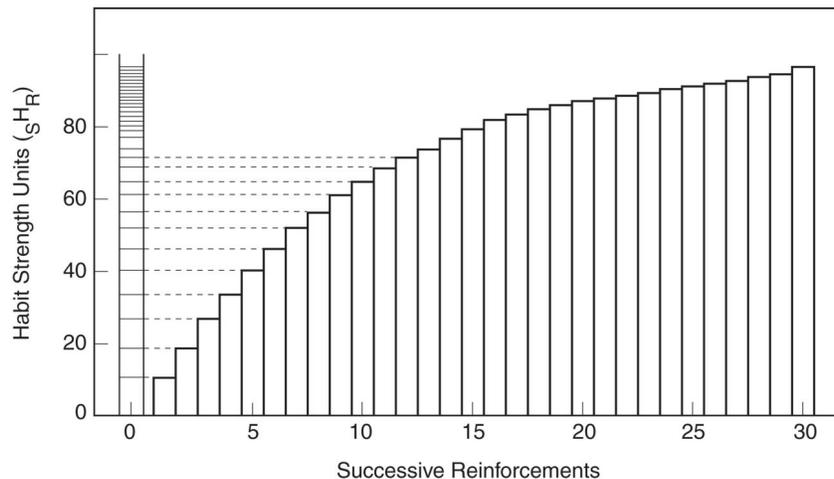


Chapter 6 - Clark L. Hull

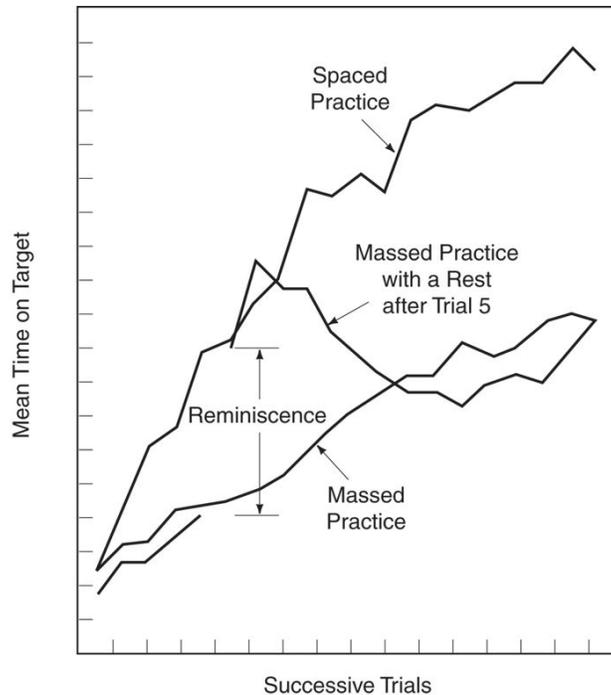
Powerpoint Notes

- Clark L. Hull (1884—1952)
 - A Hypothetical Deductive Approach
 - A dynamic, open-ended system.
 - Hypotheses are constantly being generated.
 - A theory such as Hull's must continually be updated in accordance with the outcome of empirical investigation.
- Major Theoretical Concepts
 - Hull postulates the existence of a **stimulus trace (s)** that continues for a few seconds after the stimulus event has terminated.
 - Behavior is seldom a function of only one stimulus but of **many stimuli converging** on the organism at any given time.
 - **Unlearned behavior** is triggered when a need arises.
 - If innate behavior is ineffective in reducing the need, the organism will have to learn new response patterns.
 - Contiguity and **Drive Reduction**
 - If a response is followed by need (drive) reduction, the response is learned.

