

09-28-23

Lecture Notes

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- 1) Psychology is the study of the human mind and behavior
- 2) Key Themes in Psychology
 - a) **Based on scientific evidence**
 - i) *Empirical evidence*= Evidence based on experience
 - b) **Explains general principles**
 - i) A study of the averages, in addition to the individual differences
 - c) **Recognizes psychological, biological, social, and cultural influences**
 - d) **Values diversity, equity, and inclusion**
 - e) **Reality is subjective**
 - i) Our *perceptions and biases* filter our experiences of the world through an imperfect personal lens
 - ii) *Expectations shape our perceptions*
 - iii) We use context to make meaning of the *ambiguous stimuli*
 - (1) Almost everything is ambiguous
 - (2) Tuned toward negative feedback
 - (3) Expectations shape perception
 - (a) *Placebo effect*
 - f) **Can cause positive change**
 - g) **Ethical**
- 3) HW:
 - a) InQuizitive Ch. 1 Due tomorrow 11:59
 - b) Go to Office hours (Today 2:30-3:30)

09-29-23

Lecture Notes

Critical Thinking

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- 1) Why do we need the scientific method to answer psychological questions? (Section 8.4)
 - a) **Cognitive biases**
 - i) *Subconscious, unintentional*
 - ii) A systematic error in thinking that results from the brain attempting to simplify information processing
 - iii) Related to attention or memory
 - iv) Brain simplifies things for us and predicts patterns
 - v) Affects our judgments, decisions, and how we recall information
 - vi) *Speed-accuracy tradeoff*, we can navigate the world quicker when we simplify, but we often get things wrong
 - vii) *“Two-track mind”*
 - (1) Unconscious thinking (automatic) and conscious thinking (intentional)

viii) Types of Cognitive Biases:

(1) **Confirmation Bias:**

- (a) We take in information in a skewed way, to confirm what you already believe
 - (i) We filter the world through our own set of expectations
 - (ii) Tendency to notice evidence that confirms our existing beliefs
 - (iii) Not conscious or intentional
 - (iv) E.g. perceived bad referee calls or ambiguous horoscopes
 - 1. The degree of ambiguity allows us to project ourselves into it

(2) **Present/Present Bias:**

- (a) Only notice when two things occur together, but not when they occur by themselves, leading us to believe that one can not exist without the other co-occurring
- (b) Can lead to the perception of illusory correlations, including superstitious beliefs/magical thinking
 - (i) E.g. my knee hurts whenever it rains, or a gambler's lucky shirt

(3) **Hindsight bias**

- (a) Believing that a known outcome was predictable in advance
 - (i) E.g. The events that led up to Trump's election were obvious in hindsight, but the election was a surprise to us at the time.

(4) **Overconfidence**

- (a) We generally tend to think we have more knowledge and skill than is actually true
- (b) The tendency to be more confident in one's own abilities and knowledge than is objectively warranted
- (c) Only seeing your side as valid in an argument
- (d) *Dunning-Kruger effect*, people low in knowledge in a field, tend to think they know better than the experts because they don't know what they don't know and are ignorant to their own ignorance

(5) **Bias blind spot**

- (a) Believing that others are biased, but not oneself
- (b) We are all subject to these biases, but it is hard to see

b) **Heuristics**

- i) *Subconscious and unintentional*
- ii) Mental shortcuts that let us quickly make a judgment and come to a decision; generally useful in saving time and effort but can cause errors

- (1) E.g. mnemonics, or also how it is easier to remember words that start with the letter r rather than end with the letter r, because we think about things by their first letter
- iii) **Availability Heuristic:**
 - (1) When judging how common or likely something is, we rely on how easily examples come to mind
 - (a) Car crashes aren't front cover news, so people aren't as scared of them as a plane crash for example
- c) **Motivated Reasoning**
 - i) *Conscious, Intentional*
 - ii) When we use reasoning strategies when evaluating information that lead to one's preferred conclusions
 - iii) People are more likely to arrive at conclusions they want to arrive at
 - iv) Difference between confirmation bias and motivated reasoning is that confirmation bias is unconscious thinking, while motivated reasoning is the conscious act of picking and choosing which evidence to listen to.
 - (a) E.g. Smokers know that smoking is bad for their health, however they continue to do it.
 - v) *Fake news and motivated reasoning*
 - (1) "Now that we have this idea that there is fake news, we can attribute anything we dislike to fake news." - Troy Campbell
 - (2) "Red facts and blue facts"
 - (3) *Ad Hominem*
 - (a) Despising a person with opposing viewpoints, rather than disposing their viewpoints
 - (i) Leads to *political animosity*
- 2) **A truth is something outside of yourself**
 - a) We construct our beliefs
- 3) HW:
 - a) Inquisitive Ch. 1 due tonight
 - b) Discussion due Wednesday
 - c) Inquisitive Ch. 2 due Thursday

09-29-23

Textbook Notes

Chapter 1: Psychology in Your Life (Pages 1-45)

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- 1) Why is psychology important in your life?
 - a) Psychology is a science that helps you understand your mental activity, behavior, and brain processes
 - i) **The three critical aspects of psychology:**
 - (1) Psychology explores people's thoughts, feelings, and behavior.
 - (2) Psychology investigates how the brain allows all mental activities and behaviors

- (3) Psychology is objective because it uses empiricism to investigate psychological processes
 - (a) An *empirical approach* is evidence-based
- b) Psychology uses the science of learning to help you study better.
 - i) I.M.P.A.C.T.
 - (1) **Improving**
 - (a) Have a *growth mindset*—understand that your intelligence and skills are not fixed.
 - (2) **Monitoring**
 - (a) Self-regulate your learning by setting and monitoring your goals and the methods you use to achieve them, so that you can manage your time effectively and succeed in your studies.
 - (3) **Practicing**
 - (a) Answering questions throughout your study sessions utilizes repeated practice, which will improve learning. Practice does not make perfect, practicing is only an effective strategy if it forces you to think and remember the material you learned actively.
 - (4) **Attending**
 - (a) Ignoring distractions and focusing your selective attention onto your studies will help you remember better. Multitasking has been related to negative effects on attention and memory.
 - (5) **Connecting**
 - (a) Connect new information with your own knowledge, skills and life experiences. These will provide *cues* that help you organize new information when you experience it and retain it in your memory.
 - (6) **Thinking Deeply**
 - (a) Elaborating on ideas rather than memorizing existing ones is critical to learning, as well as utilizing the *active process* of explaining or coming up with examples.
 - c) Psychology develops your critical thinking skills.
 - i) *Critical thinking* helps you evaluate information
 - (1) Engaging in critical thinking allows you to systematically evaluate information to reach conclusions based on the evidence that is presented.
 - (2) Thinking critically allows you to become an informed consumer of psychological information, rather than believing every headline you see.
 - ii) The three steps of critical thinking:
 - (1) **Is the source of the claim believable?**
 - (a) Keep an open mind of new information, but be cautious not to accept it at face value. Identify who or what the source of the claim is, and if they are a reputable source, for example a professionally published scientific journal or an expert with good standing at an academic institution or research organization.

(b) Also determine whether a source has an ulterior motive, such as twisting information to further a personal, financial, or political goal.

(2) Is there strong evidence for the claim?

- (a) Psychology is a science, and therefore the only acceptable evidence comes from empirical research.
- (b) Don't fall into the trap of accepting a claim that fits with your own intuition, beliefs, or opinions.
- (c) The research should have evidence provided that shows empirical research, and you should think critically to determine whether the research method is unclear or has flaws
- (d) The research and results should be peer-reviewed

(3) Do other believable sources agree with the claim?

- (a) Not only should you be skeptical of claims that do not have additional source lists that support the claim, but you should also be skeptical of any claims that do not have references in support of competing claims because a claim becomes stronger and more believable when it acknowledges different perspectives and shows the weaknesses in those perspectives.
- (b) The goal is to get the bigger picture of whether the claim stands up in the face of different perspectives.

d) Psychology improves your life personally and professionally

- i) Utilizing a growth mindset can help you get ahead in your career and academics
- ii) Understanding more about the brain's processes and development can make you more empathetic and understanding of your family and friends.

2) What key principles guide psychology today?

a) Psychologists Investigate topics across five interconnected domains

- i) Each domain focuses on exploring psychological processes from a specific perspective

(1) Biological Domain

(a) How does activity in your brain and body give rise to your thoughts, feelings, and actions?

(2) Cognitive Domain

(a) How do your mental activities affect your thoughts, feelings and actions?

(3) Developmental Domain

(a) How do you change over your life—from birth through old age—in terms of your thoughts, feelings, and actions?

(4) Social and personality domain

(a) How do social factors and your personal characteristics impact your thoughts, feelings, and actions?

(5) Mental and physical health domain

(a) What affects your mental and physical health, and how can you develop healthy behaviors?

