

PSYA01 – Introduction to Psychology

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CHAPTER 1 - Introducing Psychological Science

Hypothesis -> testable prediction about observable and measurable processes

Theory -> explanation for a broad range of observations, consolidates hypotheses into whole. Must be testable and falsifiable

Biopsychosocial model -> A model of human behavior as related to biological, psychological, and social factors

Empiricism -> Knowledge is obtained through experience

Determinism -> All events are predetermined by cause-and-effect relationships

Hippocrates and Galen thought of humors and temperaments as reasoning for human behaviors.

Materialism -> Humans and other living beings are composed entirely of physical matter

Psychophysics -> Relationship between physical world and mental representation (Fechner)

Localization -> Different parts of the brain has and performs different functionalities

Phrenology -> brain composed of 27 organs and could be observed by examining skull

Bumps in heads correlated to larger brain areas (e.g. muscles in body)

Injury studying:

Broca's Area -> Speech production (Tan could not say non-Tan words)

Wernicke's Area -> Speech comprehension

Psychoanalysis -> Attempts to explain behavior and personality influences by unconscious processes

Eugenics -> Concept of Good Genes, developed by Francis Galton. Galton firmly believed that all in life was determined by nature

Structuralism -> Attempt to analyze conscious experience by breaking it down into basic elements

Functionalism -> Study of purpose and function of behavior and conscious experience

Behaviorism -> The approach to psychology that only studied observable results, as little reference to mental as possible

New psychology arose between psychoanalyst and behaviorist -> The humanists

Humanistic psychology -> unique aspects of each individual, freedom, rational thought, humans are diff from animals

Hebbs Law - neurons that fire together wire together

Gestalt Psychology -> approach that emphasized focusing on the whole of perception and experience, rather than parts of it

Cognitive Psychology -> Psychology that focuses on memory, thinking, and language

Clinical psychology -> Psychology that focuses on disorders, etc

Social psychology -> Study of influence of others on our behavior

Personality psychology -> study of how different personality traits influence how we think and act

Cross-cultural psychology -> study of individual and group responses across cultures, how culture shapes values.

CHAPTER 2 - Reading and Evaluating Scientific Research

Reliable scientific research must:

Be based on objective, valid, and reliable data

Able to be generalized

Reduced bias

Public

Replicable

Operational definitions -> Statements that define how specific measures are used to record observations

Valid -> How well does it measure what it says it measures?

Reliable -> Provides consistency over multiple trials and time frames

Generalizability -> How well can it apply to other situations

Population -> group that you want to generalize about. Sample, a select group within the population

Ecological validity -> Results of the lab should be easily applied or repeated in natural environment (type of generalization)

Hawthorne effect - Behavior change in people as a result of being observed

Demand characteristics - How the experiment conductor may subtly imply that the respondees respond

Social desirability - How they respond in accordance to being viewed favorably

Bias reduction:

Anonymity

Confidentiality

Single blind (participant doesn't know purpose or treatment of study)

Double blind study (neither participant nor experimenter knows exact treatment for any individual)

Poor characteristics of study:

- Not falsifiable
- Anecdotal evidence
- Appeal to authority/common sense
- Data selection bias

Case study - in depth report about details on a specific case

Gage -> Huge metal rod pierced his brain. Survived, but became much more inconsiderate, impatient, impulsive

Naturalistic observation -> Study things unobtrusively and record behavior in natural environment

Self-reporting -> Responses are provided through people themselves.

Correlational research -> Investigation of relationship between two variables

Third variable problem/Hidden variable -> Unknown, unmeasured variable is responsible

Confounding variable -> Variable outside of researcher's control that is messing with results

Quasi-experimental research -> a research technique in which the two or more groups that are compared are selected based on predetermined characteristics

Random assignment -> Setting up two or more groups in an experiment

Between subject design -> Comparing performance of subjects in different groups

Within subject design -> Same participants respond to all stimuli/conditions

Subjects need to be told: Topic, Nature of Stimuli, Tasks, Duration, Harm/Risks, Steps to minimize risks

Subjects need to be given: Freedom to choose, equal opportunities, right to withdraw, right to withhold responses

Debriefing after the study should reveal all reasons, including deception and its necessity

Animals should be: discomfort is managed humanely, stress/pain must be justifiable by value of results. Feeding, housing, sanitation.

