Lecture 18

The features of language
Multi-scale representation of language

- Sound pressure wave
- Short-time frequency spectogram
    - A representation that has both time and frequency in it
- Phonemes & Articulatory features
- Syntax
    - Different parts of speech and what its order means (grammatical information)
- Semantics
    - Meaning
- Narrative

Sound pressure waveforms and spectrograms

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Phonetic (articulatory) features: What you say

- IPA: all the possible sounds that humans can make

Phonemic

- A subset of the phonetic features
- Some languages don't distinguish between l and r (asians?)

Syntactic (grammatical) features
Box models of production & comprehension
Brain areas involved in language

- Auditory nerve
- Cochlear nuclei
- Superior olivary nucleus
- Inferior colliculus
- Medial geniculate nucleus of the thalamus
- Primary auditory cortex

The language system

- Broca's area
- Supramarginal gurys
- Angular gyrus
- Wernicke's area
- Superior temporal gyrus
- Inferior frontal cortex

Brain lesions affecting language

- Global aphasia: fluent, severe perception and production deficits
- Broca's aphasia: fluent, speech output impaired, writing impaired, comprehension less affected
- Wernicke's aphasia: non-fluent, comprehension problems, reading impaired, spontaneous speech may be fluent (at least for articulation and prosody), grammar is preserved
- Anomia: non-fluent, deficit in naming and word finding, excellent

comprehension and semantics

- Conduction aphasia (auditory cortex); non-fluent, auditory short term memory problem, reading deficit may bot be repesent
- Echolalia (auditory cortex): non-fluent

Broca's aphasia

- Production aphasia: patients know what they are trying to say, but they can't say it
- Broca's area
    - Pars opercularis
    - Pars triangularis

Wernicke's aphasia

- Sensory aphasia: patients don't know what they are trying to say and can't comprehend language

Lichtheim's (1880s) view of language processing
Brain representation of spectral features