PSYCHOLOGY LEARNING PRINCIPLES COMPREHENSIVE STUDY GUIDE

1. PRINCIPLES OF LEARNING

Habituation

- **Definition:** Decrease in behavioral response to repeated, harmless stimulus over time
- **Non-associative learning:** No reward/punishment involved
- **Response decrease:** Faster w/ frequent, rapid repetitions
- **Stimulus intensity:** Weaker stimulus = faster habituation
- **Dishabituation:** Sudden response recovery after new/strong stimulus presented (e.g., notice fridge hum after door slam)
- **Short-term:** Fades quickly (min to hrs)
- **Long-term:** Lasts days/wks; involves synaptic changes in sensory neurons (less neurotransmitter released)

Sensitization

- **Definition:** Increased response to stimulus following intense/noxious event
- **Non-associative:** Also no reward/punishment
- **Effect:** Even mild stimuli trigger strong responses afterward
- **Function:** Adaptive, protective role
- **Dual Process Theory:** Behavior = balance of habituation (inhibitory) & sensitization (excitatory) processes in nervous system

Priming & Perceptual Learning

- **Priming:** Exposure to stimulus influences later responses unconsciously (e.g., "yellow" → recognize "banana" faster)
- **Perceptual Learning:** Improved ability to distinguish stimuli through experience (e.g., wine tasters learn subtle flavor differences)

Spatial Learning

- **Cognitive maps:** Mental representations of environments (Tolman's rat maze experiments)
- **Hippocampus:** Key for encoding spatial relationships

Constraint-Induced Movement Therapy (CIMT)

- **Method:** Restrain functional limb to force impaired limb use
- **Basis:** Experience-dependent plasticity; brain reorganizes through repeated practice

Generalization

- **Stimuli & Outcomes:** Responding similarly to stimuli resembling conditioned one
- **Example:** Fear of white rat → fear of white fur/Santa beards (Little Albert)
- **Generalization gradient:** Response strength decreases as stimulus differs from original
- **Discrete-component network:** Each stimulus component represented separately (no generalization)
- **Real systems:** Fall between continuous generalization & discrete categorization

Discrimination Learning

- **Definition:** Learning to respond differently to similar stimuli when only one associated w/ reinforcement
- **Example:** Dog salivates to 1000 Hz tone but not 1200 Hz
- **Errorless Discrimination:** Gradually introduce non-reinforced stimulus to minimize errors; prevents frustration & extinction bursts
- **Negative Patterning:** Responses to individual stimuli reinforced, but combined pattern not (or vice versa); demonstrates non-linear associations (e.g., light + tone → no food)

Concept Formation

- **Concepts:** Mental groupings of similar objects/events
- **Categories:** Sets of stimuli w/ shared characteristics
- **Prototype:** Best/"average" example of category (robin vs penguin as "bird")
- **Stereotypes:** Social application of categorical thinking; overgeneralized expectations
- **Discrimination Training:** Teach category boundaries (e.g., "cat" vs "dog" images) via feedback-based learning

2. CLASSICAL CONDITIONING

Elements & Basic Processes

- **Unconditioned Stimulus (US):** Naturally elicits response (food)
- **Unconditioned Response (UR):** Natural reaction (salivation)
- **Conditioned Stimulus (CS):** Initially neutral (bell)
- **Conditioned Response (CR):** Learned reaction to CS (salivation to bell)
- **Appetitive Conditioning:** Learning about pleasant outcomes (food, affection)
- **Aversive Conditioning:** Learning about unpleasant outcomes (shock, fear)

Extinction & Recovery

- **Extinction:** Gradual weakening & disappearance of CR when CS repeatedly presented w/o US
- **Mechanism:** Involves inhibition, not unlearning; can show spontaneous recovery later

Compound Conditioning

- **Overshadowing:** Two stimuli presented together compete for associative strength; more salient cue "overshadows" other
- **Blocking:** Prior learning of one CS-US association prevents learning new CS when both presented together; shows learning depends on prediction error