- ii) The domains of psychology provide a rich understanding of psychological processes.
- b) Psychology is becoming more diverse
 - i) Diversity is the characteristics that make us seem different from one another in a specific context or situation.
 - (1) Mary Whiton Calkins, one of the first female graduate students in psychology, and Francis Cecil Sumner, the first black person to be awarded a doctoral degree in psychology, are two of the trailblazers of diversity in the field of psychology.
 - ii) Diversity is important because it can paint a more accurate and holistic picture of the psychological processes of the brain.
 - (1) For example, early research on the topic of stress revealed that animals and humans show a *fight or flight* response, in which they either lash out at what is causing them stress or run away from it. However, only 17% of the participants in the stress response were female, and as research included female responses, researchers found that women were more likely to respond with a different approach, the *tend and befriend* response. Now we know how different genders in general tend to respond to stress.
- c) Psychologists must be ethical in their research.
 - i) Previous psychological research did not take into account the well-being of the participants.
 - ii) Psychologists today follow four ethical principles:
 - (1) Privacy**
 - (a) It is ethical to observe people without their knowledge in a public place, but you cannot observe people without their knowledge in a private place, such as their home.
 - (2) Confidentiality**
 - (a) Participants' information can only be made available to the few people who need to know it. This confidentiality prevents other people from linking the study's findings to the actual participants.
 - (3) Informed Consent**
 - (a) The people must be told about the research, and they can choose to decide to participate or not. If any deception or misleading is used during the study that is necessary to the research to get accurate results, the participants must be informed of this deception and why it was necessary after the study is completed.
 - (4) Protection from harm**
 - (a) Researchers cannot ask participants to endure unreasonable pain or discomfort. Potential gains from research sometimes require asking participants to be involved in some risk, which is known as the risk/benefit ratio and is analyzed to see whether the

research is important enough to be worth placing participants at some risk.

- iii) **Institutional review boards (IRBs)** consist of administrators, legal advisers, trained scholars, and members of the community who review all proposed research at schools and other research institutions to make sure it meets the guidelines.

3) How do you benefit from psychological research

a) psychologists use the **scientific method**

- i) **Formulate a theory**
- ii) **Develop a testable hypothesis**
- iii) **Test with a research method**
- iv) **Analyze the data**
- v) **Share the results and conduct more research**

b) Psychologists have one or more specific goals for their research including

- i) **Describing** what happens
- ii) **Predicting** when it happens
- iii) **Controlling** what happens
- iv) And **explain** why it happens

c) **Descriptive methods describe what is happening**

- i) Descriptive methods are used to collect data that test your hypothesis
- ii) The three types of descriptive methods

(1) Case studies

- (a) Intense examination of one person or one group of people. For example, a case study could be done about people with brain injuries.
- (b) Disadvantages: can be very subjective, and often the findings cannot be extended to people of other organizations/groups.

(2) Observational studies

- (a) Involve systematically assessing and coding observable behavior across specific time intervals. Coding involves deciding which predefined category an observed behavior fits into. For example, observing infants' reactions to their caretakers after being in a room with strangers. When experimenters directly participate in an observed session, it is called an observational study with intervention.
- (b) When experimenters do not, it is called observation without intervention.
- (c) Disadvantages: observer bias, also a change in behavior as a result of being observed is called reactivity

(3) Self-reports

- (a) Come directly from the research participants, such as having the participant fill out a questionnaire or survey.
- (b) Disadvantages include people biasing their own answers (self-report bias)

d) Correlational methods reveal relationships

- i) To examine a naturally occurring relationship between two factors without attempting to alter them, psychologists can use correlational methods.
 - (1) This means measuring two or more naturally occurring variables and determining the strength of the relationship between them.
 - (2) A correlation simply tells you whether two variables are related.
- ii) **Correlation is not causality**
 - (1) *Directionality problem*: the direction of the relationship between variables is not known, causing ambiguity.
 - (a) Does spending time on social media make people depressed, or does depression make people spend time on social media?
 - (2) *Third variable problem*: There may be a hidden factor, a third variable, that causes the correlation between the two variables.
 - (a) For example, does insecurity cause both depression and increased social media use?

e) Experimental methods can provide information about causality between variables.

- i) The independent variable is manipulated under the experimenter's control (e.g. study methods)
- ii) The dependent variable is the outcome that is measured (e.g. test scores)
- iii) The control group in an experiment establishes a baseline
- iv) The experimental group experiences the manipulation the researcher is interested in
- v) A confound is a potential third variable in the study.
- vi) A random sample from a population allows a generalization of results, and the random assignment of experimental and control groups is also essential to make the experiment as equal as possible.

10-02-23

Lecture Notes

Critical Thinking

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1) Review

- f) The availability heuristic is that it is easier for us to recall certain examples that are more prevalent in our minds
 - i) Being able to recall instances more easily makes us think that must be true, i.e. recalling times we were outgoing
- g) C, because the availability of the information (news) makes you think it is more likely to happen to you
- h) The bias blind spot exists because we are overconfident in our abilities to be unbiased
- i) Ayofemi is displaying confirmation bias because she is taking in evidence that confirms what she already believes. Biased because she only asks her friends, not her enemies
- j) Motivated reasoning because people who have a pre-existing political motive to believe transgender individuals are dangerous will cherry-pick this evidence. Also, present/present bias.

- 4) Folk wisdom
 - a) Common sense idioms (Opposites attract, etc.)
 - b) Helpful but also not necessarily rooted in truth
- 5) **Critical thinking is about how we evaluate claims**
 - a) Trying to evaluate information in a rigorous, systematic way
 - i) Believe claims only when trustworthy evidence supports those claims
 - ii) Fake news, first wave during 2016 election, second during AI
 - b) What evidence can I trust
 - i) **Trustworthy evidence is objective, measurable**
 - ii) Untrustworthy evidence includes: Intuition, belief, opinion
 - iii) **Pseudofacts:**
 - (1) Misinformation, fabricated information, or some AI-generated information
 - c) Lies spread farther and faster than truth
 - d) People do not always remember where they have heard something
 - i) **Source Monitoring Error:** memory error in which a memory is incorrectly attributed to a specific experience
 - (1) We forgot the original source, but remember the content
 - (2) This can lead to believing information from non credible sources because we don't retain the information that says the source should not be trusted
 - e) **Critical thinking skills:**
 - i) What am I being asked to believe
 - ii) Is the source of the claim believable?
 - iii) Is there strong evidence for the claim?
 - iv) Do other believable sources agree with the claim?
 - f) Claims require evidence
 - i) Different types of psychological claims require different kinds of evidence to substantiate them
- 6) HW:
 - a) Ch. 1 Quiz on Wednesday– Finish the textbook reading, and bring a double-sided handwritten note sheet to the quiz!
 - b) Wednesday discussion post is due
 - c) Tomorrow's Lesson: Introducing three types of claims and the methods psychologists use to evaluate them

10-03-23

Lecture Notes

How to Study People

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- 1) **Variable:** Anything that varies (has more than one level/value)
 - a) Antonym: Constant, something that could vary but only has one label in a particular study (race, gender, temperature)
 - b) Has at least two levels (values)

- c) Can be measured or manipulated (Age: Temperature)
 - i) Measured: dependent variable
 - ii) Manipulated: independent variable
- 2) 3 types of claims
 - a) **Frequency claims**
 - i) Describe the rate or the level of some variable
 - ii) 1 variable measured'
 - iii) Can be made based on descriptive research methods
 - iv) Ex; 39% of teens admit to texting while driving
 - v) 71% of Americans support transgender people serving in the military
 - b) **Association claims**
 - i) Claims that two variables are related, two variables change together
 - ii) 2+ variables, measured
 - (1) Graphed with a scatterplot
 - (2) Each participant is a dot (typically)
 - iii) Can be made based on correlational research methods
 - iv) Ex: girls are more likely to be compulsive texters
 - v) Implied comparison to men
 - vi) Suffering a concussion could triple the risk of suicide
 - vii) **Spurious correlations** = happens by chance
 - c) **Causal claims**
 - i) An association is **one-directional**: changes in one variable cause a resulting change in the other variable
 - ii) 2+ variables: one manipulated, one measured
 - iii) Can be made based on experimental research methods
 - iv) Examples: Mothers' friendships are good for babies' brains.
 - v) Just because a causal claim is made doesn't mean it's true
 - vi)
- 3) HW:
 - a) Due tomorrow: Discussion 1 and quiz
 - b) Thursday inquizitive

10-04-23
Lecture Notes
How to Study People
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- 1) Research methods are how we describe, predict, and explain the world
 - a) **Descriptive Research:**
 - i) Describe the world and answer questions about what happens
 - (1) Example: laughter in social situations
 - (a) Speakers > listeners
 - (b) Women > men
 - (c) 80% occurs not in response to a joke

