Introduction to Praat

In this unit, we will give you an introduction to Praat. Praat is a free software written and maintained by Paul Boersma and David Weenink (University of Amsterdam) for analyzing speech.

If you are not familiar with Praat, the following tutorial will be extremely useful:

Will Styler. Using Praat for Linguistic Research.

You probably know that everyone has different vowels. We are going to investigate how the vowel space of each of us looks like. To that end we will need to learn about Praat, and use what we have learned in R for visualizing the data.

Recording

First you will want to record yourself. Record the following list of words:

```
hid
head
heed
who'd
hood
hawed
hod
had
hand
ham
```

Make your recording as clear as possible: make sure your environment is quiet. If you have a separate microphone you can use it, but if not, use the built-in microphone on the computer.

Important: we want to have a *.wav file. So make sure that you save your file under that format!

If you don't know how to record on your computer, Audacity is a good option: it can be downloaded for free. It is quite straightforward. Record using the red circle button. Stop the recording using the yellow square. To save the file: File > Export. Or you can do it in Praat. Follow the instructions in Section 4 of Will Styler's Praat guidebook.

So we want to have one *.wav file containing your recording of the 10 words above.

Manual annotation

We will now see how we can annotate the sounds in Praat. Look at Section 9 of Will Styler's Praat guidebook. This explains what you need to know. We want to mark the beginning and end of the word, and the beginning and end of the vowel. So we will create two tiers: one for the word and one for the vowel. Then annotate your *.wav file.

Automatic annotation

If we have a huge number of words, we probably don't want to do this by hand. We can use the Penn Forced Aligner, which will automatically create the TextGrid for us. The aligner can be installed on a computer and run. Right now, I will do this for you with the Penn Forced Aligner installed on our server. But look at the readme, and see how you think this code needs to be run.

You will need to give your *.wav file and a transcription, and the Penn Forced Aligner is going to send you back a TextGrid, similar to what we manually did. Compare them. How well did the Penn Forced Aligner do?

Praat scripting

Now to create our vowel space plot, we need to extract the first two formants (F1 and F2) of our 10 vowels. We would like to create a table that contains for each vowel (one vowel per line) the vowel, F1 and F2.

We will do this automatically, writing a Praat script. The F1 and F2 are related, respectively, to the height of the tongue (high frequency F1 = low vowel, low frequency F1 = high vowel) and to the backness/frontness of the tongue (high frequency F2 = front vowel, low frequency F2 = low vowel).

There are plenty of Praat scripts on the Web! I want you to be comfortable enough in reading a Praat script to understand what is happening and to modify it to suit your purposes.

First, I recommend that you read Section 11 of Will Styler's Praat guidebook. Read the last two sub-sections there too :-)

Let's look together at his "DemoScript.praat" that you can find in the "Workshop Files" on his website.

If you want some specific information on what a command is doing, you can look into the Praat manual. For example, to understand exactly what the following is doing, I would look at the description of this command in the manual:

```
# Now, select the sound and create a formant object. Vary settings as you desire.
select Sound 'soundname$'
To Formant (burg)... 0 5 5500 0.025 50
```

Now that we have a basic understanding of how Praat scripting works, we will look together at another Praat script to extract formants, that can be found here. It is part of this web page, which contains a lot of different Praat scripts.

Download it, and try to run it in Praat.

It doesn't run... Let's try to understand why and to fix it!

This script does more than what we want. Try commenting out the parts that we don't need.