# Speech Science

WiSe 2023

## Exercise 4: Introduction to Praat

Nov 27, 2023

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Language Science and Technology
Saarland University

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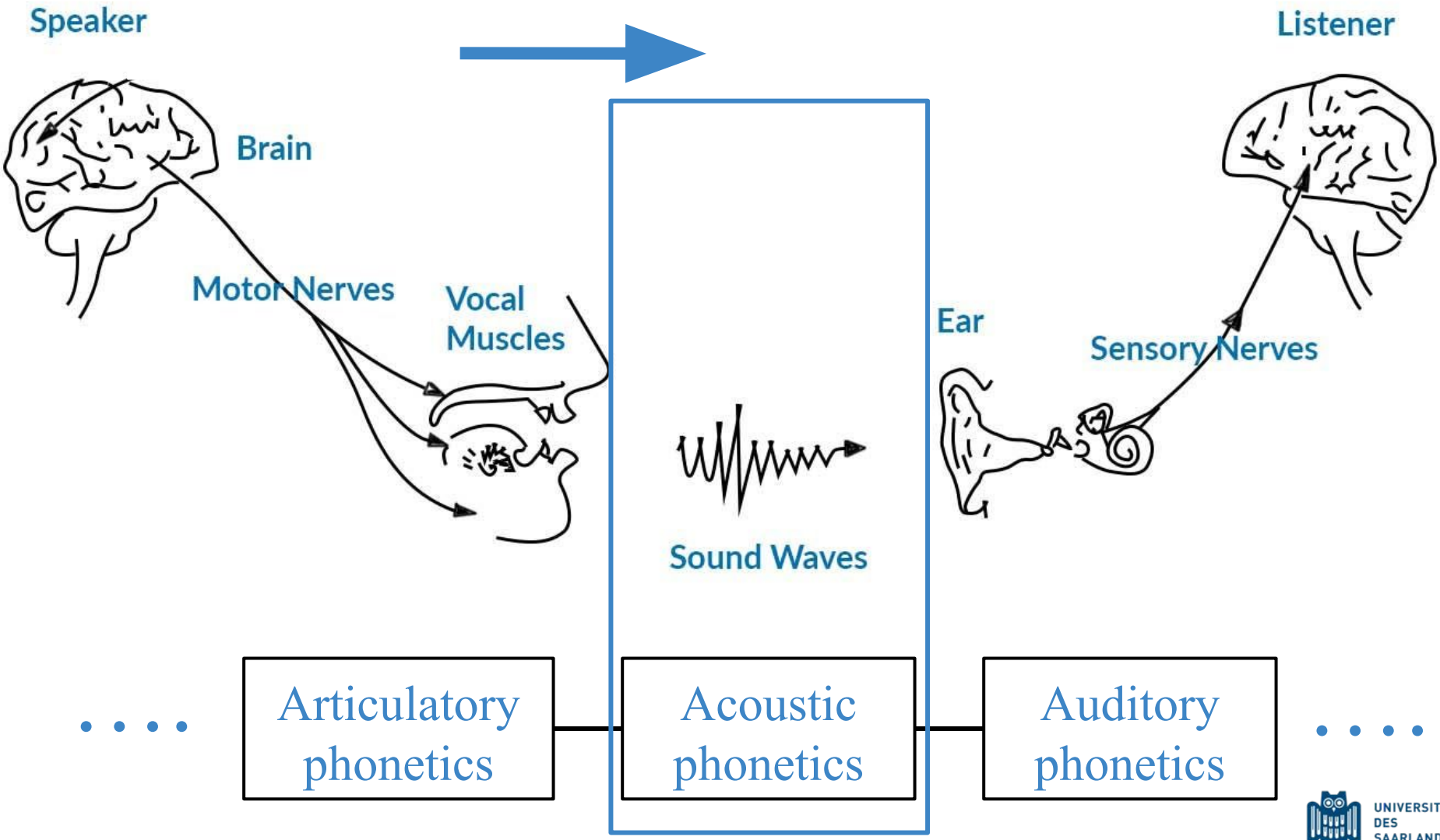
# Speech chain

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# Introduction to Praat

## Praat: doing phonetics by computer

### Download Praat:

* Macintosh
* Windows
* Linux, FreeBSD
* SGI, Solaris, HPUX
* the source code

### Information on Praat:

* Introductory tutorial: choose **Intro** from Praat's **Help** menus.
* Extensive manuals and tutorials: in Praat's **Help** menus.
* Beginner's manuals by others.
* Paul Boersma's publications on algorithms and tutorials.

### The authors

Paul

Paul Boersma and David Weenink
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Spuistraat 210
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The Netherlands

David

http://www.fon.hum.uva.nl/praat/

# Introduction to Praat

## Praat

Acoustic analysis program

Best known for its ability to:

- Visualize, label, and segment audio files
- Perform spectral and temporal analyses
- Synthesize and manipulate speech

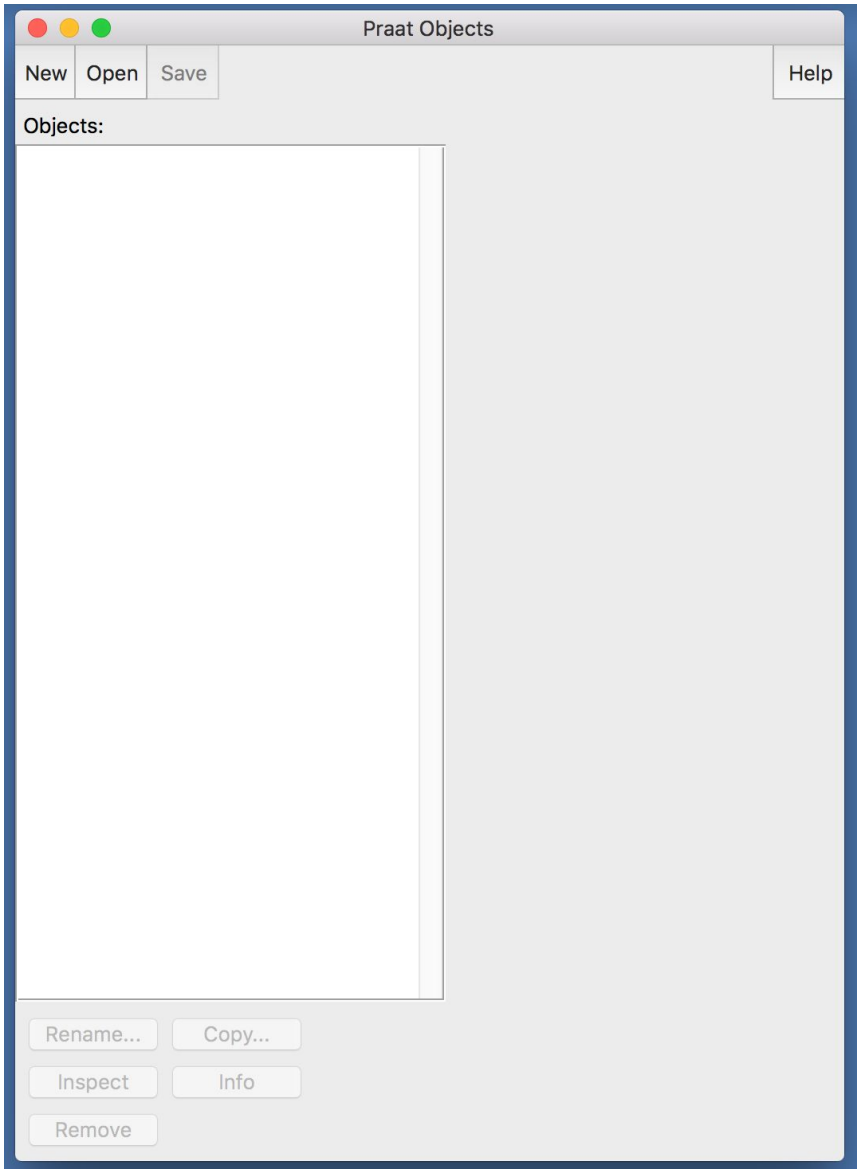
# Praat scripting

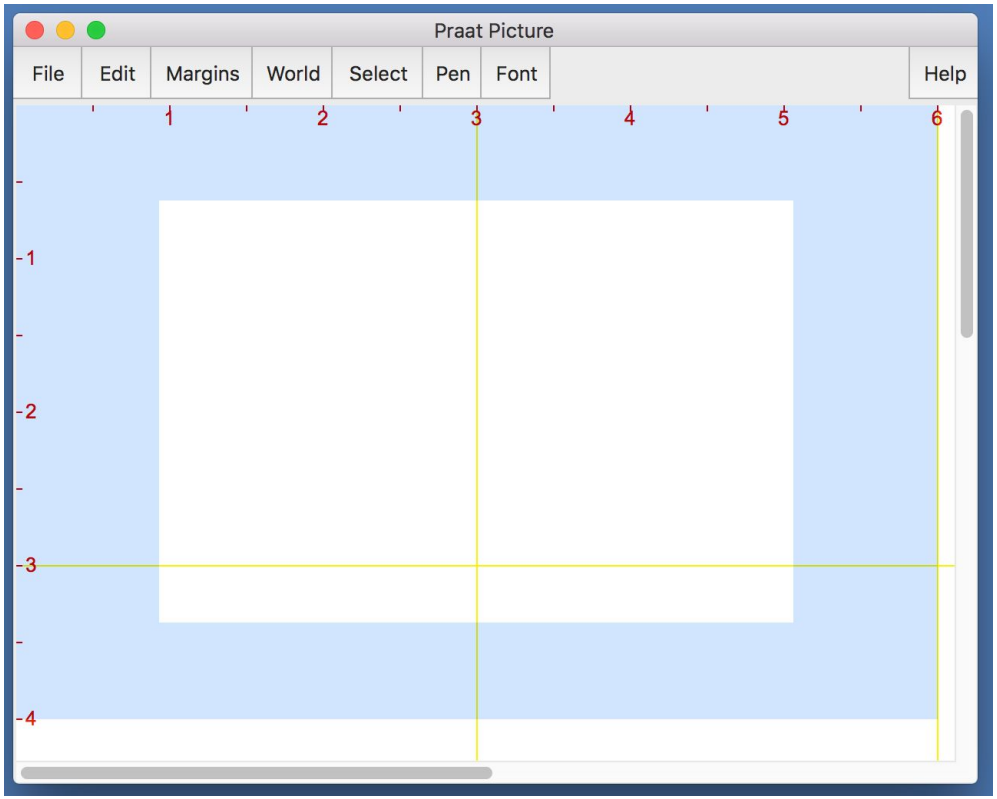
Praat: not only a program, but also a language

Why do I want to know Praat the language?