Error-Correction Learning

- **Rescorla-Wagner Model:** Learning = change in association strength ∝ predictive error
- **Formula:** $\Delta V = \alpha\beta (\lambda - \Sigma V)$
- **Principle:** If outcome fully predicted, no new learning occurs
- **Probabilistic Categorization:** Learning to predict when cues unreliable; models real-world uncertainty (e.g., weather prediction)

Brain Areas

- **Cerebellum:** Essential for timing & coordination of conditioned responses
- **Purkinje Cells:** Inhibitory neurons in cerebellar cortex; suppress motor responses; reduced activity during conditioned blink
- **Interpositus Nucleus:** Stores CS-US associations in eyeblink conditioning
- **Inferior Olive:** Provides "error signal" from unexpected US to update learning

Clinical Applications

- **Tolerance:** Repeated drug use in same environment → body anticipates effects → conditioned physiological counter-response
- **Extinguishing Drug Addiction:** Exposure therapy presents drug-related cues w/o drug, weakening conditioned craving
- **Baby Albert:** Demonstrated conditioned fear: loud noise (US) → crying (UR); paired w/ white rat (CS) → fear of rat (CR) & other furry objects (generalization)

3. OPERANT CONDITIONING

Foundational Principles

- **Thorndike's Cats:** Law of Effect—behaviors followed by satisfaction strengthened; discomfort weakened; cats escaped puzzle boxes faster over trials
- **Skinner Box:** Automated environment to measure lever-press/key-peck behavior under controlled reinforcement
- **S-R-O Framework:** Discriminative Stimulus (signal) → Response → Outcome; example: "Open" sign (S) → enter store (R) → food (O)

Shaping & Chaining

- **Shaping:** Reinforcing successive approximations toward target behavior
- **Chaining:** Linking discrete behaviors into sequence where each step cues next

Reinforcement & Punishment

- **Reinforcer:** Increases behavior likelihood
- **Punisher:** Decreases behavior likelihood
- **Positive:** Add stimulus
- **Negative:** Remove stimulus
- **Primary Reinforcers:** Innate (food, water, warmth)
- **Negative Contrast:** Preference drops when high-value reinforcer replaced by lower-value one
- **Secondary Reinforcers:** Neutral stimuli paired w/ primary reinforcers (money, praise)

Behavior Modification Systems

- **Token Economy:** Uses tokens exchangeable for rewards; effective in classrooms & therapy
- **DRA:** Differential Reinforcement of Alternative Behavior; reinforce acceptable alternative to problematic behavior while withholding reinforcement for undesired one

Operant Paradigms

- **Free-operant:** Continuous responding (Skinner box)
- **Discrete-trial:** Each response clearly separated (maze run)

Reinforcement Schedules

- **Fixed Ratio (FR):** Reinforcement after fixed # of responses
- **Variable Ratio (VR):** After varying #; produces high, steady rate (slot machines)
- **Fixed Interval (FI):** After fixed time; produces scalloped pattern
- **Variable Interval (VI):** After variable time; steady moderate rate

Behavioral Economics

- **Definition:** Examines how response rates change as "costs" (effort, delay) & "values" (reward size) vary
- **Elastic demand:** Behavior drops when cost rises
- **Inelastic demand:** Behavior persists despite cost (e.g., addiction)
- **Delay Discounting:** Tendency to devalue delayed rewards; steep discounting = impulsivity

Brain Areas

- **Dorsal Striatum:** Links stimuli w/ responses; important for habit formation
- **Orbitofrontal Cortex:** Represents value of expected outcomes; updates when contingencies change

Addiction Applications

- **Addiction Mechanism:** Drugs reinforce behavior via dopamine release; cues become powerful discriminative stimuli
- **Combined Processes:** Both classical (cue reactivity) & operant (drug seeking) interact
- **Pathological Addiction:** Dependence on substance altering neurochemistry
- **Behavioral Addiction:** Compulsive engagement in rewarding behavior (gambling, gaming) despite harm
- **Common Features:** Both show tolerance, withdrawal, & cue-triggered craving