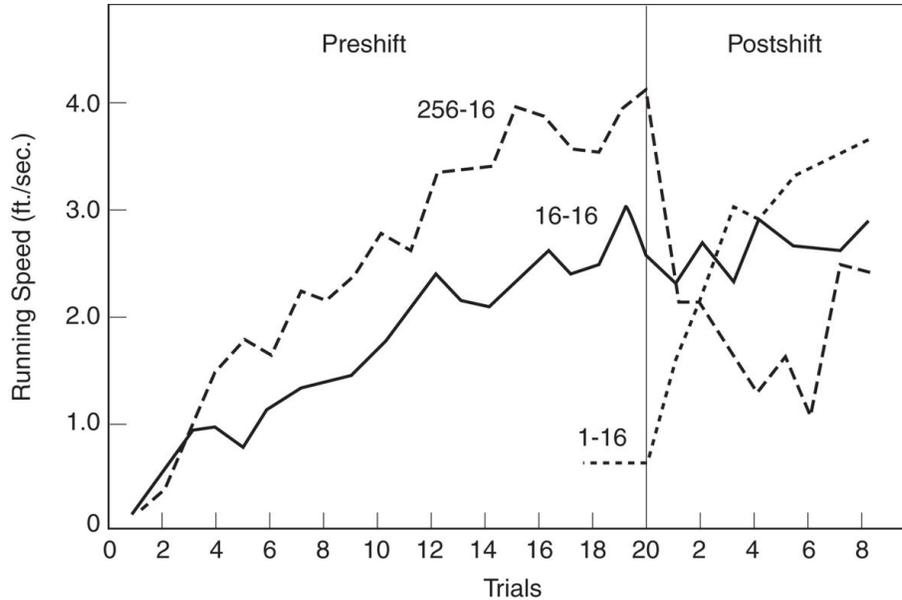


- Major Theoretical Concepts Cont.
 - **Stimulus Generalization**: Stimuli similar to the one used in conditioning can also elicit a response.
 - **Stimuli Associated with Drives**: Each need state produces its own cues. Hunger and thirst provide different stimuli.
 - **Reaction Potential** is a Function of Drive and Habit Strength

- Reaction potential = ${}_sE_R = {}_sH_R \times D$
- Actual behavior requires **both** learning (${}_sH_R$) AND drive (D). If either are zero, no behavior will be observed.
- **Responding Causes Fatigue (I)**, Which Operates against the Elicitation of a Conditioned Response.
 - Effective reaction potential = ${}_sE_R = {}_sH_R \times D - (I_R + {}_sI_R)$
 - Behavior requires learning and drive but is reduced by momentary and learned fatigue (I).

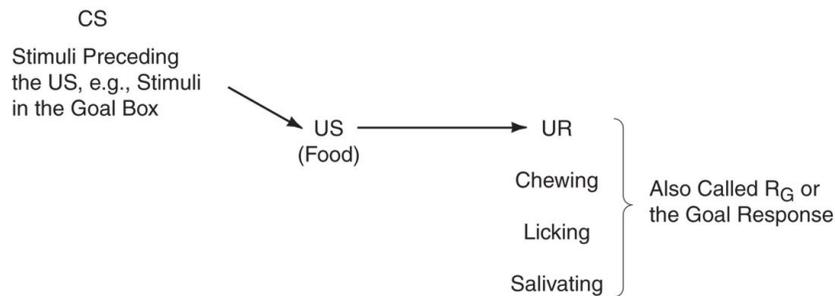


- Hull—1943 versus 1952 Theories
 - 1943: The greater the amount of reinforcement, the greater the amount of drive reduction, and thus the greater the increase in ${}_sH_R$.
 - Crespi (1942, 1944) and Zeaman (1949) showed that change in amount causes rapid change in performance that **could not** be attributed to learning