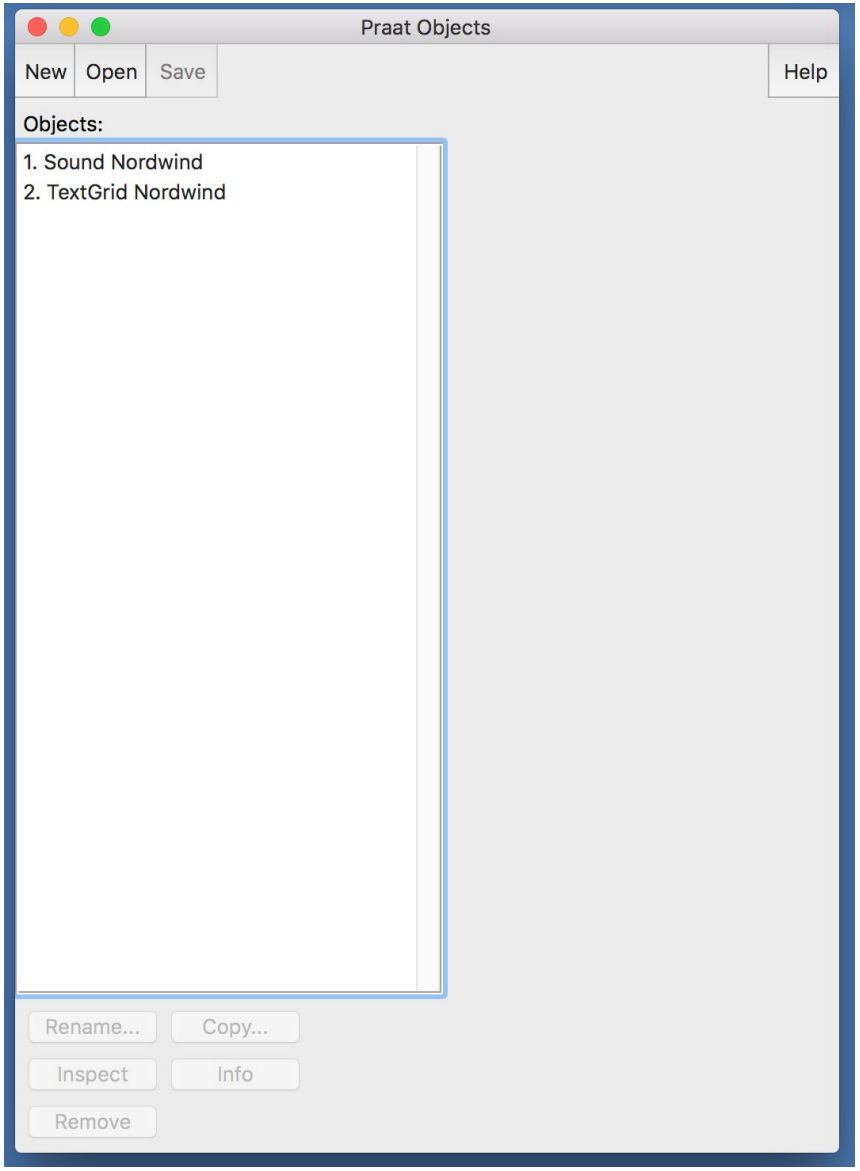
- Save time in the long run
- Minimize human error → consistency
- Allow others to repeat the process identically → replicability
- Easily correct mistakes
- Easily process large amounts of data

# Praat


Praat Objects
New
Open
Save
Help
Objects:
Rename...
Copy...
Inspect
Info
Remove


Praat Picture
File
Edit
Margins
World
Select
Pen
Font
Help
1
2
3
4
5
6
-1
-2
-3
-4

# Object window




Praat operates with *objects*.

e.g. *Sound*-objects or
*TextGrid*-objects

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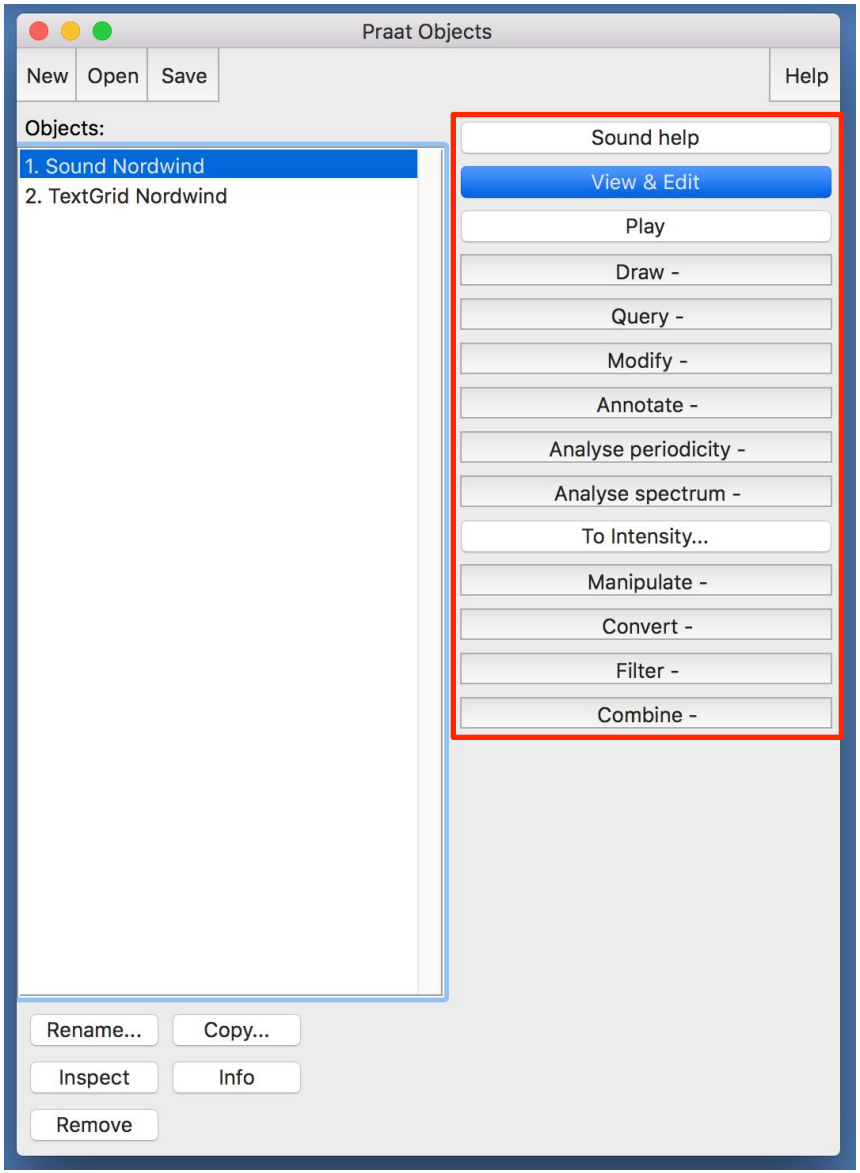
# Object window




Praat operates with *objects*.

e.g. *Sound*-objects or *TextGrid*-objects

here: *Sound*-object selected

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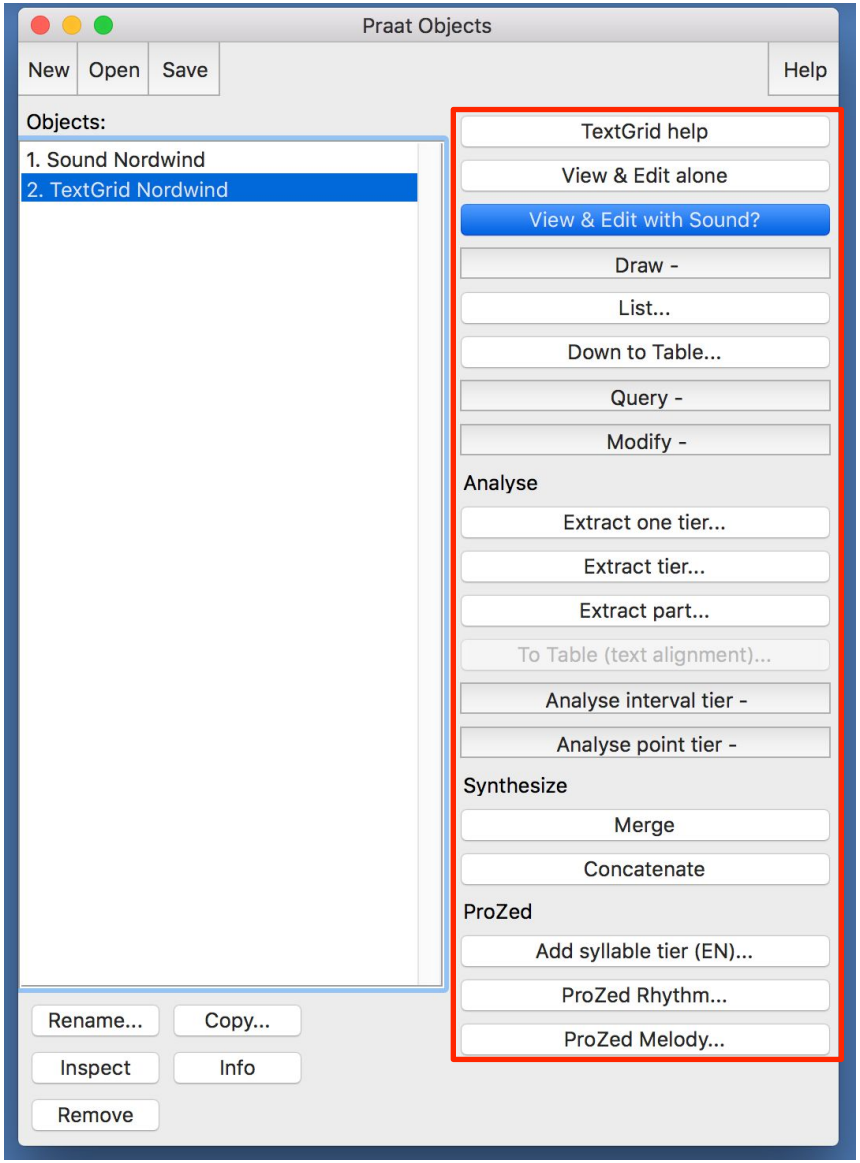
# Object window




Praat operates with *objects*.

