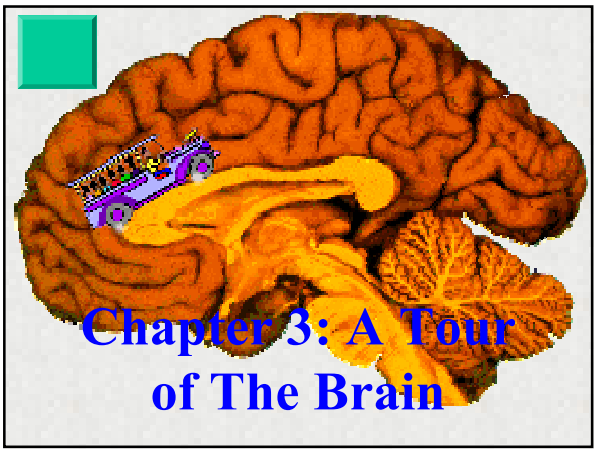
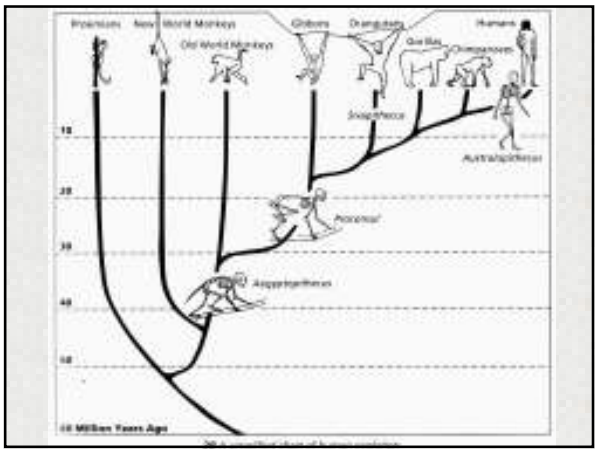
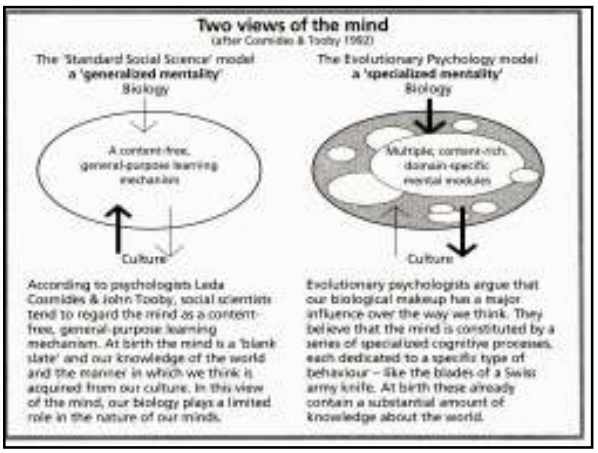
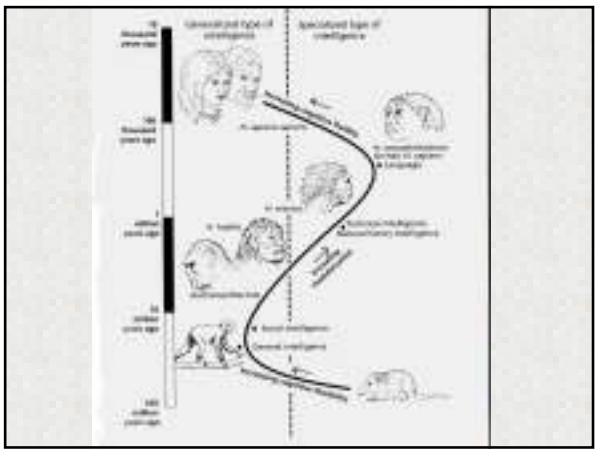
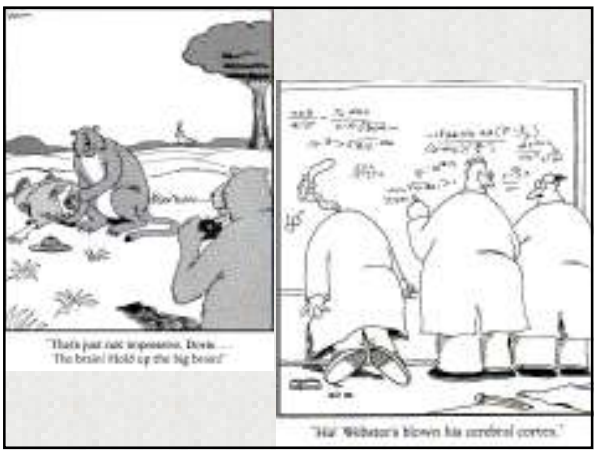
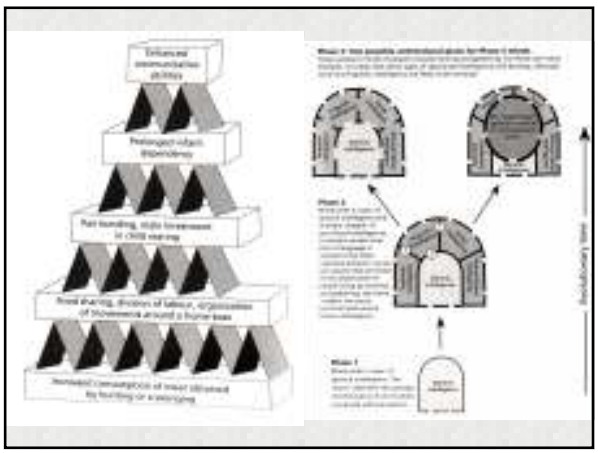

