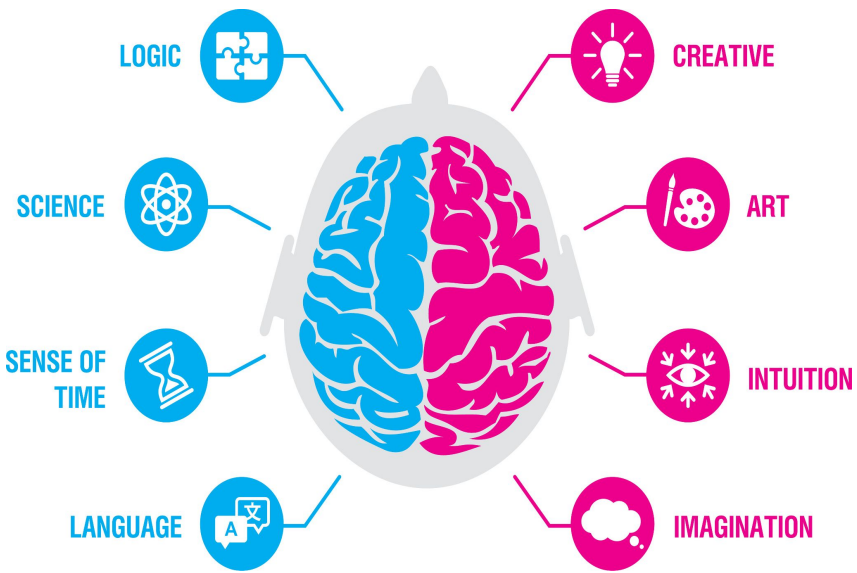
COGS 17 Week 10

Winter 2024, A04

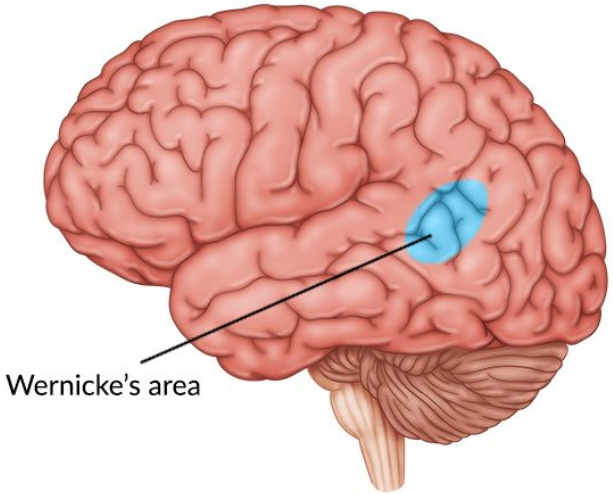
By: Jason Chen

Lateralization



- **Dominance** of one hemisphere of cerebral cortex over the other for **particular functions**
- Determined in part by **Wada Test**
- Right hemisphere is usually dominant for **visuospatial tasks** and **socioemotional processes**
- Left hemisphere is usually dominant for **language** & **other sequential and analytic processes,** which includes **manual control**