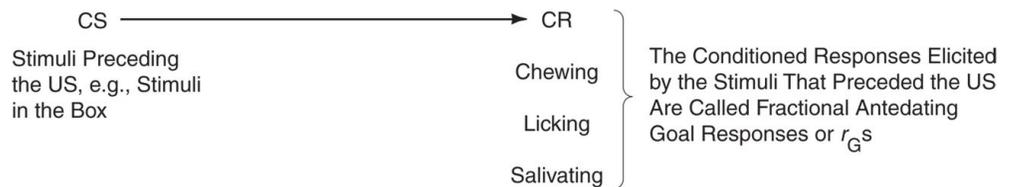


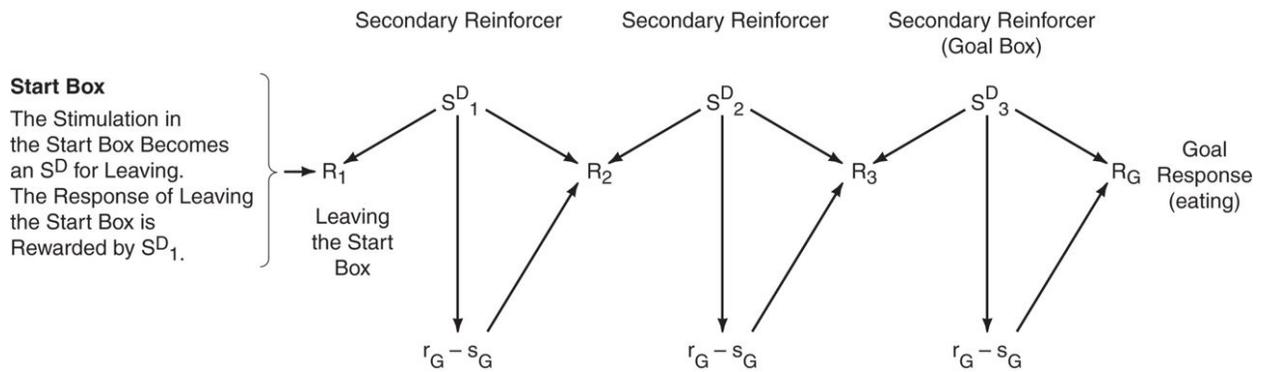
- Hull—1943 versus 1952 Theories Cont.
 - Change from Drive Reduction to *Drive Stimulus Reduction*.
 - Actual drive reduction is slow.
 - Drive Stimuli are soothed immediately.
 - fractional antedating goal response (r_G)
 - r_G is a small component of a goal response
 - e.g., Chewing and Salivation are small components of eating.
 - r_G produces stimuli which evoke responses and serve as internal secondary reinforcers.

Before Pairing



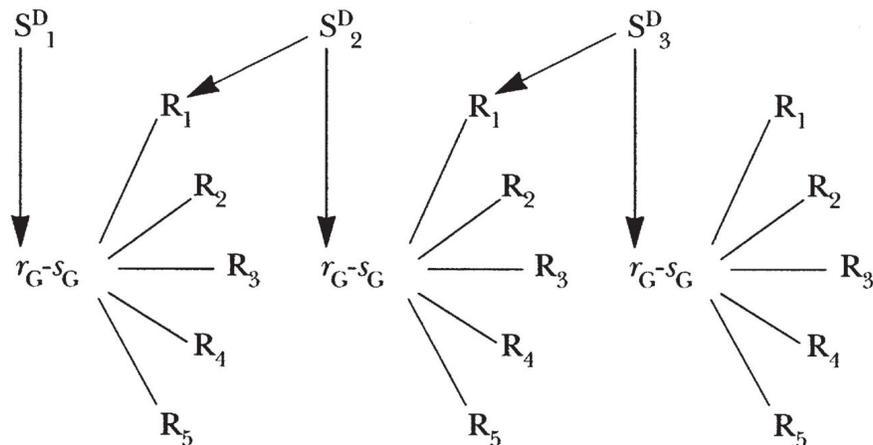
After Pairing





- **The Habit Family Hierarchy**

- In any learning situation, many responses are possible. The one that is most likely is the one that brings about reinforcement most rapidly and with the least amount of effort.



- Kenneth W. Spence (1907—1967) Incentive Motivation (K)
 - **K = Incentive**, or quality/quantity of reinforcer.
- For Hull: $sE_R = sH_R \times D \times K$
 - Learning, Drive, and Incentive must all be present.
- For Spence: $sE_R = sH_R \times (D + K)$
 - Learning is necessary. **Either D or K** must be present, but **not both**.
- Implications of Spence's Position
 - If D is not necessary (assuming there is K), then there is **no need for drive reduction** or reinforcement.
 - Spence became a **contiguity theorist** and broke with Hull's doctrine of reinforcement.
 - Reinterpreting **Extinction**
 - For Hull: Extinction was the result of I (inhibition or fatigue).