Chapter 3: A Tour
of The Brain




Two views of the mind
(after Cosmides & Tooby 1992)
The 'Standard Social Science' model
a 'generalized mentality'
Biology
A content-free, general-purpose learning mechanism
Culture
According to psychologists Leda Cosmides & John Tooby, social scientists tend to regard the mind as a content-free, general-purpose learning mechanism. At birth the mind is a 'blank slate' and our knowledge of the world and the manner in which we think is acquired from our culture. In this view of the mind, our biology plays a limited role in the nature of our minds.
The Evolutionary Psychology model
a 'specialized mentality'
Biology
Multiple, content-rich, domain-specific mental modules
Culture
Evolutionary psychologists argue that our biological makeup has a major influence over the way we think. They believe that the mind is constituted by a series of specialized cognitive processes, each dedicated to a specific type of behaviour – like the blades of a Swiss army knife. At birth these already contain a substantial amount of knowledge about the world.





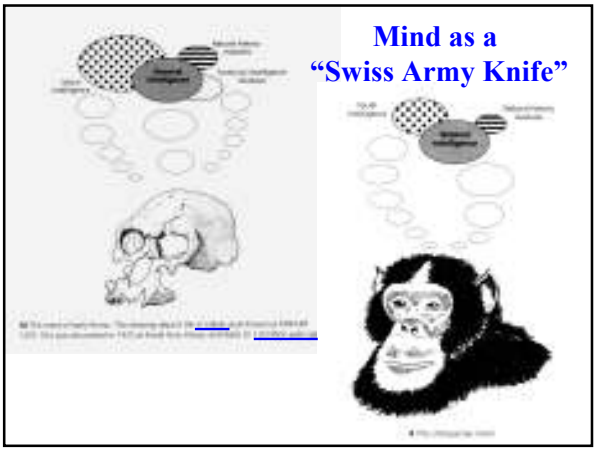


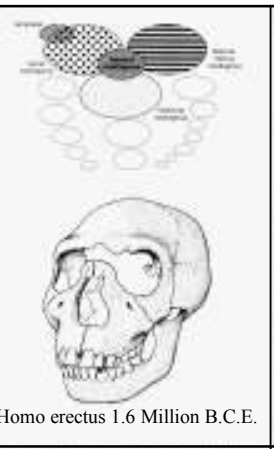
Does ontogeny recapitulate phylogeny?

Embryonic Development of Brain

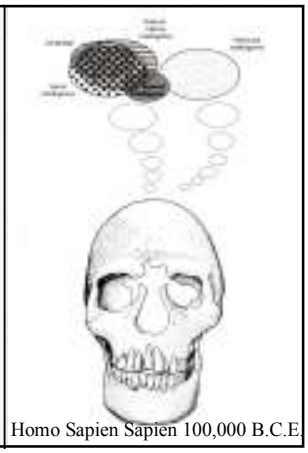
- Anterior bulges of the neural tubes: Forebrain, midbrain, & hindbrain
  - Forebrain → High level cognition and decision making
  - Midbrain → controls most autonomic functions like temperatrure
  - Hindbrain → Primitive Brain

Mind as a "Swiss Army Knife"