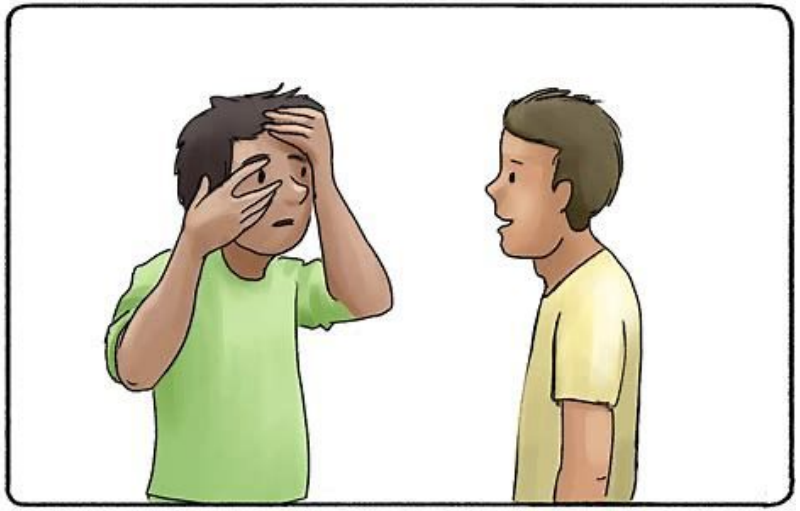
Planum Temporale



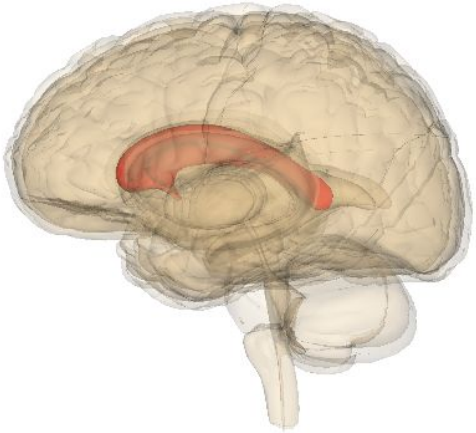
- Area in **Temporal Cortex** (includes **Wernicke's Area**)
- Larger in Left Hemisphere
- In Nonhuman Primates: Equal or only slightly larger in left,
- also **involved in vocal communication**

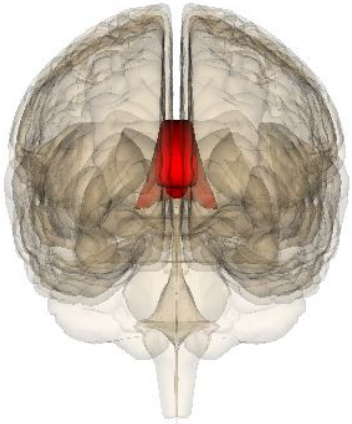
Interference

- Can be observed in **simultaneous tasks** controlled by same hemisphere, or in **competition** between hemispheres
- Stuttering (most often in left-handers) may involve **hemispheric competition for control of speech**



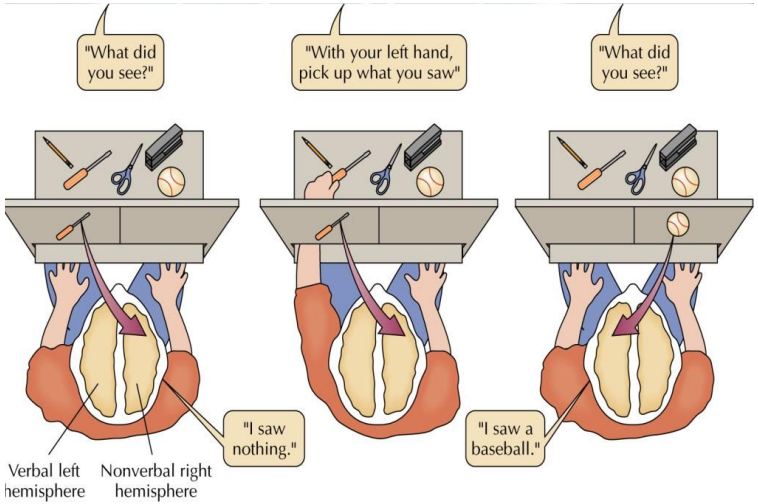
Corpus Callosum





- Bundle of axons **connecting 2 cortical hemispheres**
- Thicker in **left handers**
- Thicker in **women**, who are thus less lateralized

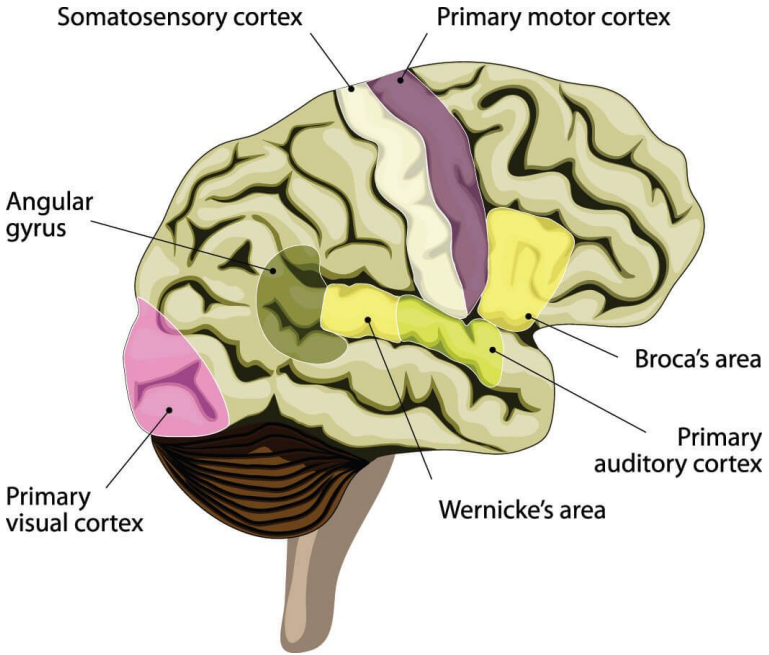
Split-Brain Patients



- Word or image flashed in Right Visual Field (=> Left hemi) can be ID'd by touch **only by Right hand** but **not by Left hand**
- Image flashed in **Right Visual Field** (=> Left hemisphere) easily named, but **not if in Left Visual Field**