- For Spence: Extinction is due to frustration, which produces incompatible responses.
- Abram Amsel (1922—2006)
 - Spence's student at Iowa.
 - Developed the *Frustration Effect*.
 - Frustration (non reward) produces an energized Drive—and Drive is a negative state.
 - Can you think of examples?
 - Frustration and the PRE
 - **PRE = Partial Reinforcement Effect**
 - Partial reinforcement schedules produce greater resistance to extinction.
 - How does frustration contribute to PRE?
 - When non-reward happens after continuous reinforcement, Frustration is strong.
 - When non-reward happens after partial reinforcement, the frustration is a cue that more reinforcement will follow.
- Neal E. Miller (1909—2002)•A major figure in the discovery of *Biofeedback*.
 - Individuals can control their own heart rate, blood pressure, and skin temperature.
 - A major figure in the discovery of Biofeedback.
 - Patients can control cardiac abnormalities, Attention Deficit Hyperactivity Disorder (ADHD) patients can increase attention, and elderly patients can control urinary incontinence.

Class Notes

- Hull
 - Postulates
 - Theorems -> law
 - Theorems are derived from a combination of postulates.
 - Experiments
 - The notion of the independent variable, which is stimuli changed by the investigators.
 - Intervening variables are hypothetical constructs
 - Habit strength
 - never weakens
 - Especially as it approaches 1.0
 - Motivates the animal
 - Drive
 - Is reduced when reinforced
 - Energizes the animal's behavior.
 - Must be reduced to be a reinforcer.

- Are stimuli.
 - Stimulus intensity dynamism
 - Incentive motivation
 - Reaction potential
 - Effective reaction potential
 - Momentary effective reaction potential
 - Reactive inhibition
 - Conditioned inhibition
 - Reaction threshold
 - Oscillations of reaction potential
 - Dependant variables
 - Response
 - Response latency
 - Number of non reinforced trials of extinction
 - Probably of response
 - Response output
 - heuristic
- Major theoretical concepts
 - Reaction potential is a function of drive and habit strength
 - Actual behavior requires both learning and drive. If either is zero, no behavior will be observed.
 - Sigmoid curve shows incremental learning (s-shaped).
 - Drive can be manipulated through deprivation.
 - Responding causes fatigue.
 - 1952:
 - Not just drive reduction but drive stimulus reduction.
 - Psychological approaches to behavior:
 - The crespri effect
 - Describes two states
 - 256-16 group: depression (below baseline 16-16)
 - 1-16 group: elation (above 16-16 baseline)
 - Hull has to reevaluate his theories through this
 - Hull does not acknowledge cognitive thinking fully but allows the possibility.
 - Reactive inhibition
 - Is similar to but is not exactly fatigue (caused by repetition)
 - Conditioned inhibition
 - Is caused by extinction and fatigue
 - Explains Ebbinghaus theory of massed vs distributed training effects.
 - Spaced practice has greater performance than massed practice.
 - Accounted for by reactive inhibition.
 - When reactive inhibition dissipates, it reinforced conditioned inhibition.
 - Reminiscence effect: a short break can improve performance.
- Spontaneous recovery for Hull

