

Lab Ch 6: Vowel Formants

In this lab, you will use Praat to measure vowel duration and formants (F1xF2), then plot your formant measures in an Excel sheet to map the vowel space for a speaker of Hoosier English, a dialect of American English centered around Southern Indiana. You will then examine the plot and compare its vowel configuration to that of a General American English plot.

Materials

- Install Praat install on your computer
- Download and open **Lab-ch6-data.xlsx** in Excel. When you enter formant values into this spreadsheet, the chart will automatically plot your vowels. (If you have problems with the spreadsheet, you can print the chart and plot your vowels by hand.)
- Download **Lab-ch6-sounds.zip** and **extract all files to a separate folder** on your computer. The sound files are 10 monosyllabic English words spoken by an American from Southern Indiana. Each word begins with /h/ or /ʔ/ (glottal stop) and ends with /d/ or /t/. The files are numbered, so you won't know from the filenames what the words are.

Praat

1. **Set up.** Open the sound files in Praat (Open > Read from file). Open the Excel file.
2. **Praat settings.** Click "View & Edit" for the first sound file. Before you get started, make sure that "Spectrum > Show Spectrogram" and "Formant > Show Formants" are checked. Go to "Spectrum > Spectrogram Settings" and click "Standards." Go to "Formant > Formant Settings" and click "Standards." If the "Maximum Formant" is set to 5500 Hz, change it to 5000 Hz before clicking "OK." These settings will remain for all subsequent sound files (or until you change them).
3. **Transcriptions.** Listen to the word and **enter a broad IPA transcription** in the Excel data table (either the whole word or just the vowel).
 - To enter IPA symbols in Excel, use an online character picker (e.g. <https://r12a.github.io/pickers/ipa/>), or within Excel, "Insert > Symbol."

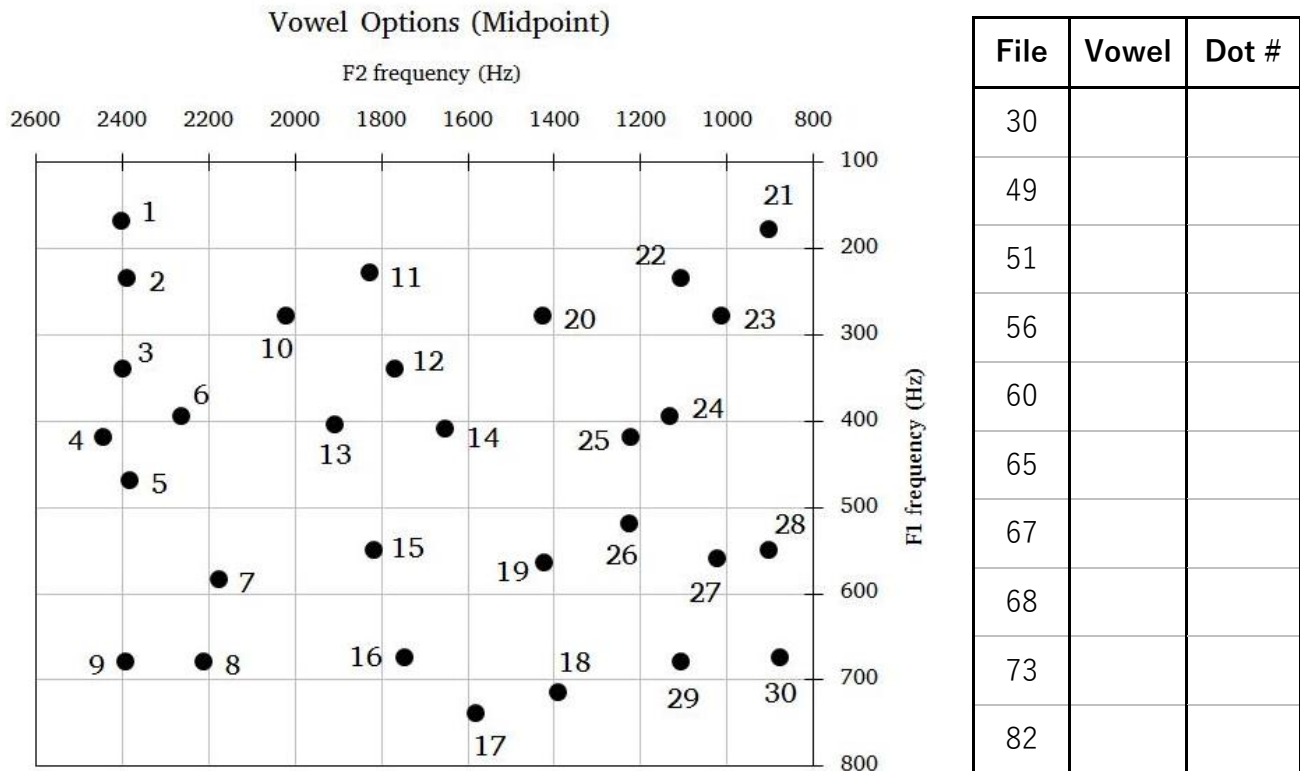
- For your convenience, there is a table on the last page of these instructions that you may use to keep track. (You will not turn in these pages.)

