

LING 151 Lab: Intro to Praat

October 15th, 2008

1 Getting Started

- To open Praat:
 - Go to `F:\Class Folders\Linguistics\LING 151\`.
 - Open `praat5032.exe`.
- Praat will automatically open two windows, one called `Praat objects` and one called `Praat picture`. You can close `Praat picture`; we won't use it today.

2 Viewing and Manipulating Sound Files

- Download `sibilants.wav` from <http://people.ucsc.edu/~kaplanas/sibilants.wav>.
- To work with a sound file, you need to read it into Praat as a Praat object:
 - Go to `Read` → `Read from file...`
 - Navigate to the folder where you saved `sibilants.wav`. You can type the entire path of the file in the box labelled `Selection`, or you can navigate to the right directory using the entries in the `Directories` box. Selecting the path ending in `..` takes you up a folder. (You can also use regular expressions in the `Filter` box. This is useful if you're working with lots of files.)
 - Select `sibilants.wav` from the `Files` box on the right and choose `OK`. There should now be one item in your list of Praat objects named `sibilants`.
- To listen to the sound file, click the `Play` button on the right.
- To view the sound file, click the `Edit` button on the right.
 - This brings up a window that lets you view and edit the sound file. The top half of the window shows the waveform; the bottom half shows the spectrogram. We won't be using the spectrogram yet; to turn it off, go to `Spectrum` → `Show spectrogram`.

- ⇒ Depending on Praat’s default settings, this may not remove the bottom half of the window. You may also need to turn off the pitch track (**Pitch** → **Show pitch**), the intensity (**Intensity** → **Show intensity**), and/or the formants (**Formants** → **Show formants**).
- The vertical red dotted line is the cursor. It behaves pretty much like you would expect:
 - * Click anywhere in the window to put the cursor at that place.
 - * Click and drag to select part of the sound.
 - * Alternatively, right-click anywhere in the window to select the portion of the sound between the cursor and where you right-click.
- Copy and paste also work like you would expect. You can find the relevant functions under the **Edit** menu.
- You can zoom in and out using various options under the **View** menu: **Show all**, **Zoom in**, **Zoom out**, **Zoom to selection**. The four buttons in the lower left corner of the editing window (**all**, **in**, **out**, and **sel**) do the same things.
- To play the sound file from the editing window, click one of the long buttons at the bottom of the window. The buttons in the top row play from the beginning of the window to the cursor (or from the cursor to the end of the window). The next button down plays the entire window, and the bottom button plays the entire sound.
 - ⇒ A useful shortcut is the **Tab** key, which plays the sound beginning from the cursor.
- There are four segments in this file. Extract the first one as a separate sound:
 - Select the portion of the sound you want to extract.
 - Go to **File** → **Extract selected sound (time from 0)**
 - A new sound called **untitled** should now appear in your list of Praat objects. Rename this sound using the **Rename...** button near the bottom of the window. Open the sound to make sure it looks like you expect it to.
- Extract the other three segments in the same way.
- Putting a sound in your list of Praat objects doesn’t actually save that sound to your computer. If you exit Praat now, you’ll lose what you just did. (In fact, if you try to exit Praat while there are objects in your window, Praat will give you a warning message to remind you to save anything you want to keep.) Save the four new sounds you’ve created by going to **Write** → **Write to WAV file....**
- **Questions:**

1. Zoom in and look at the [s] sound up close. Does this sound look periodic or aperiodic? Why? Is this expected?
2. Now look at the [z] sound. Is it periodic or aperiodic? Is this expected?
3. What do you predict about the (a)periodicity of the [ʃ] and [ʒ] sounds? Look at the waveforms. Do these sounds look like you expect?

3 Spectral Slices

- Look at the spectral slice of the [s]:
 - Open the [s] sound and select the entire period of frication.
 - Go to **Spectrum** → **View spectral slice**.
 - The spectral slice should now appear as another item in your list of Praat objects. It will stay there even if you close the editor window for the original sound. Of course, it will disappear after you exit Praat unless you save it.
- Extract spectral slices for the other four sounds.
- Recall that the horizontal axis of a spectral slice represents frequency (here, in Hz), while the vertical axis represents intensity (here, in dB). If you click anywhere in the editor window, you'll see red crosshairs that give you the coordinates of the point you clicked on.
- **Questions:**
 1. [s] and [ʃ] don't have 'pitch' because they're voiceless sounds. However, one of them sounds 'higher' than the other. Which one?
 2. Look at the spectral slices of the four sounds. What general differences in shape do you notice?
 3. Locate the maximum of each spectral slice. (In other words, for each sound, what frequency has the highest intensity? Ignore frequencies below 1000 Hz.) Which sounds have more high-frequency components?
 4. Does the answer to question 3 explain the answer to question 1?
 5. Some of the sounds have an additional low-frequency component (below 1000 Hz) that's relatively loud. What does this low-frequency component represent?
 6. How do we expect the spectral slices of [s] and [z] to be different, and how should they be similar? What about the spectral slices of [ʃ] and [ʒ]? Are the spectral slices as similar as we would expect?

4 Making New Sounds

- You can record a sound by going to **New** → **Record mono Sound...**
 - The meter tells you whether the sound you’re recording is too loud. If the meter goes into the red, the sound is louder than Praat can record, and it’s being “clipped”. This is bad, because the recorded waveform will be the wrong shape. When recording a sound, test it first to make sure you’ll stay in the green.
 - Press **Record** to start recording and **Stop** to stop. Once you’re done, click **Save to list** to save what you’ve done as a Praat object. (To actually save the sound to your computer, you’ll need to write it to a .wav file, or some other sort of file, as discussed above.)
- You can create a sound from scratch like we did in class by going to **New** → **Sound** → **Create Sound from formula...**
 - Praat gives you a default formula for creating your sound. The first part, $1/2 * \sin(2*\pi*377*x)$, creates a simple sine wave. The second part, `randomGauss(0,0.1)`, creates noise. The result is a slightly noisy tone.
 - Try changing different numbers in this formula to see what different sounds result.