PSYC 101 - Study Guide for Mid Term

Definition of Psychology
The scientific study of behavior and processes

Psychology is not Common Sense

Scientific Method - In Order
Identify a Research Problem
Design a Study
Collect and Analyze Data
Draw Conclusions
Communicate findings

Ask Geoman
1. Wild and Crazy Idea
2. Hypothesis
3. Theory
4. Law
5. Dogma
6. Stagnation

Goals of Psychology
Description
Explanation
Prediction
Control

Descriptive Research Methods
Naturalistic and Laboratory Observation
Case Study
Survey Research

Experimental Method
Definition
The only research method that can be used to identify cause-effect relationships between two or more conditions or variables

Hypothesis
A prediction about a cause-effect relationship

Independent variable
The condition that is deliberately manipulated in order to determine whether it causes any change in another condition

Dependent variable
The condition that is measured at the end of an experiment and presumed to vary as a result of the independent variable

Experimental group
The group that is exposed to an independent variable

Correlational method
Definition
Used to establish the degree of relationship between two events or occurrences

Relationships not causes
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Correlation Coefficient
Correlation and Prediction
Correlation is NOT Causation

Biopsychology

Looks for links between specific behaviors and equally specific biological processes that often help explain individual difference

Neurons

Definition

Cells specialized for communicating information and the basic building blocks of the nervous system

Three Parts

A cell body
An axon (with axon terminals)
One or more dendrites

Be Able To Label Parts

Three types of neurons

Afferent (Sensory)
Efferent (Motor)
Interneurons

The Synapse

The Parts

Neurotransmitters - specialized chemicals which pass through neurons
Synaptic vesicles - storage for neurotransmitters
Synaptic cleft - space between axon terminals and dendrites
Receptor sites - Areas on dendrites which receive neurotransmitters from axon terminals

Diagram
Resting Potential
Voltage difference value between the inside and outside of the axon

Action Potential
Positively charged particles enter the membrane through specialized ion channels, thereby momentarily eliminating the negative charge just inside the neuron's membrane.
Movement of this disturbance along the membrane constitutes the action potential.

After a brief period, however, positively charged particles are forced outside of the neuron's membrane via the ion channels

All or None Law - refers to the activity of a single neuron
A neuron will either fire or it will not
When it fires, it fires with the same intensity everytime

Implications
Because intensity is always the same, variability comes from somewhere else
That variability is the rate of nerve impulses

The central nervous system is binary
Information is encoded as frequency coding

Neurotransmitters
Kinds

Acetylcholine
Found throughout the central nervous system, in the autonomic nervous system, and at all neuromuscular junctions. Involved in muscle action, learning, and memory

Epinephrine
Neurons

**Neurotransmitters**

**Epinephrine**
- Affects metabolism of glucose and causes energy release from muscles during exercise.

**Norepinephrine**
- Found in neurons in the autonomic nervous system. Primarily involved in the control of alterness and wakefulness.

**Dopamine**
- Produced by neurons located in a region of the brain called the substantia nigra. Involved in movement, attention, and learning. Degeneration of dopamine-producing neurons has been linked to Parkinson's disease. Too much dopamine has been linked to schizophrenia.

**Serotonin**
- Found in neurons in the brain and spinal cord. Plays a role in the regulation of mood and in the control of eating, sleeping, and arousal. Has also been implicated in the regulation of pain and in dreaming.

**Endorphins**
- Endorphins were first discovered during the 1970s by researchers studying the effects of morphine and other opiates. To their surprise, the researchers learned that there were special receptor sites for such drugs within the brain.
- Endorphins are released by the body in response to pain or vigorous exercise. They help reduce the sensations of pain and also serve to intensify positive sensations. "Runner's High"

**Gamma Aminobutyric Acid (GABA)**
- Found throughout the brain and spinal cord. GABA is the major inhibitory neurotransmitter in the brain. Abnormal levels of GABA have been implicated in sleep and eating disorders.