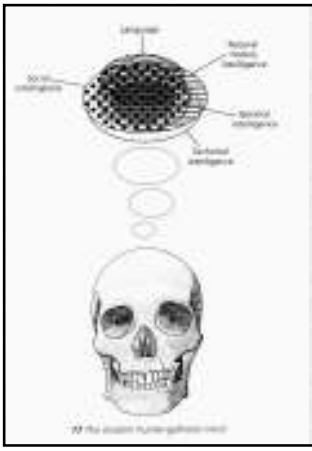




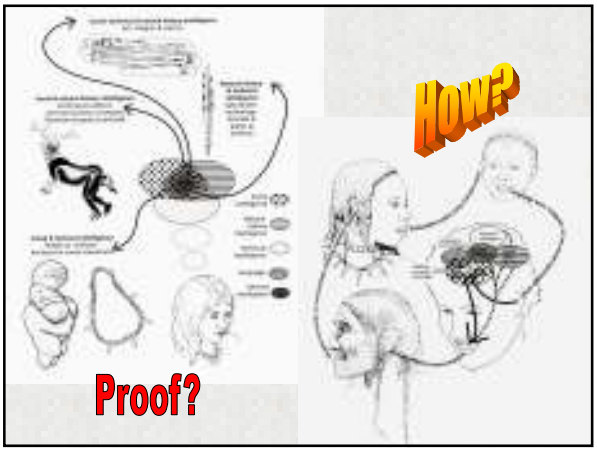
Homo erectus 1.6 Million B.C.E.



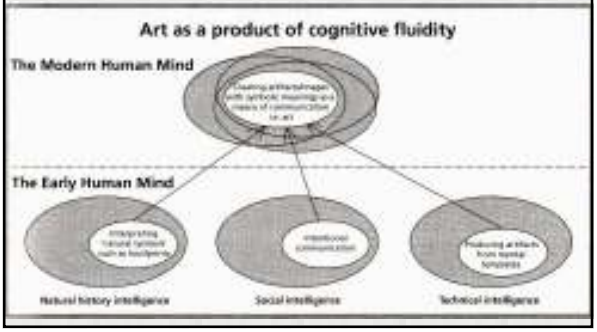
Homo Sapien Sapien 100,000 B.C.E.

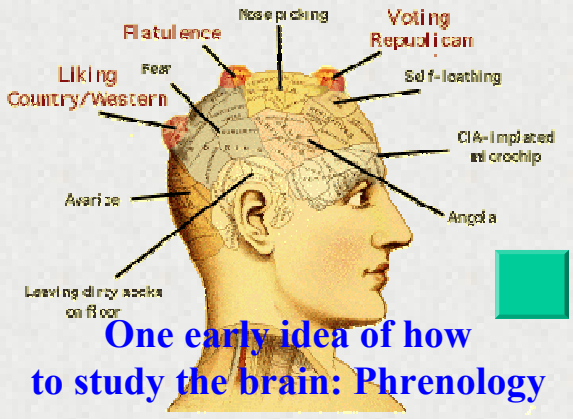


"General Intelligence" has basically disappeared as "Cognitive Fluidity" marks the rise of Modern Man



Symbolism: Human-kinds specialty



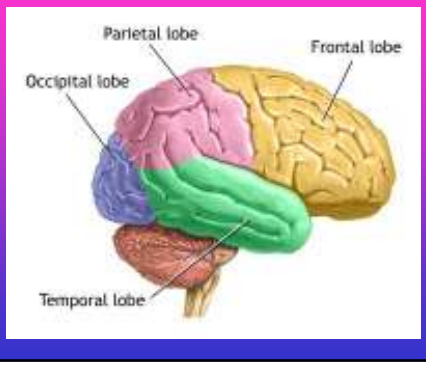


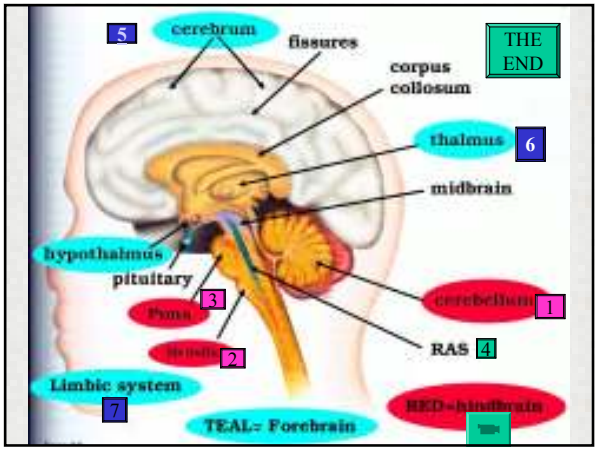
One early idea of how to study the brain: Phrenology

THE HARDWARE

- 3 Main Parts of the Brain:
  - Forebrain
    - Cerebrum
    - ½ Thalmus (the relay part)
    - Hypothalmus
    - Limbic System
  - Hind Brain
    - Medulla
    - Pons
    - Cerebellum
  - Midbrain: RAS

