Lecture 19

Stimulus pre-processing

- Each story is transcribed
- Special sounds marked
    - Breath
    - Laughter
    - Lip smack

Speech and text are aligned, and the phones and words are extracted and tagged

Vowel-wise modeling of narrative stories

- Stories + brain activity
- Estimate our models: project stories into different feature spaces
- Use regression

Time scales of linguistic features

- Language is multi-scale phenomena
- Down-sampling of semantic features
    - Lose some information

Syntactic and semantic features from NLP

- Co-variances of words in a text

- Use repeated structures: ‘I was ____’
- Words that appear together: eyes, skull

Syntactic model (HHMM)

- Probabilistic

Semantic model (English 1000, ~LSA)

- Project English 1000 into the covariance states

Representation of spectral, articulatory and semantic features

- Spectral, articulatory/phoneme and semantic model

Semantic ROIs from a functional localizer

- Meaningful vs non-meaningful words
- Statistical threshold, subtraction

PCA: principal component analysis

- Get the eigenvectors and turn the full rank eigenvector matrix into a low rank
    - By getting the first couple of eigenvectors
- Align eigenvectors of different people and see what is common

MNI coordinates: Montreal Neurological Institute

Semantic representation on the cortex: summary

- Binder, Desai, Graves & Conant, 2009

- Binder, Desai, Trends in Cog. Sci., 2011