

DEPARTMENT OF PSYCHOLOGY

DARRANG COLLEGE



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INTRODUCTION TO BIOPSYCHOLOGY

Meaning of Biopsychology:

Biopsychology, sometimes refers as psychophysiology, is an important field of psychology that seeks to understand how the nervous system including CNS and PNS, and other biological processes influence behavior, thoughts, and emotions. It serves as an essential bridge between the biological sciences and psychology, emphasizing the interplay between physiology and mental processes (Breedlove & Watson, 2018). Through the integration of neuroscience, genetics, and evolutionary theory, biopsychology explores the mechanisms that underlie cognition, perception, learning, memory, and emotion.

The scientific study of the anatomy, biochemical processes and the physiology of nervous system is known as neuroscience. A closely related field of the neuroscience is biopsychology, which

draws information from it to study human and animal behaviour. It is also known as psychobiology, behavioural biology or behavioural neuroscience. (egyankosh

Early Views and history of Brain and

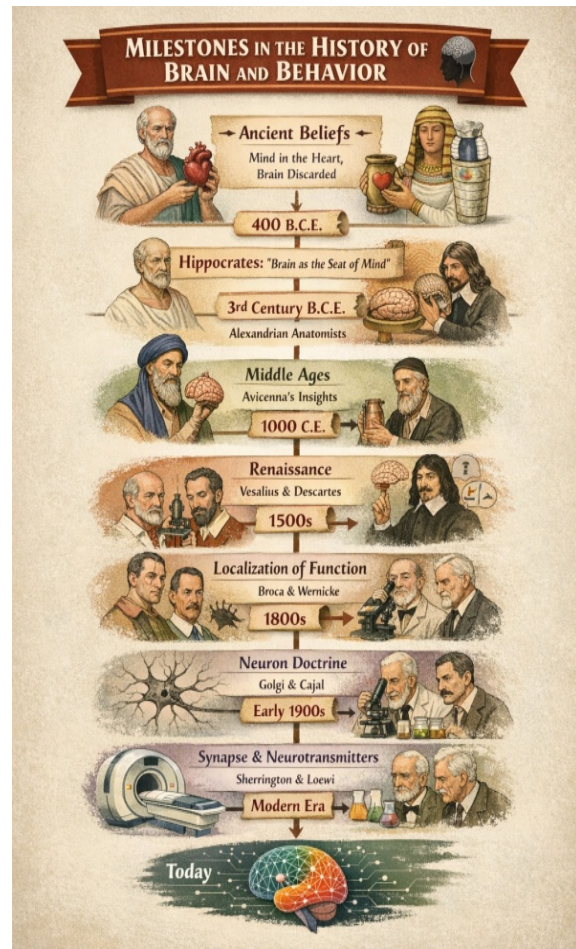
Behaviour: Early philosophers, such as Aristotle (384-322 B.C.E.), believed that one's mind resided in the heart. According to him since our blood started from the heart, the soul also originated there. Plato (428-347 B.C.E.) argued that the executor of reason was the heart and our animalistic desires and emotions were controlled by the liver (Gross, 1987). Many early civilization, including the Indian, Chinese, and Egyptian also shared the same belief. (*History of Biopsychology 2021*)



In the 3rd century B.C., anatomical research flourished in Alexandria. Herophilos distinguished between the cerebrum and cerebellum and identified the brain's ventricles. Erasistratos suggested intelligence was linked to brain convolutions. Later, Galen demonstrated that the brain controls sensation, thought, and movement, and described the spinal cord's role in muscle control. (*History of Biopsychology 2021*)

During the Middle Ages, Avicenna advanced medical and psychological knowledge, identifying brain regions involved in mental disorders and linking emotional disturbances to brain dysfunction.

The Renaissance revived anatomical study through Andreas Vesalius, who corrected earlier anatomical errors. René Descartes introduced the reflex theory and proposed mind-body dualism, suggesting the pineal gland as the interaction point between mind and body.