- (2) Example: In which direction do people turn their heads to kiss
 (a) Nearly twice as many turn their heads to the right

- b) **Correlational Research:**
- i) Predicts the world and answers questions about when things happen.
 - ii) **Positive correlation-**
 - (1) *As x increases, y increases*
 - (2) I.e. phone time and social media time
 - (3) Amount of sleep and amount of focus
 - iii) **Negative correlation-**
 - (1) *As x increases, y decreases*
 - (2) I.e. the less sleep, the caffeine use increases
 - (3) Amount of time on social media and the amount of sleep you get
 - iv) **No correlation**
 - (1) Unrelated/independent
 - v) **Curvilinear relationship**
 - (1) (U-shaped)
 - (2) Stress and preparedness (under-stress leads to boredom/low performance, a moderate amount of stress is good, and too much stress leads to anxiety and burnout)
 - vi) Self-report or observational methods
- c) **Experiments**
- i) Explain the world
 - ii) Answers why does it happen
 - iii) Establishes cause and effect relationship between a manipulated variable and a measured variable
 - (1) Manipulate the *independent variable (IV)*
 - (a) *Experimental conditions = level of IV*
 - (b) Random assignment to conditions establishes the equivalence of groups
 - (2) Measure the *dependent variable (DV)*
 - (3) Control for *confounding* variables
- 2) **Correlation** is *necessary but not sufficient* for **causation**:
- a) $A \rightarrow B$
 - b) $A \leftarrow B$ (reverse inference)
 - c) $A \rightarrow C \rightarrow B$ (third variable problem)
- 3) HW:
- a) Discussion and Quiz due today
 - b) Tomorrow inquisitive ch 2

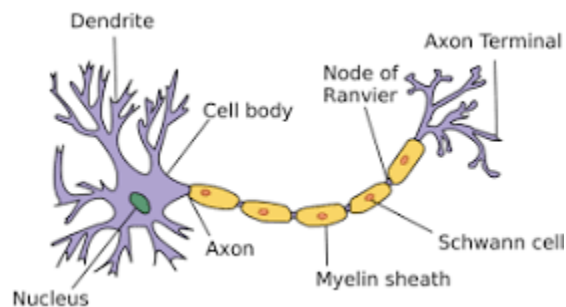
10-05-23

Lecture Notes

Biological Psychology and Neurons

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- 1) The “hard problem” of consciousness
 - a) **Mind-body separation/dualism**
 - i) Descartes, *I think therefore I am*
 - ii) The very act of thinking about existence is evidence of a mind that is separate from one's body
- 2) Question: How and why do we have subjective experiences
 - a) *Neuroscience*: What is the relationship between neurophysiological processes and conscious experiences
 - b) Our current tools can show us where something happens but not how
- 3) **Nervous system**
 - a) **Central nervous system**
 - i) Brain and spinal cord
 - b) **Peripheral nervous system**
 - i) **Somatic nervous system**
 - (1) Associated with voluntary movement
 - ii) **Autonomous nervous system**
 - (1) Regulates internal environment
 - (2) Associates with involuntary movement e.g. heartbeat
 - (3) Sympathetic nervous system**
 - (a) Increases energy
 - (4) Parasympathetic nervous system**
 - (a) Conserves energy
- 4) Types of neurons
 - a) **Sensory neurons**
 - i) Carry messages from sense receptors up through spinal cord into the brain to be processed
 - b) **Interneurons**
 - i) Inside the brain
 - ii) Communicate internally
 - c) **Motor neurons**
 - i) Send signals out to the body carrying instructions to muscles
- 5) How does a neuron communicate with itself, and with other neurons?
 - a) **Neuron structure**



- i) **Dendrites** detect and receive information from other cells
- ii) The **cell body** is the cell life support center
- iii) The **neural impulse** is an electrical signal traveling down the axon

- iv) **Myelin sheath** covers the axon of some neurons and helps speed up neural impulses, comes from glial cells
- v) **Axon** passes messages away from the cell body to other neurons muscles or glands
- vi) And **terminal branches of the axon** at the end form junctions with other cells
- vii) **Neurotransmitters** are then released
 - (1) Drugs are often designed to imitate neurotransmitters
- viii) Electrical signals are happening within the neuron, and chemical signals are happening between neurons

b) Neurogenesis

- i) The process of growing new neurons
 - (1) Occurs in the *hippocampus*
 - (2) Important for memory capacity and quality
 - (3) When we learn, we grow new dendrite connections, but not necessarily new neurons
- ii) Each time you recall a memory you change it

c) Glial cells

- i) Support the neuron
- ii) Provide nutrition and maintain cell body
- iii) Form *myelin*
- iv) Help to “clean out” chemical byproducts of neural communication during sleep
 - (1) Lack of sleep can lead to memory loss and a greater risk of Alzheimer's
- v) The most common cell in the neural system
- vi) A roughly equal amount of glial cells and neurons, but there is a higher glial ratio in more “deep thinking” regions of the brain
- vii) Einstein's brain had a higher glial cell-to-neuron ratio

6) Review Questions

a) How do neurons get information from each other?

- i) *Neurotransmitters* are used to chemically transmit information from one neuron to another.

b) What affects the speed of an action potential?

- i) The *myelin sheath*, created by glial cells, which speeds up neural impulses/action potentials.

c) Can action potentials vary in strength or intensity?

- i) No, it's like the firing of a gun. Either action potentials/neural impulses are sent out or they are not.

d) What is the difference between a sensory neuron and an interneuron?

- i) Sensory neurons are outside the brain, and carry information from *sensory receptors* to the *central nervous system*, while interneurons communicate inside the brain, giving signals to the *motor neurons* who will take information from the central nervous system back out to affect our movements/body.

7) HW:

- a) Read Ch 2 of the textbook

10-06-23

Lecture Notes

Neurotransmitters

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- 1) Neurons communicate with themselves *electrically*, using *action potentials/neural impulses* (same thing). Neurons communicate with each other *chemically*, using *neurotransmitters*. Neurotransmitters are produced in the *nervous* system, whereas *hormones* are produced in the *endocrine* system.

2) **Neurochemicals**

a) Hormones

- i) Measured with blood/saliva tests
- ii) Produced in the endocrine system
- iii) Signal the body by being released into the bloodstream
- iv) Slow-acting

b) **Neurotransmitters**

- (1) Measured with PET scans (*Positron Emission Tomography*)
 - (a) Uses a radioactive tracer to view information in the brain
- (2) Produced by the nervous system
- (3) Direct communication between neurons usually by contact at a synapse
- (4) Fast-acting
- (5) Types of Neurotransmitters:

(a) Primary Neurotransmitters

(i) *Glutamate*

1. Excitatory, increases neural firing
2. Related to learning and memory

(ii) *GABA*

1. Inhibitory, decreases neural firing
2. Anxiety, alcohol intoxication

(b) Neurochemicals: Arousal

(i) *Norepinephrine*

(ii) *Epinephrine (adrenaline)*

(iii) *Cortisol (hormone)*

(c) Neurochemicals: Mood

(i) *Serotonin*

1. Positive mood, enjoyment
2. Savoring, liking

(ii) *Dopamine*

1. Motivation, anticipation of reward
2. Focuses attention, promotes approach behavior
3. Involved in Parkinsons (dopamine deficiency) and schizophrenia (excess dopamine)

- (iii) The difference between dopamine and serotonin is
dopamine = anticipation of getting chocolate cake,
serotonin = enjoyment of chocolate cake.

1. Depression/lack of enjoyment could be caused either based on a lack of motivation to get a reward (dopamine deficiency) or a lack of enjoyment from the reward (serotonin deficiency)
- (iv) *Opioids* (hormone): buffer stress, reduce pain/increase pleasure
 1. Endorphins/runners high
- (d) Neurochemicals: Social Relationships**
 - (i) *Oxytocin* (hormone): makes animals pay more attention to social information
 1. Nurturing, bonding, childbirth, lactation, selective social bonding
 2. Romantic love along with other parts of the brain reward circuitry (opioids, dopamine)
 3. Involved in sexual desire for cisgender women (more than for men)
- (e) Neurochemicals: Sex Hormones**
 - (i) *Estrogen* (female) mood memory
 - (ii) *Testosterone* (male) aggression, dominance, competitiveness
 - (iii) Both are involved in libido (sex drive), development of reproductive systems, and secondary sex characteristics
- (f) Neurochemicals: Learning and Memory**
 - (i) *Acetylcholine*: Motor Control, attention, learning, memory
 1. *Nootropics*: supplements marketed as cognitive enhancers (including caffeine)
 - (ii) Alzheimer's disease: a neurodegenerative disorder causing memory loss and cognitive dysfunction
 1. Synaptic damage-> neuron loss->changes in neurogenesis-> plaques and tangles
 2. Begins in the hippocampus, moves up into the cortex, and down into the cerebellum and brain stem
 3. Acetylcholine decreases in concentration and function

3) HW:

- a) None :)
- b) Jk read ch 2 of the textbook before next week's inq. Quiz

10-09-23

Lecture Notes

The Brain: Below the Cortex

1) **Thalamus**

- a) Regulates transfer of sensory info to and from areas of the cortex
- b) Hub of information connecting our senses to higher areas of the brain
- c) Supports motor (movement) and language systems, spatial memory

2) **Hypothalamus**

- a) Maintains homeostasis
- b) Regulates hunger, thirst, body temp, circadian rhythms, sexual behavior

3) **Amygdala**

- a) Emotions: fear/threat detection, processing positive stimuli
- b) Consolidating emotional memories (positive and negative); may be involved in forming these memories without conscious awareness.

