Brain Resource Creation Workshop: Chapter 18 - Neuroscience in Society

Created by: Skyler Basco

Edited by: Skyler Basco, Jed Quiaoit, Riya Patel

Simply Neuroscience

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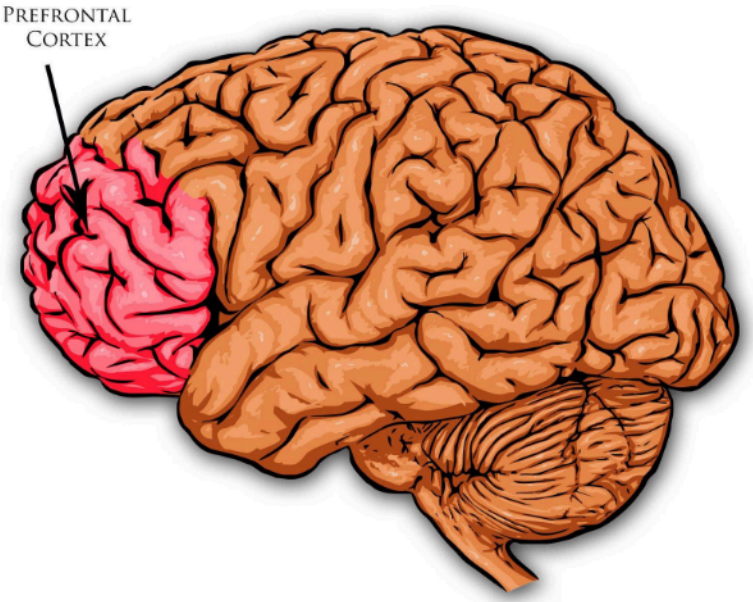
Neurolaw

Prefrontal Cortex (PFC):

- Drug abuse impacts this area of the brain (the PFC manages impulses and cravings)
- PFC changes create difficulties in drug resistance
- Constant abuse of drugs can be identified as symptom of addiction (a disease) rather than toxic habit

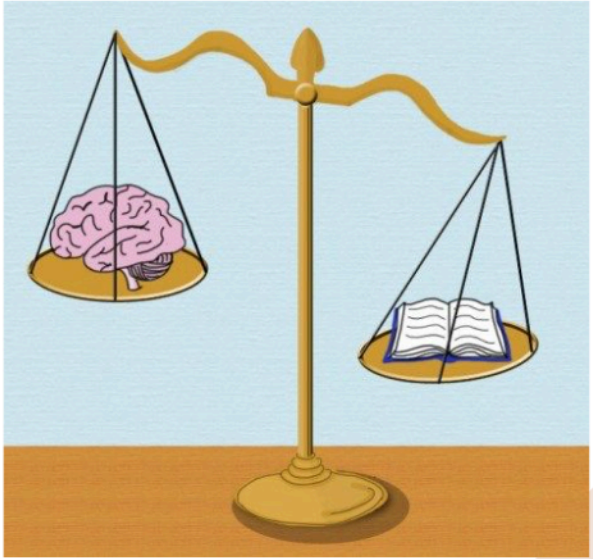


Neurolaw

Concerns in legal punishments:

- Where is the line drawn between...
  - Bad decisions and neurologically-induced actions?

- Hard to balance extent of retributions, especially for drug abuse cases
  - Should they be sent to therapeutic rehabilitation?
  - Should the criminal be punished for disobeying the law? Or both?



Neurolaw

Difficult Cases:

- A person had tumor removed from brain surgery
  - Due to this, he developed a sudden impulsive child porn addiction
- Getting rid of that area of brain got rid of ability to stop dark urges
- Tough to decide if & how person should be punished for criminal side-effect after life-saving surgery

