

PHONETICS: PRAAT II

ANNOTATION

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PHONETICS: PRAAT II – ‘PRACTICAL PRAAT’

Last week:

- General introduction
- Overview of basic Praat functionality
- Creation of vowel formant charts

This week, speech timing and rhythm:

- recording speech data
- annotating speech data
- extracting duration information from a recording, using Praat
- transferring Praat data to a spreadsheet (Excel, LibreOffice Calc, etc.)
- analysing speech timing

Next week, speech melody:

- extracting fundamental frequency information from a recording
- analysing speech melody

I assume you have Praat (<http://www.praat.org>) and spreadsheet software.

PHONETICS: PRAAT II – HOMEWORK ASSIGNMENT

Good work!

Chinese Vowels		The Highest Value	The Lowest Value
Chinese Monophthongs	a	4942	1461
	o	4220	781.7
	e	4067	1285
	i	3869	2687
	u	3782	737.9
	ü	3913	2205
	ê	4067	2183
	er	3629	1461

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Comment:

The measurements seem to be too high, they need to be checked.

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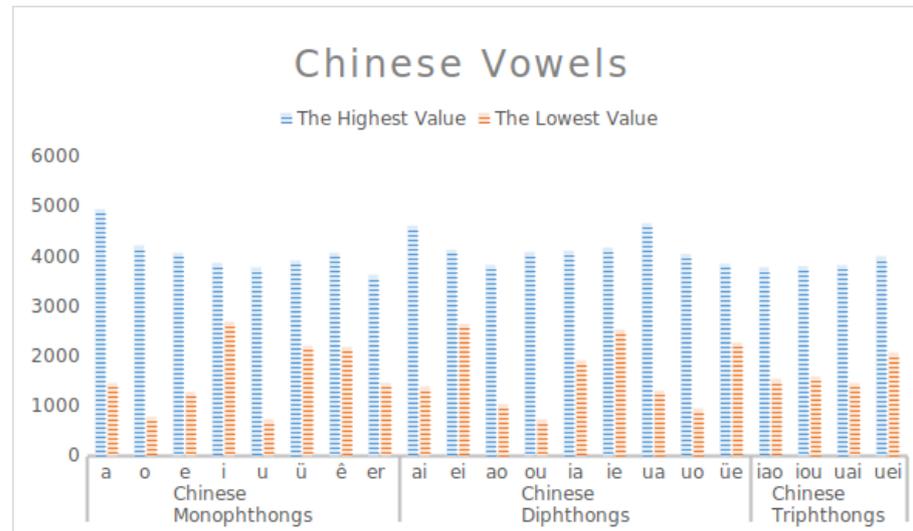
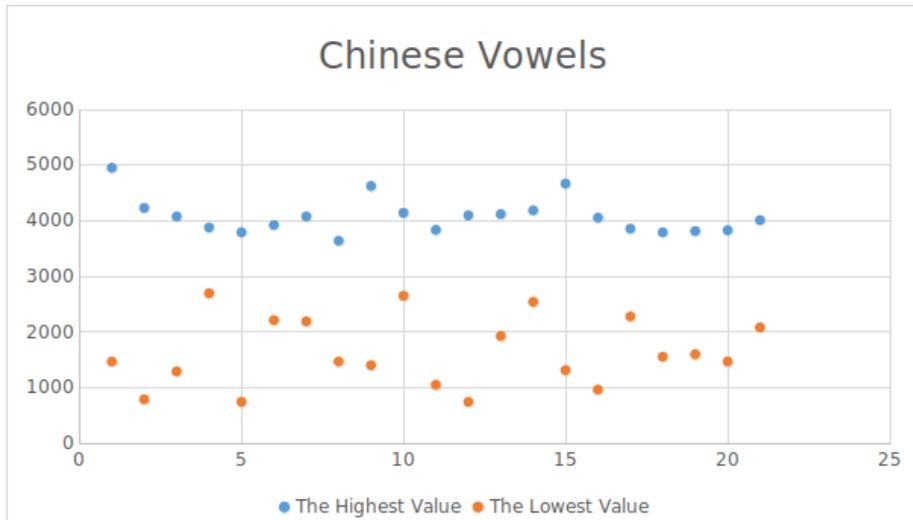
You are looking for

1. formants (areas in the spectrum where the harmonics are stronger), not necessarily the highest and the lowest values.
2. F1 (formant 1) and F2 (formant 2).