4) **Hippocampus**

- a) Storing conscious memories (i.e. consolidation of memory from short-term to long-term)
- b) Spatial navigation
- c) *London Taxi Study:*
 - i) 79 taxi drivers in training in London were studied, as they developed a spatial understanding of the 25,000 city streets during their training. Scientists studied the gray matter in MRI over time.
 - ii) Result: People who passed the taxi driver exam, (in comparison to people who failed or non-taxi drivers) developed more gray matter in the hippocampus
- d) *Brenda Milner and Patient H.M.*
 - i) Brenda Milner was a neuropsychologist who worked with a patient who had undergone a bilateral temporal lobectomy that removed major parts of the hippocampus
 - ii) By studying the fact that he could learn new tasks but still retain no memory of them, she discovered there were two different memory systems: Episodic memory and procedural memory.
 - iii) **Episodic memory** = what happened; associated with the hippocampus and parts of the temporal lobe
 - iv) **Procedural memory** = how to do something; associated with the cerebellum and motor cortex

5) Review Questions:

- a) In what way is the hippocampus linked to memory? In what way is the amygdala linked to memory?
 - i) The hippocampus is linked to memory by storing conscious memories, such as a first day of school. The amygdala is linked to memory by consolidating emotional memories
- b) What other parts of our body does the thalamus communicate with, and why?
 - i) It supports motor movement of the body and also connects our senses to higher parts of the brain.

The Brain: Cerebral Cortex

–

- 1) Review Questions:
 - a) **The Myelin Sheath**
 - b) **Serotonin**
- 2) **Cerebral Cortex Processes Complex Mental Activity**
 - a) Allows for advanced intellectual abilities; shows we have evolved as a species
 - b) Responsible for integrating sensory information and performing conscious cognitive functions
 - c) In charge of learning, conscious thinking, and memory
 - d) We have two cerebral hemispheres, which serve different but highly connected functions
 - i) They are connected by the *corpus callosum*, a large band of fibers
 - ii) Each half controls the other side of the body (right eye sends info to left visual cortex, left visual cortex controls right eye)
 - iii) *Hemispheric specialization* ≠ *hemisphere dominance* (people aren't left-brained or right-brained)
- 3) **The Four Lobes of the Cerebral Cortex:**
 - a) Information from the outside world is touted through the thalamus and sent to the regions of the cortex. Information integrates and increases in complexity as it moves forward in the brain
 - i) **Frontal Lobe**
 - (1) Complex thought, planning, movement
 - ii) **Parietal Lobe**
 - (1) Touch, spatial relations
 - iii) **Occipital Lobe**
 - (1) Vision
 - iv) **Temporal Lobe**
 - (1) Hearing, memory.
 - b) **The Cerebral Cortex: Specialized Areas**
 - i) *Primary sensory cortices* (plural of cortex) represent the major senses in our bodies:
 - (1) **Visual Cortex**
 - (a) Location: *Occipital lobe*
 - (b) Neurons devoted to visual processing take up 30% of the cortex
 - (c) Overlap between eyes is often overlooked (we don't notice our nose!)
 - (d) Sex differences in vision
 - (i) Males: better at tracking fast-moving objects
 - (ii) Females: larger vocabulary for color and can notice subtle differences among colors
 - (iii) May be due to women traditionally being gatherers and men traditionally being hunters

- (iv) Color blindness is more common in men than in women because it is linked to the x chromosome (women have two chances, men have one)

(2) Auditory cortex

- (a) Location: *Temporal lobe*
- (b) Processes auditory information
 - (i) Frequency: Pitch; Amplitude: Volume
 - (ii) Neurons organized according to their response to frequency of sound (pitch): *tonotopic map*
 - (iii) Involved in identifying and segregating auditory objects, detecting location
 - (iv) Important for language, music
- (c) Human echolocation– Sound bounces off an object, and returning echo activates the visual processing area in the brain of an experienced echolocator

(3) Somatosensory cortex

- (a) Location: *Parietal lobe*
- (b) Processes sense of touch
- (c) Receives information from sensory neurons on the skin
 - (i) Body areas that are more sensitive take up more cortical space
 - (ii) The social function of touch
 - 1. Oxytocin

(4) Motor cortex

- (a) Location: *Frontal lobe*
- (b) Responsible for coordinating voluntary actions (physical movements)
 - (i) Different from *reflexes* (involuntary movement)
- (c) Sends information to motor neurons in the body, activating muscles
 - (i) Body areas requiring greater dexterity take up more cortical space
- (d) *Mirror neurons* in the premotor cortex help us simulate other movements
 - (i) Neural basis of empathy? (Still up for debate)

- ii) The Prefrontal Cortex integrates all our sensations with experience, memory, and thought

(1) Prefrontal cortex

- (a) Location: *frontal lobe*
- (b) Responsible for higher mental functions including all conscious thought
- (c) reasoning, judgment, and decision-making, morality
- (d) Integrates info from sensory areas and links it with stored memories

- (e) Top-down processing in the prefrontal cortex can provide info to subcortical structures to reinterpret experience
 - (i) Reality is subjective
 - (ii) Ask about this during office hours ? confused
- 4) HW:
 - a) Discussion post and two responses due tomorrow
 - b) Guest lecturer tomorrow
 - c) Thurs and Fri video lectures
 - d) Read textbook and take notes for inquisitive
- 5) Things to ask during office hours: How are the amygdala and hippocampus linked to memory, and what are the differences between the two? What is top-down processing in the prefrontal cortex?

Biology of stress

- 1) Stress
 - a) The process by which we perceive and respond to certain events (stressors) that we find threatening or challenging
 - b) Stress is your physical and mental response to stressors
- 2) Signs you're stressed
- 3) Early stress research
 - a) **Hans Selye (1930s)**
 - i) Studied the effect of injecting ovaries into rats to find new hormones
 - ii) Found that the mysterious hormone led to ulcers in the rats
 - iii) He found that even his control group was getting ulcers, no matter what he injected into them
 - iv) Found that he was terrible at giving injections, which was stressing the rats severely
 - v) A variety of stressful experiences leads to the release of specific hormones
 - vi) **Chronic or extreme stress leads to pathological illness**
 - vii) The sympathetic nervous system engages fight or flight response and mobilizes the body to attack or escape
- 4) A stressed hypothalamus leads to:
 - a) **Autonomic changes: Activates the Sympathetic Nervous System**
 - i) We want our SNS active when facing an active threat
 - b) **Neuroendocrine changes: Release of stress hormones**
 - i) *Endocrine gland*= any gland that releases hormones
 - ii) Hormones are released into the bloodstream, while neurochemicals are released into local neurons
- 5) **Two Stress Pathways**
 - a) *Adrenal glands* are endocrine glands on top of the kidneys, sent by anterior pituitary and hypothalamus
 - b) **Hypothalamus pathway (Sympathetic Adreno Medullar (SAM) Axis)**
 - i) *Fast*: adrenal glands release epinephrine and norepinephrine (can work both as neurochemicals and hormones)

- ii) Causes more *physical response*
- iii) **Epinephrine** receptors through the peripheral NS
 - (1) stimulate sympathetic NS
- iv) **Norepinephrine** receptors concentrated in the brain
 - (1) Causes more vigilance, increased attention
- c) **Hypothalamus→pituitary→adrenal cortex pathway (HPA Axis)**
 - i) *Slower*: adrenal glands secrete glucocorticoid hormones such as cortisol
 - ii) *Prolonged* effects all over the body and brain
 - iii) **Cortisol** has effects all over the body and the brain (takes longer for it to get released), and also lingers in the body
 - iv) It gets the body ready to move, for example, giving your active muscles more glucose to help you run faster from a tiger.
 - v) Cortisol inhibits the long-term systems (like immune system, digestive system, and reproductive system), so that the body can focus on getting the body ready to move
 - vi) Incredibly helpful when actually dealing with a life-threatening stressor
- 6) What's stressful to humans that isn't stressful to a rat?
 - (1) **Our thoughts**
 - (2) We ruminate about the past and worry about the future in a way that other animals don't
 - (3) *Stress arises from how we interpret events not from the events themselves*
 - ii) **Short-term vs long-term stress**
 - (1) **Short-term stress**
 - (a) Elevated blood pressure and heart rate
 - (b) Increased metabolites (glucose) in the blood (good for fight or flight)
 - (2) **Chronic stress**
 - (a) Chronically elevated blood pressure (hypertension), accumulation of plaques in vessels
 - (b) Leads to an increased risk of heart disease and diabetes
- 7) **Stress: Lowers prefrontal cortex and amygdala takes over**
 - a) Stress lowers **top-down control** and heightens **bottom-up control**
 - i) *Top-down control* = conscious control of actions (prefrontal cortex)
 - ii) *Bottom-up control* = behaving in habitual ways, act without thinking, caused by the amygdala (habitual and reflexive)
 - b) What's the adaptive value in behaving and thinking less flexibly and more habitually when stressed?
 - i) Relying on things that have worked in the past can work out really well for us
 - ii) Subconscious processes of the brain are faster than our conscious critical thinking
- 8) Stress coping mechanisms
 - a) Resilience
 - i) Social support
 - ii) Self-efficacy
 - iii) Physical health

- b) Coping
 - i) Problem solving
 - ii) Soothing emotions
- c) HW discussion due tonight

10-12-23

Lecture Notes

Unusual Brains

- 1) The hippocampus
- 2) Case Study: Phineas Gage
 - a) Got spliced through the brain right below the eye.
 - b) No physical/mental disabilities (blindness, death, intellectual differences, paralyzation, loss of language, etc.)
 - c) However, his personality became extremely different
 - d) Went from being extremely reliable and responsible to being very inconsiderate and profane, he did whatever he wanted and didnt think about the impacts or effects.
 - e) Most likely due to damage of the subcortical areas involved in feeling emotions and the prefrontal areas involved in regulating them
- 3) Capgras Syndrome
 - a) Inside the inner surface of the temporal lobes, there is the fusiform gyrus, called the face area of the brain, responsible for recognizing peoples faces, including yourself
 - b) Capgras delusion- head injury, normal. Convinced that their family or friends are impostors
 - c) If the fusiform gyrus is damaged, you lose the ability to perceive faces
 - d) After going to the fusiform gyrus, the visual input from faces gets processed by the amygdala, which is the emotional core of the brain, which gauges the emotional significance of what you are looking at (prey, predator, mate), and sends a message to the autonomic nervous system with emotions (increased heart rate, sweat for stress, etc.)
 - e) If the fusiform gyrus is still operating properly, but the tie between the amygdala and the limbic system is, then you would recognize your mother, but not recognize the emotions/warmth you feel toward your mother, so you would conclude that she must be an impostor
 - f) The wire from vision to emotions is cut
 - g) Doesn't apply to hearing, and since it hasn't been cut, they wouldnt think it would be an impostor over the phone
- 4) Phantom Limb
 - a) When a limb is amputated, they continue to vividly feel the presence of that missing limb
 - b) Half of patients feel as though they acn movethe limb as well, galf feel as though its paralyzed
 - c) Paralyzed phantom limb as due to nerve damage that caused paralyzation before amputation. The pain gets carried over into the phantom limb
 - d) These people have learned paralysis, meaning that the brain understands (prior to amputaion) that they cannot move the kimb to matter how hard they try
 - e) Learned paralysis caries over after the limb as been severed

- f) By looking at a reflection to make it seem like the phantom limb as moving, the patient gets the visual impression that the phantom limb is moving, and therefore the pain is relieved, and eventually the phantom limb goes away
 - g) Vivid sensory experience
 - h) Proves theory of learned paralysis and the importance visual input
- 5) Synesthesia
- a) Certain people in the population, otherwise normal, experience a middling of the senses, e.g. seeing the number 4 as red or seeing a color when hearing a certain tone
 - b) synesthesia runs in families
 - c) Synesthesia is eight times more common among creative professions than in the general population
 - d) Color area and number area are next to each other in the brain in the fusiform gyrus
 - e) There is a gene that trims down, in all of us, the wires that connect all the parts of the brain, and if the gene mutates (as it does in patients with synesthesia), the different parts of the brain are connected when they shouldn't be, leading to color-number synesthesia if that wire is between the color and number parts of the brain
 - f) Unpruned connections between the different parts of the brain, leading to a blending of the senses
 - g) Neural pruning doesn't develop until they are older, so a baby has more neural connections, often mirroring something like the brain of a person on LSD
 - h) The ability to engage in metaphorical thinking, so having this abnormal gene, is making you more likely to engage in metaphorical thinking and creativity
 - i) Cross modal synesthetic abstraction= kiki and bouba
 - j) Kiki, creating a sharp inflection in the auditory cortex, mimics the visual inflection of the tagged shape
 - k) Happens in the fusiform gyrus of the brain
 - l) People with damage to the fusiform gyrus often cannot comprehend the kiki bouba phenomenon, nor can they engage in metaphor
 - m) Fusiform gyrus is much bigger in humans than in other animals because we have access to uniquely human abilities such as abstraction, metaphor, and creativity.
- 6) Case Study: Patient H.M.
- a) Patient H.M. was given a surgery to get rid of his hippocampus
 - b) He was left with minimal adverse effects however his memory was significantly impaired, he couldn't recall old memories or create new ones
 - c) Showed that short term and long term memory are different, and that the hippocampus is vital for storing short term memory in the brain to turn into long term memory
 - d) Also found that the unconscious motor centers can remember what the conscious mind forgets
 - e) Procedural memory (i.e. how to ride a bike) is stored in the basal ganglia and cerebellum (intact in H.M.'s brain), while declarative memory (names, dates, facts) is stored in the hippocampus
 - f) Knowing that vs knowing how
- 7) Split brain patients
- a) Often happened to patients with epilepsy

- b) Cut the corpus callosum
- c) Split brain patients have independent functioning of the left and right hemispheres of their brain. For example, they could draw a circle and a square at the same time, but it also means their left eye (right brain) can see faces while the right eye (left brain) cannot.

10-13-23

Lecture Notes

The Two-Track Mind:

- 1) Freud hypothesized that most of our thinking is in our subconscious, like an iceberg
- 2) Two kinds of thinking (presenting it as two simplified lists is an oversimplification, much of our thinking is on a continuum)
 - a) Controlled Processing
 - i) Conscious
 - ii) Deliberate
 - iii) Effortful
 - iv) Reflective
 - v) Slow
 - vi) Measured directly (explicit)
 - vii) Activity in the prefrontal cortex
 - b) Autonomic Processing
 - i) Unconscious
 - ii) Unintentional
 - iii) Effortless
 - iv) Perceptual
 - v) Fast
 - vi) Measured indirectly (implicit)
 - vii) All other brain areas (cortical and subcortical)
 - c) Important to automate processing so we don't get overwhelmed, we only use controlled processing for actions/environments/experiences that are new to us, we tend to forget/cruise through everyday experiences like getting out of bed or walking to class, we barely even remember them
 - i) Life is a lot like learning to drive, at first you need to consciously remember where the pedals are, how to turn on the blinkers, where your hands are on the wheel, etc. it's very overwhelming and unnatural to us because it's a new experience. But as we drive more and more it becomes second nature because our brains have adapted and our brains have automated those processes, and now we can often drive while our mind is wandering or thinking of something else.
 - (1) If someone ran out on the road, this would be a new experience, so our brain would snap back into controlled processing mode to swerve around
 - d) A problem with automatic processing is that we are less likely to remember important details

- e) Also responsible for grouping people together, our unconscious mind pattern-matches and stereotypes
- f) One consequence of our two-track mind is selective attention

10/16/23
Lecture Notes
Sleep

- 1) Sleep can be measured by Electroencephalography (EEG): measures electrical activity in the brain “brain waves”
 - a) Measures neural impulses
- 2) Stages of sleep
 - a) Stage 1- High frequency-low amplitude waves when you're awake and alert. As the brain gets more relaxed and starts to fall asleep it transitions to beta waves.
 - b) In the lightest non-REM (NREM) state of sleep, people are easily awakened and may experience brief hallucinations
 - i) Feeling like you are falling is another example of a hypnagogic sensation
 - ii) Theta waves
 - c) Stage 2 is a deeper stage of sleep; greater relaxation, brain waves are slower (greater space between peaks) and irregular
 - d) Stage 3 “Deepest” sleep; hardest to wake from (will be groggy). Characterized by slow, regular brain waves. Most restorative stage of sleep.
 - i) Sleepwalking occurs during this stage
 - e) REM = Rapid Eye Movements.
 - i) Commonly produces vivid dreams (although all stages of sleep produce dreams, but may be quite mundane while in REM we have our most unusual dreams).
 - ii) “Paradoxical Sleep”- muscles are nearly paralyzed, but other body systems are active. Putting your brain on the gas and the body on the brake at the same time
 - iii) REM waves look surprisingly like the waves of awake and alertness
 - f) There is no time warp in dreams, 1 minute in a dream is one minute in the real world
- 3) REM vs. Deep Sleep
 - a) REM
 - i) Brain is highly active, EEG looks similar to awake, (high frequency, low amplitude)
 - ii) Muscles cannot move
 - iii) Vivid, storylike dreams
 - iv) Possibly important for creativity but main function unknown
 - b) Deep Sleep
 - i) Brain is relaxed with high amplitude, low-frequency waves
 - ii) Body can move around (e.g. sleepwalking)
 - iii) Boring dreams
 - iv) Restorative

