

Chapter 1 – Introducing cognitive neuroscience

- First nerve cell described by Purkinje
- Cognition – higher mental processes: thinking, perceiving, imagining, speaking, acting, planning
- Mind-body problem: how physical substance (brain) can give feelings, thoughts & emotions (mind)
 - Dualism – mind & brain are made up of different substances (Rene Descartes)...interact at pineal gland
 - Dual-aspect theory – mind & brain are 2 different levels of explanation of same thing (Spinoza)
 - Reductionism – mind body concept will be replaced by neuroscientific concepts
- Phrenology – wrong. Individual differences in cognition mapped onto skull shapes
 - Assumed – different regions of brain perform different functions associated with different behaviours (functional specialisation). Size of these regions -> skull shapes -> cognitive & personality
- Info-processing – perception -> attention -> short term memory
- Later stages can begin before earlier stages are completed -> interactivity
- Later stages can influence earlier ones -> top-down processing

Facial Recognition

- Domain-specificity hypothesis –
 - Innateness – Infants are born with an innate representation of the structure of a face.
 - Processing is unique to faces – Holistic processing is unique to faces.
 - Face-specific neural representations – Lesions can isolate face processing disruption, fMRI shows blood flow to isolated areas of the brain during facial recognition, timing of face-sensitive processes.
- Expertise Hypothesis –
 - We have a lot of experience making individual level discriminations of faces.
 - Thus, if we have a lot of experience processing other objects, they should be processed like faces.
 - This is not innate; the experience can be gained at any time during life.
 - Mechanisms and neural areas that are used to process faces are recruited to make within-class discriminations when the person is an expert at recognising exemplars of the non-face object category.
- Visual analysis
 - Inferior occipital gyri – facial features, structural encoding
 - Superior temporal sulcus – changeable aspects of faces (expression..)
 - Lateral fusiform gyrus – unchangeable aspects of faces (identity, face recognition unit)
- Visual analysis links with other neural systems – attention, speech, emotion, personal identity

Chapter 2 – Introducing the brain

- The brain has about 100 billion neurons.
- Each neuron can connect with 10, 000 other ones.
- Neurons only make up 10% of the brain's cells. Rest are glia
- We lose one cortical neuron per second.
- Men have larger brains, women have more folded brains.
- Neurons have a cell body (soma), axon and dendrites.
- Dendrites receive information, axons pass on information.

Brain Structure

- Size does not entirely correlate to mental capacity, nor does brain to body weight ratio.
- Mental capacity most closely correlates to number of folds in the brain.
- "Hills" are known as gyri.
- "Valleys" are known as sulci.
- Brain consists of two asymmetric hemispheres connected by the corpus callosum.
- The brain consists of glial cells and neurons.
- Neurons process information; there are approximately 100 billion neurons in the adult human brain with over 300 trillion neuronal connections.
- Glial cells provide physical structure to the brain and support the brain's functions.