Acoustics of Speech and Hearing

Lecture 2-6 Plosives and Nasals

Remainder of Course

- Term 2 Weeks 7-11
 - Plosives and nasals
 - Speech perception experiments
 - Hearing: Loudness
 - Hearing: Pitch
 - Hearing: Timbre
- Term 3
 - Revision day (April 23)

Overview

- Review acoustic cues to vowels, fricatives, diphthongs & approximants
- Plosives
 cues to manner, place & voicing
- Nasals – cues to manner, place
- Coding of phonetic distinctions

Review 1

- Vowels
 - vowel quality differences cued by formant frequencies
- Fricatives
 fricative quality differences cued by spectral shape: centre frequency and width of main spectral peak
- Diphthongs, approximants – cued by frequency and shape of formant movements





Plosives - Place Cues				
- /b /			/g/	
Locus frequency of F2 & F3 transitions				
	Bilabial	Alveolar	Velar	
	F2 low	F2 mid	F2 high	<u>@</u> :
	F3 low	F3 nigh	F3 mid	V







pi-ka-pu experiment

- Importance of pi-ka-pu is that it demonstrates again that context matters.
- We have seen how *one phonological event* can give rise to a *number of acoustic forms* depending on context (e.g. coarticulation of /h/)
- But here we see how *one acoustic event* can give rise to a *number of phonological forms* depending on context (c.f. normalisation of vowels/intonation)









Summary

- Manner, place & voicing cues for plosives
- Manner, place cues for nasals
- "pi-ka-pu" experiment shows that single sounds can have multiple phonetic interpretations depending on context
- Redundant coding of phonetic features

Lab Experiment

/a'pa/

/a'ga/

• Analysis of your recordings of /aˈba/

 $/\alpha' d\alpha/$ /aˈka/

- Measure Voice Onset Time
- Test to see if

/a'ta/

- VOT varies with phonological voicing
- VOT varies with place