**Glutamate**
- Primary excitatory, involved in learning, memory, and emotions

**Know One In Depth**

**Dopamine**
- **Where:** In the brain, hypothalamus
- **What:** Plays a role in learning, attention, movement, and reinforcement
- **Disease:** Degeneration of dopamine-producing neurons has been linked to Parkinson's disease. Too much dopamine has been linked to schizophrenia.
- **Location:** Released from the substantia nigra

**How Psychoactive Drugs Work**

**How do they work?**
- **Agonistic -** Increases synthesis, release, or activates (mimicry)
- **Antagonistic -** Decreases by interference, false response (blocking), or causes leakage

**They exist because...**
- They are produced in nature or artificially by man
- They mimic the brain's own neurotransmitters or affect the brain's own neurotransmitters
- They cross the blood brain barrier

**Diagram**
Central Nervous System

Parts
- Brain
- Spinal Cord
- Brainstem
- Optical System

Cerebral Hemispheres

Frontal Lobes
- Reasoning, planning, parts of speech, movement, emotions, and problem solving

Parietal Lobes
- Movement, orientation, recognition, perception of stimuli

Occipital Lobes
- Visual Processing

Temporal Lobes
- Perception and recognition of auditory stimuli, memory, and speech

Other Structures

Cerebellum

Motor cortex

Divisions

Left Brain
- Language
- Mathematics
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Central Nervous System

Left Brain
- Logic
- Right Side Movement

Right Brain
- Music
- Art
- Spatial Skills
- Creativity
- Intuition
- Emotion

The Limbic System
- Hypothalamus
- Amygdala
- Corpus Callosum
- Pituitary Gland
- Hippocampus

Brain Waves
- Alternating Current

Types
- Beta Waves - Physical Activities
  Low amplitude, fastest, 15 to 40 cycles/second
- Alpha - Deep Relaxation
  Slow, High Amplitude, 9 to 14 cycles/second
- Theta - Light Sleep
  Greater in amplitude, slowest, 5-8 cycles/second
- Delta - Slow Wave Sleep
  Greatest amplitude, slowest, 1.5 - 4 cycles/second, typically 2-3 cycles/second

The Peripheral Nervous System

Somatic Nervous System
- Contracts skeletal muscles
- Interacts with external environment

Autonomic Nervous System
- Sympathetic - Mobilizes
- Parasympathetic - Rescues
  They actively suppress each other

The Endocrine System

Pituitary Gland (Master Gland)
- Thyroid Glands
- Pancreas
- Andrenal Glands
- Ovaries and Testes

Five Senses
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**Taste**

**Touch**

**Hearing**

**Vision**

**Smell**

**Secondary Senses**

- Balance
- Pain
- Hunger

**Sensation**

The process through which the senses **detect** visual, auditory, and other sensory stimuli and **transmit** them to the brain.

**Perception**

The process by which sensory information is actively **organized** and **interpreted**.

**Absolute threshold**

- Minimum stimulus intensity that a person can detect.
- Psychologists have defined this as the minimum that can be detected and reported 50% of the time.

**Difference threshold**

- Minimum amount by which stimulus intensity must be changed in order to produce a just noticeable change.
- The JND is the smallest change in sensation that a person is able to detect 50% of the time.

**Weber's Law**

- The law stating that the just noticeable difference (JND) for all the senses depends on a proportion or percentage of change in a stimulus rather than on a fixed amount of change.

**Signal Detection Theory**

- Also called the signal decision theory.
- The view that the detection of a sensory stimulus involves both discriminating that stimulus from background "noise" and deciding that a stimulus is present depends partly on the probability that the stimulus will occur and partly on the probability that the stimulus can be observed.
- Noise and Observer Bias exist.

**Transduction**

- Process where receptors change/convert the sensory input into neural impulses, then the impulses are transmitted to the precise/proper location in the brain.

**Sensory Receptors**

- Specialized cells designed to detect a certain type of energy, one type of sensory stimuli.
- Essential link between the physical, sensory world and the brain.
  - Discriminating a stimulus from background "noise".
  - Deciding whether the stimulus is actually present.

**Sensory Adaption/Habituation**

- The process of becoming less sensitive to an unchanging sensory stimulus over time.
- The sensory system is more sensitive to changes in stimuli than to sameness.
- After a time the sensory receptors grow accustomed to constant, unchanging levels of stimuli.

**Vision**

- This flattening and bulging action of the lens is known as **accommodation**.
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With age, the lens loses some elasticity
   It loses the ability to change its shape to accommodate the near vision
   Called **presbyopia** ("old eyes")

Bone Conduction

Dogs lack color vision, which helps with their night vision

Hearing
   Theories
   Place
   Frequency

Olfaction
   Process of detecting smells

Gestalt
   Figure - Ground
   Grouping
      Similarity
      Proximity
      Continuity
      Closure
   Organization
      Perceptual Constancy
      Shape Constancy
      Brightness Constancy
      Color Constancy

Depth Perception
   Binocular Depth Cues
      Convergence
      Binocular Disparity
   Monocular Depth Cues
      Interposition
      Linear Perspective
      Relative Size

Extraordinary Perception
   Ambiguous Figures
   Impossible Figures
   Illusions
      Muller-Lyer Illusion
      Ponzo Illusion
      Cultural Differences

Bottom-Up Processing
   Begins with the individual components of the stimulus that are detected by the sensory receptors, it is transmitted to the brain where it is combined and assembled into patterns

Top-Down Processing
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Previous experience and conceptual knowledge is applied in order to recognize the nature of the "whole" and logically deduce the individual components of that whole.