Data should be kept 3-5 yrs after being reported.

Scientific misconduct is manipulating the data to be dishonest

Descriptive statistics - Techniques used to organize, summarize, and interpret data

Negatively skewed - easy test, tail on the left

Positively skewed - hard test, tail on the right

Central tendency - where scores cluster together

Variability - the degree in which scores are dispersed. Low variability means higher looking graph, whereas high means flatter graph

Standard deviation - Link between central tendency and variability. Measures variability around the mean.

Hypothesis test - method of evaluating whether differences are meaningful or chance

CHAPTER 3 - Biological Psychology

Behavioral Genomics -> Study of DNA and genes relating to behavior

Behavioral Genetics -> Study of how genes and environment influence behavior

Longitudinal study -> Follow individual for many years

Epigenetics -> Change in gene expression as a result of XP, don't alter gene code.

Intrasexual selection -> Members of same sex compete to win mating opportunity

Intersexual selection -> Mates are selected based on desirable characteristics

Human brains have more folds and grooves. The front of the human brain developed more. Human skulls still grow (neotony)

Neurons -> Cells that are responsible for sending and receiving messages

Soma -> Cell Body

Dendrites -> Tentacles that receive input

Axon -> transmission wire

Myelin -> fatty sheath covering for Axon that increases speed

Terminals -> Attaches to other neurons

Neurotransmitters -> Chemicals that communicate

Glia cells -> manage and remove waste from neurons, produces myelin
Resting potential -> cell not transmitting messages
Action potential -> ions > -55mV, wave of electric activity shoots down axon stem
Excitatory -> Increases chance it'll fire
Inhibitory -> Reduces chance it'll fire
Refractory period - 2-3ms where neuron cannot fire
Synapses -> Microscopically small spaces between nerve cells
Reuptake -> Takes back the neurotransmitters released into synapse
All or None principle : Individual nerve cells fire at the same strength every time an action potential occurs

Drugs -

Agonists -> Drugs that enhance or mimic chemical signalling.
Direct agonist -> Binds to physical receptors
Indirect agonist -> Do not bind to physical receptors, regulates intake instead
Antagonist -> Inhibits neurotransmitter activity by blocking or preventing synthesis of aforementioned

Hypothalamus -> regulates biological needs and motivational systems stimulates the pituitary glands
Pituitary Glands -> endocrine command center that sends commands about hormone production

Central Nervous System -> Brain and spinal cord
Peripheral nervous system -> Brain and rest of body

Somatic System -> controls movement and input
Autonomic -> regulates glands
Sympathetic NS -> fight or flight
Parasympathetic NS -> Bodily functions (automatic)

Hindbrain -> CRITICAL to controlling life-sustaining processes
Brain stem - breathing, heart rate, sleep
Cerebellum - Balance, coordination, timing, emotion, attention
Midbrain -> Relay between sensory and motor areas
Forebrain -> Essential to critical things like emotion, memory, thinking, reasoning
Hippocampus - Learning memory and formation of memories
Cerebral Cortex -> higher functions like thought, language, personality
OCCIPITAL LOBE - visual information, sends to temporal for recognition and parietal for movement
PARIETAL LOBE - experiences of touch and body awareness
TEMPORAL LOBE - hearing, language, facial recognition
FRONTAL LOBE - planning, regulating, language production, voluntary movement
Corpus Callosum - Neural fibres that connect the two spheres of the brain
Hemispheric specialization - Right hemisphere is visual/spatial, left is language/math

Neuroplasticity -> Ability of brain to change and rewire as a response to experience (e.g. occipital lobes for blind people restructure for diff purpose)

Lesioning - researchers damage area in the brain for research on effect

Transcranial magnetic stimulation - procedure in which an electromagnetic pulse is delivered to a targeted region of the brain

structural neuroimaging - type of brain scanning that produces images of the diff structures of the brain (three main types: CT scans, MRI, DTI)

CT scan - xrays sent through the brain by a tube that rotates around the head

MRI - clear images of the brain are created based on how diff neural regions absorb and release energy while in a magnetic field

DTI - allow researchers to measure white-matter pathways in the brain

Other types:

functional neuroimaging - shows which areas of the brain are active when a person performs a particular behavior