- After extinction, without any further training behavior returns.
 - Reactive inhibition dissipates with rest.
- Reintroducing a reinforcer after complete extinction
 - Habit strength is permanent
 - Motivation
- Muller and Pilzecker = consolidation hypothesis
- Massed practice begins to interfere with the consolidation of memory.
- Disrupted practice allows for time for memory traces to get to where they need to and to be more persistent.
- Hull 1943 vs 1952
 - Fractional antecedating goal response is a small component of goal response.
 - Produces stimuli
 - Integrates and guides behavior.
 - Similar to skinner's chaining.
- Secondary Reinforcers
 - Skinner
 - External, attached to the primary
 - Hull
 - Internal to the organism
 - Fractional behaviors (chewing, swallowing, salivating are fractional behaviors to eating)
 - Glues behavior / integral
 - Behavior is guided similar to successive approximation
- Hull
 - Incremental learning theorist
 - Drive reduction theorist
 - Reinforcer theorist
- Reinforcers in the early stages of learning cause greater increases in habit strength than do later reinforcers.
- If one arm of a T-Maze is tilted upward at 30 degrees, then more effort is required to reach the goal, Therefore:
 - Reactive inhibition would be greater.
- Which of the following describes the Crespi effect?
 - Performance is related to the size of the incentive (k - motivation)
- Hull changed from a drive reduction theories to a drive stimulus reduction theory of learning because:
 - Drive reduction often after the presentation of a reinforcer which is immediate. Being presented with food reduced drive, before the animal has finished eating which is what diminishes the hunger.
- Hull's equation for momentary effective reaction potential suggests that, other things being equal, if incentive motivation increases then momentary effective reaction potential
 - Increases

Vocabulary:

- Anticipatory frustration stimulus
- Biofeedback
- Conditioned anticipatory frustration
- Conditioned inhibition
- Crespit effect
- Distributed practice
- Drive
- Drive reduction
- Drive stimuli
- Drive stimulus reduction
- Effective reaction potential
- Fractional antedating goal response
- Fractional anticipatory frustration reaction
- Frustration-competition theory of extinction
- Frustration drive stimulus
- Frustration effect
- Generalized habit strength
- Habit family hierarchy
- Habit strength
- Hypothetical deductive theory (logical deduction)
- Incentive motivation
- Interaction of sensory impulses
- Latency
- Latent learning
- Law of contiguity
- Law of frequency
- Massed practice
- Momentary effective reaction potential
- Oscillation effect
- Partial reinforcement effect
- Primary frustration effect
- Primary frustration
- Proprioceptive stimuli
- Reaction potential
- Reaction threshold
- Reactive inhibition
- Reinforcement
- Reinforcer
- Reminiscence effect

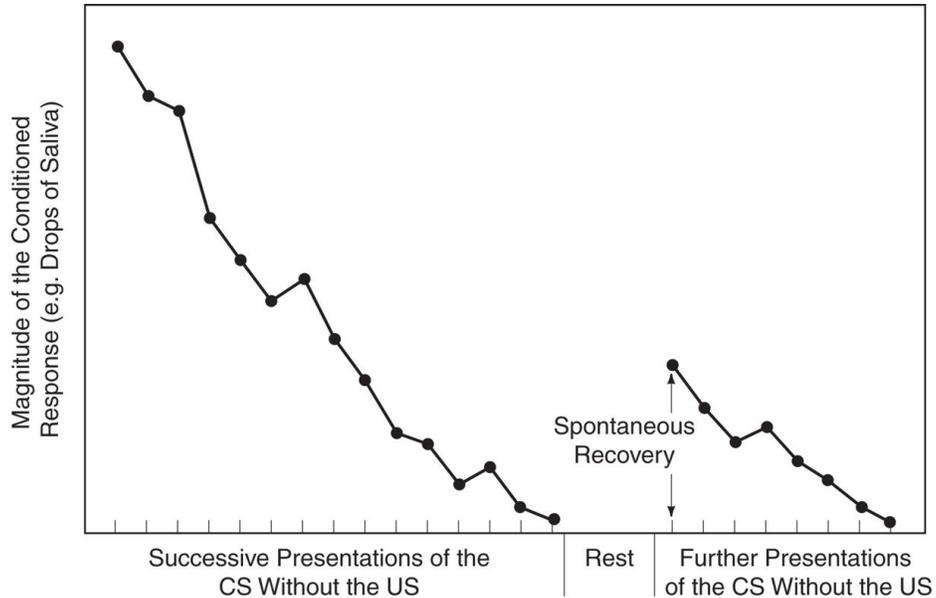
- Stimulus generalization
- Stimulus-intensity dynamism
- Stimulus trace
- Testing effect
- Unlearned behavior
- Visceral conditioning