Specializations of the Left Hemisphere

Broca's Area



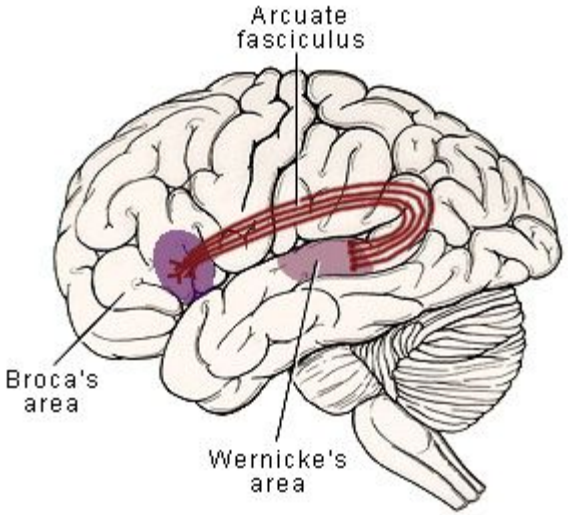
- Linked with **speech production**
- Damage to this and surrounding cortical area, including underlying basal Ganglia => **Broca's Aphasia**
- Deficits in **producing** (& comprehending) **grammatical speech**
- Also produces deficits in **Sign Language production**

Wernicke's Area

- Linked with **speech comprehension**
- Damage to this & surrounds (including adjacent Parietal) => **Wernicke's Aphasia**
- Deficits in **comprehension (and production) of meaningful speech**

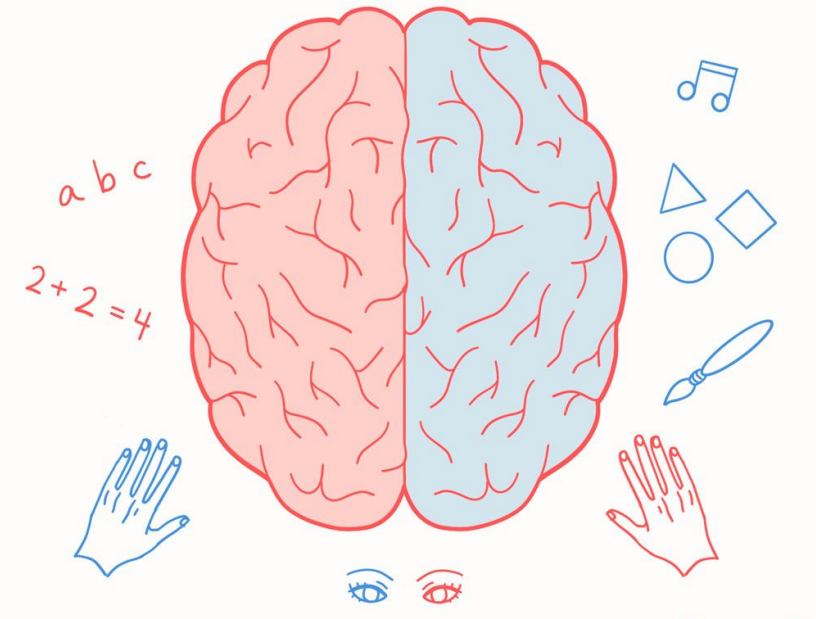
Arcuate Fasciculus

- Bundle of axons (White Matter) **forming reciprocal connections** between Broca's and Wernicke's Areas
- Damage to these axons => **Conduction Aphasia**
- Ability to **Repeat impaired** - esp of unfamiliar **or nonsense words**
- May produce **Phonemic Paraphasia** = **substitute wrong phoneme** into word



Specializations of the RIGHT Hemisphere

Specializations of the RIGHT Hemisphere



- **Global** pattern-recognition
- Music (esp **Melodic**) perception and appreciation
- **Spatial abilities** related to above
- **Socio-Emotional expression** and **perception**
  - Damage (esp in Frontal Lobe) results in:
  - Reduced **emotional expression** both in **face** and in **speech**
  - Reduced ability to **recognize**, **correctly categorize emotional expression/speech** in others

Important thing to know

- In normal people, **both hemispheres** participate in, contribute to **all of the functions** we have mentioned.

Good luck!

Questions?

Office Hours: Mon 5-6 pm

To get the section slides:
https://github.com/JasonC1217/COGS17_A04_Wi24

OR: