SpeechRhythmExtractor (version 1.8)

Leônidas SILVA JR.
State University of Paraíaba (UEPB) / University of Campinas (UNICAMP/CNPq)
Grant: *National Council for Scientific and Technological Development* (CNPq), No. 151027/2020-0.

Plínio A. BARBOSA
University of Campinas (UNICAMP/CNPq)
Grant: *National Council for Scientific and Technological Development* (CNPq), No. 302194/2019-3.

This script implemented by Leônidas SILVA JR. (State University of Paraiba / University of Campinas - Brazil) & Plínio A. BARBOSA (University of Campinas - Brazil). It aims to build rhythmic multidimensional modellings of vowel, consonant, phonetic syllable and chunk units computed from (the classical) metrics and prosodic-acoustic parameters.

This script can be used in a cross-section of diifferent languages and dialects.

- Audio/TEXTGRID files are required and have to be in the same directory of the script.
- Script under updating process.

HOW TO CITE THIS SCRIPT

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GETTING STARTED...

Hi! We will start from the point having in mind that you have already installed Praat in your computer.

BEFORE RUNNING THE *SpeechRhythmExtractor* SCRIPT...

- For the sake of two of the variables (*language/dialetc* and *sex*), we strongly recommend that the audio file is named in the following sequence: the first to third letters = the *languge/dialect*; and the fourth to sixth letters = the *sex* of the speaker;
- You will need at least a couple of **Audio**/**TextGrid** files;
- The audio, TextGrid files and the script MUST BE in the **SAME DIRECTORY**;
- The TextGrid files must be segmented into vowel onsets (VV), vocalic (V) consonantal (C), silence (# or _) and chunk (CH) intervals as shown in Figure 1.

AmEFEM001
AmE = *language* (American English); **FEM** = *sex* (female); **001** = *order* (the very first participant)

Example .**wav**
Example.**TextGrid**

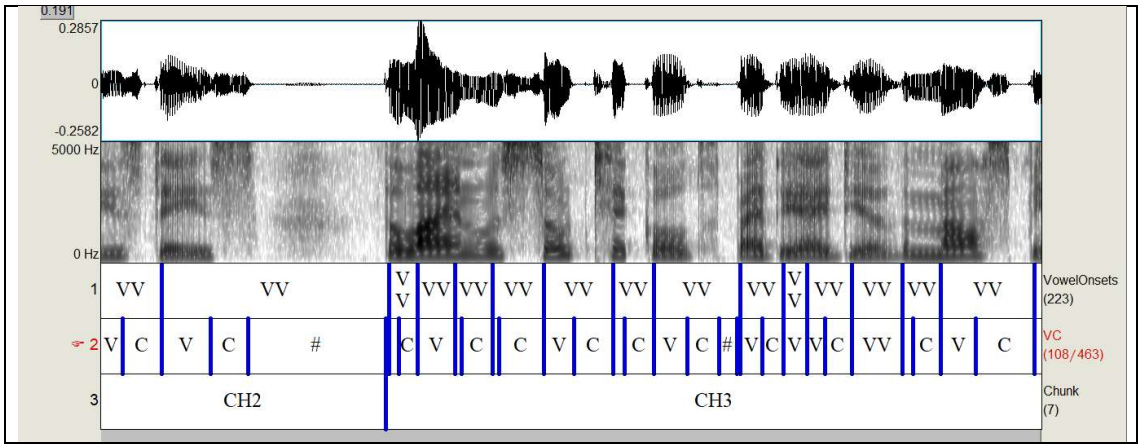

Figure 1.

RUNNING THE *SpeechRhythmExtractor* SCRIPT

Now that your audio, textgrid and script files are in the same folder and the textgrids are properly segmented (see Figure 1), you will need to "call the script" into Praat object's window. On Praat's drop-down menu, click **Praat >> Open Praat script...** as shown in Figure 2. Now choose the directory you have your files and the *SpeechRhythmExtractor* script in.

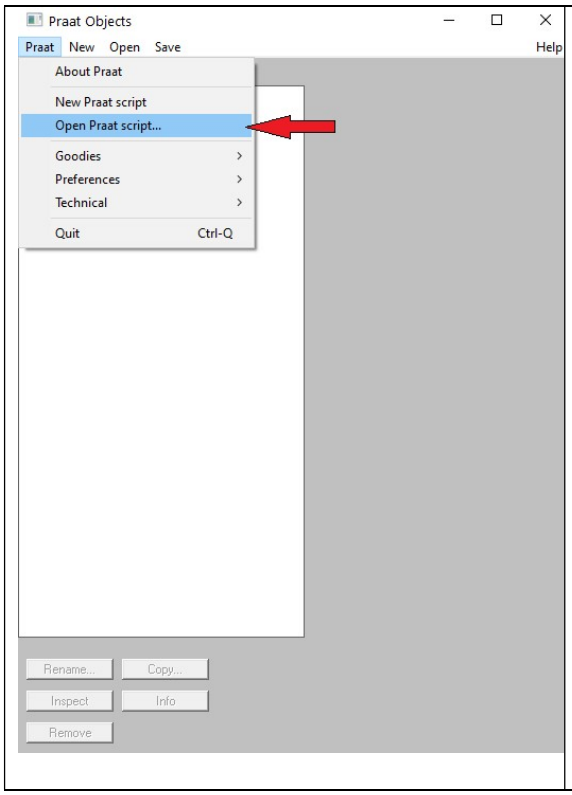

Figure 2.