Lecture Notes
Sleep

- 1) Sleep Modifiers
 - a) Age is the strongest and most consistent factor that affects sleep
 - b) Individual Differences (variations among people)
 - i) College students and the workforce tend to sleep less on weekdays
 - ii) Ultra short sleepers
 - (1) Not an insomniac because insomnia is a sleep disorder and disorder is distressing and hindering to the individual
 - (2)
 - c) Differences Across Cultures
 - i) Sleep Length
 - (1) Self-report polls found Japan needed the least sleep, and Mexico needed the most sleep, mostly study of westernized countries
 - (2) Hunter gatherer societies get 7-9 hours of sleep on average
 - ii) Pattern of Sleep
 - (1) Segmented sleep (preindustrial europe, as well as some societies in South America and africa) vs. monophasic sleep (western)
 - (2) Biphasic sleep (siesta)
 - (3) Polyphasic sleep (unplanned napping + primary nocturnal sleep period) (common in India and japan)
 - d) Sleep Hygiene
 - i) A set of instructions for promoting healthy sleep
 - (1) Immediate sleep environment
 - (a) The bedroom should be cool, dark, and quiet
 - (i) 65-68 degrees ideal
 - (b) Social media and electronics should be turned off an hour and a half 90 minutes pre-bedtime
 - (c) Dim lights >30 min pre-bedtime
 - (d) Pre-sleep relaxation, reading a book or taking a bath
 - (2) Lifestyle
 - (a) Having stable sleep and rise times (waking up and going to bed at the same time each night)
 - (b) Limiting caffeine after noon
 - (c) Exercise in the afternoon (not in the evening)
 - (d) If you have trouble sleeping, get out of bed and don't return until you tired
 - (e)

10-23-23

Lecture Notes

Developing Across Lifespan

- 1) Principles of human development

- a) We have the greatest degree of *neuroplasticity* when we are young and become increasingly inflexible as we age
- b) All the assumptions about the world we carry into our adult lives are built on the mental models of the world formed when we were young
- c) Parents and caregivers play the most important role in our lives when we are young
- d) We face different developmental challenges at different ages

2) Erikson's Stages of Psychosocial Development

- a) **Infancy** (0-1.5 years) – Can I trust the world?
 - i) Goal: develop a sense of trust vs. mistrust toward others
- b) **Toddlerhood/early childhood** (1.5-3 years): can I be me?
 - i) Goal develop personal control over physical skills
 - ii) Success -> autonomy; failure -> shame and doubt
- c) **Play age/preschool** (3-5 years): is it okay for me to move, do, and act?
 - i) Goal: control environment
 - ii) success-> purpose; failure (disapproval)-> guilt
- d) **School-aged** (5-12 years): Can I make it in the world of people and things?
 - i) Goals: cope with new social and academic demands
 - ii) Success-> competence; failure-> inferiority
- e) **Adolescence** (12-18 years): who am I? Who can I be?
 - i) Goal: develop a sense of self
 - ii) Success-> identity; failure-> role confusion (“identity crisis”), and a weak sense of self
- f) **Adulthood** (18-40 years): Can I love?
 - i) Goal: form intimate, loving relationships
 - ii) Success-> intimacy; failure-> isolation
- g) **Middle adulthood** (40-60 years): Can I make my life count?
 - i) Goal: Create or nurture things that will outlast oneself
 - ii) Success-> generativity, accomplishment; failure-> stagnation (“mid-life crisis”)
- h) **Maturity** (65+ years): Is it good to have been me?
 - i) Goal: look back on life and feel a sense of fulfillment
 - ii) success-> integrity, wisdom; failure-> despair, regret, bitterness

Lecture Notes 10/26/23

Attachment Styles and Morality

- 1) Parenting Styles:
 - a) Authoritative
 - i) Linked with secure attachment
 - b) Authoritarian
 - i) Linked with insecure attachment
 - c) Permissive
 - i) Linked with secure attachment
 - d) Uninvolved
 - i) Linked with insecure attachment
- 2) Morality and moral development in babies:

- a) Develops in three areas
 - i) Helping: babies understand that helping other is morally good, and that harming others is morally bad
 - (1) Evidence that babies seem naturally inclined to help others as young as 18 months old
 - (2) Development of prosocial development in babies
 - (a) Helping, sharing, and comforting
 - (3) Babies are more likely to help adults when they experience interpersonal synchrony
 - ii) Justice: babies have a sense of justice: that good guys should be rewarded and bad guys should be punished
 - (1)
 - iii) Fairness: babies have a sense of fairness: that there should be equal division of resources

Lecture Notes

10-31-2023

- 1) Temptation Bundling
 - a) Pairing an intrinsically rewarding activity with a chore (something you usually need to motivate yourself to do)
 - b) Works in two ways
 - i) Spend less time on your temptations (not always available)
 - ii) When you do have access to temptation, more likely to do what you should be doing
- 2) Reinforcement Increases behavior
 - a) Positive reinforcement
 - i) Increases future behavior by adding a desirable stimulus (if you participate we'll give you extra credit on the quiz)
 - b) Negative reinforcement
 - i) Increases future behavior by removing an undesirable stimulus (if you participate we'll take away the quiz)
- 3) Punishment decreases behavior
 - a) Positive punishment
 - i) Decreases future behavior by adding an undesirable stimulus
 - b) Negative punishment
 - i) Decreases future behavior by removing a desirable stimulus
- 4) Reinforcement is more effective than punishment
 - a) Disadvantages of punishment
 - i) Creates anxiety, interferes with learning
 - ii) Teaches what not to do, doesn't teach what to do
 - iii) Learn not to get caught
 - iv) Models aggressive behavior
- 5) When does punishment work?
 - a) Consistent

- b) Relation to undesired behavior
 - i) Immediate, proportional
 - c) Also, reinforce desired behavior
- 6) Coming Up:
- a) Discussion post due tomorrow
 - b) Lecture tomorrow partial reinforcement

Lecture notes

11-01-23

Operant conditions- Partial reinforcement

1) Continuous reinforcement

- a) Rewarding you every time you do something right vs.

2) Partial reinforcement

- a) Behaviors that are reinforced occasionally are slower to extinguish than those reinforced continuously
- b) Schedules of reinforcement vary the basis and consistency of reinforcement.

i) Basis of reinforcement

(1) Ratio

- (a) Based on your response/behavior ratio

(2) Interval

- (a) Based on a time interval

ii) Consistency of reinforcement

(1) Fixed regular

- (a) Predictable schedule

(2) Variable

- (a) Unpredictable schedule

<p>Fixed Ratio:</p> <ul style="list-style-type: none"> - Being paid based on commission 	<p>Fixed Interval:</p> <ul style="list-style-type: none"> - Quiz every Friday - Getting mail delivered every wednesday - Looking at clock until the end of lecture at 10:20
<p>Variable Ratio:</p> <ul style="list-style-type: none"> - Unclear how many houses you need to deliver newspapers to to get the reward of a paycheck - Swiping on TikTok until eventually, you find a funny video - Slot machines or gambling - Can be the basis for addiction 	<p>Variable Interval:</p> <ul style="list-style-type: none"> - Pop quiz any day - Checking Instagram for likes (depends on time/waiting for people)