Definition of Consciousness

Everything of which we are aware at any given time - our thoughts, feelings, sensations, and perceptions of the external environment
This is lousy because sensation is not something we are aware of.

Circadian Rhythm

All eukaryotes and some prokaryotes (cynobacteria) wax and wane through the cycle of days and nights in a 24 hour period
When the organism is placed in constant conditions these rhythms persist
  However, without environmental cues, they tend to be somewhat longer or somewhat shorter than 24 hours
  Giving rise to the name circadian rhythms
The level of the hormone melatonin that rises during the night and falls during the day

Suprachiasmatic Nucleus

A discrete brain region lying within the hypothalamus
Responsible for the generation of circadian oscillation

Jet Lag

The disruption to your cycle by traveling far enough that your clock and your environment differ in time

Shift Work

About 20% of Americans worked at night and sleep during the day
Shift workers average 2 to 4 hours less sleep than nonshift workers
Alertness and performance deteriorate if people work during their subjective night

Taking Melatonin

Is sold over the counter as a sleep aid or dietary supplement
Helps reset the biological clock of night-shift workers and those suffering from jet lag

Sleep

NREM Sleep

Non-rapid eye movement sleep, consisting of the four stages of sleep and characterized by slow, regular respiration and heart rate, an absence of rapid eye movements, and blood pressure and brain activity that are at a 24 hour low point
Moves from Light to Deep Sleep in Stages
Stages have smooth transitions
Called "quiet sleep"

REM Sleep

Sleep characterized by rapid eye movements, paralysis of large muscles, fast and irregular heart rate and respiration rate, increased brain-wave activity, and vivid dreams
Called "active sleep"
Constitutes 20-25% of a normal night's sleep in adults
External calm, the large muscles of the body are paralyzed

Sleep Cycles

Sleepers progress through four NREM stages
  Stages 1 and 2 - faster, low voltage waves
  Stages 3 and 4 - slower, large delta waves

Normal Sleep
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Sleep

Normal Sleep
Follows a predictable pattern
We all sleep in cycles
Each cycle lasts about 90 minutes
A person has one or more stages of NREM followed by a period of REM sleep

Functions of Sleep
Restorative theory
Circadian theory
A blended theory

Sleep Deprivation
After missing two or three nights
Difficulty concentrating
Lapses in attention
After 60 hours without sleep
Some people have minor hallucinations

Microsleeps
2-3 second lapses from wakefulness into sleep
What suffers most from prolonged sleep is loss is the motivation to sustain performance

Variations
Older you get less sleep
Larks - 25%
Owls - 25%
In Between - 50%

Dreaming
Can occur during both REM and NREM sleep
Matches real world in time
We can only remember a few
Features that stand out are bizarre or emotional

Narcolepsy
Lack of the neurotransmitter that causes awakensness, genetic component
A sudden attack of REM Sleep
Excessive daytime sleepiness
Usually lasting 10 to 20 minutes

Sleep Apnea
Don't take sleeping pills or consume alcohol if you suffer from this
Breathing stops during sleep
The individual must awaken briefly to breath
Can happen up to 800 times a night

Meditation
A Group of techniques that focus on
An object
A word
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Meditation
One’s body
Breathing
In the U.S., used to
Increase relaxation
Reduce arousal
Expand consciousness

Hypnosis
A procedure through which one person uses the power of suggestion to influence the thoughts or behaviors of another
People allow themselves to experience distortions in perception
They make experience...
Positive - creation of or addition of
Negative - absence of or taking away of
Individual proneness to fantasy and their expectation of responding to hypnosis

Myths
Under complete control and will violate moral values
Perform superhuman strength
Reveal embarrassing secrets
Memory is more accurate
Can relive an event and function mentally at a younger age

Medical Use
Control of Pain
Treating
High Blood pressure
Side effects of chemotherapy
Bleeding

Altered States of Consciousness
A mental state other than ordinary wakeful consciousness, such as sleep, meditation, hypnosis, or a drug-induced state.