e.g. *Sound*-objects or *TextGrid*-objects

here: *TextGrid*-object selected

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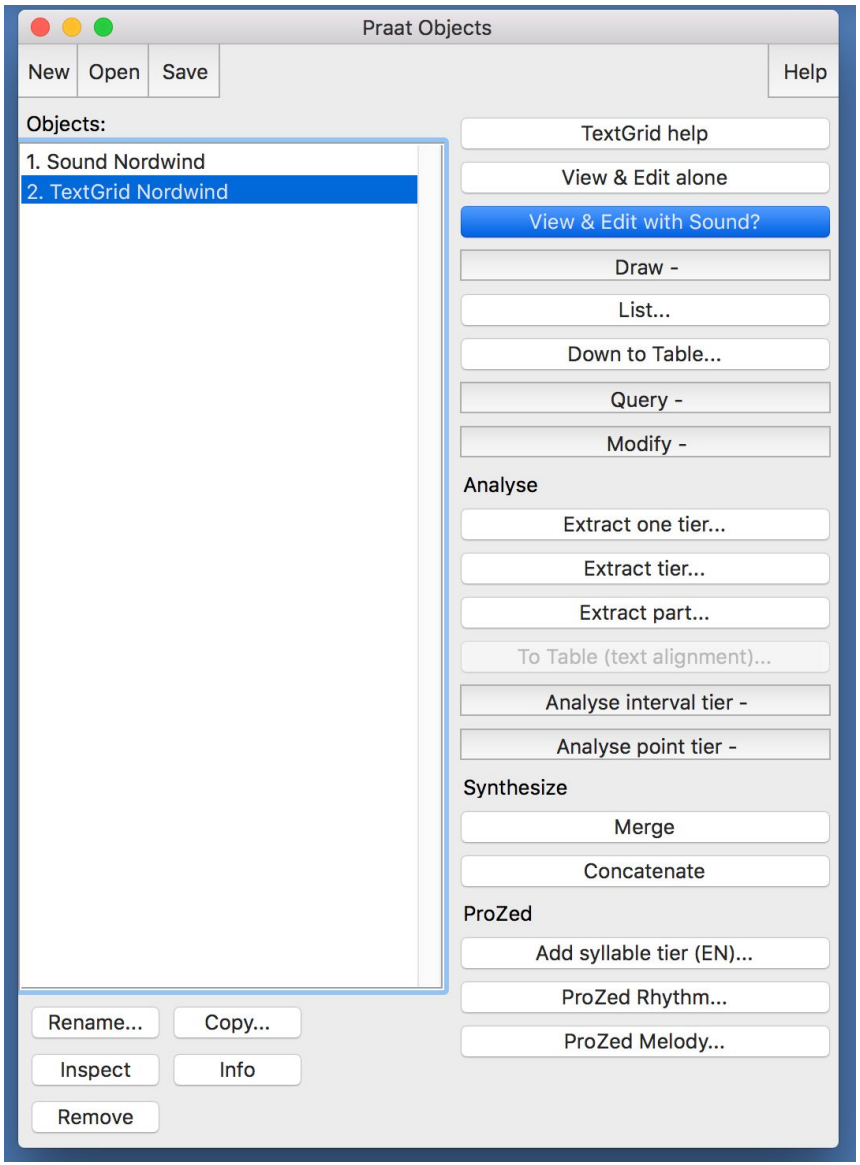
# Object window




Objects are transient –

don't forget to save your changes!

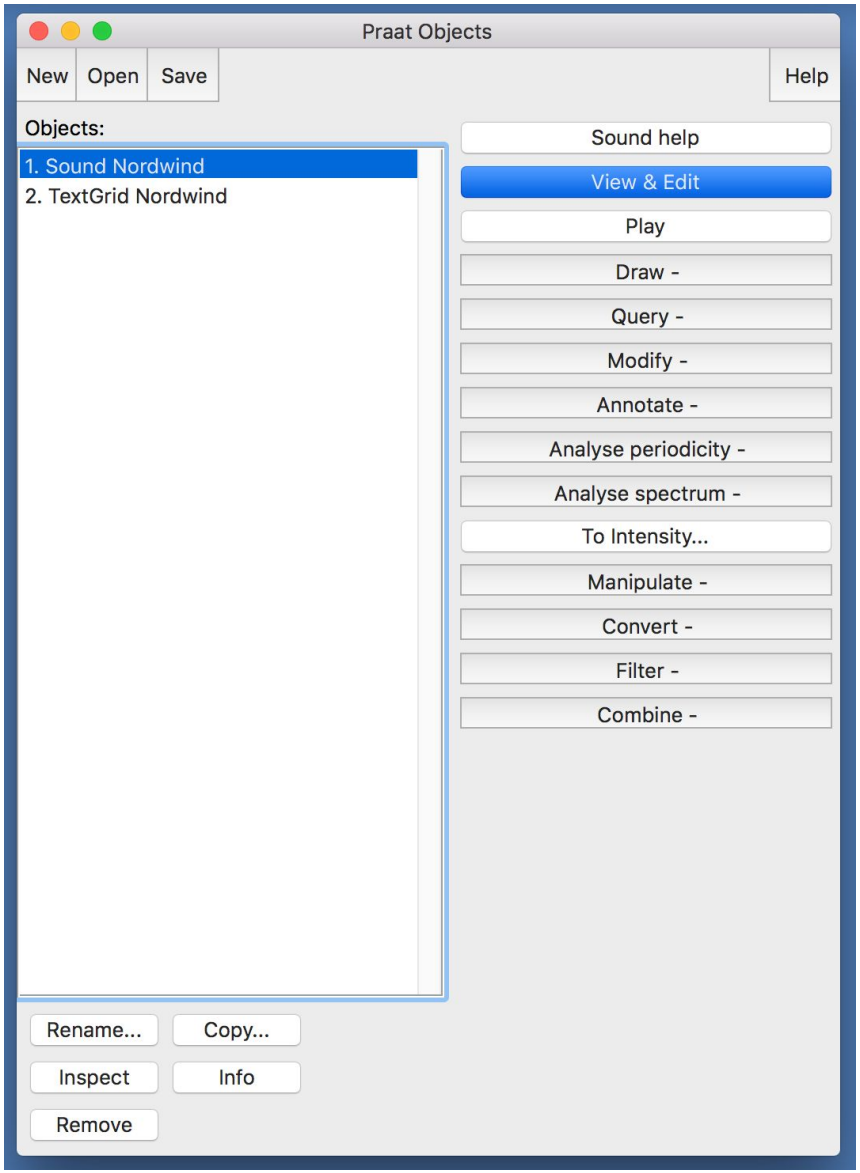
For most operations

there is no way to undo!

e.g. *Remove* will remove objects definitively

and without asking for confirmation!

# Object window




## Load files

↪ Open > Read from file...

(Open long sound file )

## Save files

↪ Save > Save as WAV file...

↪ Save > Save as text file...

## Manage objects

Rename...

Remove

Info

Inspect

Play

Copy...

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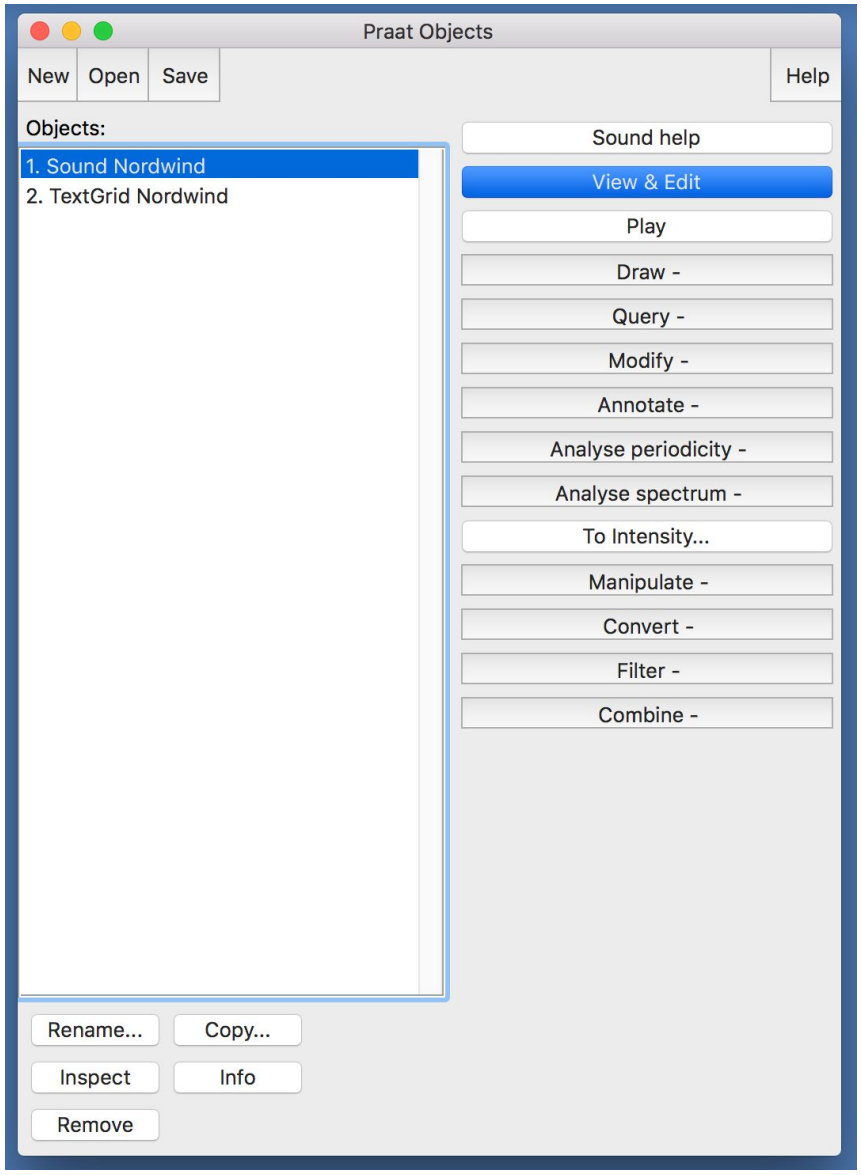
# Open editor window

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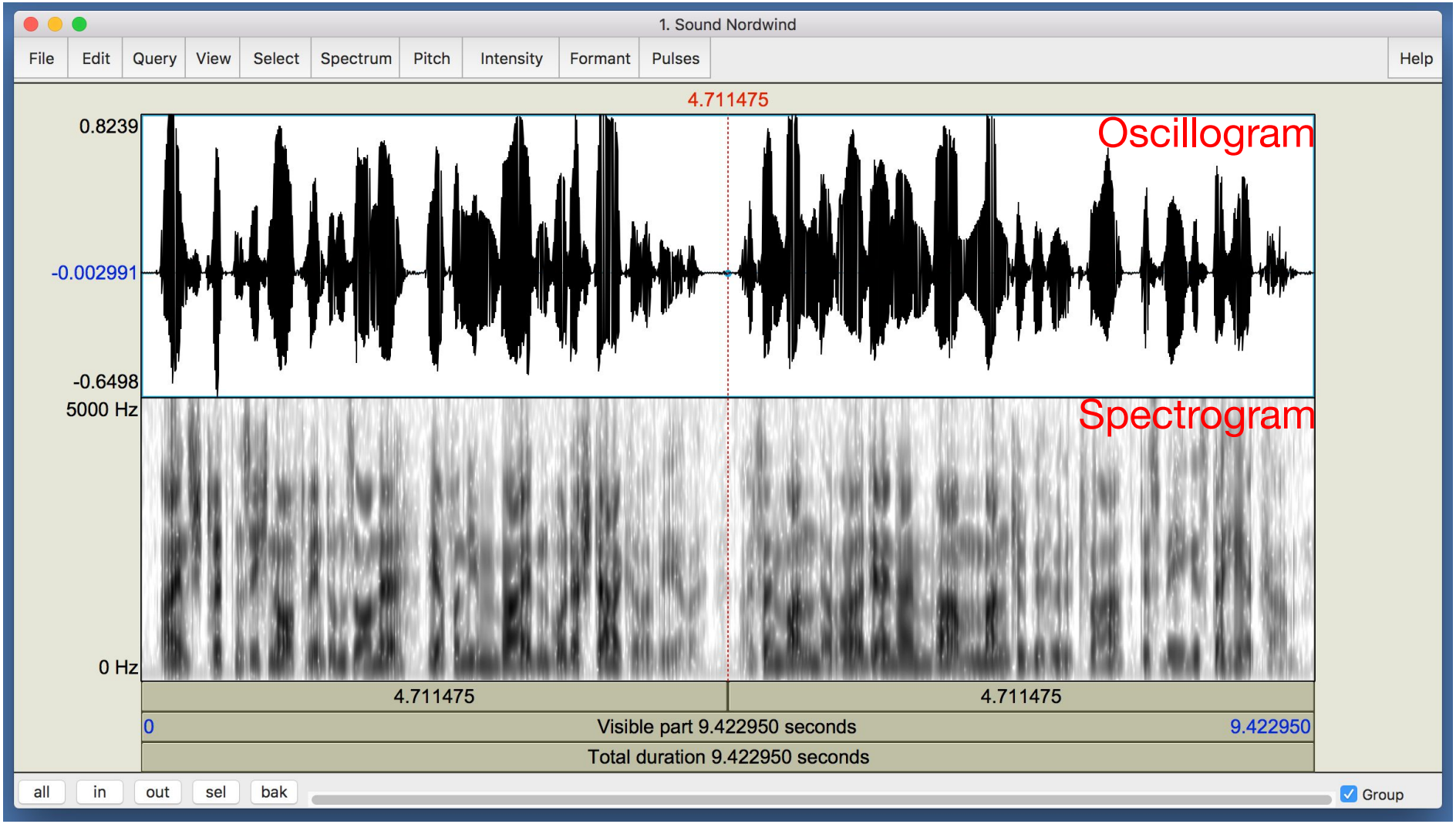
# Editor window