Lecture Notes

11-02-23

Applications of Operant Conditioning

- 1) Shaping
 - a) Reinforce behaviors that come closer and closer to target
 - i) “Successive approximations”
 - b) Combine shaping with chaining
- 2) Chaining-
 - a) Linking a number of interrelated behaviors to form a longer series
- 3) Classical Conditioning
 - a) Associate an involuntary response and a stimulus
 - b) Learning that two or more events are related (correlated)
 - c) Relating meaningful events to their predictors or signals
 - d) Results in conditioned (learned) behaviors
 - e) Steps of Classical Conditioning
 - i) Unconditioned Stimulus (US)-> Unconditioned Response (UR)
 - ii) Neutral Stimulus (NS) + Unconditioned Stimulus (US) = Unconditioned Response (UR)
 - iii) Over time, Neutral Stimulus (NS) becomes Conditioned Stimulus (CS)-> Conditioned Response (CR)
 - iv) Football Example:
 - (1) Touchdown (US)=Excitement (UR)
 - (2) Cheering (NS) + Touchdown (US)= Excitement (UR)
 - (3) Cheering (NS) -> (CS)=Excitement (CR)
 - f) Phases of Classical Conditioning
 - i) Acquisition (learning)
 - (1) Closer in time= better
 - ii) Conditioned response (learning)
 - iii) Extinction
 - (1) Several CS without US pairing; lose CR
 - iv) Spontaneous Recovery
 - (1) After extinction, weak CR may appear
 - (2) Suggests CR was not forgotten
 - g) Applications of classical conditioning
 - i) Taste aversions
 - (1) Aversion conditioning (aversion therapy) to treat addiction
 - ii) Phobias and fetishes
 - (1) Can be acquired through CC
 - (2) Can be treated through CC
 - (3) Tomorrow quiz 5
- 4) Operant conditioning
 - a) Associate a voluntary behavior and a consequence

11-03-23
Lecture Notes

1) Rewards and motivation

- a) **Intrinsic motivation:** Doing an activity because the act of doing it is rewarding
 - i) Going for a run because you enjoy running
 - ii) Children who are more intrinsically motivated in academics (enjoy learning) do better in school, take more challenging classes, and more likely to be leaders
- b) **Extrinsic motivation:** Doing an activity because you will get some other reward for doing it
 - i) Going for a run because you want to stay in shape
 - ii) Extrinsic rewards *decrease* intrinsic motivation
 - (1) Especially the case when rewards are contingent on performance
 - iii) Unexpected awards don't effect motivation
 - iv) Effect of tangible rewards on motivation depends on age
 - (1) More harmful for children than college students
 - v) Effect of verbal rewards (positive feedback) depends on phrasing
 - (1) Controlling ("You should keep up the good work on your tests") = less intrinsic motivation
 - (2) Informational ("You got a 95 on the test, which is considerably above average") = more intrinsic motivation
 - vi) Money will undermine your intrinsic motivation

2) **Self determination theory**

- a) States that there are three factors that drive intrinsic motivation
 - i) **Autonomy**
 - (1) A sense of control over what you are doing/learning; having choices in what and how you learn (i.e. no helicopter parents, no controlling bosses)
 - ii) **Competence**
 - (1) Feeling like you are equipped to meet challenges
 - (2) Students: challenge vs. threat appraisal; managing anxiety
 - (3) Teachers: noncritical feedback, scaffolding, info on how to approach/master task, optimally challenging tasks
 - iii) **Relatedness**
 - (1) Feeling connected to and cared about by others
 - (2) Partner and group work, study groups, desks facing each other

3) **Metacognition**

- a) Thinking about thinking
- b) Awareness and understanding ones own thoughts and knowledge
- c) **Dunning-Kruger Effect:** many low skill people overestimate their own competence
 - i) Dont understand what they dont know
 - ii) *Illusory superiority*
 - iii) Conversely, many high skill people underestimate their own competence.
 - iv) Bloom's taxonomy

4) Social Learning- Learning by Watching Others

5) HW:

- a) Discussion due wednesday
 - b) Activity due monday night
 - c) Inquisitive due monday night
- 6)

Lecture Notes

11/7/23

Encoding and working memory

- 1) Elaborative encoding strategies (how to memorize information so that its easy to retrieve)
 - a) Focus on retrieval cues
 - i) Chunking
 - (1) Organizing info into manageable units
 - (2) Works even better if the units are meaningful
 - ii) Mnemonics
 - (1) Connect new information to existing memory strengths (imagery, structure)
 - (2) List of otherwise meaningless info→ acronyms, songs, etc. with words that relate to each other
 - (3) Try to capitalize on your highly visual nature
 - (4) Multisensory mnemonics are even better (e.g. visual, auditory)
 - (5) Peg word system: memorize words in order
 - (a) Visually associate ordered info you already memorized (pegs) with new info you want to remember (words)
 - iii) Hierarchies/categories
 - (1) Organize a list of items into related sets
 - (2) Concept maps
 - (a) Milk→butter→cheese
 - (b) Chicken→eggs
 - (c) Flour→bread
 - (d) Broccoli, canned beans
 - (e) Sparkling water
 - iv) Rehearsal and distributed practice
 - (1) Spacing effect
 - (a) Better retention and recall for longer if you spread the same amount of time spent studying into shorter study sessions
 - (2) Distributed practice:
 - (a) (vs. massed practice) gives you more opportunities to rehearse material by repeatedly testing yourself on tough concepts
 - v) Deep/semantic processing
 - (1) Information is remembered better when processed according to its meaning rather than its sound or appearance
 - (a) Example: note taking mode (typing vs. handwriting)
 - (b) Example : highlighting your notes
 - vi) Make information meaningful

- (1) Things are more easily remembered if they are:
 - (a) Personal, funny, sexual, gross, surprising, etc.
 - (b) Basically anything that catches your attention
- (2) Positive mood helps memory encoding
- (3) Memory retrieval is mood congruent
- b) Learning style and memory
 - i) No evidence that matching the modality of teaching or studying to self described leaning style improves learning
 - ii) Learning styles is a myth
 - iii) Multimodal learning gives maximum number or retrieval cues and results in best learning and memory
- c) Feats of memory
 - i) Hyperthymesia: ability to vividly recall an abnormally large number of life experiences
 - ii) Photographic memory: ability to vividly and accurately recall visual stimuli after short exposure
 - (1) Myth
 - (2) Impossible to recall images with perfect memory
 - (3) Eidetic imagery: people shown an image for 30 sec can recall it in detail appears as a visual afterimage. But still error-prone, memory fades over time
- d) summary ways to improve your memory
 - i) What do you remember from this lecture:
 - (1) Learning styles are a myth, people learn best with multimodal learning, also there are certain ways you can improve short term memorization by using strategies. Situate new info into the context of things you already know. Study in short frequent sessions.

Lecture Notes 11/15

Deindividuation and obedience

- 1) Deindividuation
 - a) When we are anonymous/not seen as individuals, people engage in uncharacteristic behaviors
 - b) Reduced self evaluation, decreased inhibition
 - c) Brought on by feelings of anonymity lack of personal responsibility for behavior, and increased arousal
 - d) Comment sections, sporting event crowds, trick or treating children in costume
 - e) The dark room study:
 - i) Men and women put in a pitch black room together
 - ii) Behavior in the room:
 - (1) Exploring room and chatting
 - (2) Talk turned serious and personal
 - (3) Hugging and intimacy. 80% reported sexual arousal
- 2) Obedience

- a) Milgrams Experiments
 - i) The learner is set up to get an electric shock, the subject is set up to deliver an electric shock to the learner, being told by the experimenter when to deliver the shock
 - ii) The majority of subjects delivered a shock until 450 volts, even when they thought the learner was dead
 - iii) People will do things they don't agree with when under the orders of an authority figure
 - iv) "We are puppets controlled by the string of society"- Milgram

Friday-Wednesday recorded lectures

Thursday Lecture

Notes 11/16

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1) Ingroup

- a) Group of people to whom we belong with or with which we identify
- b) Meaningful groups: gender, age, race/ethnicity, religion
- c) Group membership comprises our **social identity**

2) Outgroup

- a) Group of people to whom we do not belong or with we do not identify
- b) Ingroup bias: preferring ingroup members over outgroup members

3) Stereotypes, prejudice, and discrimination

- a) **Stereotype: Beliefs** about individuals based on their group membership
 - i) Culturally learned schemas about groups
 - ii) Automatic, uncontrollable
- b) **Prejudice: Negative feelings** toward individuals based on their group membership
 - i) Can be controlled
- c) **Discrimination: Negative behavior** toward individuals based on their group membership
 - i) Based on membership can also be controlled

4) Stereotypes and Attitudes:

- a) Beliefs about groups of people can be conscious (explicit) or unconscious (implicit)

5) Implicit association test

- a) Measures associations between groups and their general traits characteristics behaviors
 - i) Example: women/household and men/career
 - ii) Stronger response time = stronger association
- b)

6) Racial Position Model

- a) Predicts that stereotypes disadvantage minority group members along dimensions of perceived inferiority and perceived cultural foreigners

7) Model minority

- a) Belief that a minority group has enjoyed above average success in the us because of positive stereotypes
- b) Negative consequences
 - i) Depersonalization among group members

- ii) Used to legitimize prejudice and discrimination against other minority groups
- c)
- 8) Video lecture tomorrow QUIZ due tomorrow
- 9) Video lectures through next week