Neurolaw

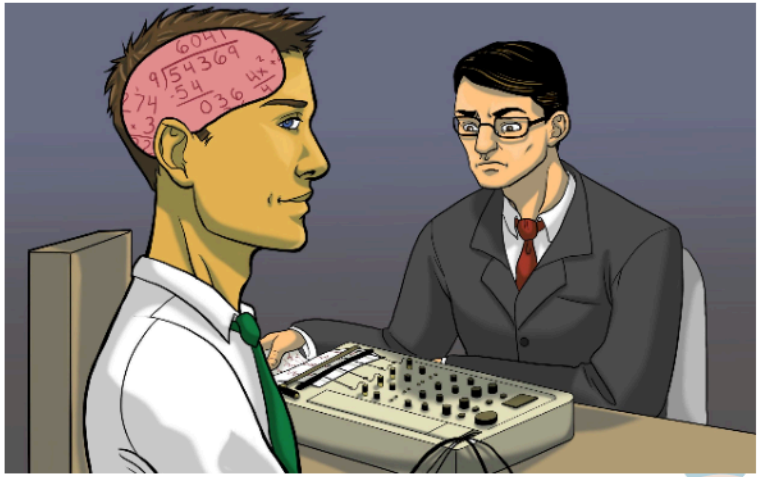
Eyewitness testimony:

- People who observed criminal event are vital when swaying jury
- Often witnesses are more convincing than physical forensic evidence
- Human memory = flawed, errors presented overtime, creating inaccuracies in memories
    - Neuroscience proves that eyewitness testimonies = not always most credible

Neurolaw

Polygraph tests:

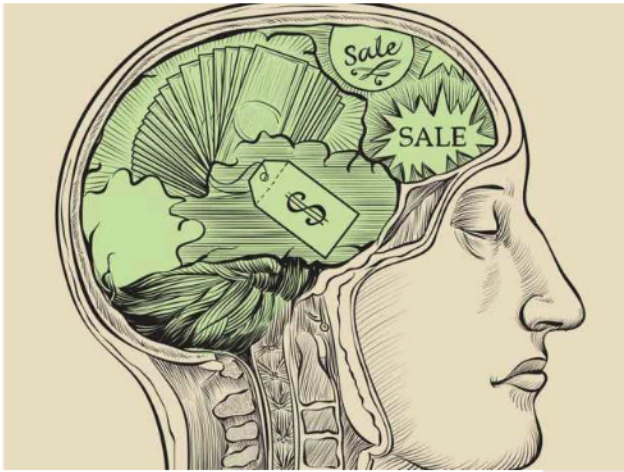
- Lying and guilt are not always the root of such physiological responses
  - Sweating
  - High Heart Rate
  - High Blood Pressure



- Polygraph tests are now rejected by Supreme Court due to unreliability
  - Shouldn't be the primary form of evidence

Neuroeconomics

Modern capitalism: Belief that everyone makes their own rational financial decisions, leading to fair system of distribution



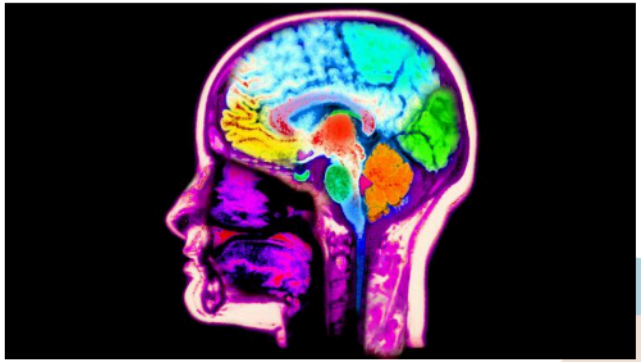
Neuroeconomics: Involves the issue that people don't realize the irrationality of economic choices until later on

- What prevents you from making rational $ choices?
  - Gut instinct (without full awareness)
  - Unacknowledged neurological factors and risk

Neuroeconomics

Measuring brain activity:

- Taking a risk heightens activity level in insular cortex
- The insular cortex communicates with other regions of the brain
  - ie. limbic system (learning, memory, and emotion functionality)
- This causes person to realize the potential downfalls of a daring risk



