



Scientific Influences and Related Philosophers

Psychology 390

Psychology of Learning

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1543

Scientific Revolution Begins

Copernicus

- Proposes that the sun not the earth was the center of the solar system.
- First great blow to human ego (Freud)
- Humans could no longer pride themselves as living at the center of the universe around whom everything else revolved.
- Problem
 - Copernicus's physics were Aristotelian.
 - His data did not support his system any better than the old Ptolemaic one which was simplistically attractive.
- Tried for Heresy

Galileo Galilei (1564 - 1642)

- Was a better spokesman than Copernicus.
- Supported it with new physics which made better sense.
- Used telescopic evidence that the moon and other celestial bodies were no more heavenly than earth.
- Problem
 - Like Copernicus could not shake the notion that planets orbits were circular.

Kepler (1571 - 1630)

- Showed the orbits of the planets were elliptical not circular.
- Solved Galileo's problem.

Bacon (1561 - 1626)

- Beginning of systematic empirical research.
- Believed that learning could only be advanced through the inductive study of nature by means of:
 - sensory experience and observation,
 - collection of facts,
 - careful experimentation to test the validity of a conclusion.

Bacon (1561 - 1626)

- Believed that philosophy should investigate nature in a wholly naturalistic and mechanistic way using theology and teleology equally.
- Believed you should carefully collect facts unguided by any biasing hypothesis until you could cautiously draw some simple generalization.

Descartes (1596 - 1650)

- Psychology as we know it begins.
- Created a framework within which all philosophers and psychologists have worked ever since; even when they attacked his ideas.
- Was the first great Dualist.
- Made a sharp distinction between the mind and body.
- But was also an interactionist - That is, the mind may affect the body and the body could affect the mind.

The Mind

- Was the same as the Soul for Descartes.
- Was the part that thinks.
- Principle site of activity was the head.

The Body

- Was clearly objective extended substance.
- Was mechanical in its action and obeyed all the known laws of the inanimate.
- Since animals had no minds (souls) they were nothing more than machines.

Reflexes

- Two types
- Involuntary
- Voluntary

Involuntary Reflexes

- Contended Senses and muscles are connected by a complex set of nerves.
- The flow of animal spirits through these nerves makes it possible for instinctive reactions to take place.
- Step on a sharp stick.
- Nerves in foot send a signal to the Brain.
- Brain releases an animal spirit into the nerve which goes to a muscle causing it to swell causing the foot to be pulled up off the stick.

Voluntary Reflexes

- Were more problematic.
- Mind and body are separate.
- Again,
 - Body is controlled by physical mechanisms
 - Mind is controlled by the soul.
- So how does the mind influence the body?

Answer

- The soul was located in the Pineal gland.
- The pineal also was the container for the animal spirits which was the fluid that produced the contractions of the muscles.
- Tip the Pineal in the right direction, Then, the soul then pushed the fluids in the right direction.
- Fluids would flow to the right muscle and movement would occur.

Pineal Body

- Thus, Pineal was the connecting system for both the mind and the body.

Descartes (1596 - 1650)

- Also developed the concept of consciousness and defined psychology as the science that studies consciousness.
- Made the search for self-understanding an important one.

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British Associationists

Locke (1632 - 1704)

- Considered to be the father of Empiricism
- Was a physician and practical politician.
- Was less in the grip of a comprehensive metaphysical system than Descartes.
- Basic view and major point: The mind in was a sheet of white paper upon which all experience writes - a blank slate.
- Generally all ideas come from experience.

Locke (1632 - 1704)

- Was like Aristotle's view of the mind as a Tabula Rasa but the development of the view was Locke's own.
- Was also the first Associationist.
- Associationism was used to describe the combination and compounding of ideas.
- Expounded by later theorists.

Hobbs (1588 - 1679)

- Was also an empiricist.
- Contended that trains of thought are guided by desire and purpose. Others are unguided without desire.
- Began the idea of motivating factors.

Berkeley (1685 - 1753)

- Did not believe in the existence of material substance.
- Belief in the mind was the only real reality.
- Denied the mind pictures objects at all.
- We never sense visual depth or the third dimension directly. Always need to use cues.

Hume (1711 - 1776)

- Locke had eliminated from experience all but the sense impressions and their contributions. But still accepted the existence of objects that were similar to ideas.
- Berkley took the next step by denying the existence of objects at all.
- Hume took the next step.

Hume (1711 - 1776)

- Questioned the existence of God and the Soul. This left nothing except for sensations and ideas.
- Made a clean cut distinction between sensations and ideas (called images).
- Treated them in relation to cause and effect.
- Sensations create the ideas or images.

Hartley (1705 - 1757)

- Credited with the development of two concepts.
 - Association
 - Psychophysical Parallelism

Association

- Included not only ideas (Hobbes, Locke, Berkeley and Hume) but sensations and actions as well.
- Associations were used to explain the nature of memory, imagination, emotion and other complex mental states.

Psychophysical Parallelism

- Sensations, ideas and other mental events run along side of, but are not affected by events.
- Are of a more bodily nature - changes in the nerves and the brain
- Was a dualist but also was a parallelist but not an interactionist
- Will be more acceptable to later psychologists .

James Mill (1773 - 1836)

- Made extreme use of the association of ideas in explaining mental life.
- Ideas run together.
- Simple ideas by association run together and form complex ideas.
- One idea is also capable of entering into combinations with other ideas. Thus, a complex idea consists of many simpler ideas.

John Stuart Mill (1806 - 1873)

- Son of James Mill
- Agreed with his father.
- But also contended that simpler ideas generate more complex ideas which are definitely more than the mere summation of the simple components.
- Similar ideas to later Gestalt Psychology.

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Sensory Physiology

Sensory Physiology

- Made major impacts into what would become physiology and sensory psychology.
- Work was related to theories such as Descartes but went far beyond the crude imaginings of structure and function of the body.
- Was analytical and objective.
- Detailed physical changes arising from excitations of the eye, ear, and other structures.
- Disclosed nerve speed etc.
- Many contributors

Newton

- Principia mathematica (1687)
- Laws of motion put a capstone on the idea that the universe was a machine.

Helmholtz (1821 - 1894)

- Was a physician, physicist, and physiologist
- Contributed significantly to the fields of
- Vision
 - Developed the ophthalmoscope to look at the retina
 - Trichromatic theory of color
- Audition
 - Developed Place theory
 - Identified the function of the ossicles

Fechner (1851)

- Father of Quantitative Psychology.
- Published “The Elements of Psychophysics”
- Founded psychophysics: The quantitative study of the relation between physiological stimuli and its psychological attributes.
 - Found heaviness, and loudness increased logarithmically as you added volume.
- Showed psychological concepts (loudness) could be measured accurately.
- Ultimately became Experimental Psychology