# Basics

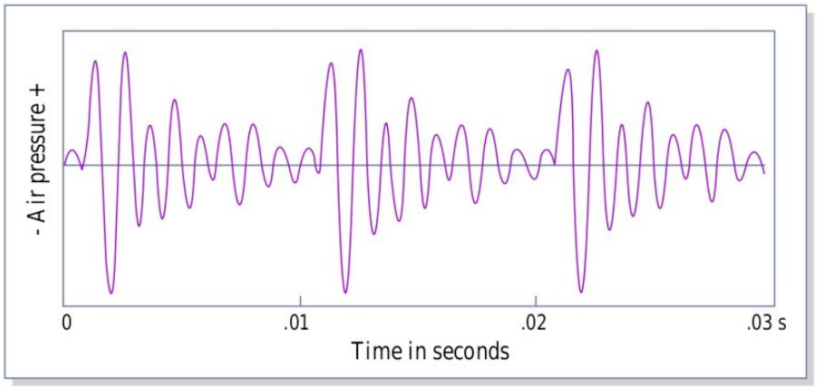



Image by MIT OpenCourseWare.

Segment of [ɔ]

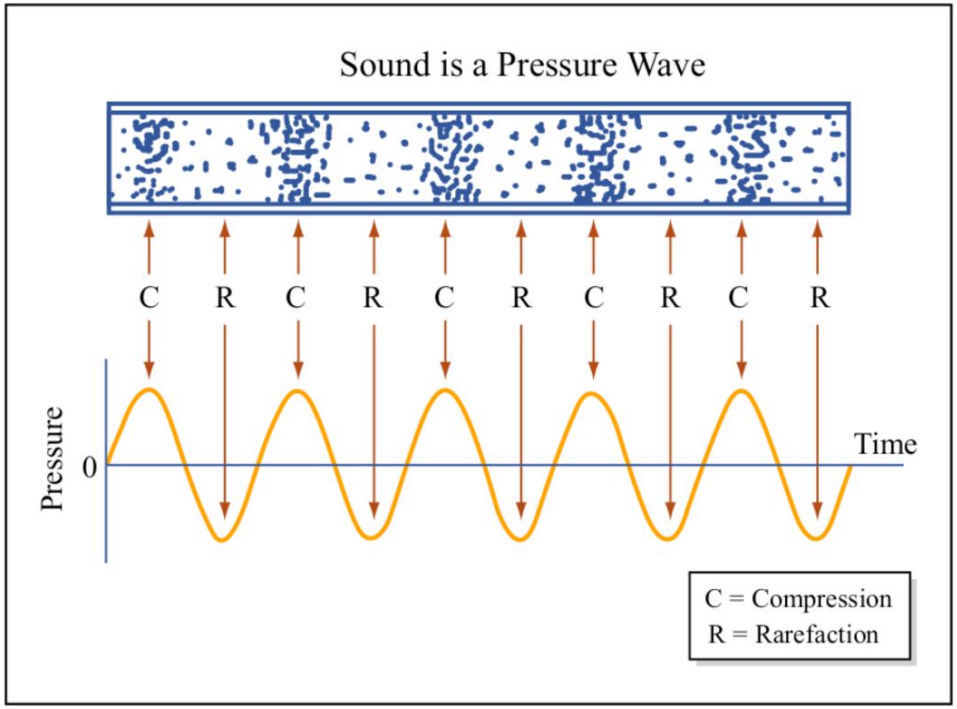
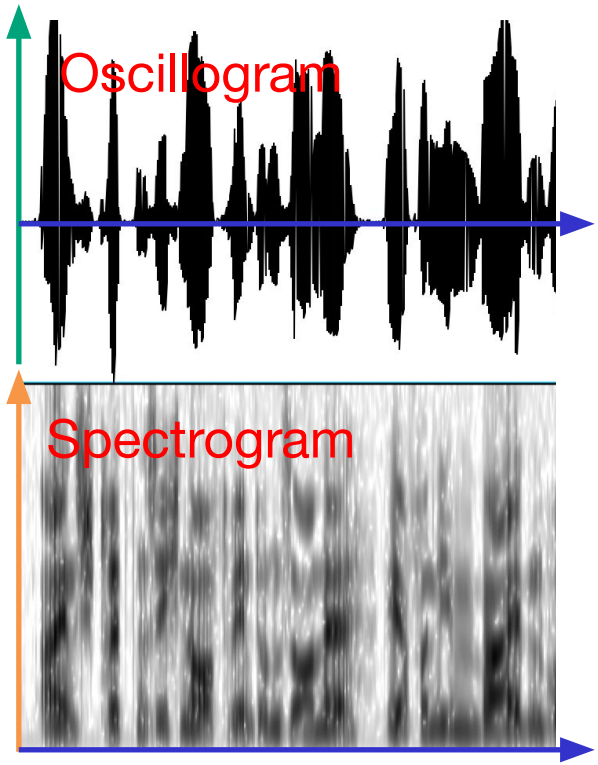



Image by MIT OCW.
Adapted from The Physics Classroom Tutorial.

# Oscillogram and Spectrogram




We are looking at the speech signal as…

…change in **sound pressure *p*** over **time *t***.

…**frequency *f*** over **time *t***.

The darker the shading in a given area,

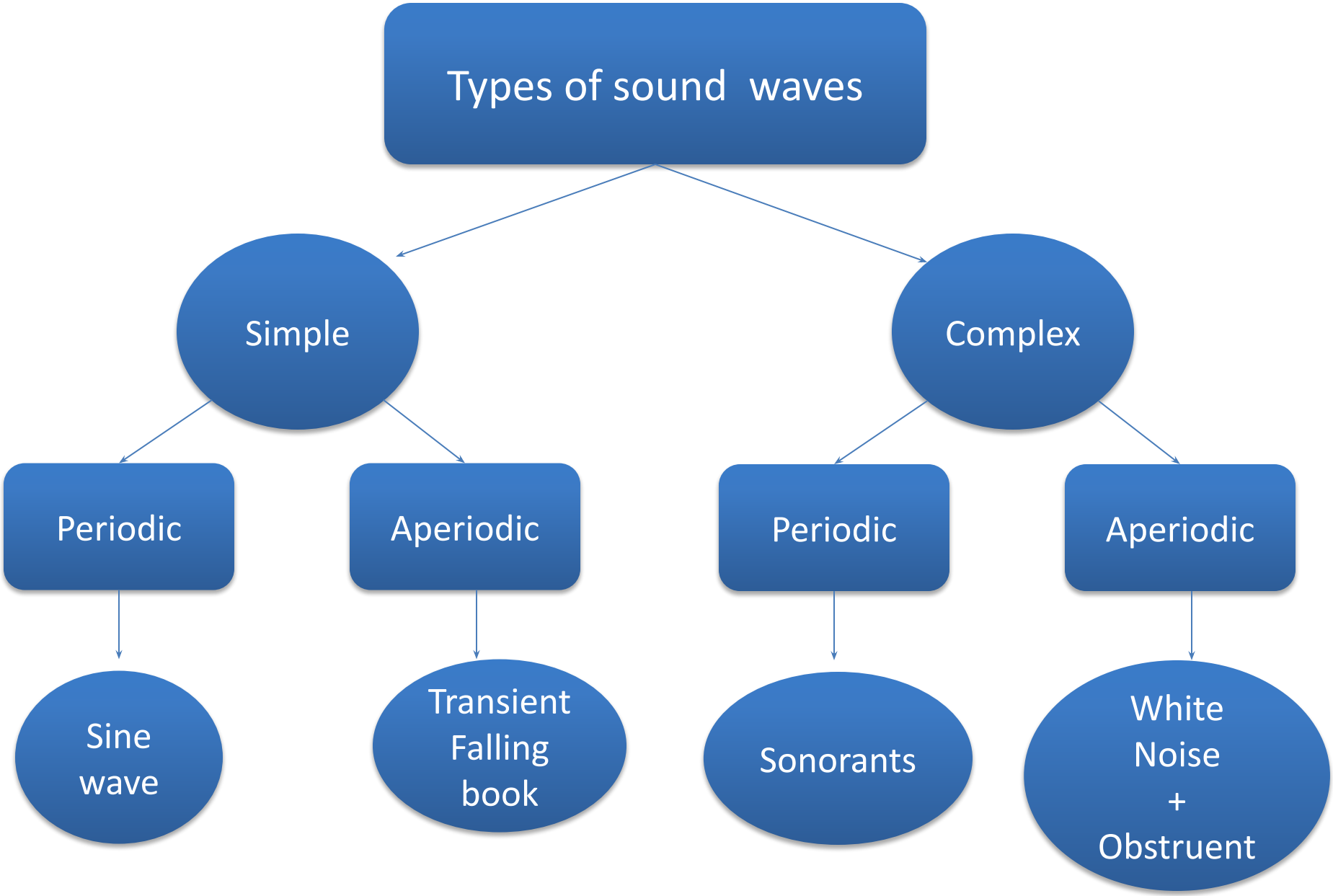
the higher the **sound pressure *p***.

