Today

- Intro to Psycholinguistics
- Language and the brain
- Aphasia

Readings: 9.1 – 9.2
What is psycholinguistics?

- The study of language and the brain
- Seeks to understand how language is represented and processed using experimental methods
The Brain
The Brain

- Divided into two hemispheres: the left and right hemispheres
- The hemispheres are connected by bundle of nerve fibers: the corpus callosum

Front

Left hemi

Right hemi

Corpus callosum
The Brain

- **Contralateral control:** Each hemisphere controls opposite side of body
  - Left hemisphere controls **right side** of body
  - Right hemisphere controls **left side** of body
The Brain

- **Lateralization**: the brain is asymmetrical such that each hemisphere is specialized for certain cognitive functions
Lateralization

- Left hemisphere:
  - Analytical processing (analyzing information)
  - Language, speech sounds
  - Mathematics
  - Temporal relations
  - Intellectual reasoning
Lateralization

- **Right hemisphere:**
  - Holistic processing (recognizing overall patterns, e.g., face recognition)
  - Nonspeech sounds
  - Music (in musically naïve individuals)
  - Visual-spatial skills
  - Emotional reactions
How do we know this?

Experimental evidence
Split-Brain patients

- Corpus callosum is severed (used to treat cases of epilepsy)
- Two hemispheres cannot communicate with each other

Clip from “Pieces of Mind: The Man with Two Brains”
Transcript available at:
http://www.pbs.org/saf/transcripts/transcript703.htm
Split-Brain patients

Left

Right

corpus callosum

Hemisphere

Eye

‘face’

Eye

‘fruit’
Left hemisphere: Language

- Aphasia:
  - Any language deficit caused by damage to the brain (e.g., bullet, stroke, infection, etc.)
  - Aphasia almost *always* caused by left hemisphere damage
Broca’s area  Wernicke’s area
Left hemisphere: Language

- **Broca’s area:**
  organizes articulatory patterns of language; also controls use of inflectional, function morphemes

- **Wernicke’s area:**
  involved in comprehension and selection of words from mental lexicon
Broca’s aphasia

- Labored, halting speech
- Lack of inflections and function morphemes
- Comprehension is generally good
“Cookie jar... over ... chair... water... empty...ov...ov...[Examiner: ‘overflow’?] Yeah.”
Wernicke’s aphasia

- Speech is fluent (i.e., can use function words, inflections) but semantically incoherent
- Lexical errors, nonsense words, circumlocutions
- Comprehension is poor
“Well, this is…mother is away here working out o’here to get her better, but when she’s working, the two kids looking in the other part. One their small tile into her time here. She’s working another time because she’s getting, too.”
(trying to name a ‘knife’):

“That’s a resh. Sometimes I get one around here that I can cut a couple of regs. There’s no rugs around here and nothing cut right. But that’s a rug, and I had some nice rekebz. I wish I had one now. Say how Wishi idaw, uh windy, look how windy. It’s really window, isn’t it?”
Aphasia in ASL users

- **Broca’s**: sign slowly, omit inflections
- **Wernicke’s**: sign fluently but confusingly, show comprehension problems
Lateralization and Modality

- Left hemisphere specialization for language *independent of modality used to communicate*