Textbook Notes

Powerpoint Notes

Ivan Petrovich Pavlov (1849—1936)

- Pavlov's Discovery
 - Development of a Conditioned Reflex
 - Basic Elements
 - **Unconditioned Stimulus (US)**
 - elicits a natural and automatic response called the
 - **Unconditioned Response (UR)**
 - **US**-----à**UR**
 - Meat powder-----àSalivation or Weak electric shock-----àwithdrawal reflex
 - **Conditioned Stimulus (CS)**
 - A “neutral” event that does not elicit the response of interest. A flashing light, for example, does not normally elicit salivation.
 - The **CS** is repeatedly paired with the **US**.
 - **CS**(flashing light) + repeatedly paired with **US**(meat powder)----à**UR**(salivation)
 - Eventually, the **CS** is presented *without* the **US**, and a response called the **Conditioned Reflex** or **Conditioned Response (CR)** is elicited.
 - **CS**-----à**CR** (Flashing light) (salivation) + (**no US**)
 - **Experimental Methods**
 - **Experimental Extinction**
 - After CR develops, the CS is repeated without the US, and the CR gradually disappears.
 - **Spontaneous Recovery**
 - After extinction, the CS can be presented and the CR will temporarily reappear.
 - After a CS has been paired repeatedly with a US, it can be used much like a US.
 - CS is temporarily a **secondary reinforcer**. Because secondary reinforcement cannot develop without the US, the US is called a **primary reinforcer**.



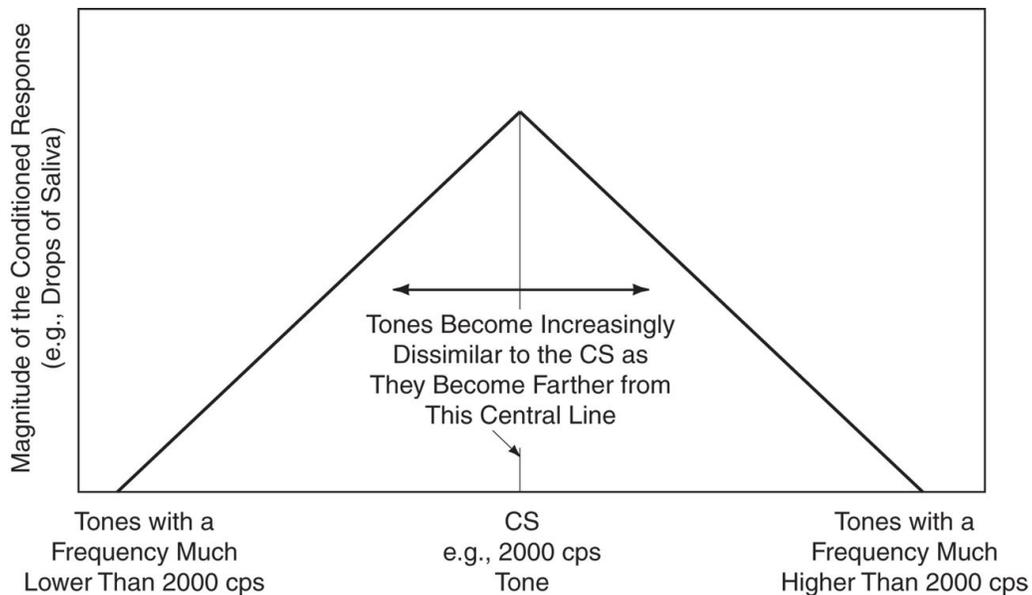
- **Higher-Order Conditioning**

- **Generalization**

- Stimuli similar to the CS will also elicit the CR

- **Discrimination**

- With prolonged training, generalization decreases and only the original CS elicits the CR.



- **Comparison Between Classical and Instrumental Conditioning**

- **Instrumental and Operant Conditioning**

- Reinforcer follows response.
 - There is debate about necessity of reinforcers.