sound pressure → **volume**

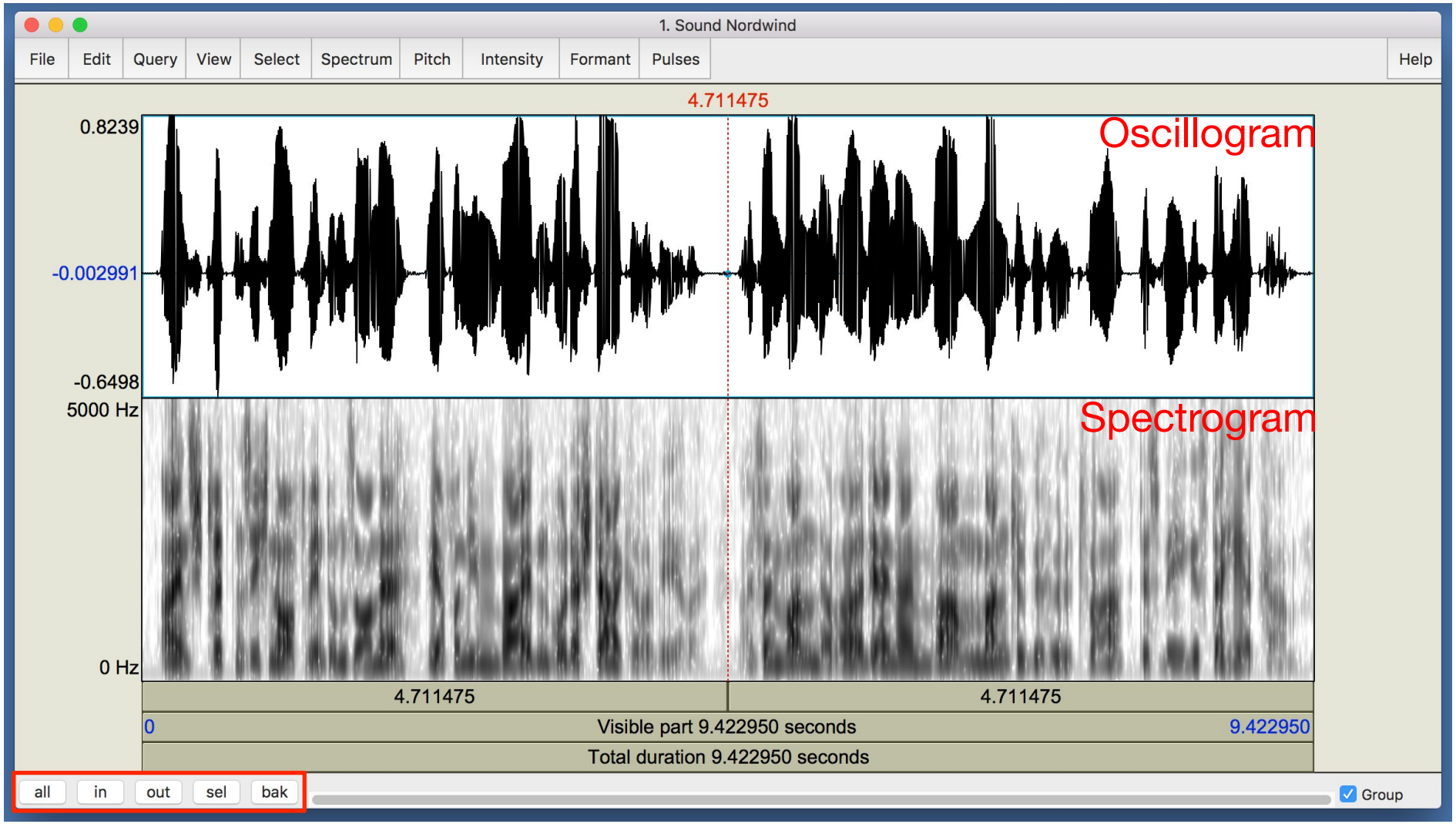
time→ **duration**

frequency → **pitch**

# Basics


Types of sound waves
Simple
Complex
Periodic
Aperiodic
Periodic
Aperiodic
Sine wave
Transient Falling book
Sonorants
White Noise + Obstruent

# Editor window




| | | all | in | out | sel | bak |
|---|---|---|---|---|---|---|
| cmd | + | a | i | o | n | b |

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# Recording

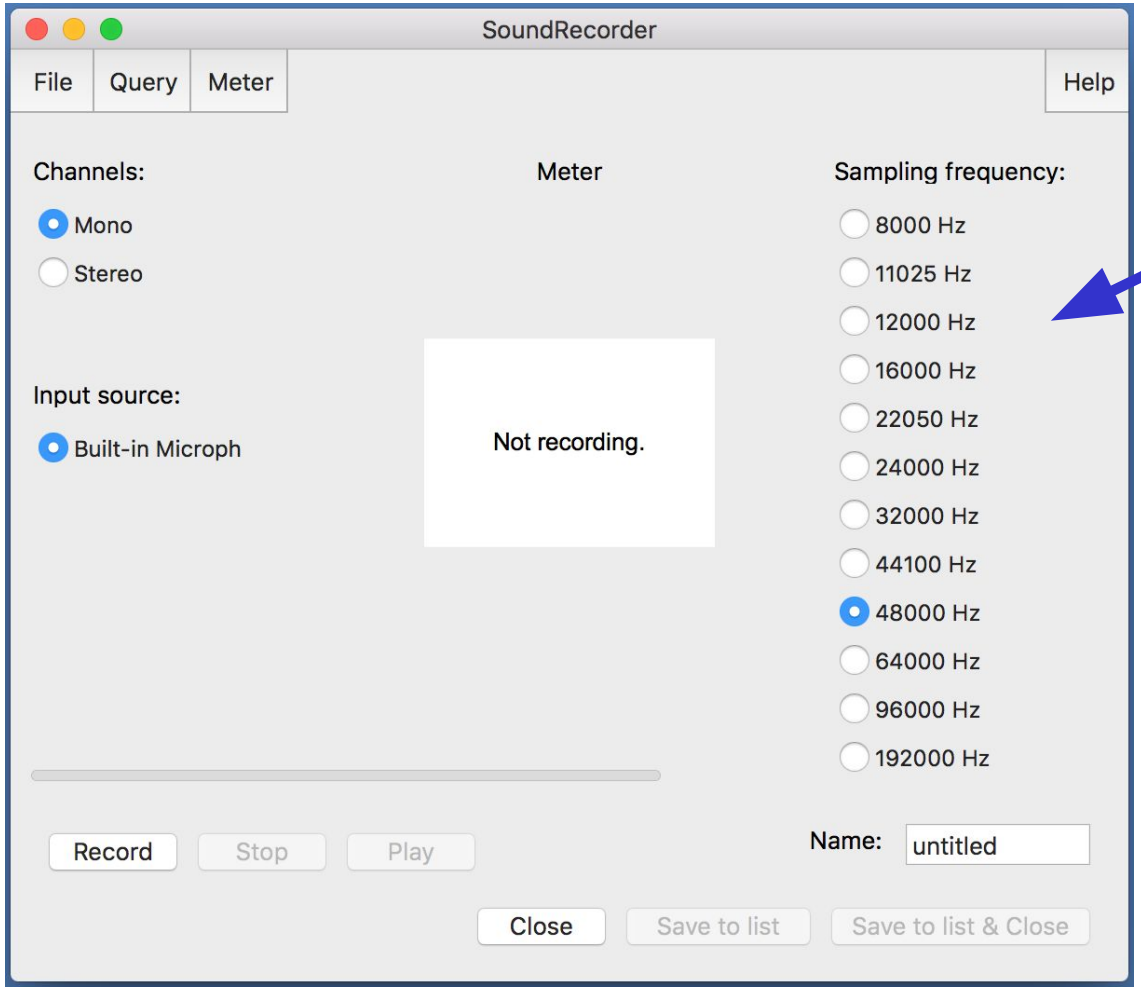
Praat

Audacity®

# Recording with Praat

↪ New > Record mono Sound...

↪ New > Record stereo Sound...




Choose sampling frequency.

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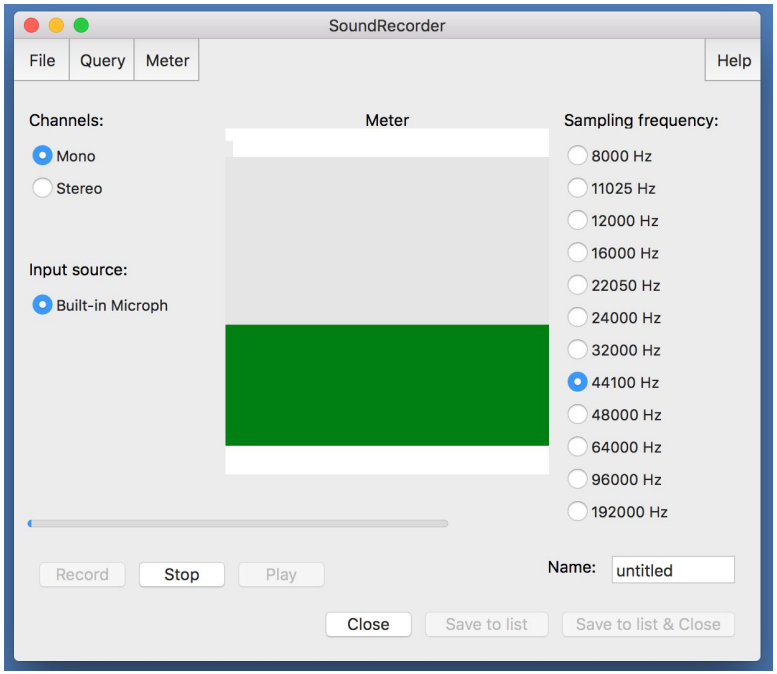
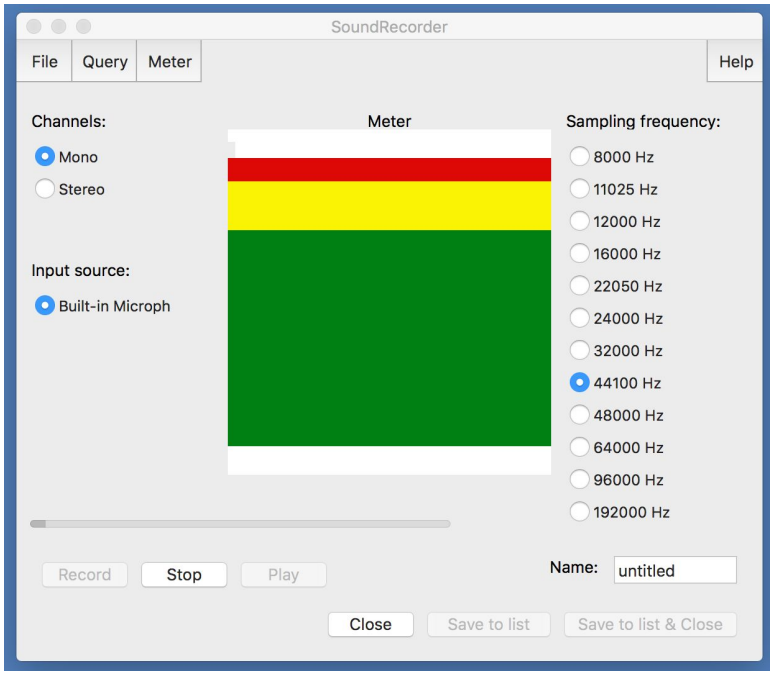
# Recording with Praat

Perform a test recording to balance the input signal.
Stay within the green area of the meter to avoid clipping.

