PY 101 – 012

Monday, January 25, 2016

Week 3, Day 1 Notes

Nervous System & Effect of Substances

Quizlet for terms on this lecture: <https://quizlet.com/_1yzdw4>

Inferential statistics

* + You can infer characteristics of population based on responses of sample

Statistical significance

* + Statistical significant means that it is unlikely to have occurred given that the null hypothesis is true

Meta-Analysis

* + Study of studies
  + Look at things like the differences between samples
    - Quantifies differences in studies
  + If you look at 100 studies that are on one topic and they all reach the same conclusion, it helps the likelihood of the study being accurate

Report, revise, refine, replicate

* + Report
    - Lets others know what you find and scrutinize it
  + Revise / refine
    - Your theory and subsequently future hypotheses based on your data
  + Replication
    - Can someone else repeat your study and get the same results
    - This is a key indicator of the validity of research

Chapter 4

What is the nervous system?

(See vocab)

achine generated alternative text:
The Nervous System 
Peripheral Nervous 
Sy

What is a neuron?

* + See vocab
  + Types of neurons
    - See vocab
  + Neuron structure
    - See vocab (zipping through these slides)
  + achine generated alternative text:
    Dendrites 
    Neuron Structure 
    Direction of 

* + Synaptic cleft - narrow gap between terminal button and dendrite

Electric communication

* + Resting membrane potential - see vocab
    - Start off polarized when signals are sent, becomes de-polarized, and polarizes again over time
  + Action potentials
    - Electrical signal that passes along the axon and causes the release of chemicals that transmit signals to other neurons

achine generated alternative text:
+70 
+50 
+30 
+10 
Membrane 
potential 
-

Polarizes, releases a communication signal, and then repolarizes, repeat

When a neuron fires, the neuron becomes more positively charged than the outside

Action potential travel

* + Depolarization travels along an axon in a wave movement called propagation
  + Myelin sheath enables action potential to skip quickly along the axon
  + achine generated alternative text:
    Action potential 
    Myelin sheath 
    - Sheath - fatty insulation
    - The axon can skip along the nodes in the sheath.
    - Makes the communication much faster
  + If the process breaks down, you get multiple sclerosis
    - <https://www.youtube.com/watch?v=nB6yF6Rdxvc>

When does a neuron fire

* + Determined by number and frequency of signals
  + An action potential occurs when the sum of excitatory and inhibitory signals leads to a change in voltage that exceeds the neuron's firing threshold

Chemical messages

* + When the action potential reaches the terminal buttons, the buttons release vesicles which release chemicals into the synapse
  + The binding of a neurotransmitter produces excitatory or inhibiting signals

Neurotransmitters & Receptors

* + Stimulate signals until something tells them to stop

Agonists can increase how much neurotransmitter is made and block reuptake of neurotransmitters

achine generated alternative text:
Agonists 
Agonist drugs can 
increase how 

Antagonists

* + Decrease the release of neurotransmitters
  + Destroy neurotransmitters in the synapse
  + achine generated alternative text:
    Neurotransmitter 
    Acetylcholine 
    Epinephri

* + achine generated alternative text:
    DIFFERENT CHEMICALS HAVE BEEN ASSOCIATED 
    

Vocab

|  |  |
| --- | --- |
| Inferential statistics | Used to determine whether differences actually exist in populations from which samples are drawn |
| Statistical significance | Determination of whether observed differences between groups are likely due to chance or if they are the result of actual differences |
| Meta-Analysis | Study that involves the analysis of multiple analyses |
| Report | Helps others benefit from your findings. Makes them public |
| Nervous system | Network of nerve cells and fibers that transmits nerve impulses between parts of the body |
| CNS (Central Nervous System) | Brain and spinal cord (organizes and evaluates information from PNS. Directs PNS to perform specific behaviors) |
| PNS (Peripheral nervous system) | All other nerve cells in the body (Transmits information to the CNS) |
| Neuron | Cell that facilitates communication in the nervous system (Receive integrate, and transmit information in the nervous system) |
| Reception (Phase 1 of nerve cell communication) | Chemical signals are reveied from neighboring neurons |
| Integration (Phase 2 of nerve cell communication) | Incoming signals are assessed |
| Transmission (Phase 3 of nerve cell communication) | Signals are passed on to other receiving neurons |
| Sensory neurons (afferent) | Detect information from the physical world and pass that information along to the brain |
| Motor (efferent) neurons | Direct muscles to contract or relax |
| Interneurons | Communicate within local or short-distance circuits |
| Dendrite | Detects chemical signals from neighboring neurons (takes in information) |
| Cell body (soma) | Collects and integrates information |
| Axon | Transmits electrical impulses |
| Mylin sheath | Encases and insulates axons (made up of glial cells) |
| Glial cells | Cells that support, nurture, and insulate neurons |
| Terminal buttons (axon terminals) | Bulbous end of an axon |
| Synapse | Supports chemical communication between neurons |
| Resting membrane potential | The ratio of negative to positive ions is greater inside the neuron than outside |
| Sodium ions and potassium ions | Contribute to a neuron's resting membrane potential |
| Inhibitory signals | Increase polarization in the cell (Decrease the likelihood that the neuron will fire) |
| Excitatory signals | Depolarize the cell membrane (Increase the likelihood that the neuron will fire) |
| All-or-none principle | A neuron either fires or it does not (there is no partial fire of a neuron. It's like a gun) |
| Neurotransmitters | Chemicals that relay information between neurons |
| Receptors | Chemicals travel across the synaptic cleft and are stop here (like a lock) |
| Reuptake | Neurotransmitter is reabsorbed into the presynaptic terminal buttons |
| Enzyme deactivation | Enzyme destroys the neurotransmitter |
| Autoreceptors | Monitor amount of neurotransmitter in the synaptic cleft then signal the presynaptic neuron to stop releasing the neurotransmitter |
| Agonist | Enhance the actions of neurotransmitters |
| Antagonists | Inhibit the actions of neurotransmitters |