- **Classical (Pavlovian) Conditioning**

- The reinforcer (US) precedes response (UR).
 - The US is essential for classical conditioning.
- Research After Pavlov
 - CRs Are Not Necessarily Little URs
 - CRs may actually be the opposite of the UR.
 - Possibly a homeostatic response to return the organism to a state of balance.
 - Extinction Involves Interference
 - **Renewal effect:** when a response conditioned in one context is extinguished in another. When the subject is returned to the original setting and the CS presented, the CR is readily elicited.
 - Extinction Involves Interference
 - **Reinstatement:** when experimental extinction seems to be complete, after a few *unpaired* presentations of the US, the original CS again elicits a CR.
- The Rescorla-Wagner Theory of Classical Conditioning
 - A maximum level of conditioning can be attained. This maximum is called λ (*lambda*).
 - The theory describes how the level of learning on a given trial approaches the maximum λ .
 - The amount of learning on any trial (n) is ΔV_n
 - The “strength” of a CS is designated α .
 - The “strength” of a US is designated β .
 - α and β combine when the CS and US are presented.
 - The change on a trial (ΔV_n) starts with the amount conditioned on the previous trial V_{n-1} and brings the amount of learning closer to λ .
 - $\Delta V_n = \alpha\beta (\lambda - V_{n-1})$
 - The amount conditioned on any trial ΔV_n is some portion of what was already conditioned previously and the maximum that can be conditioned.
 - That portion is large if α and β are large, and vice versa.
 - What happens if $\alpha \times \beta = 1.00$?
- Research After Pavlov
 - Martin Seligman and Learned Helplessness
 - Learned Helplessness
 - When animals are exposed to unpredictable and unavoidable electric shocks as US, they “give up.”
 - They appear helpless when later challenged with learning problems.
 - **Conditioned Taste Aversion**

- Garcia and Koelling exposed rats to strong X-rays while they were drinking saccharine-sweetened water (CS). X-ray treatment causes nausea (US).
 - Subsequently, the rats refused to drink saccharine-sweetened water.
- Applications in Clinical Psychology
 - Extinction
 - Counter conditioning
 - Flooding
 - Systematic Desensitization
 - Applications in Medicine
- The immune system can be classically conditioned.
- Application in autoimmune disorders, implant rejection, or AIDS

Textbook Notes

Vocabulary:

- Anxiety hierarchy
- Backward conditioning
- Behaviorism
- Behavior therapy
- Blocking
- Concentration
- Conditioned compensatory responses
- Conditioned emotional response
- Conditioned inhibition
- Conditioned response
- Conditioned stimulus
- Conditioned suppression
- Cortical mosaic
- Counterconditioning
- Discrimination
- Disinhibition
- Dynamic stereotype
- Excitation
- Excitatory conditioning
- External inhibition
- Extinction
- First signal system
- Flooding
- Forward conditioning
- Garcia effect
- Generalization
- Higher order conditioning
- Information value of a stimulus
- Inhibition
- Irradiation of excitement
- Latent inhibition effect
- Learned helplessness
- Learned irrelevance
- Negative transfer effect
- Orienting reflex
- Overshadowing
- Predictiveness principle
- Primary reinforcer

- Reinstatement
- Renewal effect
- Secondary reinforcement
- Second signal system
- Semantic generalization
- Spontaneous recovery
- Superconditioning
- Systematic desensitization
- Truly random control group
- Uncertainty principle
- Unconditioned response
- Unconditioned stimulus
- Watson, John B.

Class Notes

- Pavlov
 - Father of modern physiology in Russia
 - Adopted Descartes “reflex arch” idea
- Vladimir Bekhterev
 - Associative reflex
 - Animals not as useful as human models
- Pavlov
 - Nobel prize for digestive research
 - Serendipity
 - Some call it luck
 - Most important part of genius is not IQ, its observation and how to use it.