EEG - measures patterns of brain activity with the use of multiple electrodes attached to the scalp

MEG - measures the tiny magnetic fields created by the electrical activity of nerve cells in the brain

PET - low level radioactive isotope is injected into the blood and its movement to regions in the brain engaged in a particular task is measured

Chapter 4 - Sensation and perception

Transduction -> Receptors transform physical energy of outside world to neural impulses

Stimulus > Sensory receptors (transduction) Neural Impulses > Perception

"Different senses are separated in the brain" - Johannes Muller, doctrine of specific nerve energies

Sensory adaptation -> reduction of activity in receptors after repeated exposure to stimulus

Divided attention != Selective attention (distract vs focus)

Inattention blindness -> failure to notice events/objects because inattentive (attention elsewhere)

Backwards messages -> Can't occur unless people are told what to listen for

Absolute Threshold - The energy that needs to be present for the stimulus to be detected at least 50% of the time

Difference Threshold - The difference between stimuli to be reliably recognized

Signal detection Theory - signal perception depends on both threshold and judgement by subject

Stimulus can be: Hits(exists, caught), misses(exists, not caught), false alarms(DNE, caught), or correct rejections(DNE, not caught)

Gestalt Form Perception -> We create our own organized perceptions from the stimulus we see, not often one-to-one exact

a) Figure and Ground - contrast

b) Proximity/Similarity - things that are close are related to each other as a group

c) Continuity - Lines tend to be continuous rather than jagged or changing motion

d) Closure - Tendency to fill in gaps between objects

Red-green perception helped us identify vegetation or recognition of blushing & social cues

optic nerve connects eye to brain

Rods -> Dim light (photoreceptors)

Cones -> Color wavelengths (photoreceptors in fovea)

Trichromatic theory (Young-Helmholtz) 3 different types of cones sensitive to short, med, long wavelengths of light and RGB

Opponent process theory -> We perceive light in terms of opposing pairs (the gradients we saw)

colorblindness -> inability for green red differentiation, often hereditary

elongated eye = nearsighted(myopia), shorter eye = farsighted(hyperopia)

Optic chiasm -> optic nerves cross midline of brain

Fusiform face area (FFA) -> Identifies upright faces

Perceptual constancy -> Ability to recognize and perceive objects regardless of changes in perspective (e.g. cat at night, noon, etc)

Ventral and Dorsal streams -> streams of vision that are important to our function (visual cortex to temporal/parietal respectively)

Called the 'what' and 'where' pathways

Ventral -> Object recognition (e.g. representation of dog -> 'dog')

Dorsal -> Locates object in space and allows interaction

Woman with damaged temporal (ventral) couldn't identify, but could interact -> Theory of visually guided movement

Binocular depth cues -> Visual based on both eyes' differing cues

Convergence -> both eye muscles contract to focus on one object

Retinal disparity -> difference in position of an object as seen by 2 eyes

Monocular cues -> eye focuses on far and near objects

Accommodation

Motion Parallax

Ear

Auditory canal, sound travels

Pinna, outer flap that channels sound

Eardrum, membrane vibrates due to sound waves

Ossicles, bones of middle ear

Semicircular canal, balance for body
Cochelea, converts vibration of eardrum to neural activity

Sound localization -> where sound is from, handled by brain stem and inferior colliculus
Uses difference in time received by both ears and intensity to locate
Intensity diff is called sound shadow
Volley principle -> neurons have firing upper cap, but can fire together to create effect that is like 5000 times/second (max 1k per neuron)
Place of hearing theory -> place on basilar membrane dictates pitch
Frequency theory -> perception of pitch is relative to how much basilar membrane vibrates

Synesthesia -> taste/feel colors etc (blended perceptions)
Haptics -> Active exploratory aspect of touch sensation
Kinesthesia -> sense of bodily motion and position
Nociception -> action of nerves responding to unpleasant sensations (pain)
Signals go to somatosensory cortex and anterior cingulate gyrus
Fast fibres register sharp immediate pain
Slow fibres register chronic and dull pain
Gate-control theory (pain is an interaction between nerves that transmit pain msg and those that inhibit those msgs)
e.g. rubbing a hurt would inhibit it because larger signals from rub overpowers smaller signals from pain
Nociceptors: Pain receptors that send info in response to uncomfortable situations
Gate control theory -> pain is interaction between nerves that transmit pain msgs and those that inhibit messages, sends to somatosensory, anterior cingulate gyrus

