Lecture 5 (13 November 2012)

Assignment 9: read Hayward chapter 5.

9a. Measure the Voice Onset Time of your own **t** and **d**. Record a minimal pair from your own language (keep the sounds for assignment 10b). You report this in the following way: in the spectrogram, measure the time of the release and the time of the onset of voicing. Draw the two spectrograms into your Word file (zoom in to an extent comparable to figure 5.1), then use **One mark bottom...** from the **Margins** menu to add marks for the four times. Also compute the two VOT values.

9b. Make an intermediate sound from the **d** word of assignment 9a by removing 10 milliseconds of voicing from its start (cut it at a zero crossing). Does it sound like d or like t? If it still sounds like **d**, do it again, and again... then once it starts to sound like **t**, send it to me and tell me how many milliseconds you have cut off. What is the VOT of this sound? Then estimate your perceptual VOT boundary from the result. Is the boundary near the English VOT boundary for the apical sounds in figure 5.3?

9c. (very important paper-like assignment) Do you think that speech is special? Why? Spend at least 15 lines of text on this assignment.

9d. (very important paper-like assignment) Which of the models in 5.2.4 is your favourite? Why? Spend at least 15 lines of text on this assignment.

9e. If you understand Figure 5.10, then you will be able to do the assignment that we will give you in class.

9f. Discuss whether you expect that chinchillas will be good at hearing apart Dutch /b/ and /p/.

9g. Make excitation patterns (first **To Spectrum...**, then **To Excitation...**) for your /a/, /i/ and /u/, and copy them to your Word file, Tell us whether and where you see the separate harmonics, and identify some peaks as F1, F2, F3, and F4.

Assignment 10: reproducibility of your experiment.

Now you download the 16 sounds, which is the 8 you already had plus the second try of all those speakers. The names of the 8 new files will end in 2HVDA_fm.aifc.

10a. For each of the 16 files do the following. Open the file in Praat, then choose **To TextGrid...** from the **Annotate** menu. Create one tier (not a point tier), which you call **vowels** or so. Then select the Sound and the TextGrid together and click **View & Edit**. You will see the waveform at the top and the TextGrid at the bottom. By clicking on the small circles you can set *boundaries*. Please set boundaries at the beginning and end of [i], [ɪ], and [aː]. Into the interval between beginning and end of vowel, you can write an appropriate text, for instance *ie*, *i* or *aa*. You can then save the TextGrid, either with the **File** menu in the TextGrid window or with the **Save** menu in the Objects window. Make sure the TextGrid file has the same name (before the ".") as the sound (this should be almost automatic). Then send us the 16 TextGrid files, perhaps in a zip file.

10b. Next you write a Praat script that extracts the information for the previous assignments automatically. You could begin like the script on the next page (do not copy-paste, but create the script incrementally, i.e. in small steps whose correctness you check individually).

The script has to be saved in the same directory as your TextGrid files, otherwise it will not work (because it loads files with **Read from file...** without saying from which directory). When you run it, the script gives you a list of durations for [i], [ɪ], and [aː]. Please send us the output as **10b.Table** (you can save it from the Info window under that name).

10c. It should not be very difficult to make the script include columns for the *ie–i* difference and the *aa–ie* difference as well, i.e. five columns in total. Send us that second script as **10c.praat**, and its output as **10c.Table**. You should keep this script for a later assignment.

10d. Finally, you can make the script do the statistics (i.e. means and standard deviations), as in previous lectures. For the means, just use the averages found above as the new slightly more reliable values of the durations. For the standard deviation, use the fornulas of assignment 4g. Then send us this third script as **10d.praat**, and its output as **10d.Table**.

```
speaker$ [1] = "F20N"
speaker$ [2] = "F28G"
speaker$ [3] = "F40L"
speaker$ [4] = "F60E"
speaker$ [5] = "M15R"
speaker$ [6] = "M40K"
speaker$ [7] = "M56H"
speaker$ [8] = "M66O"
echo ie'tab$'i'tab$'aa
for speaker from 1 to 8
   speaker$ = speaker$ [speaker]
   #
   # Measure the first replication.
   #
   Read from file... 'speaker$'1FPA1HVDA_fm.TextGrid
   # We know that ie is in the second interval:
   ie_begin1 = Get starting point... 1 2
   ie_end1 = Get end point... 1 2
   i_begin1 = Get starting point... 1 4
   i_end1 = Get end point... 1 4
   aa_begin1 = Get starting point... 1 6
   aa_end1 = Get end point... 1 6
   Remove
   #
   # Measure the second replication.
   #
   Read from file... 'speaker$'1FPA2HVDA_fm.TextGrid
   ie_begin2 = Get starting point... 1 2
   ie_end2 = Get end point... 1 2
   i_begin2 = Get starting point... 1 4
   i_end2 = Get end point... 1 4
   aa_begin2 = Get starting point... 1 6
   aa_end2 = Get end point... 1 6
   Remove
   #
   # Compute the average of the two replications.
   #
   ie_begin = (ie_begin1 + ie_begin2) / 2
   ie_end = (ie_end1 + ie_end2) / 2
   i_begin = (i_begin1 + i_begin2) / 2
   i_end = (i_end1 + i_end2) / 2
   aa_begin = (aa_begin1 + aa_begin2) / 2
   aa_end = (aa_end1 + aa_end2) / 2
   #
   # Compute the durations.
   #
   ie = ie_end - ie_begin
   i = i_end - i_begin
   aa = aa_end - aa_begin
   # Tabulate the results.
   printline 'ie:4''tab$''i:4''tab$''aa:4'
endfor
```