

**6.542J, 24.966J, HST.712J LABORATORY ON THE PHYSIOLOGY,  
ACOUSTICS, AND PERCEPTION OF SPEECH  
Fall 2005**

Kenneth N. Stevens

Joseph S. Perkell

Stefanie Shattuck-Hufnagel

Lab 3

09/15/05

**Broadband Spectral Analysis of Sonorant Consonants**

**References**Chapter 9 of **Acoustic Phonetics**

Espy-Wilson, C. (1992) *Acoustic measures for linguistic features distinguishing the semivowels /wjr/ in American English*, **J. Acoust. Soc. Am.** **92**, 736-757.

**Procedure**

The computer in the lab will be used for making acoustical analyses of sonorant English consonants in vowel-consonant-vowel phrases “the mug, the young, ...”.

Broadband spectrograms with a frequency scale from 0-5000 Hz (0-6500 Hz for a 13 kHz sampling rate) should be made of each of the words containing examples of sonorant English consonants. Select the “best” speaker among the lab partners (other speakers may be analyzed, if desired, by coming in for additional time on the computer).

Analyze at least one of the following subsets of consonants:

<b>NASALS</b>	m	n	ŋ
<b>LIQUIDS</b>	r	l	
<b>GLIDES</b>	w	y	

For at least *one* of the nasal consonants and one of the liquids or glides, use the computer to sample the spectrum at about four or more selected points in the vicinity of the time when the consonant is

released into the vowel, to show the essential attributes of the spectrum change as the vocal tract moves away from the constricted configuration. (One of the spectra should be sampled in the middle of the vowel.) For example, how does the amplitude of the first harmonic change as the consonant is released into the vowel? How do the frequency and amplitude of the first formant peak change? How do the frequency and amplitude of the second formant peak change? Etc.

The lab report should include (1) a description of your spectrograms with respect to the relevant reference paper or section of the text for the consonants that you examined; (2) a discussion of the spectra you generated; and (3) a description of any divergences between theory and observations. We will discuss the results in a future lecture.