

Behavioural Neuroscience Lecture 2: History

Facts about the brain:

- Purpose: to process sensory information in order to guide movement (and thus control behaviour) □
- Weighs 1,400 grams □
- 3% of body weight, consumes 20% of energy □
- Made up of 100 billion neurons, 1 million synapses, lots of circuits □
- Most complex system in the universe □
- Everything you think, feel and experience are a product of neurons in the brain □What is behavioural neuroscience? □
- Scientific study of the role of the central nervous system in behaviour □
- Combines psychology and neuroscience □
- Identifies what part of brain controls what aspect of self □Phineas Gage: □
- Phineas Gage (railway foreman from Virginia) □
- Incident involving tamping iron (1845): detonated explosives, tamping iron went □through brain □
- Survived but with profound damage to frontal lobe □
- Treated by John Harlow (physician) □
- Recovered and went home after 10 weeks □
- Experienced behavioural (personality) changes: proved that one part of brain controls □certain aspects of a person □
- Went from "reliable and kind" to "disrespectful and aggressive" (common injury) □
- Held numerous jobs and died in 1860 (probably from epilepsy subsequent to the brain □injury) □
- Proof in 1800s that parts of brain control different things (brain is important) □The history of Neuroscience: □1. Ancient Cultures: □

- Thought heart was a vase of the mind □
- Reflected religious/moral views □
- Limited study methods □
- Finds from chance discoveries □
- Controversial □2. Hippocrates (Greece, 450BC) □
- First to suggest that the brain is the center of the body (not heart, contrary to Aristotle)

- Four bodily "humours"

3. Galen (Rome, 130CE)

- Tested on animals □
- Revised dissection/vivisection after dark ages □
- Made detailed drawings of brain (clear sense of structures) □
- Advanced knowledge of brain structure □
- Failed to explain function □4. Descartes (France, 1596CE) □
- Impressed by hydraulically controlled statues □
- Animals controlled mechanistically □
- Animal spirits in brain directed by pineal gland ventricles (used mind like joystick to □control) □
- Humans work on their own □
- Proposed model of how things work □5. Thomas Willis (England, 1621CE) □
- Rejected idea that mind resides in ventricles □
- Thought generated by outer tissue of cerebral hemispheres (cortex) □
- Based idea on comparative anatomy and effects of cortex damage on behaviour □

- Believed cortex contained animal spirits (transported by white matter) □6. Luigi Galvani (Italy, 1737CE) □
- Rejected idea of animal spirits flowing through nerves □
- Frog experiments: electrical charge applied to frogs legs to make muscles contract □
- Suggested nerves must be coated in fat (insulation to prevent any leaking) □
- Inspired books like Frankenstein (electrical happening in brain to allow thought) □7. Franz Joseph Gall (Germany, 1758CE) □
- Thought brain was composed of several distinct “organs of thought” or faculties □reflecting bumps on skull □
- Introduced skull map used to read a person’s character (phrenology) □8. Paul Broca (France, 1824-1880) □
- Described patient unable to speak after damage to left frontal lobe (now known as □Broca’s area) □
- Key role in production of speech, not to do with language completely but motive □control □