In the 19th century, scientists established the principle of localization of function—the idea that specific brain regions control specific behaviors. Researchers such as Paul Broca and Carl Wernicke identified areas of the brain responsible for speech production and comprehension. The famous case of Phineas Gage demonstrated how frontal

lobe damage affects personality and decision-making.

A major breakthrough came with the discovery of the neuron as the brain's basic unit. Camillo Golgi developed a staining technique to visualize neurons, while Santiago Ramón y Cajal established the neuron doctrine, showing that neurons are individual cells. Later, Charles Scott Sherrington identified the synapse, and Otto Loewi demonstrated chemical communication between neurons through neurotransmitters like acetylcholine.

In the 20th century, researchers uncovered how electrical impulses (action potentials) travel along neurons, notably through the work of Alan Hodgkin and Andrew Huxley studying the squid axon.

Technological advances such as EEG, CT scans, MRI, PET, and fMRI allowed scientists to observe brain structure and activity in living individuals. These tools revolutionized neuroscience and helped

link brain activity to behavior, cognition, and psychological disorders.

Today, neuroscience continues to expand, highlighted by initiatives like the Brain Initiative, aimed at advancing understanding of the human brain.

NATURE OF BIOPSYCHOLOGY

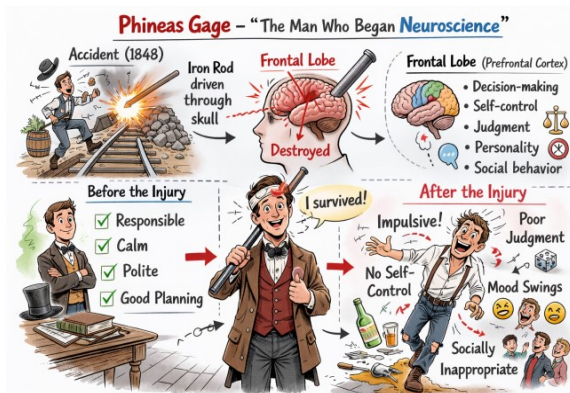
In simple word the biological approach to the study of human and animal behaviour is known as biopsychology. The bio psychologists try to understand empirically how organic processes interact with cognition, emotions and other psychological processes.(egyankosh 2026). To doing so bio psychologist uses different scientific methods like observation, experiments, and other modern techniques ie brain imaging, Neuroimaging etc to understand the relationship between brain and behavior.

Biopsychology mainly Focus on Central Nervous System (brain and spinal

cord), Peripheral Nervous System, Endocrine system (hormones) and It explains how different parts of the brain perform different functions. It is based on the idea that Brain structures control thinking, memory, and emotions e.g

- Neurotransmitters influence mood and mental health.
- Hormones affect stress and motivation.

For example, the case of Phineas Gage showed that damage to the frontal lobe can change personality and decision-making.



(The case of Phineas Gage: Phineas Gage is often referred to as the "man who began neuroscience." He experienced a traumatic brain injury when an iron rod was driven

through his skull, destroying much of his frontal lobe. Gage miraculously survived the accident. However, his personality and behavior were so changed as a result of the frontal lobe damage that many of his friends described him as an almost different person entirely. The impact that the accident had has helped us better understand what the frontal lobe does, especially in relation to personality. (*The Famous Case of Phineas Gage's Astonishing Brain Injury*, n.d.)

Biopsychology is an interdisciplinary field that combines knowledge from psychology, biology, neuroscience, medicine, and genetics to understand how biological processes influence behavior. It connects the mind and body by explaining how the brain, nervous system, hormones, and genes shape our thoughts, emotions, and actions. Biopsychologists study both humans and animals, as animal research helps us better

understand learning, memory, and emotions. The field is also influenced by the theory of evolution proposed by Charles Darwin, which explains behavior as an adaptation for survival. Biopsychology has important practical applications in understanding and treating conditions such as depression, anxiety, schizophrenia, brain injuries, and other neurological disorders. In simple terms, it shows that behaviour is deeply rooted in our biological systems.

From the above discussion it can be conclude that , the nature of biopsychology lies in its scientific, biological, and integrative approach to understanding how the brain and body shape behaviour.

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