

## Speech Analysis Lab Project: Parrot vs. Human

**Purpose:** This project aims to provide students with an opportunity to do acoustic recording and analysis of speech sounds. The project uses a comparative design to study the acoustic characteristics of human speech and parrot speech.



### Materials & Methods:

- (a) You need to use a computer with a sound card and a microphone.
- (b) The sound files for parrot speech have been prepared for you. Please download the zipped file at [http://zhanglab.wikidot.com/local--files/language-brain/parrot\\_speech.zip](http://zhanglab.wikidot.com/local--files/language-brain/parrot_speech.zip)
- (c) Sound files for human speech need to be recorded using a microphone.
- (d) You need to install the open software “Praat” for the analysis.  
<http://www.fon.hum.uva.nl/praat/>
- (e) Note that not all sounds need to be used for the lab. For example, there are files with barking sounds by dogs. You may want to open it to see if the sounds similar to human speech...



### Experimental Procedure:

- (1) Select three files of parrot speech. Use Praat to segment three clearly identifiable words and generate the waveforms and spectrograms for these words.
- (2) Use Praat to record your own articulation (one member of your lab team) of those three words and generate the waveforms and spectrograms. If you have problems in recording your own words, you can generate and download those sound files using the text-to-speech system online demo: <https://text-to-speech-demo.ng.bluemix.net/>
- (3) Compare and contrast three important acoustic parameters (possible candidates:  $f_0$ , F1, F2, segmental duration, amplitude envelope, spectral envelope, attack/decay, etc.) of human speech and parrot speech. (You need to pick the ones that you think are very important for meaningful comparisons.)

### Final Report:

1. Define the following terms: waveform, spectrogram.
2. Show a table with the waveforms and spectrograms of the three words in human speech and parrot speech. Label the x axis and y axis.
3. Discuss some key similarities/differences on both segmental and suprasegmental levels. Give specific examples and measurements such as pitch ( $f_0$ ) analysis to support your claim.
4. Discuss what improvements or adjustments an automatic speech recognition system, which was originally designed for human speech, needs to make in order to be able to recognize parrot speech more accurately.
5. Finally, do you think Parrots have brain structures similar to humans to learn how to make speech? Why or why not?