Drug Addiction
Both types of dependencies must be addresses to combat the addiction
Physical dependence
Psychological dependence

Stimulants
Caffeine
Nicotine
Amphetamines
Cocaine

Depressants
Alcohol
Barbiturates
Minor Tranquilizers
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Depressants
Narcotics
Inhalants

Hallucinogens - Alter or distort perceptions of time and space
Marijuana
LSD
MDMA (Ecstasy)
Mushrooms
Peyote
LSD

Usually produces extreme perceptual changes - visual hallucinations and distortions
LSD can cause bad trips that can be terrifying and leave the user in a state of panic
Can produce a flashback, a brief recurrence of a previous trip.

MDMA (Ecstasy)
A Designer Drug, a cross between a hallucinogen and an amphetamine
Is more toxic than most other hallucinogens
Destroys serotonin producers in the brain

Learning

Definition
Learning is defined as a relatively permanent change in behavior, knowledge, capability, or attitude that is acquired through experience and cannot be attributed to illness, injury, or maturation

Origins
A lot of the first "real" scientific Psychology was done in learning

Problem Statement
Learning cannot be observed directly, but must be inferred that it has occurred
Draw inference from changes in observable behavior or in measurable capabilities and attitudes
Learning does not always result in an observable change in behavior.

Motivation - We "want" to
Context - Only "fits in" occasionally
Capability - Requires external conditions

To document learning, the change must be observable

How do we learn?
Habituation (sensory adaption)
Classical Conditioning
Instrumental or operant learning
Cognitive Learning

Classical Conditioning
Classical Conditioning is defined as - a learning process through which one stimulus comes to predict the occurrence of another stimulus and to elicit a response similar to or related to the response evoked by that stimulus.

Unconditioned Stimulus == Not Learned
Not learned
Any stimulus that without learning will automatically cause an unconditioned response

Examples
Classical Conditioning

Unconditioned Stimulus
- Not Learned

Examples
- Food
- Loud Noise
- Light in Eye

Unconditioned Response
- A response that is invariably elicited by the unconditioned stimulus without prior learning

Conditioned Response
- A learned response rather than a naturally occurring one.
- Conditioned Reflex is an improper term, as reflexes cannot be learned

Conditioned Stimulus
- Any stimulus that comes to elicit a conditioned response through Classical Conditioning

Dr. Ivan Pavlov - 1849 - 1936
- Organized and directed research in physiology
- At the Institute of Experimental Medicine in St. Petersburg
- Conducted experiments on the physiology of digestion
- Nobel Prize in 1904

Careful Research
- Experimental apparatus eliminated
  - Vibration, horse, temperature extremes, odors, drafts
  - Nothing could influence the animals except the conditioning stimuli to which they were exposed

The Dogs were...
- Isolated inside soundproof cubicles
- Put in harnesses to restrain their movements
- Experimenters were in an adjoining cubicle
- Observed through a one-way mirror
- Presented food by remote control
- Other conditioning stimuli also presented by remote control
- A tube carried the saliva from the dog's mouth to container where it was measured.

Tie off stomach - Pavlovian Pouch

Stimulus - Any event or object in the environment to which organisms respond.

Reflex - An involuntary response to a particular stimulus, not learned.

Reflexes are made up of both a stimulus and a response.

Generalization
- In classical conditioning, the tendency to make a conditioned response to a stimulus similar to the original conditioned stimulus.

Discrimination
- The learned ability to distinguish between similar stimuli so that the conditioned response occurs only to the original conditioned stimulus but not to similar stimuli.

Higher-Order Conditioning
- Conditioning that occurs when a neutral stimulus is paired with an existing conditioned stimulus, becomes associated with it, and gains the power to elicit the same conditioned response.

Factors of Influence
- How reliably the Conditioned Stimulus predicts the Unconditioned Stimulus
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Factors of Influence
- The number of pairings of the Conditional Stimulus and the Unconditioned Stimulus
- The intensity of the Unconditioned Stimulus
- The temporal relationship (proximity in time) between the Conditional Stimulus and the Unconditioned Stimulus

Watson - Research into Conditioning and Response - American

Little Albert
- In the laboratory, Rayner presented Little Albert with a white rat.
  
  As Albert reached for the rat, Watson struck the steel bar with a hammer just behind Albert’s head.
  
  This procedure was repeated, and Albert “jumped violently, fell forward and began to whimper” (Watson & Rayner, 1920, p. 4).

  A week later, Watson continued the experiment, pairing the rat with the loud noise five more times.

  Then at the sight of the white rat alone, Albert began to cry.