Gustatory System : Taste
papillae -> Taste buds are in here (go to thalamus then hi-level brain parts)

Olfactory system : Smell
Olfactory Epithelium -> thin layer of cells lined by cilia (sensory receptors)
Only 1k types of odor receptors, we identify over 10k smells by patterns of stimulation instead.
Cilia transmit message to olfactory bulb on bot of frontal lobes (brain's smell region)

Multimodal integration
Ability to combine sensations like vision and hearing into one integrated perception
Babies can lip-read due to multimodal integration

Chapter 5 - Consciousness

Consciousness -> Person's subjective awareness, including thoughts, perceptions, exp, and self-awareness
Circadian rhythms -> 24h cycles of internally driven physiological/behavioral processes. (e.g. hunger, sleepiness)
Entrainment -> Biological rhythms become synchronized to external cues (light, time, etc)
Endogenous rhythms -> Biological rhythms generated by body independent of external cues
Polysomnography -> Set of objective measurements used to examine physiological variables during sleep
Stages of Sleep:
Stage 1: theta waves, slower bp, breathing, heart rate
Stage 2: sleep spindles (brain activity in large bursts), EEG activity.
Stage 3 sleep: delta waves, slower brain waves
Stage 4 sleep: deepest sleep, difficult to be awoken
Cycle goes back to one, then enters REM sleep
REM Sleep -> Stage of sleep characterized by quickening brain waves, inhibited body movement, and rapid eye movements. Seems wakeful, but is asleep
Restore and Repair - theory that body needs to restore energy and repair wear and tear.
Preserve and protect - theory that suggests sleep preserves energy and protects organisms from harm (e.g. nighttime = wolves, better sleep)
Sleep deprivation - Cannot or does not sleep. As sleepiness and circadian rhythms are disrupted, illness, etc rises.
Sleep displacement - Individual cannot or does not sleep at regular time, maybe sleeps earlier or later.

Dreams -
Manifest content -> Images and stories we dream about. Symbolizes hidden meaningful

Latent content -> Symbolic meaning of dreams built on sexual or aggressive urges

Activation synthesis hypothesis: dreams arise from brain activity originating from bursts of messages from pons(activates), and synthesis occurs when images are pulled from memory

Insomnia -> Severe lack of sleep. (Onset, cannot fall asleep), (maintenance, cannot return), (terminal, wakes too early)

Nightmares - vivid and disturbing dreams during REM sleep

Night terrors - bouts of panic and arousal that awaken the individual, in a state of heightened emotion

Somnambulism -> Sleepwalking (NREM, Stage 3-4)

Sleep Apnea - inability to breathe while sleeping, like snoring

Narcolepsy - drowsiness attacks, extreme bouts of sleepiness and sleep attacks

Hypnosis - procedure of inducing a heightened state of suggestibility

Ideomotor suggestions -> Actions to be performed

Challenge suggestions -> indicate actions that are NOT to be performed

Cognitive-perceptual suggestions -> remember or forget specific information (e.g. pain, loss)

Disassociation theory -> hypnosis divides consciousness into observer and hidden observer.

Social-cognitive theory -> hypnosis emphasized the degree to which expectations and beliefs contribute to suggestibility (e.g. conform to what they're told to expect)

Meditation -> Individual shifts to a mental state of heightened awareness and control of mental processes

Brain death -> Brain stem no longer functions, no hope of recovering because basic functions are gone

Coma -> state marked by complete loss of consciousness

Persistent vegetative state -> Sleep cycles, opens eyes, but no signs of consciousness still (no dmg to stem, but to white/grey matter)

Minimally conscious state -> some behaviors that exhibit consciousness, but inconsistent

Locked in -> aware and aware, but unable to communicate consciousness

Drugs -

Tolerance -> higher dosages are required to get intended effect

Physical dependence -> the need to take a drug to ward off physical withdrawal symptoms

Psychological dependence -> addiction develops without physical symptoms of withdrawal

Psychoactive drugs -> Substances that affect thinking, behavior, perception, and emotion

Stimulants -> Speed up nervous system, wakefulness, alertness

Hallucinogenics -> Produce perceptual distortions

Opiates -> reduce pain and induce feelings of euphoria

Sedative -> depress activity of nervous system

Chapter 6 - Learning

Learning -> A process by which behavior or knowledge changes

Classical conditioning - learning that occurs when neutral stimulus elicits a response that was originally caused by another stimulus

Unconditioned stimulus - elicits responses without learning

Unconditioned response - reflective, unlearned reaction

Similarly, CR, and CS.