(F0 is the fundamental frequency)

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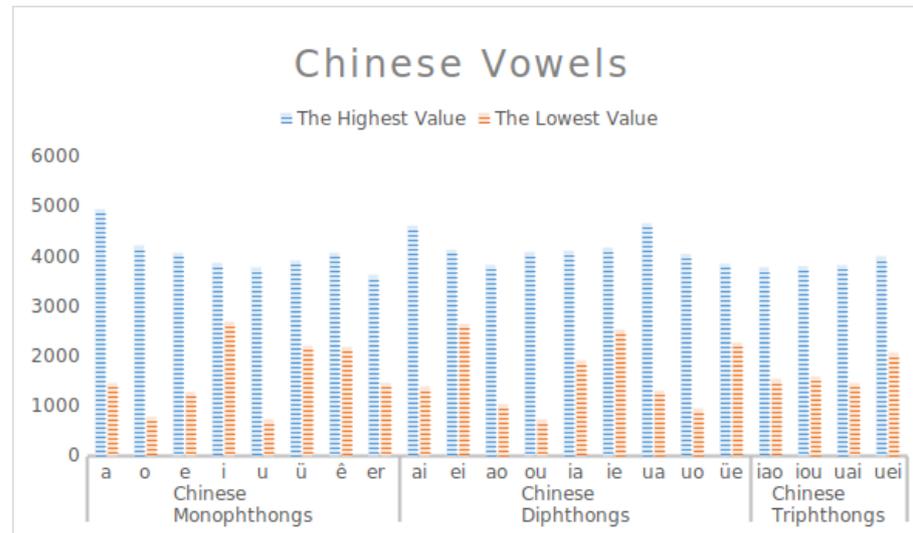
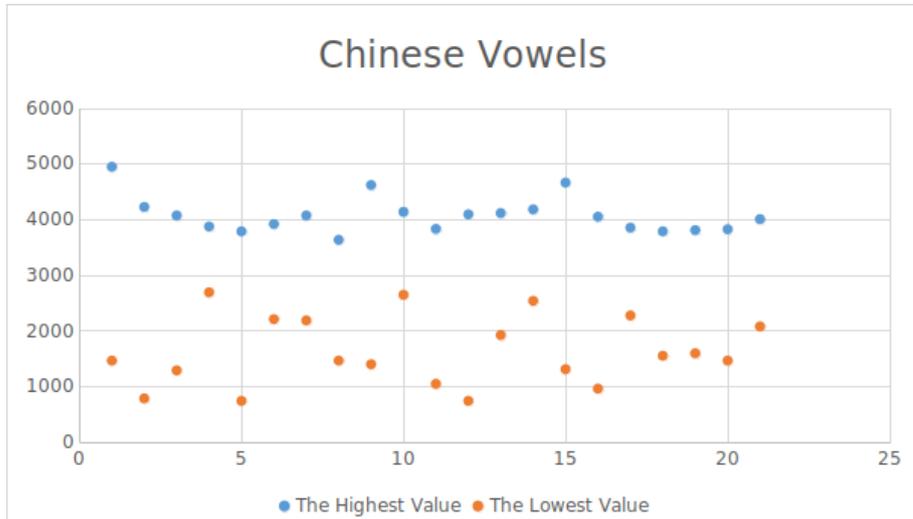


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Comments:

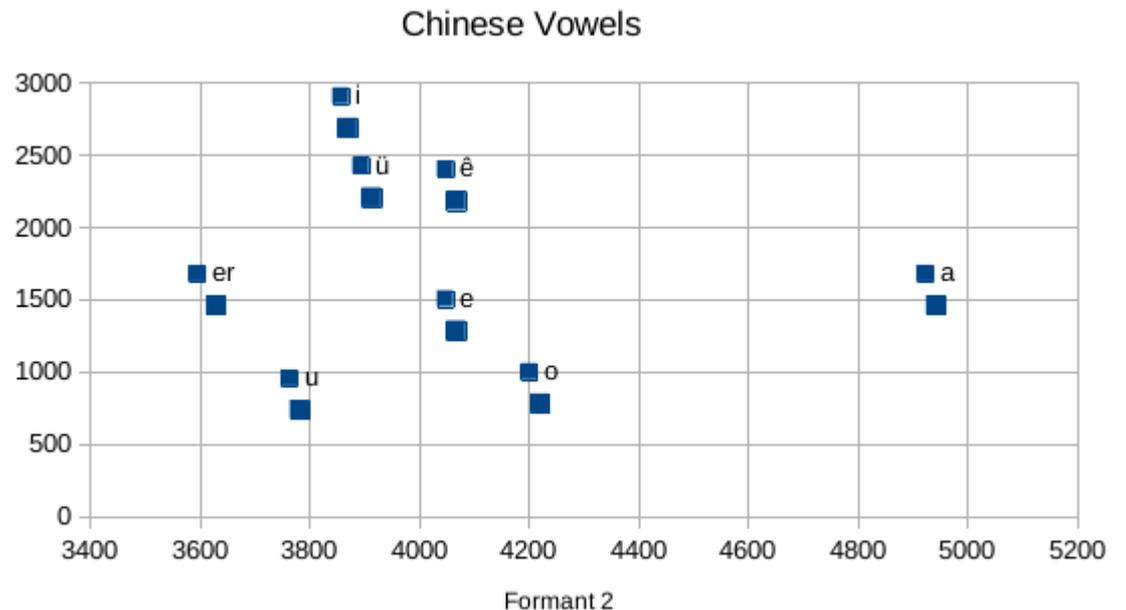
1. Top left is a scatter plot for each of the data columns separately.
2. A better representation would be a scatter plot for both the data columns together:
3. For this, mark the two data columns, select scatter plot
4. Define the column with the data labels.
5. Then in the scatter plot select “Insert Data Labels”, then “Format Data Labels” and “Show category”

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PRAAT: BASIC FUNCTIONALITY

Input:

