

(A Brief) History of Psychology

Intro Psychology
Georgia Tech
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Today

- Historical roots of psychology
- Systems and theories

Why Study History?

- History of a topic does not equal the topic
- Teaches us at least three things:
 - **Questions:** How people view the world, and questions they asked about it
 - **Methods:** How people tried to answer these questions
 - **Answers:** Results of those studies (conclusions they came to)

http://ancienthistory.about.com/library/bl/bl_time_philosophers.htm

The Problem of Knowledge

- How can we specify what is knowable without implicitly claiming to know it?
- How can we sincerely claim to search for what we have not identified as knowable (or findable)?
- How, in the end, can we ever be sure we know anything?

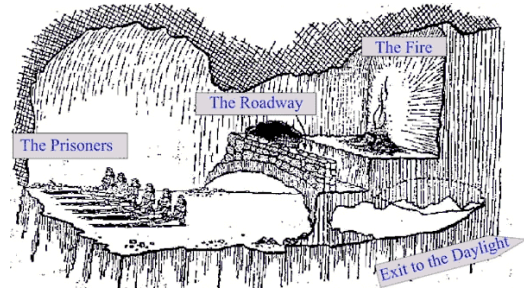


The Pre-Socratics: Ionians

- Parmenides, Pythagoras, Anaxagoras, Anaximander, Heraclitus
- Question: How is it that anything exists?
- Method: Theoretical and numerical relationships
- Answers: Human senses are confined to the realm of *appearances*; what is *true* lies beyond the capabilities of the senses

Plato (following from Socrates)

- Cave illusion: perception and life goals interact



Plato

- Rationalism
 - True knowledge comes from reasoning about the senses
 - "...in the world of knowledge the idea of good appears last of all, and is seen only with an effort...this is the power upon which he who would act rationally, either in public or private life must have his eye fixed..."
The Republic
 - Note: Still a reliance on the senses; but knowledge does not stop at sensing

Hippocrates

- Reliance on observation and empirical method
- Make the most of the sensory input
- Medical discoveries came from keen observations

Aristotle (following from Plato)

- Sensation (observation) *critical* for discovery
- Soul is derived from the study of the body
- Note: soul does not equal mind
- Four body functions:
 - Nutritive
 - Perceptive
 - Locomotor
 - "Universalizing" (abstracting--humans only)
- 5 senses + 6th "sensus communis"
 - (a central executive)

Christian Era

- Augustine: examine nature only to find proof of the existence of God
- Q: Is there a God? Are we created by God?
- M: Casual observations, but not of humans (why?). Generally anti-intellectual.
- A: non-sensing inner awareness of "truth", right/wrong, personal identity.
- Note: "tactile-vision" theory; remnant of Aristotle and Epicureans

Galen

- The Scientific Alternative
- Q: How does this “machine” (body) work?
- M: Anatomy, dissection, functionalism
- A: Not “tabula rasa”; rather, we are born with instincts that affect what we learn
 - Nature *and* nurture

(Modern) Empiricism

- The Authority of Experience
- Q: All questions are “valid”, from:
 - How do we function, feel, perceive?
 - Why, for what?
- M: “Scientific scholarship” (Francis Bacon)
 - Observation, evidence of senses is primary data of all knowledge; evidence required before knowledge can be developed
 - (differs from Rationalists)
- A: Mind must be pre-organized to make sense of all the perceptions
 - (Confirmed by modern science??)

More Empiricists

- John Locke
 - Q: What is human understanding?
 - A: Sensation & reflection are source of all ideas
- George Berkeley
 - A: Experience affects how we interpret our sensations
 - (Top-down influences on perception)
 - New Theory of Vision
- Thomas Reid
 - Very practical
 - A “common sense” (modern definition)

Rationalism

- Q: how do we work? How does sensation, perception, thinking, living work?
- M: “we can only understand something when we can supply the reason for it being what it is”
 - Limited to thought, proofs
- A: We have innate ideas
 - There are also eternal truths that we may never know
 - Perception based on geometric calculations of eye angles, triangular convergence, etc.

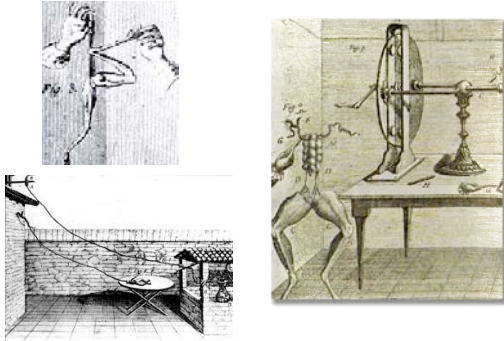
Materialism

- “The Enlightened Machine”
- Q: Separate spirituality from psychology & science
 - Don’t deny existence of either, though
 - Then: how does this machine work?
- M: Metaphor of a machine
 - Perception can be used to study perception!
- A: Perception is a process of the brain
 - No ideas are innate
 - All ideas enter mind through observation (sensation) and tradition (memory)

Luigi Galvani (1737-1798)

- Bioelectrogenesis
- Around 1780, found that the electric current delivered by a rotating static electricity generator caused the contraction of the muscles in the leg of a frog

Galvani's Experiments



The Action Potential

- Emil Heinrich Du Bois-Reymond (1818-1896) in 1848 was able to detect "action current" in frog nerve
 - Small negative variation of the resting electrical potential when the stimulation of the nerve would elicit a response from the muscle.
- Hermann von Helmholtz (1821-1894) in 1852 was able to measure the speed of frog nerve impulses, about 27 m/s.

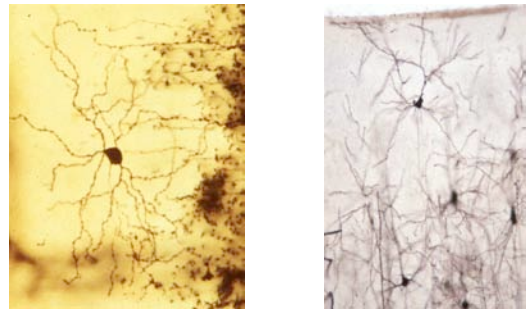


The Neuron Doctrine



- Camillo Golgi (1843-1926): "Black Stain" stained the entirety of a neuron, but only a small proportion of neurons were stained. Revealed the structure of neurons and their processes.
- Santiago Ramon y Cajal (1852-1934): Applied Golgi's stain to study the microstructure of the nervous system (how neurons were organized and connected in the brain).
- Golgi and Ramon y Cajal shared the 1906 Nobel Prize for Physiology or Medicine
- Their work led to the Neuron Doctrine – e.g., the Brain is a bunch of neurons that collectively do all the work.

Golgi's "Black Stain"



Flourens (1794-1867) and Experimental Ablation

- Developed the ablation, or surgical lesion technique
- Observed no change in behavior with different cortical lesions
- Size of lesion more important than location
- "[...] a large section of the cerebral lobes can be removed without loss of function. As more is removed all functions weaken and gradually disappear. Thus the cerebral lobes operate in unison for the full exercise of their functions."

Clinical Studies: Broca (1824-1880)

- 1861: reported on patient "Tan"
- 1865: 7 other cases of aphemia - now called aphasia
- "I persist in thinking, until further details are available, that true aphemia, that is loss of speech without the paralysis of the organs of articulation and without the destruction of the intellect, is linked to the third left frontal convolution."