  When Albert returned to the laboratory 5 days later, the fear had generalized to:
  - a rabbit
  - somewhat less, to a dog, a seal coat, Watson’s hair, and a Santa Claus mask.

  After 30 days Albert’s fears were still evident, although less intense.

  Albert moved away still afraid of fuzzy things

Peter
- Afraid of rabbits, fur coats, feathers, cotton, and a fur rug
- Strongest fear of rabbit
  - Rabbit brought into room in cage, kept far from Peter, Peter was given candy
  - The rabbit was brought closer and closer to Peter and his friends were brought in to play with the rabbit
  - He grew fond of the rabbit and lost his fear of the other objects

Ideal Time
- The ideal time between conditioned and unconditioned stimuli is about 1/2 second
- Varies according to the type of response being conditioned, the nature and intensity of the conditioned stimulus, and the nature and intensity of the unconditioned stimulus

Taste Aversions
- The intense dislike and/or avoidance of a particular food, that has been associated with nausea or discomfort
- An example of a Second Order conditioning

Operant Conditioning

Definition
- A kind of learning in which the consequences are manipulated to increase or decrease a response.

Thorndike
- American Psychologist
- Preceded Pavlov
- Designed and conducted experiments in animal intelligence
- Nature of Learning across species
- Investigated “trial and error learning” in cats, dogs, chicks, and monkeys

  Best known experiments placed a hungry cat in a wooden box with slats, called a puzzle box

  After many trials, the cat learned through trial and error to open the door almost immediately after being placed in the box

Law of Effect
- The consequence of a response (behavior) will determine whether the tendency to respond the same way in the future will be strengthened or weakened.
- Responses closely followed by satisfying consequences are more likely to be repeated
Operant vs. Classical

In classical conditioning
Organism does not learn a new response
learns to make an old or existing response to a new stimulus.
cannot help but respond in expected ways.
Classically conditioned responses are involuntary or reflexive
Process begins with stimulus to evoke a reflexive response.
In operant conditioning
learns a new response
Response comes first, the consequence that follows tends to modify this response in the future.
Consequences of behavior manipulated to increase or decrease response frequency or to shape an
entirely new response.
Behavior that is reinforced tends to be repeated.
Process does not begin with a stimulus to elicit a response.

Reinforcers
anything that strengthens or increases the probability of the response it follows. Behavior which is
ignored or punished is less likely to be repeated

Shaping
Gradually molded a desired behavior (response) by reinforcing that becomes progressively closer to it.

Skinner Box
A soundproof chamber with a device for delivering food and detecting behavior.

Reinforcement
Positive
A reward that follows a response and increase the probability that the responses will be repeated.

Negative
The termination of an unpleasant stimulus after a response that increases the probability that the
response will be repeated

Primary
Fulfills basic physical need for survival

Secondary
NS that becomes reinforcing after repeated pairings with other reinforcers

Schedules
Partial Reinforcement
Fixed Ratio - given after a fixed number of correct responses
Variable Ratio - given after a variable number of correct responses
Fixed Interval - first correct response after a fixed passage of time
Variable Interval - first correct response after a variable passage of time (most powerful)

Shaping
Particularly effective in conditioning complex behaviors

Process
Don’t wait for desired response and then reinforce it
Reinforce any movement in the direction of desired response
Gradually guide responses closer and closer to goal

Superstitious Behavior
Sometimes a reward follows a response, but the two are unrelated
An individual falsely "believes" that a connection exists between the act and its consequences.

**Extinction**

Responses followed by reinforcers tend to be repeated and responses no longer followed by reinforcers will occur less frequently and eventually die out. In operant conditioning, extinction occurs when reinforcers are withheld.

Spontaneous recovery also occurs in operant conditioning.

**Factors of Influence**

- Magnitude of Reinforcement
- Immediacy of the Reinforcement
- Level of Motivation of the Learner

**Issues**

- Punishment
  - Escape Learning - Result of Punishment
  - Avoidance Learning - what occurs due to punishment after Escape Learning (Greater Severity)
  - Learned Helplessness - (greater than Avoidance Learning)

**Cognitive Learning**

- Insight
  - The sudden realization of the relationship between elements in a problem situation, which makes the solution obvious

- Latent Learning
  - Learning that occurs without apparent reinforcement but that is not demonstrated until sufficient reinforcement is provided

- Cognitive Maps
  - A mental representation of a spatial arrangement such as a maze

**Observational Learning**

- Observing the behavior of others and the consequences of that behavior learning by imitation
- Modeling (another name for observational learning)
- Also called Social Learning Theory
  - Occurs when an observer's behavior changes after viewing the behavior of a model