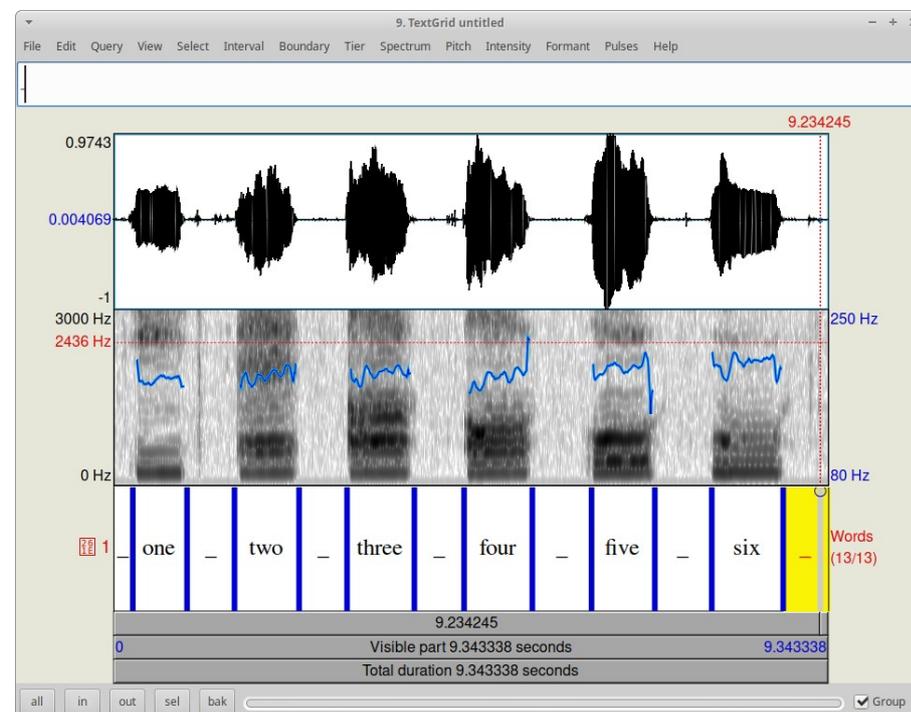
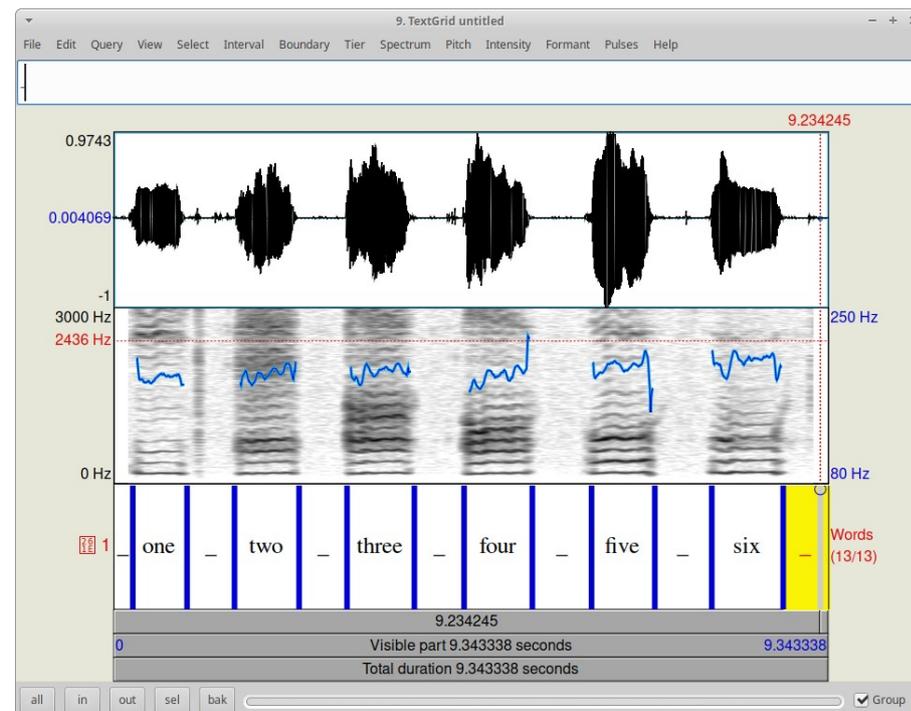
- recording speech from microphone or other sources
- reading from files

Methods:

- waveform selection and analysis
- spectral analysis
- transcription and annotation of speech
- frequency and intensity analysis

Output:

- saving speech files
- saving files with analysis results:
 - annotations (TextGrid files)
 - fundamental frequency
 - spectral information



SPEECH RECORDING

1. pre-recording phase
2. recording phase
3. post-recording phase

SPEECH RECORDING: 1. PRE-RECORDING PHASE

Choose phonetic features:

- phones (speech sounds): vowels, consonants, syllables, words ...
- prosody: timing and rhythm, melody

Choose the speech variety:

- corpus phonetics, experimental phonetics
- language, dialect, register, style
- ‘authentic speech’, lab speech (with instructions, prompts)
- interactivity features: reading, dialogue, task solving
- personal features: male, female, age, ...

