

Hall & Wong
Ling 500
Winter 2006

Lab 3: Charting the Vowel Space
Due: Monday, February 13, 2006

In this lab, you will compare your own vowels to the “standard” productions given in the textbook. There are five parts to this lab, each with something that you should turn in to us. Remember, you have two weeks to do this lab!

Part 1: Recording your vowels

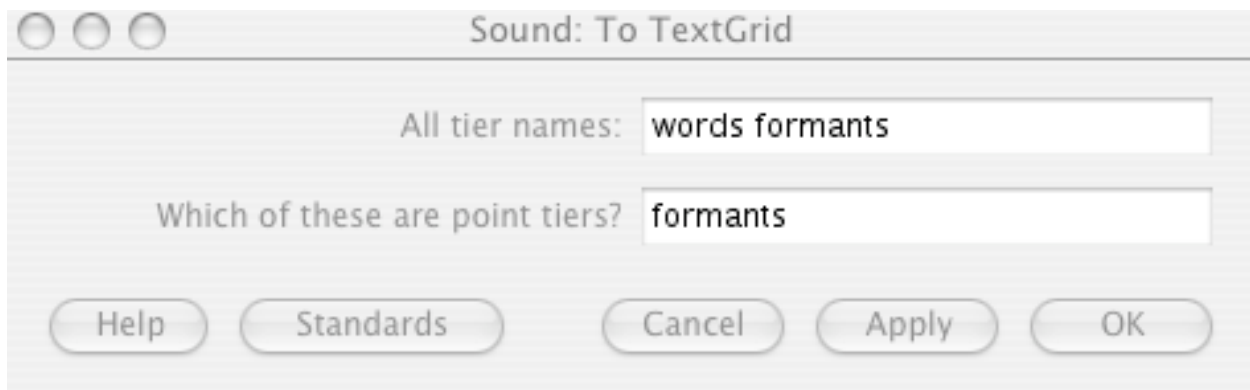
Using the headphone/microphone set in class, record the following list of words in Praat. Note that each word contains one of the monophthongal English vowels. To record, go to the “New” menu in the Objects window and choose “Record mono sound.” When you are ready to record, hit “Record” and start speaking. You should see an amplitude meter that monitors how much sound is being taken in: try to keep the amplitude in the green range, out of the yellow and red range. When you are finished, click on “Save to list.” The recorded sound should appear as a new sound in your Objects window. Make sure that you save this object by choosing “Write to WAV file” so that you don’t erase it when you close Praat.

Word list: heed, hid, head, had, hod, hawed, hood, who’d

To turn in: e-mail us a copy of your .wav file with your vowels.

Part 2: Examining your vowels

Create a TextGrid to go along with your sound file (remember, this is under the “Annotate” menu). Your TextGrid should have two tiers; the first should be an interval tier called “words” and the second should be a point tier called “formants.” The dialogue box should look like this when you create the TextGrid:



Edit the Sound file and the TextGrid together. Zoom in so that you can see the spectrogram of each word. You can turn off the pitch and pulse tracking, but leave the formant tracking on.

On the first tier ('words'), put in interval boundaries around each word and label it appropriately. On the second tier ('formants'), put in a point boundary at approximately the midpoint of each vowel. All of these vowels should have relatively straight formants, without much movement, since they are monophthongs. If there is movement, however, try to put the point boundary at the midpoint of a nice flat section of the vowel. Label each of these point boundaries with the appropriate IPA symbol or description of the symbol.

To use the IPA symbols, you need to install the font "SIL Doulos IPA 1993" on to your computer (you can get it from our class webpage by following the link for "Fonts by SIL"). Then enter the following codes on each boundary as appropriate. If you don't want to bother with downloading the phonetic font, simply use the name of the IPA symbol, also given in the chart.

Description	Name of IPA symbol	Praat code for IPA symbol
low front vowel	ash	\ae
high front vowel, lax	small capital i	\ic
mid back rounded vowel, lax	open o	\ct
low back vowel	script a	\as
high back rounded vowel, lax	small capital u	\hs
high front vowel, tense	lower-case i	i
mid back rounded vowel, tense	lower-case o	o
mid front vowel	epsilon	\ef
high back rounded vowel, tense	lower-case u	u

Make sure you save your TextGrid as a text file!

Back in the Praat Objects window, select just the sound file. Create a spectrogram of the sound by selecting "Spectrum – To Spectrogram." Paint the spectrogram and draw the TextGrid in the Praat Picture window (like we did for Lab 1). This will allow you to see what your formants look like and compare them to the picture in the book!

To turn in: The Picture you create with the spectrogram and the TextGrid (e.g., cut and paste this picture into a Word file).

Part 3: Measuring your formants

There are several ways you could get the formant values for your vowels. We're going to use one that allows you *not* to have to cut and paste so much!

Under “Query,” go to “Log settings.” In the box labelled “Log file 1:” type in the complete path name for a file of the formant values (e.g. C:\WINDOWS\DESKTOP\formants.txt). In the box labelled “Log 1 format:” enter the following:

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't1:4' 'tab$' 'f1:0' 'tab$' 'f2:0'
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Choose “Write log 1 to Log file only” from the menu.

Now, go through and click on each point interval boundary (each vowel). Once it is selected, hit F12. Move to each vowel in turn and click F12 for each one. When you are done, you will have a file on your desktop (or wherever you put it) called “formants.txt” (or whatever you called it) that lists the time of each vowel, the first formant in Hz, and the second formant in Hz. Each vowel is on a separate line; each value is separated by a “tab” character (empty space). Go back in and add labels for each of these rows and columns, so that you don’t forget what each one is. (For example, simply type the words in order for each row, and then the columns would be: “Word Time F1 F2”).

To turn in: Your measurements. You can send us the text file you created, or cut and paste them into a Word document underneath your picture – or any other easy-to-read method is fine.

Part 4: Plotting your vowels

On the attached sheet, graph each of your vowels as a point, and label each one with the IPA symbol. The x-axis should be F2, the SECOND formant, and the y-axis should be F1, the FIRST formant. Note that the frequencies are in reverse order: the origin (0,0) is in the upper right hand corner. This is so the vowels get plotted in a way that is as similar as possible to traditional vowel charts.

To turn in: The vowel chart.

Part 5: Comparing your vowels

Compare your vowel spectrograms (part 2) to the diagrams on p. 204 in the textbook. Then compare your vowel plot (part 4) to the diagrams on p. 189 and p. 206. What similarities and differences do you see? Describe them in terms of the formant frequencies and what they correspond to (which should be easy to see on the vowel plots) (e.g. “My second formant in the vowel [u] is much higher than the diagram on p. 204 – this means that my [u] is much fronter than the example one on p. 189, but rather similar to the speaker represented by dark circles on p. 206.”) Which of the three vowel plots in the book does your plot most closely resemble?

To turn in: A paragraph describing your vowels and how they compare to the examples given in the book.