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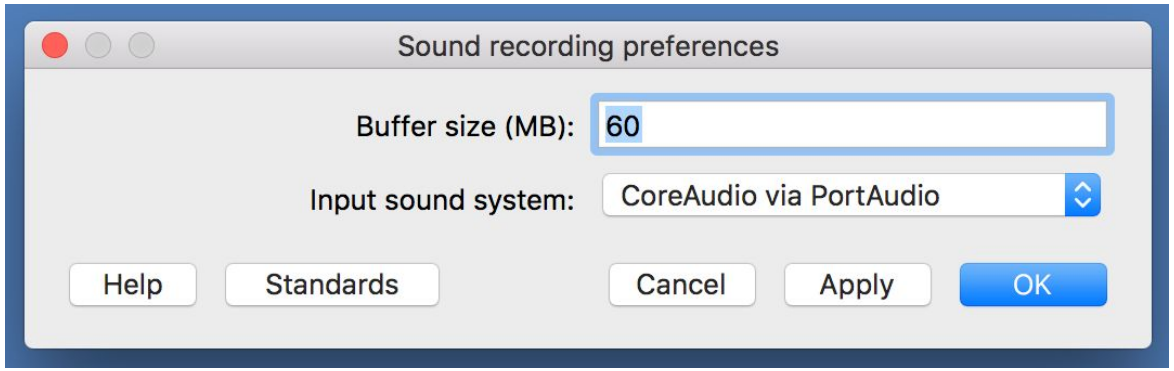
# Recording with Praat

If the recording stops by itself, buffer size was probably set to low.

Praat > Preferences > Sound recording preferences...



# Recording with Praat

(A) Dismiss a recording: Record again, or Close

(B) Keep a recording: Save to list or Save to list & Close

The recording appears as a sound object in the object window, **but is not saved yet**!

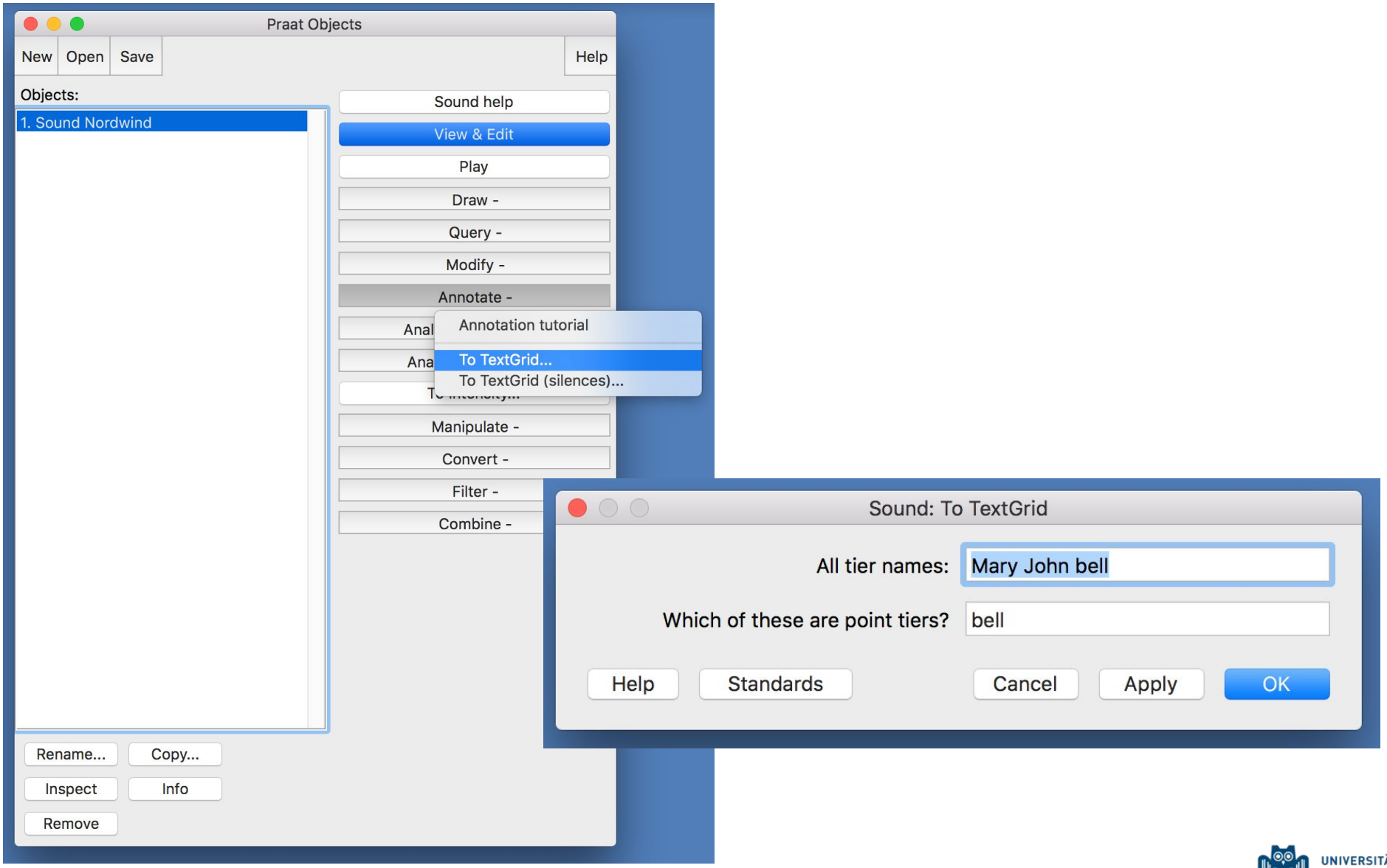
***Save → Save as WAV file...***

(C) Keep a long recording: ***File → Save as WAV file...***

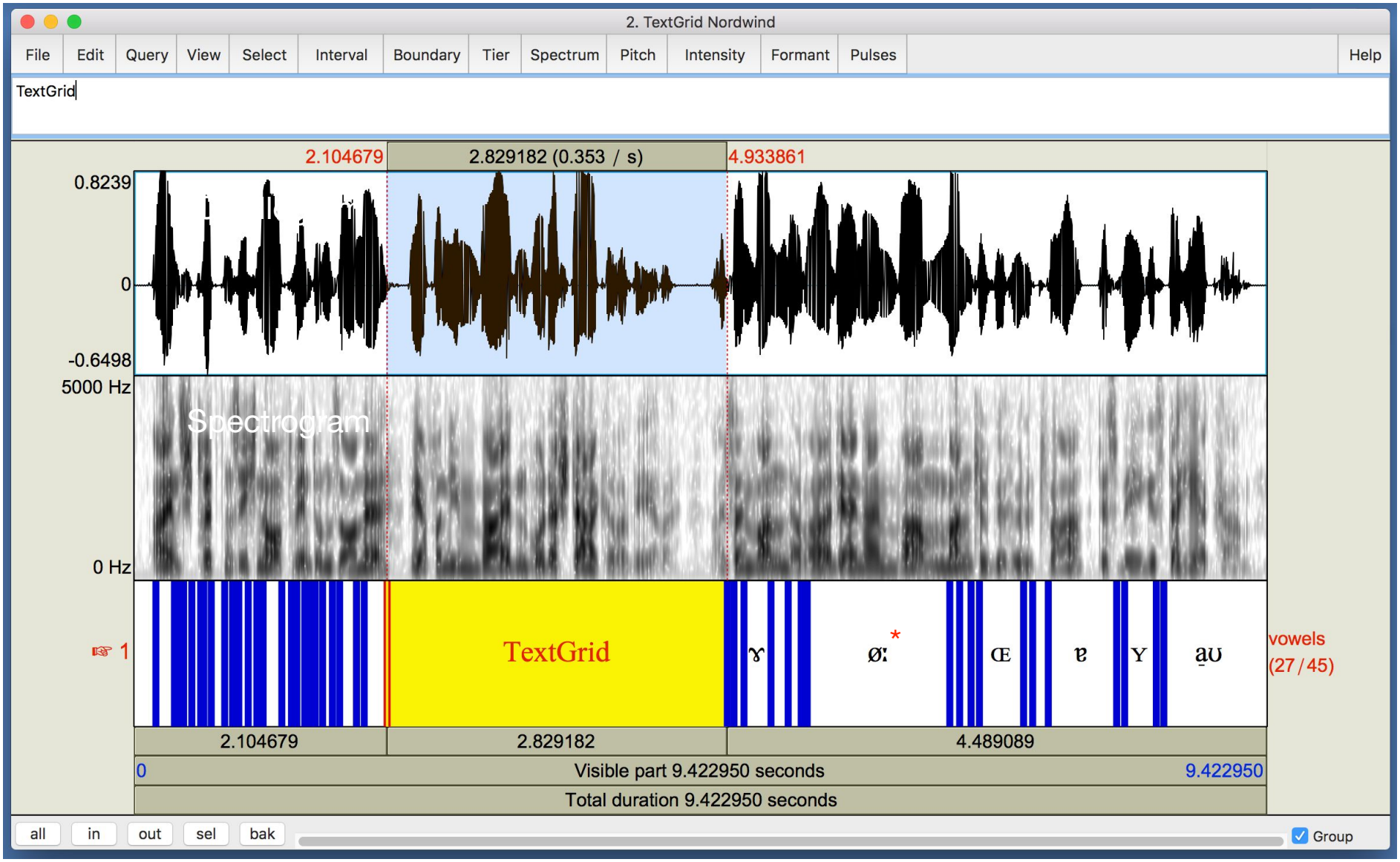
***Open → Open long sound file...***

A longer recording cannot directly be turned into a sound object. It has to be saved as a *WAV file* from within the sound recorder and then opened as a *long sound file* in the object window.