Neuroeconomics

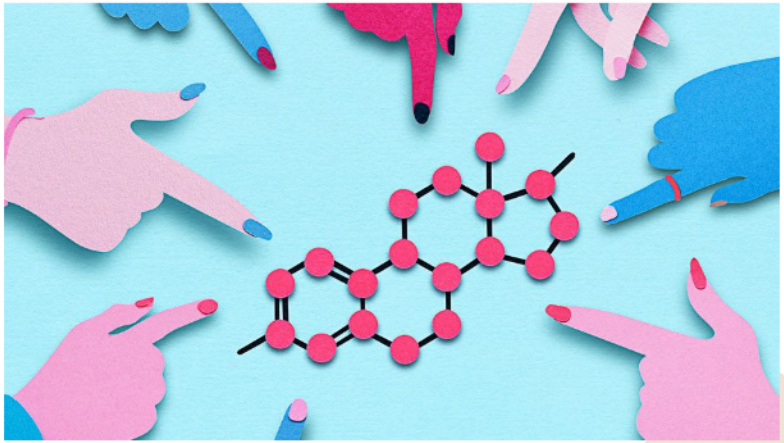
Hormones:

- Test subjects received oxytocin: a social bonding hormone
  - Experiment displays the strong role of neuroscience in decision-making
- Those given oxytocin had trust in a broker to manage investments
- Investment was made through computer = indicates that oxytocin didn't affect them

Neuroeconomics

Testosterone and cortisol:

- Saliva samples taken from set of people daily during business week
- Higher testosterone in saliva = bigger risks taken in work
- Higher cortisol in saliva = strong opposition to risk-taking in the market industry



Neuroeconomics

Practical Applications of Neuroscience:

- Researching how to bring productivity in workplace of neurodiversity
- Analyzing why brain causes people to make impulsive decisions
  - To prevent making irrational $ choices
- Currently researching neurological reasons for biases and prejudices in the workforce

Ethics and the Future of Neuroscience

Brain Science Complications:

- Must establish a stable, ethical foundation for science innovation
  - Could be consequential to people and society if handled incorrectly

- Research started years ago with faulty practices including
  - Phrenology
  - Eugenics
  - Forced Sterilization
  - Lobotomies

Ethics and the Future of Neuroscience

Gene Editing Technology:

- Researchers can detect diseases before a child's birth through
  - Analysis of genetic code

- New tech pinpoints future disorders, then modify genes to prevent it

- Some say it's unethical to alter child's DNA sequence, others say genetic enhancement is a right

Ethics and the Future of Neuroscience

Concerns of when to treat a disease:

- Scientists unsure if they should treat disorders before symptoms arise

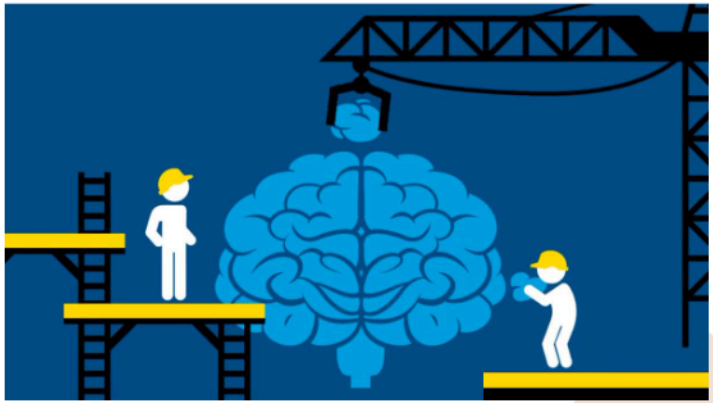
- Using biomarkers, researchers can detect the following disorders prior to outbreak of side effects
  - Depression
  - Psychosis
  - Chronic pain

Ethics and the Future of Neuroscience

Consent in clinical treatment:

- Conflict on whether a surgeon should continue a large step/decision at certain points of the surgery

- Patient is unconscious during the operation
  - Will not be able to give informed consent
  - ie. Surgery for brain tumor removal for an Alzheimer's disease patient
  - Patient cannot approve certain surgical decisions throughout



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We hope you enjoyed the workshop!

Any questions?

You can email us at

jed@simplyneuroscience.org,
riya@simplyneuroscience.org