11/27 Lecture Notes

Introduction to Psychological Disorders

- 1) Criteria for diagnosing disorders
 - a) **Deviance:** thoughts, feelings, or behaviors that differ from societies normal expectations or are deemed unacceptable by others; statistically rare
 - b) **Dysfunction:** Impairment, difficulty functioning in daily life (maladaptive)
 - c) **Distress:** causes distress or suffering to person with the disorder and/or others in the community
 - d) **Discomfort:** causes others in the community to feel uncomfortable or concerned
- 2) Development and definition of psychological disorders is influenced by biological, psychological, and social factors
 - a) **Biological influences:** evolution, individual genes, brain structure and chemistry
 - b) **Psychological influences:** stress, trauma, learned helplessness, mood related perceptions
 - c) **Social factors**
- 3) Diathesis stress model
 - a) Development of disorder depends on
 - i) Pre Existing biological vulnerability (nature)
 - ii) Stressful life experiences (nurture)
 - iii) Genetic predisposition and childhood trauma → diathesis (vulnerability to mental disorder)--> minimal to excessive stressful circumstances→ lower to higher probability of mental disorder→ likelihood of a mental episode→ leads to more mental episodes
 - iv)
- 4) Types of mental disorders and types of psychological treatments
 - a) Psychotherapy
 - i) Behavioral
 - (1) Unlearn unwanted behaviors through operant conditioning
 - (2) Social skills training, modeling
 - ii) Cognitive
 - (1) Recognize and replace maladaptive thought patterns (cognitive restructuring)
 - b) Biological therapy
 - i) Psychotropic medications (affect neurotransmitters)
 - ii) More extreme treatments altering brain activity
 - (1) Electroconvulsive therapy
 - (2) Transcranial magnetic stimulation
 - (3) Deep brain stimulation

11/28 Lecture Notes

Anxiety Disorders

- 1) Anxiety disorders are the most common class of psychological disorders in the us, affecting 40 million adults
 - a) Happen when the brains danger detection system becomes hyperactive
 - b) Amygdala hyperactivation
- 2) **Panic disorder**
 - a) Characterised by frequent and unexpected panic attacks
 - b) Leads to avoiding situations that may trigger panic attacks
 - c) More common in women
 - d) Worry about anxiety can amplify symptoms
- 3) **Social anxiety disorder**
 - a) Intense fear of social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others
 - b) The individual fears that he or she will act in a way (or show anxiety symptoms) that will be embarrassing and humiliating
 - c) Treatment: cognitive behavior therapy
 - i) DBT: developed to treat BPD, similar to CBT but focuses on accepting them as they are and encouraging them to change
- 4) **Phobia**
 - a) Persistent, irrational fear and avoidance of some object, activity, or situation
 - b) Fear is out of proportion to actual danger posed and to the sociocultural context
 - c) Treatment: exposure therapy, cognitive therapy, medication
- 5) **Generalized anxiety disorder**
 - a) Chronic worry, physical tension, irritability
 - b) Difficulty concentrating, fatigue, sleep deprivation
 - c) Commonly comorbid with depression, substance abuse
 - d) Treatment : medication, meditation

Lecture Notes 11/30

Bipolar Disorder and OCD

- 1) Bipolar Disorder
 - a) People who experience at least one episode of mania
 - i) Decreased need for sleep
 - ii) higher sex drive
 - iii) noticeably talking more
 - iv) feeling euphoric
 - v) engaging in risky behaviors like self harm or spending excessive amounts of money, increased energy levels
 - vi) Euphoria, excitement, emotional instability, overactivity, difficulty concentrating or sleeping, impulsive behavior
 - vii) Can involve delusions, psychotic symptoms

- b) Common: separate experiences (s) of depression
 - c) Treatment:
 - i) Lithium (mood stabilizer for mania), antidepressants (can trigger manic episodes), antipsychotics, anticonvulsants, benzodiazepines, psychological interventions
 - d) Predictors of Bipolar disorder
 - i) Family history (5-10 x more likely)
 - ii) drugs/medication
 - iii) Presence of other disorders (anxiety disorders, substance abuse, ADHD, personality disorders)
 - iv) Hypomanic personality
 - v) History of childhood abuse
- 2) OCD
- a) Characterized by obsessions
 - i) Unwanted, repetitive, intrusive thoughts
 - ii) Eg fear of contamination
 - iii) Need for symmetry
 - iv) Unwanted sexual or aggressive thoughts or images
 - v) doubts
 - b) Characterized by compulsions
 - i) Unwanted repetitive actions
 - ii) Eg washing/cleaning
 - iii) Ordering, balancing, or straightening things until just right
 - iv) Checking, praying, undoing actions, asking for reassurance
 - v) Repeated checking behaviors
 - c) Treatment
 - i) SSRIs
 - ii) Cognitive behavior therapy
 - (1) Exposure and ritual prevention therapy
 - iii) Deep brain stimulation
- 1) Emotion Regulation
- a) Process by which we control our emotions
 - b) Increase (up regulate) or decrease (down regulate) emotion behavior and/or experience
- 2) Gender differences in emotion behavior
- a) Women: internalizing, powerless emotions (sadness, fear, anxiety, guilt)
 - b) Men: externalizing powerful emotions (anger, contempt, disgust)
- 3) Common types of emotion regulation
- a) Distraction
 - i) Trying to replace unpleasant thoughts with an alternative thought or activity
 - (1) Effective at reducing distress
 - (2) Not helpful if you always turn to this strategy instead of addressing the underlying problem
 - b) Cognitive reappraisal

- i) Reinterpreting the situation
 - (1) Positive reappraisal, humor, forgiveness
 - c) Suppression
 - i) Inhibit emotional behavior
 - (1) Tends to increase our physiological response
 - d) Long term consequences of reappraisal vs suppression
 - i) Reappraisal
 - (1) Better social relationships
 - (2) Better cope with stress
 - ii) Suppression
 - (1) Feel less authentic in social life
- 4) Psychopathy
 - a) Chronic clinical condition involving egocentricity and interpersonal callousness, impulsiveness, impaired emotional function, antisocial lifestyle
 - i) Personality and emotion: manipulative, callous, lack guilt/remorse
 - ii) Lifestyle: impulsive, irresponsible, antisocial
 - b) Occur early in life, stable over lifetime, negatively impacts others
 - i) E.g. aggression, intimate partner violence, deception, and manipulation
 - c) Show decreased recognition of others' emotional expressions
 - d) Capable of experiencing some emotions, but have very little fear/anxiety, lack understanding of others' distress cues for sadness and fear
 - e) Many psychopaths experience substantial anger, sadness, fear, in early life in trauma and develop maladaptive coping strategies

Dec 6 Lecture Notes
Neurodiversity and Neurodivergence

- 1) Neurodiversity
 - a) People experience and interact with the world around them in many different ways, there is no one right way of thinking, learning, and behaving, and differences are not viewed as deficits
- 2) Neurodivergent:
 - a) Can be used to describe people whose brains process information differently than someone who is neurotypical
 - b) Examples: learning differences (dyslexia, dysgraphia, dyscalculia), autism spectrum, ADHD, Down syndrome, etc.
- 3) Neurodivergent words
 - a) Use inclusive, nonjudgmental language
- 4) Is neurodivergence a disability?
 - a) Medical vs. social model of disability
 - b) Some neurodivergent people struggle because of systems or processes that don't give them a chance to show off their strengths that create new or more intense challenges for them.
 - c) I.e. job interview, noisy situations
- 5) ADHD

- a) Symptoms
 - i) Inattention
 - (1) Difficulty concentrating,
 - (2) Being disorganized and forgetful,
 - (3) Can also involve hyper fixated on an object or topic of interest
 - ii) hypetactivity/impulsivity
 - (1) Fidgeting, restlessness, excessive talking
 - (2) Interrupts or intrudes on others
 - (3) Difficulty waiting/taking turns
 - iii) Emotion dysregulation
 - b) Strengths
 - i) Higher energy levels
 - ii) Greater spontaneity
 - iii) More creative
 - c) Two main types:
 - i) Inattentive (more likely in women)
 - ii) Hyperactive (more likely in men)
- 6) Autism
- a) Symptoms
 - i) Differences in communication and social interaction
 - ii) Repeated behaviors
 - iii) Speicalized interests
 - b) Strengths
 - i) Cognitive advantages (creativity, focus, memory)
 - ii) Efficiency (accuracy, productivity, organization)
 - iii) Expertise in specialized areas
 - iv) Character traits such as honesty, justice, fairness
- 7) Adhd and autism spectrum disorder
- a) 50 to 70% of people on autism spectrum also have adhd
 - b) Both involve genetic differences
 - c) Both involve social difficulties, difficulty focusing on uninteresting tasks, motor skill deficits, and more sensory processing differences than neurotypical folks
- 8) Treatment approaches
- a) Behavioral therapy
 - b) Social skills training
 - c) Occupational therapy
 - d) Medication

Do the course evaluation!

Lecture Notes Dec 7

Happiness, wellbeing, and course wrap up

1)