

# LSA Institute Workshop: Using Praat for Linguistic Research

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## Workshop Plan

*Numbers in parentheses (3.2.1) refer to sections in the accompanying "Using Praat for Linguistic Research" manual which can (and should) be consulted in working through a given task.*

1. Introduction to Praat
2. How to explain a wave to an entity which knows only 0 and 1
3. Meeting Praat's interface and windows

### Using Praat for Measurement

1. Opening, closing and saving other people's sounds
2. Recording your own sounds
  - **Practice task: Recording Sounds**
    - (a) Record yourself asking "I'm having fun at this workshop?" (Section 4)
    - (b) Save the file to your hard drive (5.2)
3. Examining sounds in the Praat Editor Window
4. Working with Spectrograms
5. Measuring durations
  - **Practice task: Voice Onset Time**
    - (a) Measure the voice onset time for three different stops
      - Open all three sounds in the *vot sounds* folder
      - Measure the Voice Onset Time (VOT) of all three.
        - \* Voice onset time is the time between the start of the voicing and the release of the stop (this number can be negative)
6. Adjusting the Spectrogram settings (Broadband vs. Narrowband)
  - **At-home practice task: Name that tune**
    - (a) Listen to the small chunk of the Dave Brubeck Quartet performing "Take Five" (misc/takefive.wav)

(b) Use a narrow-band spectrogram (with some zooming, etc) to measure the frequencies of the first five notes of the saxophone melody

(c) Optional: Figure out what notes they represent:

– <http://www.phy.mtu.edu/~suits/notefreqs.html>

## 7. Working with Pitch

## 8. Adjusting the Pitch settings

- **Practice task: Pitch contours and comparisons**

(a) Does "alice" have a higher or lower maximum pitch than "erick" in our samples?

- Open both moss files (*moss/alice\_moss.wav* and *moss/erick\_moss.wav*)
- Examine both words in a narrowband spectrogram to see the pitch contour
- Manually measure one cycle of each of their voices (6.4.1)
- View Praat's Pitch tracker (6.4.3) for both, and adjust the settings to get a proper track

(b) What does sentence-level intonation look like in Praat?

- Open *pitch/newzealand7partial.wav*
- Use Praat's and the editor window to find the speaker's maximum, minimum, and average pitch (6.4.6) for the duration of the entire sentence

## 9. Working with vowel formants

- **Practice task: Formant Contours and Comparisons**

(a) Does "alice" have a higher or lower F1, F2 and F3 than "erick" in our samples?

- Open both moss files (*moss/alice\_moss.wav* and *moss/erick\_moss.wav*)
- Eyeball the formant heights using the cursor
- Pick a point in the middle of the vowel, then measure F1, F2 and F3 for both speakers (6.6.1)
- *Hint: You will need to tweak the formant settings to properly view Erick's F2. (6.6.2)*

## 10. Working with Amplitude

## 11. Working with Spectra and taking Spectral Slices

## 12. A1-P0 nasality measurement

- **At home practice task: Nasality Measurement**

- (a) Does the amount of nasality in a given place on the vowel differ depending on what consonants surround it, or is coarticulatory nasality steady throughout the vowel?
  - Open both files in the *nasality* directory
  - Measure the A1-P0 nasality of each vowel at 1/4 and 3/4 of the duration of the vowel (6.12)

### 13. Spectral Center of Gravity

- **At home practice task: Measuring Spectral COG**

- (a) What can spectral COG tell us about place of articulation?
  - Open the files in the *spectral cog* directory
  - Measure the spectral center of gravity of both fricatives in *sueshoe.wav*
    - \* Are they different? What does this say about their place of articulation?
  - Measure the spectral center of gravity of the fricatives in the remaining files (some are word initial, some follow a stop)
    - \* Are they different? What does this say about their place of articulation?

### Using Praat to Create and Modify Sounds

#### 1. Cropping, Copying, Splicing and Pasting

- **Practice task: Of Damp Skunks and Stamp Gunk**

- (a) Change "damp skunk" into "stamp gunk" by moving a fricative
  - Open *misc/dampskunk.wav*
  - The speaker coughed at the end of the recording. Select and remove it using "Cut". (7.2)
  - Move the fricative at the start of "skunk" to the start of "damp". (7.2)
    - \* Make sure to cut and paste at zero crossings using the procedure in 7.2

#### 2. Sampling Rates

#### 3. Filtering Sounds

- **Practice task: I dislike battery backup systems**

- (a) Remove a highly annoying high frequency noise from a file
  - Open *misc/samplewithnoise.wav*.
  - Find the frequency of the annoying high-pitched noise (*Hint: Narrow band spectrogram or Spectral slice*)
  - Filter the sound out using the instructions for a band-pass filter in 7.4.3 (*Hint: You may need to remove 100+ Hz to either side to get rid of it*)
- (b) Remove the low frequency noise from the same file
  - If you look at the low frequencies of *misc/samplewithnoise.wav* (the file you've been working with) or at the waveform, you'll see a very low frequency rumble from building HVAC.
  - Find the frequency of the low pitched rumble (*Hint: You'll need a spectral slice to see this one*)
  - Filter the sound out using the instructions for a high-pass filter in 7.4.2 (*Hint: Use a small Smoothing value*)
- 4. Creating Sounds in Praat by Formula
- 5. Vowel Editor
- 6. Pitch manipulation
  - **At-home practice task: Change your own opinion**
    - (a) Change your earlier question into a statement
      - Open the "I'm having fun at this workshop?" file you recorded earlier.
      - Use the Pitch Manipulation instructions in the guidebook (Section 7.5) to lower the pitch at the end of the question
      - Tweak the pitch settings until it sounds like a statement. Dreamy affect is a plus.
      - Hint: If Praat's having trouble moving the pitch, use (*misc/havingfunatthisworkshop.wav*)
      - Save the result
- 7. Matching the pitch tracks of two sounds
- 8. Matching intensity
- 9. Combining Sounds and Formula modification
- 10. Synthesizing sounds

## 11. Source-filter vowel resynthesis

### Using Praat to Export Images of sounds

#### 1. Praat Pictures

- **At home practice task: Export a Pretty Picture**

(a) Aren't you proud of your pitch manipulation? Let's make an image for all to see.

- Open the "I'm having fun at this workshop?" file you manipulated earlier
- Use the instructions in Section 8 to Draw a spectrogram into the picture window
- Overlay the pitch track (by creating a Pitch object and drawing it on top of the spectrogram)
- Save the result as a PDF

### Praat Scripting

#### 1. Intro to Scripting

#### 2. Praat Object Types

#### 3. Creating a script from History

- **Practice task: Create a useful script**

(a) Let's make a script which changes the spectrogram to a narrowband spectrogram

- Take the steps described in Section 11.3.4 to create the script
- Add the newly created script to your *Editor* → *Spectrum* menu using the technique in 11.2.2

#### 4. Demonstrations of more advanced scripts

#### 5. Script walkthrough