# Make a TextGrid

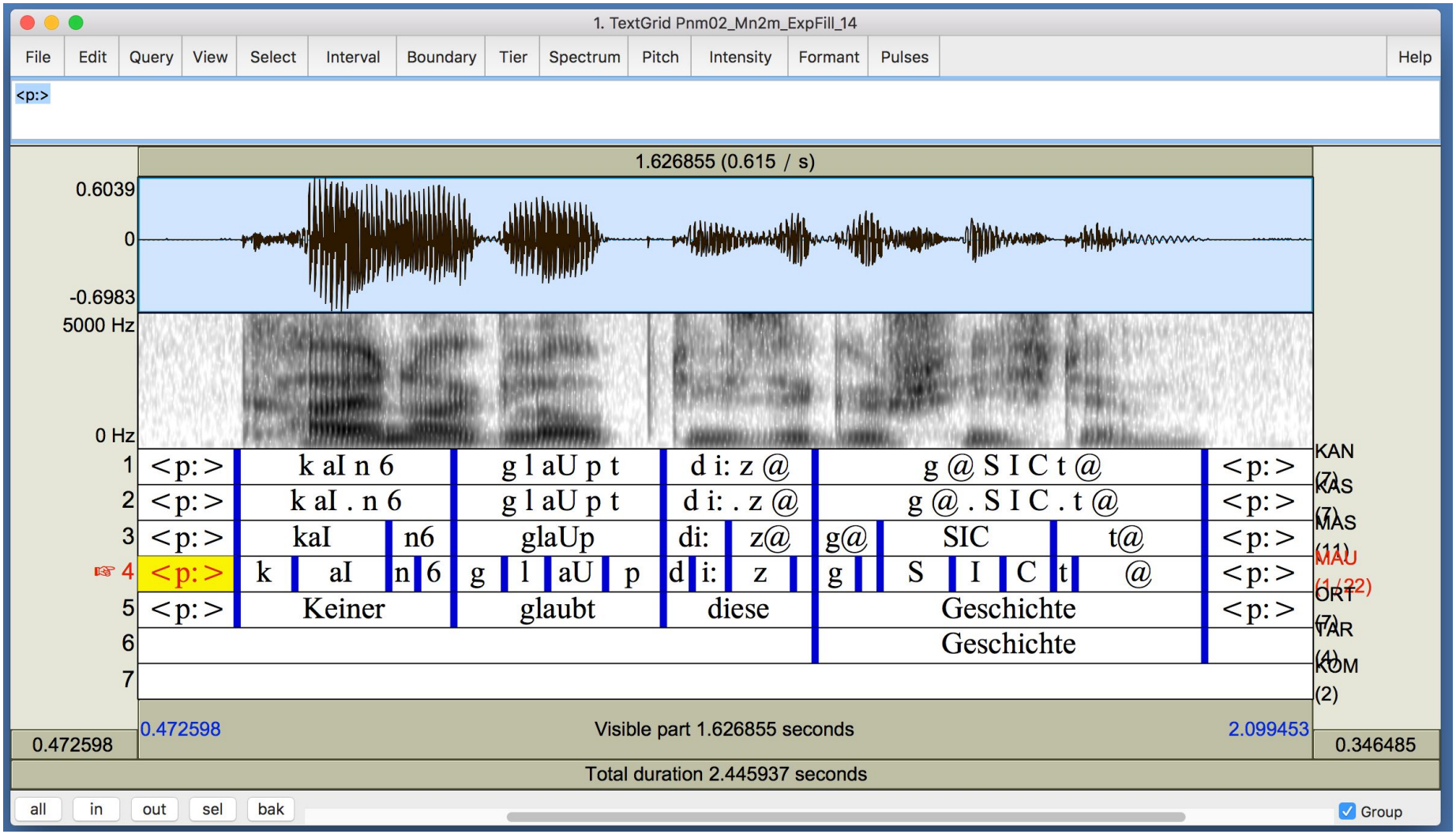


# Editor window




*For illustrational purposes only. No actual vowels were segmented here.

# TextGrid – example

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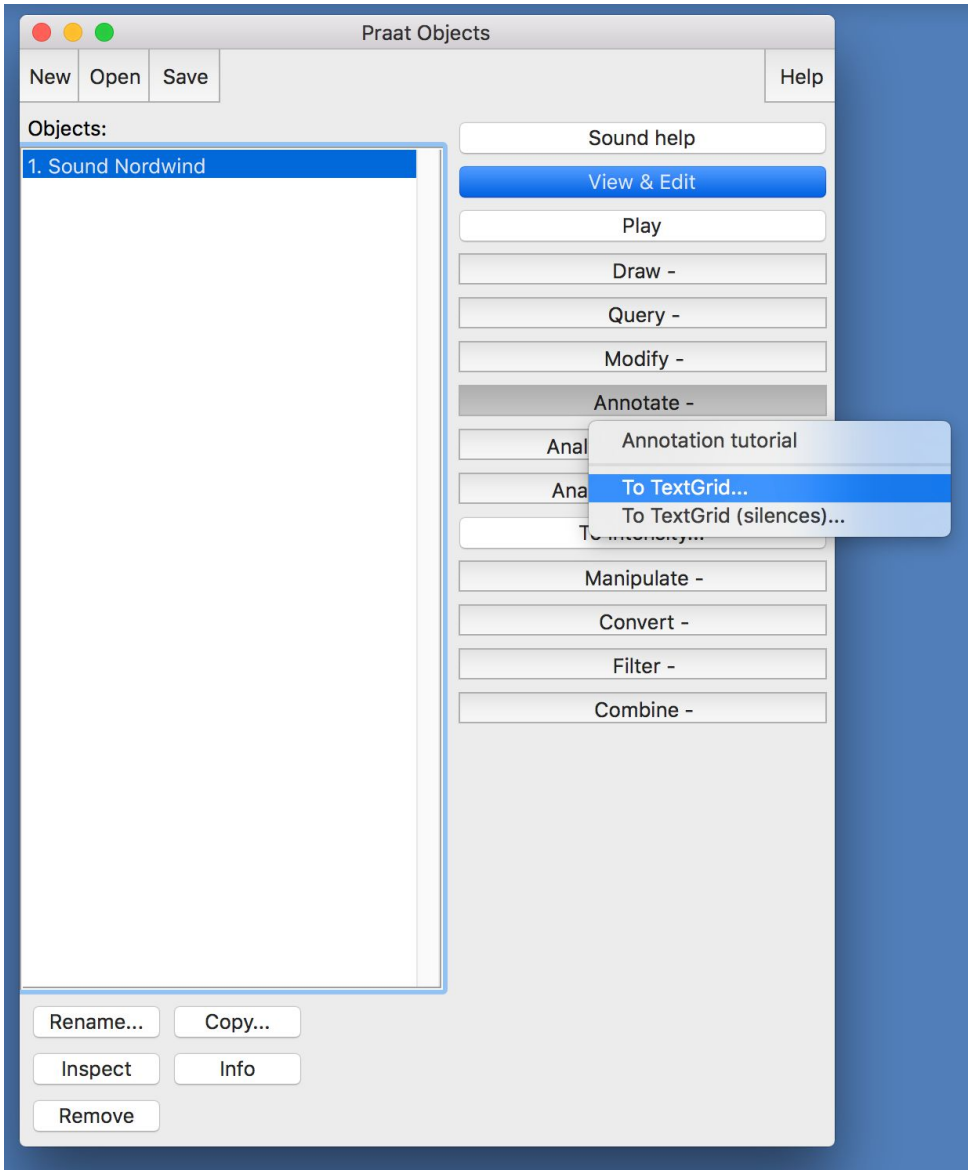
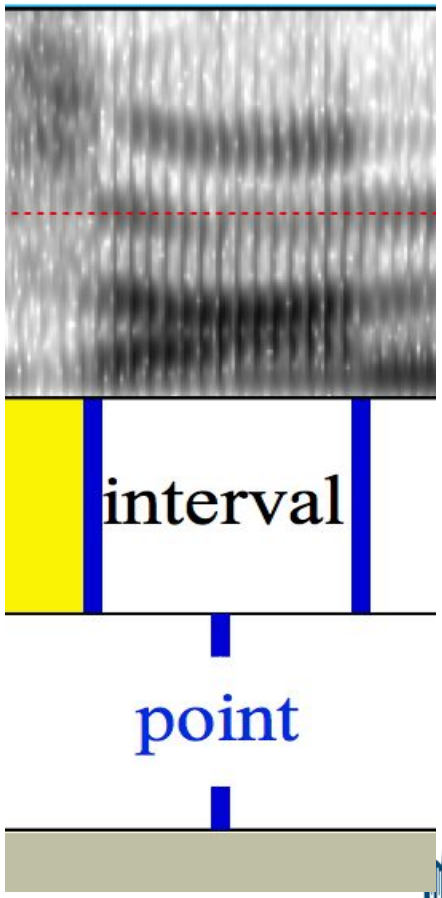
# TextGrid: Tiers types



*interval tier*

*point tier*

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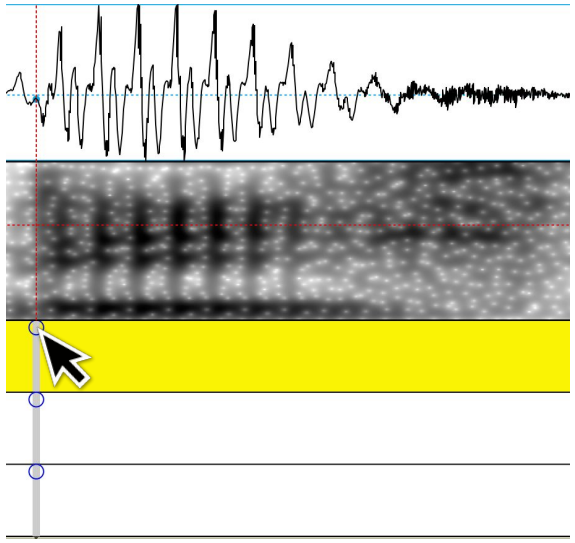
# Annotate a TextGrid

To set a boundary, select a point in time and click on a circle.

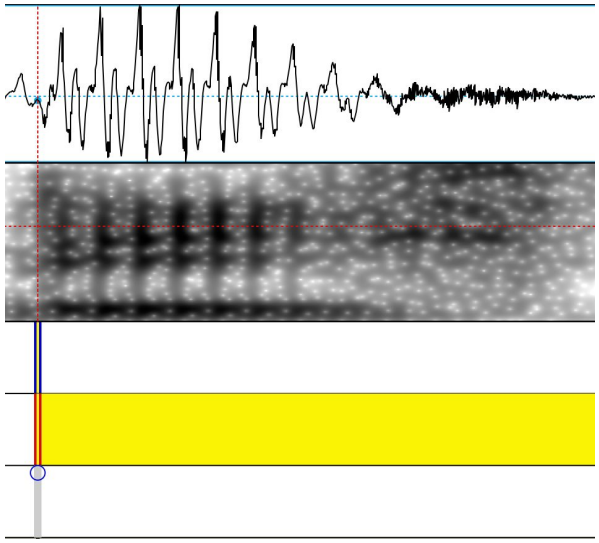
Boundaries can still be manually moved after that.

Press shift to move boundaries on several tiers at the same time.

