

# Biological psychology

## chapter 1



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biological psychology the study of the biological bases of psychological processes and behaviour (also called behavioural neuroscience)

neuron the basic unit of the nerve system

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neuroscience the study of the nervous system conserved in the context of evolution, referring to a trait that is passed on from a common ancestor to two or more descendant species.

five research perspectives on the biology of behaviour

1. description: structural and functional

2. evolution

3. development over the life span

4. mechanisms

5. applications

physiological psychology More specific and defined area of biological psychology - Deals with the relationship between mind and body (i

- Tends to be invasive (i. e., manipulating directly the nervous or endocrine system of animals)

- Focus is on the central nervous system

psychophysiology Tends to take physiological measures, and correlate them with behavioural or cognitive measures.

- Focuses on autonomic nervous system measures, brain waves, muscle activity, etc.

- Ex: EEG, EMG, EOG, GSR, etc.

- Applications: Biofeedback, sleep studies,

polygraph

neuropsychology Typically in the human and clinical context ("clinical neuropsychology")

- A clinical psychology Ph. D or PsyD is required.

- based on assessment of patients (for brain disorders and injuries) and

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rehabilitation.

- Working with neurologists (MD's) is often required in hospitals) behavioural neuroscience Tends to be defined as " biological psychology" (so quite general) with the exclusion of cognitive neuroscience.

- Fundamental (basic) research with both animal models and humans.

- Definitions depend on how you define " behaviour"

- Focus on observable behaviours (i. e., motor behaviour), and emotions (affective processes) and motivational processes ethology the science of animal behaviour behaviourism the theory that human and animal behavior can be explained in terms of conditioning, without appeal to thoughts or feelings, and that psychological disorders are best treated by altering behavior patterns. striated muscle A type of muscle with a striped appearance, gen-

erally under voluntary control. Compare smooth muscle cognitive

neuroscience Fundamental research with predominantly human but some animal models

- Heavy reliance on non-invasive neuroimaging techniques (e. g., CAT, PET, fMRI, etc.).

- Focuses on cognitive processes (covert processes) and functions (e. g., behavioural plasticity, communication, etc.): Learning and memory, Attention and perception, Problem solving, decision making,

Language developmental psychology or neuroscience and behaviour genetics Study of

- life-span development

- early development (pre-natal, peri-natal, early post natal)

- aging

- genetic vs. environmental influences
  - epigenetics
  - brain growth and regeneration, neuroplasticity, etc.
  - In behavioural endocrinology and toxicology: organizational effects of hormones, endocrine disruptors, neuroteratology
- 3 emerging areas of neuroscience
1. Affective neuroscience: The neuroscience of emotions, affect
  2. Social neuroscience: The neuroscience of social behaviour and socio-affective processes.
  3. Motivational neuroscience: the study of motivational processes. " Drives" and incentives, and how the brain responds to " reward", and becomes addicted
- behavioural pharmacology or psychopharmacology The study of the effects of drugs on brain, behaviour, cognition
- behavioural endocrinology and psychoendocrinology The study of the effect of hormones on brain and behaviour and also the effect of behaviour on the endocrine system
- behavioural toxicology The study of the effect of neurotoxins (and sometimes endocrine disruptors) on brain and behaviour
- neurotoxin a poison that acts on the nervous system
- psychoneuroimmunology Study of the relationship between the immune system, the nervous system and behaviour
- 3 main approaches to studying the neuroscience of behaviour
1. somatic intervention
  2. behavioural intervention
  3. both of these variables measured to allow for correlations between somatic and behavioural changes
- each approach enriches the others
  - somatic intervention investigators change the body structure or chemistry of an animal in some way and observe and measure any resulting behavioral

effects. behavioural intervention An approach to finding relations between body variables and behavioural variables that involves intervening in the behaviour of an organism and looking for resultant changes in body structure or function. epigenetics The study of heritable changes in gene activity that are not caused by changes in the DNA sequence

- The study of factors that affect gene expression without making any changes in the nucleotide sequence of the genes themselves. monism the brain and the mind are the same

- also physicalism, materialism dualism brain and mind are not the same

- but could interact (interactionism)

- Cartesian dualism telencephalon The frontal subdivision of the forebrain that includes the cerebral hemispheres when fully developed. MacLean's brain

theory The Triune Brain

- telecephalic components:

1. reptilian brain

2. paleo-mammalian brain

3. neo-mammalian brain reptilian brain basal ganglia and extrapyramidal motor system paleo-mammalian brain "visceral" or "ventral" brain

- limbic system, social emotions neo-mammalian brain "dorsal" brain

- neocortex, complex cognitions