Choose the scenario:

- recording instructions and prompts
- location
- equipment
- experimenter, operator, subjects

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SPEECH RECORDING: 1. PRE-RECORDING PHASE

Choose recording equipment:

- recording device and microphone:
 - for high quality laboratory work
 - a digital recorder for recording music, get advice from a musician!
 - either separate microphone or builtin microphone
 - for most phonetic classwork and theses:
 - laptop with *Audacity* or *Praat*
 - mobile phone (for exploratory work, and not for spectral analysis):

Choose appropriate recorder settings:

- in general, 44.1kHz (CD standard) or 48kHz (digital tape) sampling rate is available
 - for many purposes 16kHz is used for digital processing of the speech signal

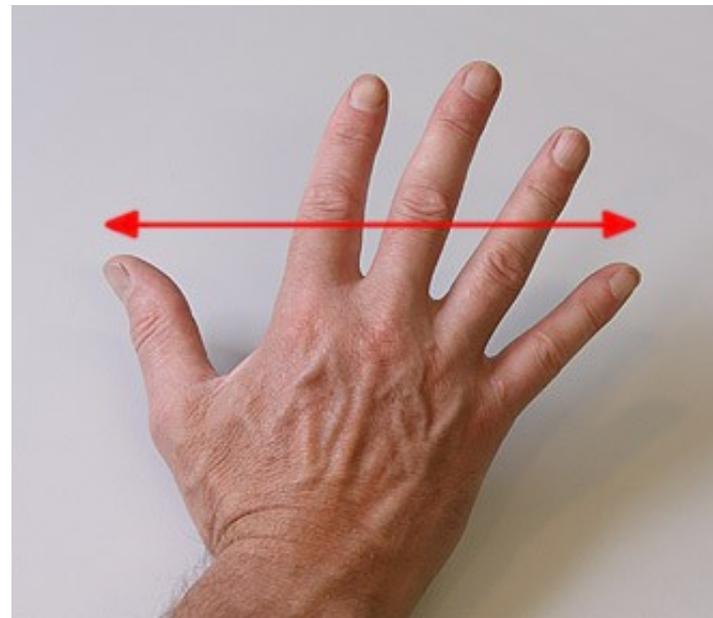
Choose speech file format:

- WAV is the most popular format; if you use other formats you may have to convert (Praat can handle a wide range of formats)
 - (MP3 and OGG are not suitable for spectral analysis)
- Prepare a document with information on your recording phases.

SPEECH RECORDING: 2. RECORDING PHASE

Recording location:

- to avoid echo caused by hard walls, ceilings and floors, choose a place with soft furnishings or sound-proof walls (as in a professional recording studio or booth)
- avoid noise caused by
 - mobile phones (switch them off if you are not using them to record)
 - electronic noise-producing devices: LED lights, phone chargers
 - rustling paper, tapping fingers and feet, wind, cats, dogs, cicadas
- place the microphone 20-25cm from the speaker:
 - one span (a traditional measure: thumb tip to pinkie tip)



And make sure that the recording volume is loud enough!

SPEECH RECORDING: 2. RECORDING PHASE

Speaker (where relevant):

- be sure to give the speaker clear instructions
- if reading, prepare prompts (randomised if words or sentences)
- record metadata at the beginning of the session: name (or abbreviation), date, place; recording operator
- ask the speaker for permission to use the data for scientific purposes (for example, at the beginning of the recording)
- speakers should take a sip of water every 5-10 minutes to avoid drying out the vocal folds and thereby changing the voice quality.

Protocol, diary:

- keep a protocol of the recording session, including metadata, recording equipment, problems which arose
- include the protocol in the documentation

SPEECH RECORDING: 3. POST-RECORDING PHASE

Data management

- for safety, archive the data, your protocol file and your analysis files on at least two media
- never change the original data, always work with copies
- convert the data into a standard WAV format
- cutting of recordings is usually necessary for phonetic analysis, for example using one of these:
 - <http://www.audacityteam.org/>
 - <http://www.fon.hum.uva.nl/praat/>
- label your files systematically, e.g.
 - english-interview05-20220509.wav (for the recording)
 - english-interview05-20220509.txt (for the protocol)
 - english-interview05-20220509.TextGrid (for Praat annotation)
 - (perhaps with additional information after the date)