Measurements – For each sound file (repeat for all sound files):

4. Look at the waveform and spectrogram in Praat, and **identify the vowel onset and offset**. (Do not include the beginning and ending consonants.) For this lab, accuracy within 5 milliseconds (0.005 s) is reasonable. In the Excel data table, **enter the timestamps** for the onset and offset (shown in red above the waveform). The Excel sheet will calculate the vowel duration and the timestamp for its midpoint.
 - To find the vowel, look for the edges of dark formant structure and greater waveform amplitude. /h/ may have formants, but it will appear lighter than a vowel (its energy is dampened, and there is no voicing bar). /t, d/ appear as a gap in the spectrogram (with or without a voicing bar), and there may or may not be a release burst at the end.
 - To find/verify vowel duration in Praat: Select the vowel by hand or use “Select > Select” to enter the start and end points. The duration is in gray below the selection.
 - To find/verify a vowel’s midpoint in Praat: With the vowel highlighted, go to “Select > Move cursor to...”. The timepoint that appears in the box is the midpoint of your selection. Hit OK and skip Step 5.
5. In Praat, place your cursor at the midpoint. Go to “Select > Move cursor to...” and enter the time stamp from your data table.
6. Check that the formant tracker is lined up well. Are the lowest two red dots nearest your cursor located in the middle of the lowest two dark formant bands? If not, check your formant settings: “Formant > Formant settings...” (see #2 above). You can also try changing the number of formants by one or two (up or down).
7. **Get the measurements for the first two formants.** Go to “Formant > Get first formant” or hit F1 on your keyboard. Enter the output in the Excel data table. You can type manually or copy and paste into the Excel sheet (it should round to the nearest Hz). Do the same for F2: “Formant > Get second formant” or hit F2.
8. The vowel plot in the Excel sheet will fill in automatically to match the data you enter. Examine the chart and see if the location of each vowel seems plausible. Go back and listen to each vowel while looking at the chart to see if its location and label make sense. If something seems off, double-check your measurements. (If you are plotting

by hand, also double-check your duration and midpoint calculations and that you have plotted F1 vertically and F2 horizontally.)

9. Find the dot in the plot below that corresponds to the vowel's location on your plot. If a vowel doesn't line up clearly with just one dot, double-check your measurements. **Enter your vowel transcriptions and each dot number** in the table below (and/or in the Excel sheet, if you like).



Interpretation Questions

10. In the lab assignment on Canvas, enter your vowel transcriptions and dot numbers for each sound file. These will be graded automatically. (You do not need to turn in your Excel sheet, but keep it in case you want to go back and check your work later.)
11. To answer the rest of the questions on Canvas, examine the configurations of the vowels in your Hoosier plot and compare them to those in the “General American” plot here. (For your convenience, the questions also appear here, but you will not turn in this sheet.)

12. In many American regions, the high back vowel /u/ is fronted, pronounced as a central vowel. Is this Hoosier speaker's /u/ fronted compared to their other back vowels?
 - Yes / No
13. In areas around the Great Lakes (including Northern Indiana near Chicago), /æ/ is pronounced as a diphthong that begins high front and ends mid central [ɪə]. Is it likely that this Hoosier pronounces /æ/ this way?
 - Yes / No
14. Most North and South American dialect regions have two low back vowels (pronouncing "cought" and "cot" differently [ɔ, ʌ]). The Midland and West regions have merged the two low back vowels into one intermediate vowel [ɑ] (pronouncing "cought" and "cot" the same). Does this Hoosier speaker have this low-back vowel merger?
 - Yes / No
15. Compared to the General American plot, the Hoosier high back vowels /u, ʊ/ have reversed positions with each other.
 - True / False
16. Compared to the General American plot, the Hoosier mid tense vowels /e, o/ have reversed positions with the high lax vowels /ɪ, ʊ/ (small capital i, horseshoe).
 - True / False
17. Compared to the General American plot, the Hoosier high lax vowels /ɪ, ʊ/ (small capital i, horseshoe) are more centralized and closer together.
 - True / False
18. The Hoosier high front lax vowel /ɪ/ (small capital i) is lower than the mid front lax vowel /ε/ (epsilon).
 - True / False
19. The mid back /o/ and high back /ʊ/ (horseshoe) are closer together in the Hoosier plot than in the General American plot.
 - True / False
20. In the Hoosier plot, /ʌ/ (wedge/turned-v) is central (hint: compare to low vowels).
 - True / False