Lobes of the Brain





CEREBELLUM

- Maintain balance
- Controls muscles
- known as the "Little Brain"

MEDULLA

- REGULATES:
  - –HEART RATE
  - –BLOOD PRESSURE
  - –RESPIRATION
  - –SNEEZING, AND COUGHING

PONS

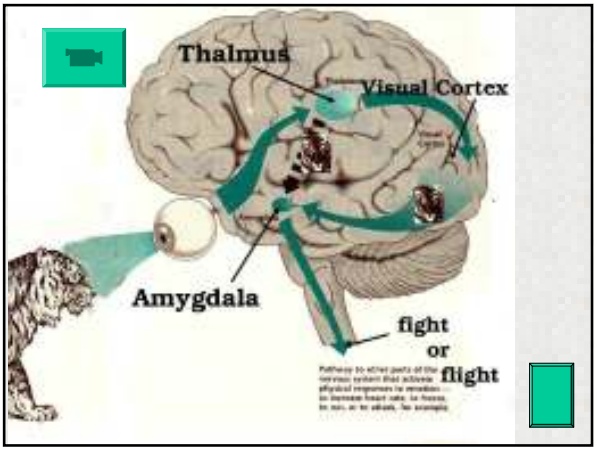
- A bundle of nerves that transmits info on
  - body movements
  - attention
  - sleep
  - alertness

Reticular Activating System (RAS)

- Connects
  - hindbrain to
  - mid brain to
  - forebrain
- controls
  - attention, sleep, arousal
- drugs lower RAS activity

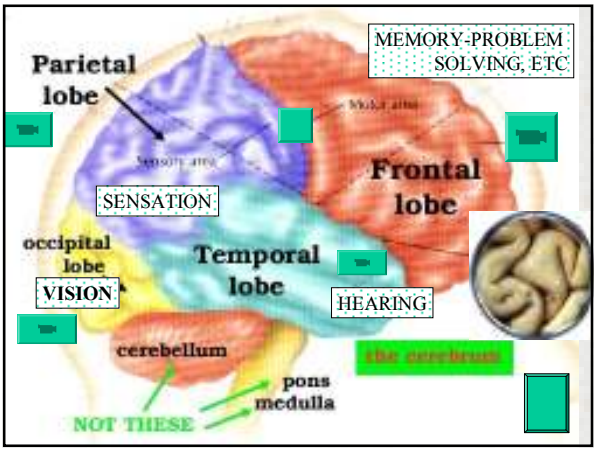
Thalmus

- 2 football-shaped structures
- A relay station for sensory input. eg;
  - from eyes to thalmus to cerebral cortex to wherever it needs ro get



CEREBRUM:

- CEREBRAL CORTEX (2/3 OF BRAINS NERVE CELLS & 40% OF ITS MASS)
  - TWO HEMISPHERES (R/L)
  - FOUR LOBES
  - CONNECTED BY CORPUS CALLOSUM
  - COVERS THE HIDEBRAIN LIKE A VERY THICK ORANGE SKIN.

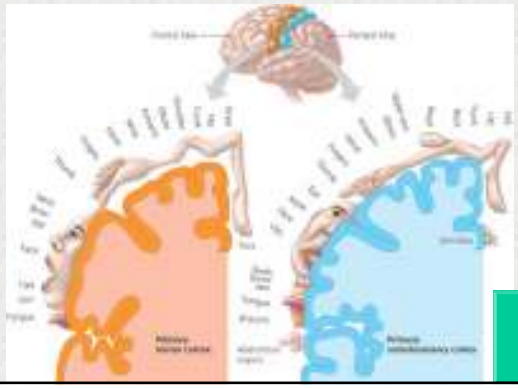


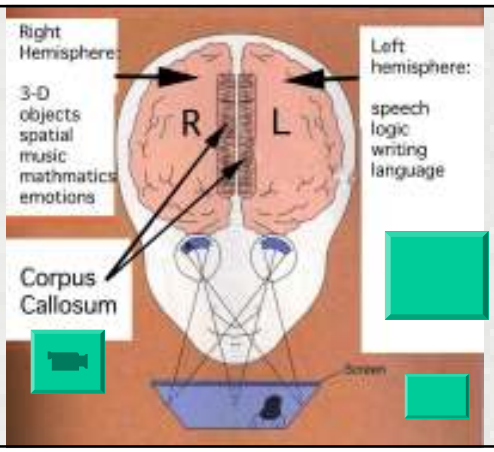
Information Processing

cerebral cortex

- **Primary Somatosensory Cortex** – send info to nearby association areas that can process particular features in the sensory input
  - Ex.~ *Primary visual cortex* – some neurons are sensitive to bars of light that have a certain width & orientation
- **Primary Motor Cortex** – helps issue commands that consist of action potentials produced by neurons
  [located: rear of frontal lobe, adjacent to the primary somatosensory cortex]
  - Action potentials travel along axons to brainstem & spinal cord → excite motor neurons → excite skeletal muscle cells