SPEECH RECORDING: 3. POST-RECORDING PHASE

Transcription and annotation

- choose orthography or phonetic notation, depending on your task
- choose a tonetic notation or ToBI for prosody
- for phonetic transcription,
 - for using with my apps, use plain keyboard text, if possible, with the SAMPA keyboard-friendly encoding of the IPA;
 - for other purposes, use an IPA font
 - for printed classwork, theses, publications, always use a Unicode font

Publication in English (classwork, theses)

- use an international standard font:
 - serif font such as Times New Roman for the text
 - non-serif font such as Arial table and figure captions (if necessary)
 - fixed width font such as Courier New for computer code
- use Word (or LibreOffice) format styles (which you can modify), but never use the Default style – They keep your text consistently formatted and save a lot of time!
- citing Praat: information at <https://www.fon.hum.uva.nl/paul/praat.html>

SPEECH RECORDING: 3. POST-RECORDING PHASE

Annotation software

Praat (Linux, Mac, Windows):

- Praat software reference:

Paul Boersma & David Weenink (1992–2022). Praat: doing phonetics by computer [Computer program]. Version 6.2.06, retrieved 23 January 2022 from <https://www.praat.org>

- Praat article citation:

Boersma, Paul (2001). Praat, a system for doing phonetics by computer. *Glott International* 5:9/10, 341-34

Annotation Pro (Windows only): Praat, compatible format, with facilities for perception experiments:

<http://annotationpro.org/>

SPPAS (Linux, Mac, Windows):

- For large quantities of speech to be annotated it is worth considering automatic annotation (with correction by manual post-editing) implemented in Python:

<http://www.sppas.org/>

SPEECH RECORDING: 3. POST-RECORDING PHASE

Online tools and information:

Praat: <https://www.praat.org>

Audacity: <http://www.audacityteam.org/>

Annotation Pro: <http://annotationpro.org/>

Praat scripts: <https://lennes.github.io/spect/>

Praat scripting makes it possible to automate many kinds of phonetic analysis with Praat. There are also other sites: search the internet.

Online TextGrid analysis: <http://wwwhomes.uni-bielefeld.de/gibbon/TGA/>

The TGA (Time Group Analyzer) online tool extracts many kinds of information from annotations in Praat TextGrid or Character Separated Value (CSV) formats: transcription text, timing statistics, graphs showing time relations.

Online TextGrid to CSV conversion:

<http://wwwhomes.uni-bielefeld.de/gibbon/Guangzhoulectures2022/Media/textgrid2csv-example.html>

PRACTICAL HANDS-ON TASKS - ANNOTATION

1. Read and record these sentences at a medium speed:

Today the weather is fine. I will go for a run. Then I will chill.

- Playing, viewing, zooming the waveform
- Saving the speech file – use an informative filename

2. Syllable annotation

- starting an annotation tier
- selecting interpausal units (IPUs, TimeGroups)
- finding syllable boundaries and selecting syllables
- marking the boundaries
- listening to individual syllables
- Saving the annotation file

PRACTICAL HANDS-ON TASKS – ANALYSIS

1. Inspection of your annotations (TextGrid files)

- reading the TextGrid file with a plain text editor (not WORD!)
- online conversion to spreadsheet CSV format
- examination of the CSV file with a plain text editor
- reading into Excel or LibreOffice Calc

2. Analysis of durations:

- duration regularity: creation of a chart image
- duration regularity analysis:
 - standard deviation
 - pairwise regularity index

3. Detailed online analysis of TextGrid files

- TGA (Time Group Analyser)
 - descriptive statistics
 - charts
 - substitution of example files with your own TextGrid files

PRACTICAL HANDS-ON TASKS – SUGGESTION

Homework assignment (see the class website for more detailed instructions):

1. English:

1. Record the short English passage shown above.
2. Annotate the syllables.
3. Convert the TextGrid to CSV and find the nPVI using TGA.

2. Translate the passage into Chinese.

1. Annotate the syllables.
 2. Convert the TextGrid to CSV and find the nPVI using TGA.
3. What conclusions do you draw from the nPVI values?

THANKS – NOW PLEASE PRACTICE !