This is caused by Hebb's law -> Fire together, wire together.

Acquisition -> When neutral stimulus is continuously paired with response.

Extinction -> Loss of CR when CS and US are no longer presented together

Spontaneous recovery -> Reacquisition of previously extinct CC responses.

Generalization -> Similar stimuli may elicit the same response (different tone of bell)

Discrimination -> Responding to original stimulus, but not anything similar

Preparedness -> Rapidly learn response to particular class of stimuli

Latent inhibition -> Frequent stimulus without US pair makes it harder to become CC

Operant Conditioning -

Operant Conditioning - learning behavior is influenced by consequences

Thorndike -> Law of effect -> Actions that have punishment will be less likely, actions that have rewards will increase

Reinforcement -> Reward/event that raises future probability of a response

Punishment -> process that decreases future probability of a response

Positive -> Stimulus is added

Negative -> stimulus is removed

Avoidance learning -> negative reinforcement that removes the possibility that a stimulus may occur (e.g. overdue fees)
Escape learning -> negative reinforcement that occurs if a response removes a stimulus that is already present (e.g. covering ears at loud music)
Discriminative stimulus -> Cue or event that indicates that if a response, if made, will be reinforced.
Delayed reinforcement is generally more effective than immediate for hook-onto-ability
Shaping -> Operant response is created by repeatedly reinforcing good responses

Schedules of Reinforcement

Fixed ratio: Set number of responses before reward is given. Leads to behavior BURSTS.

E.G. Flirting. Less effective than variable ratio, but easier extinction

Variable ratio: Delivered on average, once every ever-so-many behaviors. Leads to rapid and constant responses

E.G. Flirting. Harder to extinct. Same thing with Gambling, 'HAS TO PAY OFF'. Its ADDICTIVE

Fixed Interval: Set period of time passing, then reinforcer is delivered. Leads to responses just before

off
E.G. Boss checks progress every 3h, people will only do work right before boss checks, then go back to goofing

Variable Interval: Same, except random, but average. Leads to slow, steady responses.

Latent learning -> learning is not immediately expressed until organism is reinforced for doing do

Observational learning -> changes in behaviors and knowledge that results from watching others (rat breath)

Imitation -> recreate someone's motor behavior or expression to accomplish a specific goal

Chapter 7 - Memory

Atkinson Shiffrin Model ->

3 memory stores, Sensory, Short Term, and Long term memory.

Control processes shift info from one store to another

Attention -> Control process that selects what info goes to Short Term Memory

Retrieval -> Memories from long term memory to Short Term Memory

Consolidation -> Conversion of STM to LTM

Sensory Memory ->

accurately holds perceptual info for a fraction of time. Tested by Sperling's whole/partial report tasks. Retained for about half a second

communicated with longer memory through attention. See change blindness test

Short Term Memory ->

We can help our STM by using Chunking methods

Chunking - dividing information into more useful chunks to memorize easier

Long Term Memory ->

Stored by organization (e.g. cat would be beside dog, mouse)

Stored by association as well (similar words)

Working memory -> Model of ST remembering that includes combinations of small amounts of info for short periods of time.

e.g. all systems in phone-to-win contest (remember phone number, manage traffic, pull over, etc)

Phonological Loop -> Storage of working memory that relies on rehearsal of sounds and info

Visuospatial Sketchpad -> Memory component that deals with visual images and spatial sense

Episodic Buffer -> Storage that combines images and sounds into story-like episodes (relevant info)

Central Executive - Control Center of all working memory

Long term memory - Declarative and Nondeclarative memory models

Declarative memory -> memories we are aware of and can be verbalized

episodic - episodes, declared through first person

semantic - about the world (Halifax is capital of nova scotia..)