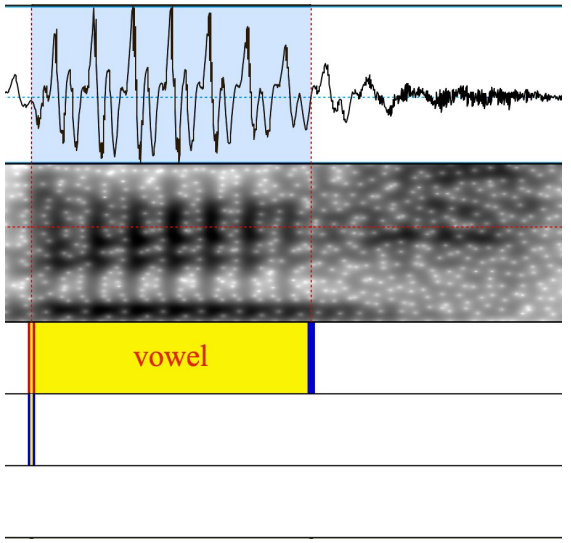
(1)



(2)



(3)




To delete a boundary, select it and press alt + backspace

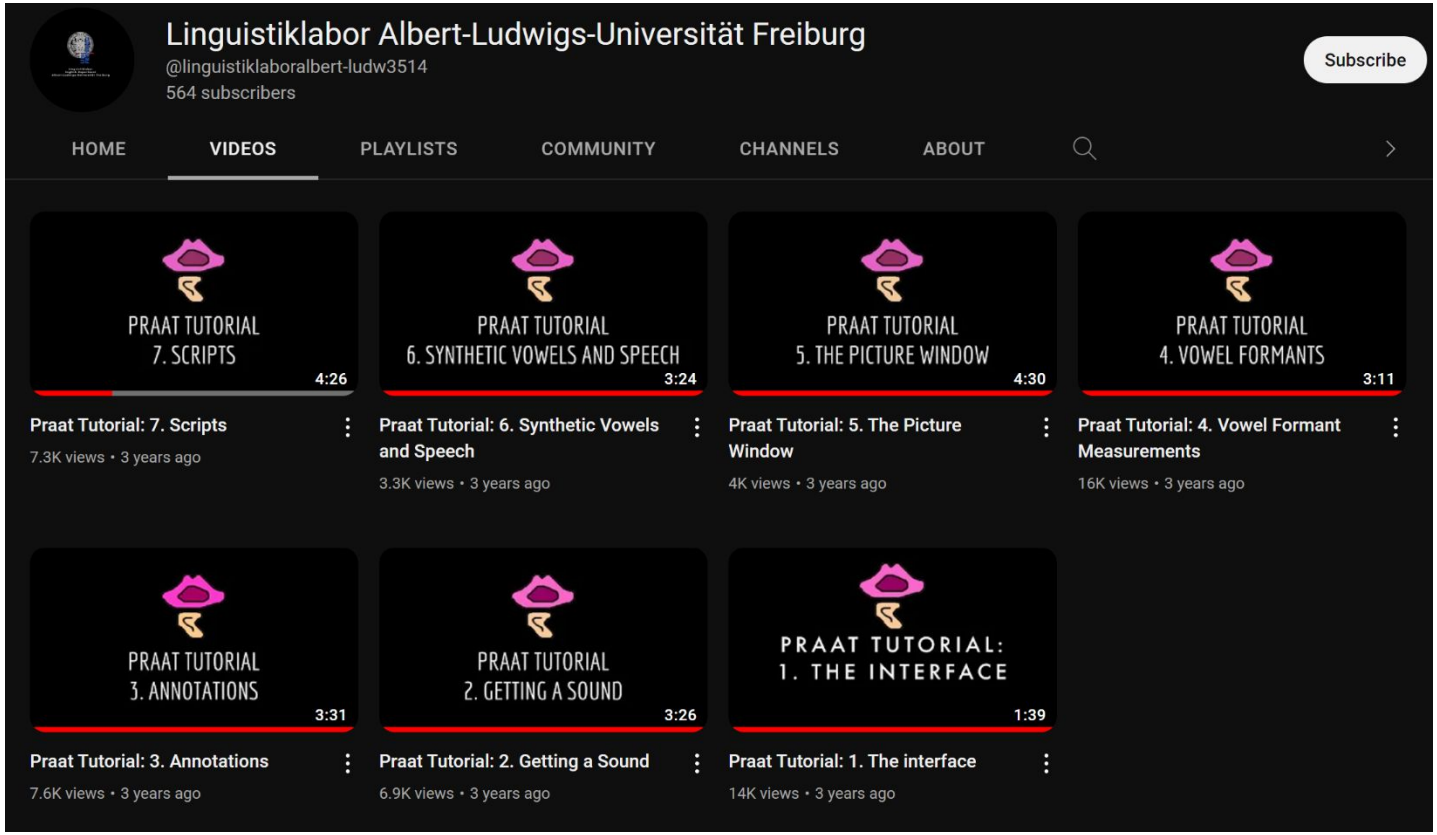
# Assignment 3

**Instructions: Record yourself saying the following passage. Create two interval tiers (orthography and IPA) and annotate. If you are unable to record yourself:**

**The North Wind and the Sun**

The North Wind and the Sun were disputing which was the stronger when a traveler came along wrapped in a warm cloak. They agreed that the one who first succeeded in making the traveler take his cloak off should be considered stronger than the other. Then the North Wind blew as hard as he could, but the more he blew, the more closely did the traveler fold his cloak around him; and at last the North Wind gave up the attempt. Then the Sun shone out warmly and immediately the traveler took off his cloak. And so the North wind was obliged to confess that the Sun was the stronger of the two.

# Introduction to Praat: Video Tutorials




https://www.youtube.com/@linguistiklaboralbert-ludw3514/videos

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# Praat Scripting Tutorial

## Scripting

This is one of the tutorials of the Praat program. It assumes you are familiar with the Intro.

A *script* is a text that consists of menu commands and action commands. If you *run* the script (perhaps from a ScriptEditor), the commands are executed as if you clicked on them.

You can read this tutorial sequentially with the help of the "< 1" and "1 >" buttons.


Scripting 1. Your first scripts (how to create, how to run, how to save)
Scripting 2. How to script settings windows (numeric, boolean, multiple-choice, text, file)
Scripting 3. Simple language elements
- Scripting 3.1. Hello world (writeInfoLine, appendInfoLine)
- Scripting 3.2. Numeric variables (assignments)
- Scripting 3.3. Numeric queries
- Scripting 3.4. String variables (assignments)
- Scripting 3.5. String queries
- Scripting 3.6. "For" loops (for, endfor)
- Scripting 3.7. Layout (white space, comments, continuation lines)

Scripting 4. Object selection
- Scripting 4.1. Selecting objects
- Scripting 4.2. Removing objects
- Scripting 4.3. Querying objects

Scripting 5. Language elements reference
- Scripting 5.1. Variables (numeric, string)
- Scripting 5.2. Expressions (numeric, string)
- Scripting 5.3. Jumps (if, then, elsif, else, endif)
- Scripting 5.4. Loops (for/endfor, while/endwhile, repeat/until)
- Scripting 5.5. Procedures (@, procedure)
- Scripting 5.6. Arrays and dictionaries
- Scripting 5.7. Vectors and matrices
- Scripting 5.8. Including other scripts
- Scripting 5.9. Quitting (exitScript)


https://www.fon.hum.uva.nl/praat/manual/Scripting.html

# Premade Praat Scripts

## Praat script resources

**Page contents**


- How to use this page
- Directory of scripts by type and description
- Links: other online collections of Praat scripts


### How to use this page

#### How to run a script

Scripts save **Praat** users time and effort by automating a sequence of operations. To run a Praat script, go to the **Control** menu in the **Praat objects** window and select **New Praat script**. Then pull up the code for the desired script by clicking on one of the links below. Copy all the code there (e.g. highlight and **Ctrl-C** on a PC) and paste it into the new **untitled script** window. Finally, select **Run > Run** (or type **Ctrl-R**) in the **untitled script** window to execute the script.

#### How to save a script or add it to the menu

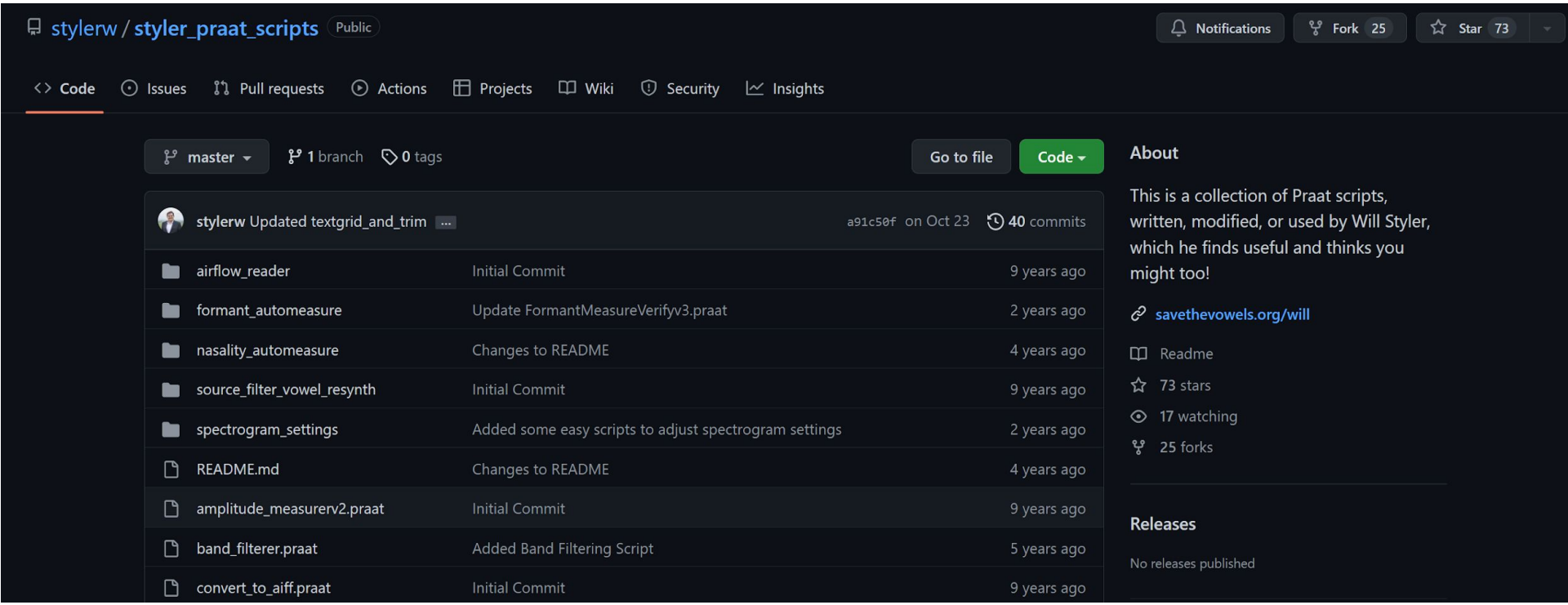
In the open **untitled script** window with the new script pasted in the text box, go to the **File** menu to **Save** the script to a convenient location. The **Add to fixed menu...** command under **File** can be used to add the current script to one of the head menus in the **Praat objects** window. Menus can be edited (e.g. to remove previously added scripts) by going to **Control > Preferences > Buttons** and clicking on the desired command.

#### How to script in Praat

See the **Scripting tutorial** under **Help** in **Praat objects** or try any of the many online tutorials.

http://phonetics.linguistics.ucla.edu/facilities/acoustic/praat.html

# More Premade Praat Scripts




https://github.com/stylerw/styler_praat_scripts