

Midterm syllabus

(Midterm is Wednesday, September 28)

Linguistics 520, UNC-Chapel Hill
Elliott Moreton

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This handout, together with the *Using the IPA for Vowels* handout, summarizes what we've done so far, and hence what the midterm will cover. The marginal asterisks mark the most important topics (the ones most likely to be on the midterm and to be weighted heavily). Of course, some non-marked topics will also be on the midterm.

1. Sound

- (a) amplitude, period, frequency, wavelength
- (b) periodic vs. aperiodic
- * (c) convert between frequency and period, or between frequency and wavelength (given speed of sound)
- (d) simple vs. complex periodic waves
- (e) Fourier analysis (what's the connection to spectrograms?)
- (f) fundamental frequency of a complex periodic wave: What is it, and how do you find it?
- (g) harmonics

2. Spectrograms

- (a) What do the horizontal and vertical axes show?
- (b) wide-band vs. narrow-band spectrograms: How do you get them, and what are they good for?
- (c) What does a spectral slice show? (I.e., how is it related to the spectrogram?)

3. Source/filter theory of vowels

- * (a) What is the main claim of this theory?
- (b) What is the source (anatomically)?
- (c) acoustics of the wave produced by the unfiltered source
- (d) What is the filter (anatomically)?
- (e) What does the filter do to the source wave?
- (f) harmonics vs. formants

- ** i. What's the difference?
- * ii. If you want to see a harmonic on a spectrogram, what do you do?
- * iii. How about if you want to see a formant?
- * iv. Soprano vowel effect: What is it, and why does it happen?
- * (g) linguistic use of the source: In a real language, what things are controlled by manipulating the voicing source? (Vowels only! You're not yet responsible for the consonant features you may have come across in the reading.)
- * (h) linguistic use of the filter

4. f_0

- (a) What is it?
- (b) How do you find it using Praat? (3 ways at least!)
- * (c) What is its relation to formant frequencies?
- (d) What is its relation to pitch (i.e., high-pitched vs. low-pitched)? If I play two vowels with very different f_0 s, you should be able to tell which one has the higher f_0 .
- (e) What is it used for in real languages?

5. Acoustic theory of [ə]

- (a) What is the approximate shape of the (supralaryngeal) vocal tract for [ə]?
- (b) What are the frequencies of F_1 and F_2 for [ə] in a vocal tract of length L ?
- (c) Where are the pressure nodes and antinodes of F_1 and F_2 ? Where are the velocity nodes and antinodes?
- (d) What about F_3 ?

6. Perturbation theory

- ** (a) In a [ə]-shaped vocal tract of length L centimeters, a constriction is made at a point d centimeters from the glottis. Which way does F_1 change? F_2 ?
- ** (b) In order to make F_1 go up, where do you need to make a constriction? (Likewise for all possible ways to rewrite that sentence substituting " F_2 ", "down", and "expansion").

NOTICE:

The two-tube theory will *not* be on this midterm. However, it will come in handy for HW 3, and we will use it a lot for consonants.

7. Vowel articulations and traditional articulatory features

- ** (a) rounding, height, and backness
- ** (b) Be able to recognize them on a midsagittal section, X-ray tracing, photograph, etc.
- ** (c) Be able to draw in the lips and tongue on a midsagittal section for a specified set of vowel features.

** (d) Know how each feature relates to F_1 and F_2 .

* 8. Stuff on *Using the IPA for Vowels* handout.

9. Anatomy

- (a) Larynx, vocal folds, glottis
- (b) epiglottis, tongue
- (c) lips,
- (d) (supralaryngeal) vocal tract