Nondeclarative memory -> actions performable without awareness

procedural - patterns of muscle movements, like driving, playing piano

Neuroscience of Memory -

When neurons fire together, they're more likely to fire again together in the future. This is called LTP - Long term Potential. Enduring increase in connectivity and transmission between neurons that fire together

Amnesia - Profound loss of one of the types of memory

Anterograde Amnesia -> inability to form new memories. Caused by damage to consolidation process (hippocampus)

Retrograde Amnesia -> condition in which memory preceding trauma are lost (medial temporal lobes, or frontal lobe dmg)

Storage -> Time and manner in which memory is retained between encoding and retrieval

Maintenance rehearsal -> prolonging exposure to info by repeating it does not work too well

Elaborative rehearsal -> prolonging exposure to info by thinking about its meaning

Levels of processing ->

Shallow - superficial, spelling, sound

Deep - meaning, function

Retrieval cues - things that help us remember the associated memory (e.g. 'gr-' for grape)

Encoding specificity principle - retrieval is most effective when in the same context as the encoding

Context-dependent memory -> the idea that retrieval is easier when in the same physical setting as the encoding

Context-dependent forgetting - change in context/environment influenced the forgetting

Context reinstatement effect - return to original location/context and memory returns

State-dependent memory - retrieval is more effective when your internal state matches the state you were in during encoding

Emotions affect memories (ex. people remember sad stuff more easily)

Flashbulb memory - an extremely vivid and detailed memory about an event and the conditions surrounding how one learned about the event

Mnemonics - a technique intended to improve memory for specific info

Method of loci - a mnemonic that connects words to be remembered to locations along a familiar path

Dual coding - occurs when info is stored in more than one form (e.g. visual, sound, for example ABC's song)

Forgetting curve - Ebbinghaus has a steep forgetting after 1 day, which trails off. (Half in one hour)

Schemas -> clusters of organized memories that constitute one's knowledge about objects, events, ideas, etc. Affects all stages of memory

Constructive memory -> Framework of memory then adding details

False memory -> remembering things that didn't happen, or recalling incorrect details

Misinformation effect -> info after event becomes intertwined with memory of event

Imagination inflation -> increased confidence in false memory

DRM procedure - list of words really closely related. Absence of a very obvious word, critical lure. This was a test of imagination inflation

Recovered memory -> Memory of traumatic event recovered after many years of blocking it out

Recovered memory controversy -> validity of recovered memories are not guaranteed, cannot determine T/F

Chapter 8 - Organization of Knowledge

Prosopagnosia -> difficulty recognizing faces (face-blindness)

Classical categorization -> objects and events are categorized by certain rules or sets of features

Graded membership: certain objects/concepts make better category members than others

Proven by sentence verification (e.g. sparrow is more bird than penguin)

Prototypes (think prototypical) represent an average category member. They explain why some things are better members than others

Semantic networks -> ideas linked by nodes and joined to form categories (e.g. Animal -> Bird/Fish etc.)

Whorfian hypothesis/Linguistic relativity -> How we understand the world is determined by language

Algorithms -> problem solving strategies following a set of rules

Heuristics -> Problem solving strategies from prior experiences and educated guesses

Mental set -> cognitive obstacle that occurs when people try to apply routine solution to new problem

Functional fixedness -> identifies a solution that can potentially solve problem, but only thinks of most obvious application

Representativeness heuristic -> judgements of likelihood based on how well example represents category

Availability heuristic -> estimates the frequency of an event based on how easily examples of it come to mind
Anchoring effect -> problem solving numbers and uses previous knowledge to keep it within a range.
Framing effect -> different wording of questions influence answer (consider medicine question of survival rates)
Belief perseverance -> believes they have solution, and accepts only evidence for his belief
Confirmation bias -> only searches for evidence that confirms his beliefs

Aphasia -> injury to brain structures that influence using and understanding language
Language -> Written, spoken, gestural symbols combined in rule-based form
Pragmatics -> study of nonlinguistic elements of language
Fast-mapping -> ability to map words onto concepts after single exposure (children 20months onwards)
Bilingual children tend to have smaller vocabulary. Helps against dementia/Alzheimer's