Information Processing *cerebral cortex*





- **The Right Hemisphere controls the left side of the body.**
- **The Left Hemisphere controls the Right side of the body.**

- **Information the left half of the visual field goes to the right brain.**
- **Information the right half of the visual field goes to the left brain.**

Major Functions of the Left side of the cerebrum

- **Language functions: Speaking, comprehension, Writing**
- **Analytic functions: e.g. Arithmetic reasoning**

How do we know that the left side of the brain houses language functions?
- research on split brain patients

Split brain patient

Left hand → To right side of brain ---------- Broken Corpus Callosum

Touching an object

Patient cannot name the object he/she is touching, but can pick out the right object from an assortment.

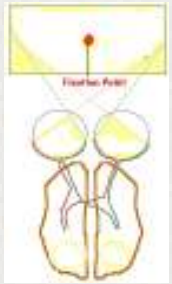
Intact brain

Left hand → To right side of brain → Left brain (speech) Corpus Callosum

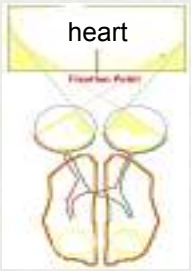
Touching an object

successful naming of the object he/she is touching.

1. fixate on the red dot.



2. name the word on screen



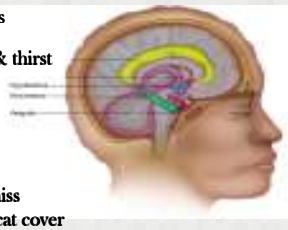
Split-brain patient says "art".

The Limbic System

The functions of the Hypothalamus

Controls vital functions: hunger & thirst

Harbors the brain's pleasure center



The functions of the Amygdala

Controls fear & rage

-Stimulate one area makes cat hiss

-Stimulate another area makes cat cover

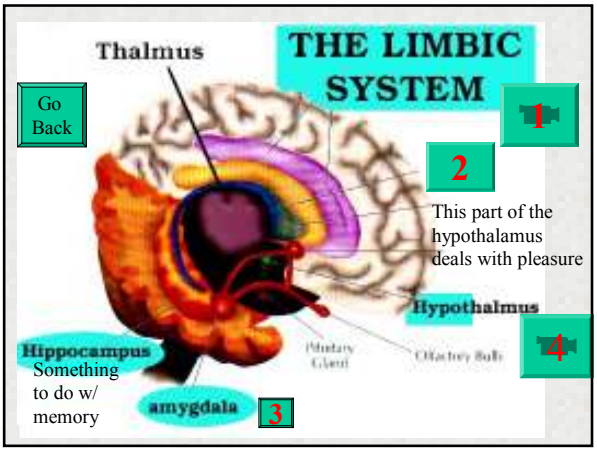
The functions of the Hippocampus

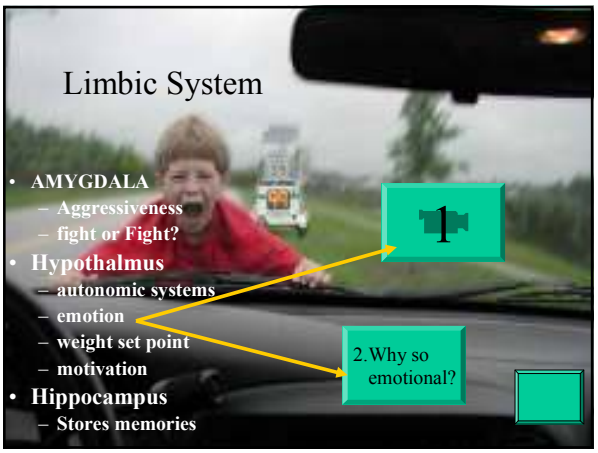
Memory functions

Destroy Hippocampus, squirrels can't remember where they hid nuts.

Destroy Hippocampus, rats fail to learn to navigate in a maze.

Memento





It is fairly delicate, and when it gets messed up--serious problems can arise. Mild problems are called neurosis and major problems psychosis

When things get out of whack some people resort to chemicals--or food

And then there are just common confusions caused by different views of the world