Chapter 10 - Gestalt Psychology

Textbook Notes

- Abandonment of introspectionism
- Phi phenomenon - motion illusion by combination of stimuli
- Gestalt Psychology: we experience the world in meaningful wholes.
 - The whole is different from the sum of the parts
 - To dissect is to distort
- Opposition to voluntarism, structuralism, and Behaviorism

Vocabulary:

- Absolute Theory
 - The contention of the behaviorists that what an organism learns are specific responses to specific stimuli.
- Agnosia
 - Inability to interpret sensations and hence to recognize things, typically as a result of brain damage.
- Behavioral Environment
 - According to Koffka, the environment as it is consciously experienced. Also referred to as subjective reality.
- Cognitive Hunger
 - Popper's term for innate desire to revise expectancies continuously so that they are increasing accurate in reflecting reality.
- Epiphenomenalism
 - The belief that the body sensations cause mental images. In other words, mental images are seen as by-products of body experiences.
- Field theory
 - The belief that the environment consists of interdependent events. In psychology, field theory assumes behavior or cognitive processes are a function of many variables that exist simultaneously, and a change in any one of them changes the effect of all the others.
- Geographical environment
 - According to Koffka, the physical or objective environment. Also referred to as objective reality.
- Gestalt
 - A German word meaning pattern or configuration.
- Individual memory trace
 - The memory trace left behind by a specific experience.
- Insightful learning

- Learning that occurs very rapidly; is remembered for a considerable length of time, and transfers readily to a situation related to the one in which the insightful learning took place.
- Integrative agnosia
 - Integrative agnosia is a disorder in which the patient has symptoms of both apperceptive agnosia and associative agnosia, although their primary visual abilities are intact. A patient with an integrative agnosia will be impaired in naming objects as well as in seeing object as wholes.
- Isomorphism
 - As used by Gestalt psychologists, the relationship that exists between brain activity and consciousness.
- Law of pragnanz
 - The overriding principle in Gestalt psychology, which states that all mental events tend toward completeness, simplicity, and meaningfulness.
- Memory process
 - The brain activity that is caused by environmental stimulation.
- Memory trace
 - The remnants of an environmental experience after the experience is terminated.
- Molar behavior
 - The large segment of behavior that is goal directed and therefore purposive.
- Molecular behavior
 - A small segment of behavior such as a conditioned reflex that is isolated for detailed study.
- Phenomenology
 - Phenomenology within psychology is the psychological study of subjective experience. It is an approach to psychological subject matter that has its roots in the phenomenological philosophical work of Edmund Husserl.
- Phi phenomenon
 - The phi phenomenon is the optical illusion of perceiving a series of still images, when viewed in rapid succession, as continuous motion. Max Wertheimer, one of the three founders of Gestalt psychology, defined this phenomenon in 1912.
- Principle of closure
 - The Principle of Closure refers to the belief held in the Gestalt school of psychology that the human brain is inclined to perceive forms and figures in their entirety and complete appearance in spite of the absence of one or more parts, whether they are absent or hidden.
- Productive thinking

- Wertheimer's term for thinking that is based on the understanding of the principles involved in a problem rather than on logic or rote memorization of facts or rules.
- Prosopagnosia
 - Prosopagnosia, also called face blindness, is a cognitive disorder of face perception in which the ability to recognize familiar faces, including one's own face (self-recognition), is impaired, while other aspects of visual processing (e.g., object discrimination) and intellectual functioning (e.g., decision-making)
- Relational theory
 - Relational theory proposes that a central human necessity is the establishment of authentic and mutual connection in relationship. Disconnection in relationship is the source of psychological problems.
- Trace system
 - A number of interrelated individual memory traces.
- Transposition
 - Transposition is found in cognitive psychology, particularly in learning experiments where subjects can react to the relationship between stimuli rather than to each stimulus on an individual basis.
- Zeigarnik effect
 - In psychology, the Zeigarnik effect states that people remember uncompleted or interrupted tasks better than completed tasks. In Gestalt psychology, the Zeigarnik effect has been used to demonstrate the general presence of Gestalt phenomena: not just appearing as perceptual effects, but also present in cognition.