260-2017-01-09-intro

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2017-01-04 08:24:19

Prelude

PSYCH 260.000

Neurological Bases of Human Behavior

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What is this course about?

What is behavior?

What distinguishes human behavior?

What are neurological bases?

What other bases are there?

How do the neurological bases of human behavior affect your life?

- Why does taking/drinking X make me feel Y?
- My grandmother has Alzheimer's disease. What does that mean for her brain?
- My aunt has bipolar disorder. Why does she take so many meds?
- Why is sleep so important for brain health?
- My mom says my brain isn't fully mature. Is she right?

This course is about...

Genes

Neurotransmitters

Neurons

Networks

Brains

Behavior

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http://www.nature.com/news/human-brain-mapped-in-unprecedented-detail-1.20285

Today's topics

- Course overview
- Neurological bases of human behavior?
- What does that mean?
- Why psychology (and neuroscience) is more difficult than physics

Course overview

- Course website:
  - http://psu-psychology.gitbub.io/psych-260-spring-2017/

Keys for success

- Study the figures.
- Study regularly – don't cram.
- Come to class.
- Participate!

Neurological bases of human behavior

- Why is biology essential for the science of behavior?
- What is science?
- What distinguishes sciences?
- What is neuroscience?
- Why is neuroscience harder than physics?
- Why is it more fun?

What is science?

- Science

What is science?

- Body of facts or truths.
- Process of acquiring knowledge
- Systematic study
- Observation, experiment, description
- Strives for objectivity
- Aims at reliable, reproducible, general, systematic, universal laws

Gilmore on science vs. religion

- Science is a way of thinking
- Science *describes*, but not well-suited to *proscribing*
- Science has little to say about what is good, just, right, moral, etc.
- Science rests on evidence and logic NOT on authorities
- Science respects tradition, but questions and tests it

Gilmore on science vs. religion

- Science (and allied fields) is why human health and prosperity have advanced so significantly over the past 300 years.
- Science will be essential for maintaining and extending those advances in the future

Similarities between sciences

- What are the different kinds of X?
  - Form, e.g., anatomy
- How does X work?
  - Function, e.g., physiology
- Where did X come from?
  - Origins, e.g., development/evolution

What distinguishes sciences

- Phenomena of interest
- Methods or tools
- Levels of analysis
  - Spatial scale (nanometers to light-years)
  - Temporal scale (milliseconds to millenia)

What is neuroscience?

- The study of the nervous system
  - And the behavior it makes possible
- Questions
  - What are the parts of the nervous system?
  - How do the parts work? What do they do?
  - Where did they come from?

Why neuroscience is harder than physics

Why neuroscience is more fun than physics

A bit about systems

A bit about systems

- What are systems?

Related ideas

- Wikipedia on systems theory
- Wikipedia on systems thinking
- Wikipedia on cybernetics
  - *Science concerned with the study of systems of any nature which are capable of receiving, storing and processing information so as to use it for control.*

Non-biological examples

- Solar system
- Climate system
- Economic system
- Internet

Systems have

- Components
- Interactions
- Forces/influences
- Boundaries
- Inputs/outputs/processes

Systems. . .

- "Behave" or change state across time
- Return to starting state
- Appear to be regulated, controlled, influenced by feedback loops

May be thought of as networks

Why is studying systems so hard?

- Single parts -> multiple functions
- Single functions -> multiple parts
- Change structure/function over time (learning, development)
- Biological systems not "designed" like human-engineered ones

Next time...

- History of neuroscience