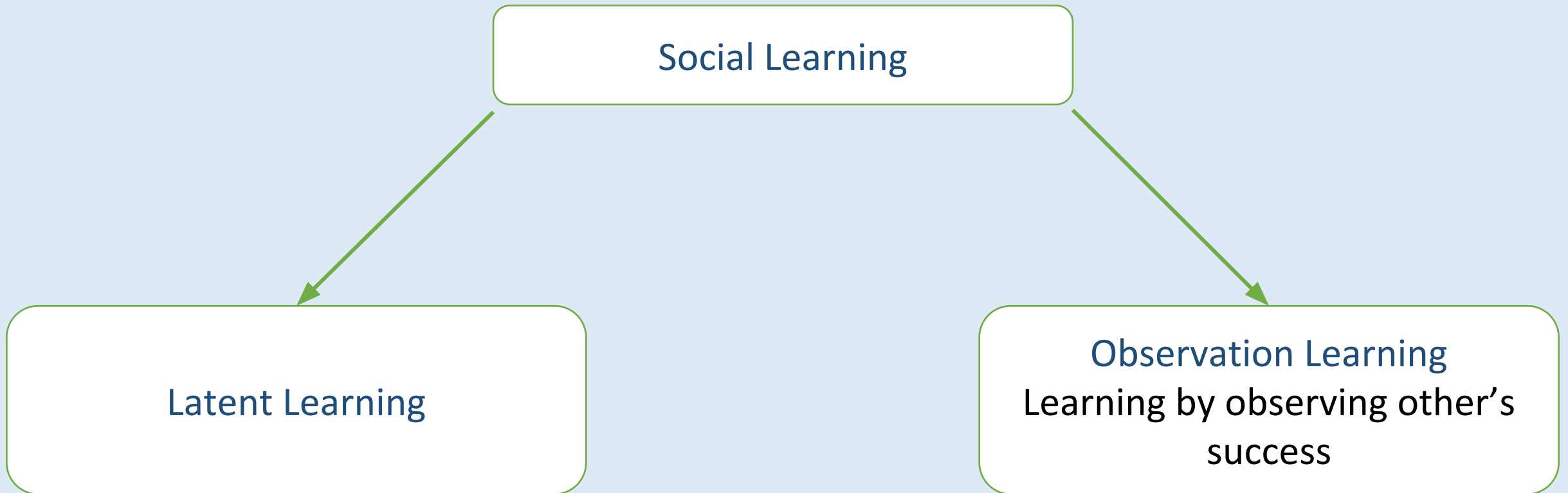
- Crime involves reinforcement positive or negative.
- Reinforces are products not person.
- Punishment reduces the response rate but, unless it is severe, punishment will not eliminate a response rate.
- Punishment is usually paired with a response that is strongly maintained by other reinforcing stimuli.
- Certainty of punishment and the severity- that deters people from criminal acts.
- Severity of punishment can lead of avoidance and escape
- Individual factors in punishment.

# Laws of Learning

- **Law of readiness** – By readiness means the organism is ready to respond or act. This is more essential prerequisite for learning.
- **Law of exercise** – This law is also known as law of frequency. Frequency refers to number of repetitions of learning.
- **Law of effect** – This law states that when a connection is accomplished by satisfying effect- its strength is increased.

JB Watson, in his book, has said, *“Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations and the race of his ancestors”*.

# Learning and Cognition



- Bobo doll experiment – Albert Bandura

# Observational Learning

There are four mediational processes proposed by Bandura:

- **Attention:** The extent to which we are exposed/notice the behavior.
- **Retention:** How well the behavior is remembered. The behavior may be noticed but is it not always remembered which obviously prevents imitation.
- **Reproduction:** This is the ability to perform the behavior that the model has just demonstrated.
- **Motivation:** The will to perform the behavior. The rewards and punishment that follow a behavior will be considered by the observer.

# Latent Learning

- learning which is not apparent in the learner's behavior at the time of learning, but which manifests later when a suitable motivation and circumstances appear.

- Observational Learning –

<https://www.verywellmind.com/bobo-doll-experiment-2794993>

<https://www.simplypsychology.org/bandura.html>



- An example of a conditioned taste aversion

“I experienced a long time ago. When I was little (let’s say I was like 5), I had some oysters, and the following day I got a really bad stomach flu. Since then I haven’t had any oysters at all— just smelling them or thinking about eating them still makes me feel nauseated. I have to say it’s a really strong conditioning because it occurred after just a single trial, and I still feel nauseated and sick when I see or smell oysters even after 15 years.”

### Identify:

- Unconditioned Response (UR)
- Unconditioned Stimulus (US)
- Neutral Stimulus (NS)
- Conditioned Response (CR)