Consonant Classification

International Phonetic Alphabet (consonants)

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Loss of Categorical Perception

- Example: Hindi contrast

Perceptual Loss: Locus of Onset

- When does perceptual loss take place?
  - Hindi contrasts tested on…
    - Hindi-speaking adults
      - Discrimination
    - English-speaking adults
      - No discrimination
    - English-exposed 7-month-olds (Werker, 1981)
      - Discrimination

Hindi (spoken in India):
unvoiced unaspirated retroflex vs. dental stop

- Dental Stop
- Retroflex Stop

Retroflex - tongue curled so tip is behind alveolar ridge
Dental - tip of tongue on teeth
(English /θ/ is somewhere between the two)
Hindi (spoken in India):
unvoiced unaspirated retroflex vs. dental stop

- Dental Stop
- Retroflex Stop

Retroflex - tongue curled so tip is behind alveolar ridge
Dental - tip of tongue on teeth
(English /t/ is somewhere between the two)

Salish
(Native North American—Canadian—language):
glottalized voiceless stops
- Uvular
- Velar

(note: they are actually ejectives - ejective is produced by obstructing the airflow by raising the back of the tongue against or behind the velum)

Velar - tongue is raised against velum
Uvular - tongue is raised behind the velum

Not-So-Special Perception

- Three main issues undermine the view that categorical perception makes speech special:
  - Some speech sounds do not evoke categorical perception (e.g., vowels)
  - It has been shown that musical sounds (non-speech sounds) of various kinds (e.g., notes, bowing, plucking) appear to have categorical properties
  - Non-linguistic animals have been shown to perceive speech sounds categorically as well

Language Processing

- Area ‘storing’ permanent information about word sounds (~Wernicke’s)
- Area for speech planning and programming (~Broca’s)
- Conceptual storage area

History of Broca’s Aphasia

- Paul Broca
  - Treating patient for leg infection; patient was an epileptic who only said “tan”
  - Found brain lesion in posterior portion of left inferior frontal gyrus
  - These sorts of patients generally showed right hemiparesis (weakness of right arm & leg)
Broca’s Summary

- Speech output is slow and effortful and lacks function words (like a telegram)
- Broca’s aphasics have a hard time understanding reversible sentences, where a full understanding of the sentence depends on syntactic assignment of thematic roles (e.g., the boy kicked the girl/the boy was kicked by the girl)
- Problems with speech articulation because of deficits in regulation of articulatory apparatus

History of Wernicke’s Aphasia

- Carl Wernicke (1870s)
  - Described patients with trouble understanding spoken language following stroke
  - Damage in posterior regions of superior temporal region of Heschl’s gyrus
  - Damage to this area produced poor language comprehension due to lost word-related memories and nonsense speech resulted from patients’ inability to monitor their own output

Wernicke’s Summary

- Wernicke’s aphasics speak fluently, but make no sense; their speech is meaningless
- They make many notable semantic errors
Language in the Brain

- Broca’s area concentrates on motor memory for words; Wernicke’s area is the region concerned with sensory memory for words.
- These ideas led to a view of language in which 3 brain centers interact as foundations of language:
  - Production area
  - Comprehension area
  - Conceptual area

Lichtheim’s (1885) Model of Language Processing

- Arrows indicate direction that information flows
  (From this model it was predicted that lesions in the 3 main areas could account for 7 main aphasic syndromes; lesions indicated by line segments transecting connections between A, B, and M)

- “A” = area storing permanent information about word sounds (Wernicke’s)
- “M” = speech planning and programming area (Broca’s)
- “B” = conceptual storage

Homunculus

- Different amounts of brain real estate are devoted to different parts of the body.