**CLASS 4 INTRO to the BRAIN: Injuries, aphasia (SEDIVY ch. 3, part I)**

**GIVEN:**

*BRAIN is a lump of dense tissue of interconnected cells.*

*LANGUAGE a phenomenon organized within neural pathways of the neocortex and also within the brain.*

***BRAIN*** *is inscrutable; it is the language organ.*

*In the brain, functions do not align unambiguously with tissues and neural pathways but are intertwined in tissues and pathways.*

*There is no separate, identifiable language module dedicated to just language that would be independent of intelligence.*

*If language is an "outgrowth" of our intelligence, which is genetic, then genetic anomalies are evident in language.*

What were the cognitive abilities to which the emergence of human language was linked?

What features of this language could support communication and information transfer?

What is the relationship between language usage, behavior and functions, on the one hand, and the brain, on the other?

But what are the language subsystems in the brain?

Does combining sounds into words housed in the same system as combining words > sentences?

Is understanding word meanings in the same system as choosing words to convey what’s intended?

**APHASIA - Broca's, Wernicke's et al.**

[*https://www.youtube.com/watch?v=eYVKxZszofE*](https://www.youtube.com/watch?v=eYVKxZszofE)

Aphasia = outcome of damage to the visual, auditory or articulatory cortex evident in language usage impairments, i.e., malfunctioning of mental operations involved in producing and understanding language:

e.g. while reading…

visual cortex – processes written word (size, shape, color…)

auditory cortex – processes the visual into auditory perception (inside your mind)

articulatory cortex – processes what’s said (damage to **Wernicke's area shows up in comprehension**)

Why couldn't the aphasia patient figure out the meaning of …

The boy was chased by the girl but understood The mouse was chased by cat?

e.g. one can hear, read, listen and process but cannot respond to what’s heard or repeat it

**Broca's – haulting, dysfluent l.**

**If damage happened early in life, other brain areas take over even if what was damaged was in the left hemisphere.**

**BRAIN ANATOMY:** Language localization and lateralization

**Brodman’s anatomy**

**NEOCORTEX**

The six-layer **cortex** is a distinguishing feature of **mammals** forming 76% of the entire brain;

… is the structure that we hold responsible for the repertoire of behaviors distinguishing us from our closest living and extinct relatives.  <http://dev.biologists.org/content/141/1/11>

**WHITE MATTER of the NEOCORTEX**

**…** bundles of tissue through which messages pass between different areas of **grey matter** within the **central nervous system**, i.e. the tissue carrying [nerve impulses](https://en.wikipedia.org/wiki/Nerve_impulse) between neurons;

**white matter tracts** form networks of neural fibers.

**CORPUS CALLOSUM** [https://www.medicalnewstoday.com/articles/318065.php#](https://www.medicalnewstoday.com/articles/318065.php)

… is the connective pathway between the left to the right side of the brain;sitting in the centerof the brain (10 cm long, shaped like the letter C);

each side of the brain controls movement and feeling in the opposite half of the body, and processes information such as language;

physical coordination and taking in complex information requires both sides of the brain to work together;

cc gets formed between [12 and 16 weeks](http://nodcc.org/corpus-callosum-disorders/#cc) after conception and near the end of the first trimester of pregnancy, and continues to develop throughout childhood until abt 12 years old, then remains unchanged into adulthood and throughout the rest of life.

**SPLIT BRAIN condition reflected in language usage**

contra-lateral processing of language and muted communication

Web activity 3.2 - M. Gazzaniga's split-brain patient <http://sites.sinauer.com/languageinmind/>