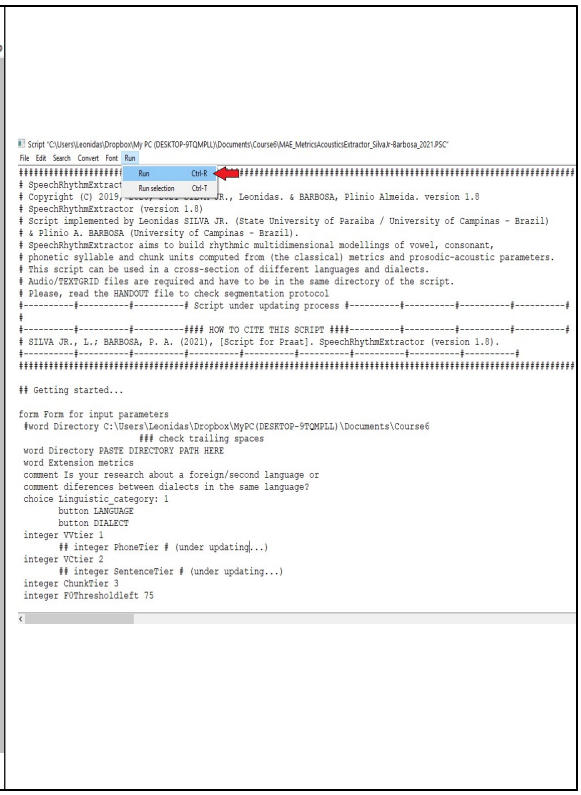

Figure 3.

Once the script is uploaded from Praat objects' window, you will need to run it. For running the script, click **Run >> Run** as shown in Figure 3.

When you click **Run**, the script will pop-up a window (a form contaning the input parameters) as shown in Figure 4. Unless you need to work under specific conditions

determined from your experimental design, we advise the maintenance of the form default values. . Click the **Ok** button to run the script.

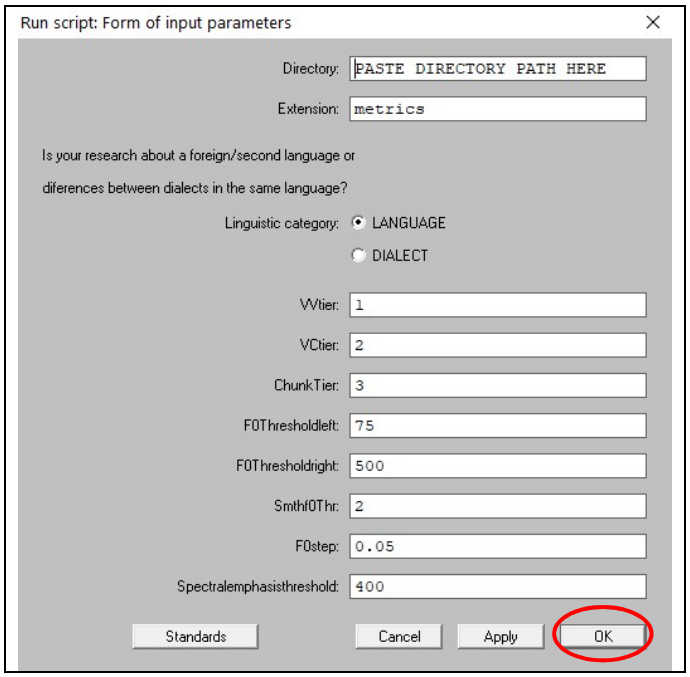

Figure 4.

The script automatically returns an **in-tab-delimited .txt file** named '*metrics*' to the same directory where the script, audio and TextGrid files are in. The **metrics.txt** file contains:

- The string vectors (audio file ID, linguistic category and the speaker's sex), and;
- The numerical vectors (the rhythm metrics and the prosodic-acoustic parameters).

You can change the name of the .txt file right before clicking the **Ok** button in the form as shown in the argument line <*Extension*> in Figure 3.

The rhythm metrics and the acoustic parameters extracted from *SpeechRhythmExtractor* script for speech rhythm analysis can be seen in Chart 1.

METRICS		ACOUSTIC PARAMETERS	
Parameter	**Segment of application**	**Parameter**	**Segment of application**
Proportion (%)	V, C	F0 median	CH
Standard deviation (σ)	V, C, (V or C), VV	F0 peak	CH
Variation coefficient (Varco)	V, C, (V or C), VV	F0 minimum	CH
Raw pairwise variability index (r-PVI)	V, C, (V or C), VV	F0 standard deviation (σF0)	CH
Normalized pairwise variability index (n-PVI)	V, C, (V or C), VV	F0 skewness	CH
Rhythm ratio (RR)	V, C, (V or C), VV	Mean of F0 first derivative (μΔ1- F0)	CH
Variability index (VI)	V, C, (V or C), VV	Standard deviation of F0 first derivative (σΔ1- F0)	CH
Yet another rhythm determination (*z-score duration*) (YARD)	V, C, (V or C), VV	Skewness of F0 first derivative (skΔ1- F0)	CH
		Speech rate (SR)	VV, CH

	F0 rate (F0-R)	CH
	Spectral emphasis	CH
	Mean of normalized syllable-peak duration (μdur- Sil)	VV, CH
	Mean duration of pauses (μdur-#)	CH

Chart 1.
Adapted from Silva Jr. & Barbosa, (2019, 2020)[1] based on the phonetic literature since the mid 1990s (see References for details about each metric and acoustic parameter purpose and their mathematics).

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