Acoustic Phonetics

A Brief Introduction to Praat

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Guangzhou, Autumn 2019

Objectives

At the end of the course, participants should be able to

- extract duration and fundamental frequency information from a speech recording, using Praat

Part I: Annotation

- Basic knowledge of signal analysis with Praat.
- Basic knowledge of syllable annotation with Praat.
- Practical application to the recorded data of course participants.
-

Part II: Syllable timing analysis

- Examination information in Praat annotation file.
- Analysis of Praat annotation file with Time Group Analyser.

Praat

- Praat is a phonetic workbench application developed in Amsterdam by Paul Boersma and David Weenink.
- “Praat” means ‘talk’ in Dutch.
- The basic functionality of Praat includes:
  - Input: speech recordings
  - Methods:
    - analysis of properties of speech signals such as spectral analysis, pitch analysis, annotation of signals with transcription labels
  - Outputs:
    - files with information about the speech signal
- The annotation information files which Praat produces
  - can be re-structured, and analysed with other means,
    - with Excel or Calc
    - with the online tool Time Group Analyser, for efficient analysis of timing relations in the speech signal.

Praat Input

Praat Input

Pre-recording phase:

- definition of purposes for which the data will be used
- scenario: domain, activities, speakers
- equipment and technical operator:
    - general: digital audio (recorder / laptop), digital video
    - specialised: laryngograph, etc

Recording phase:

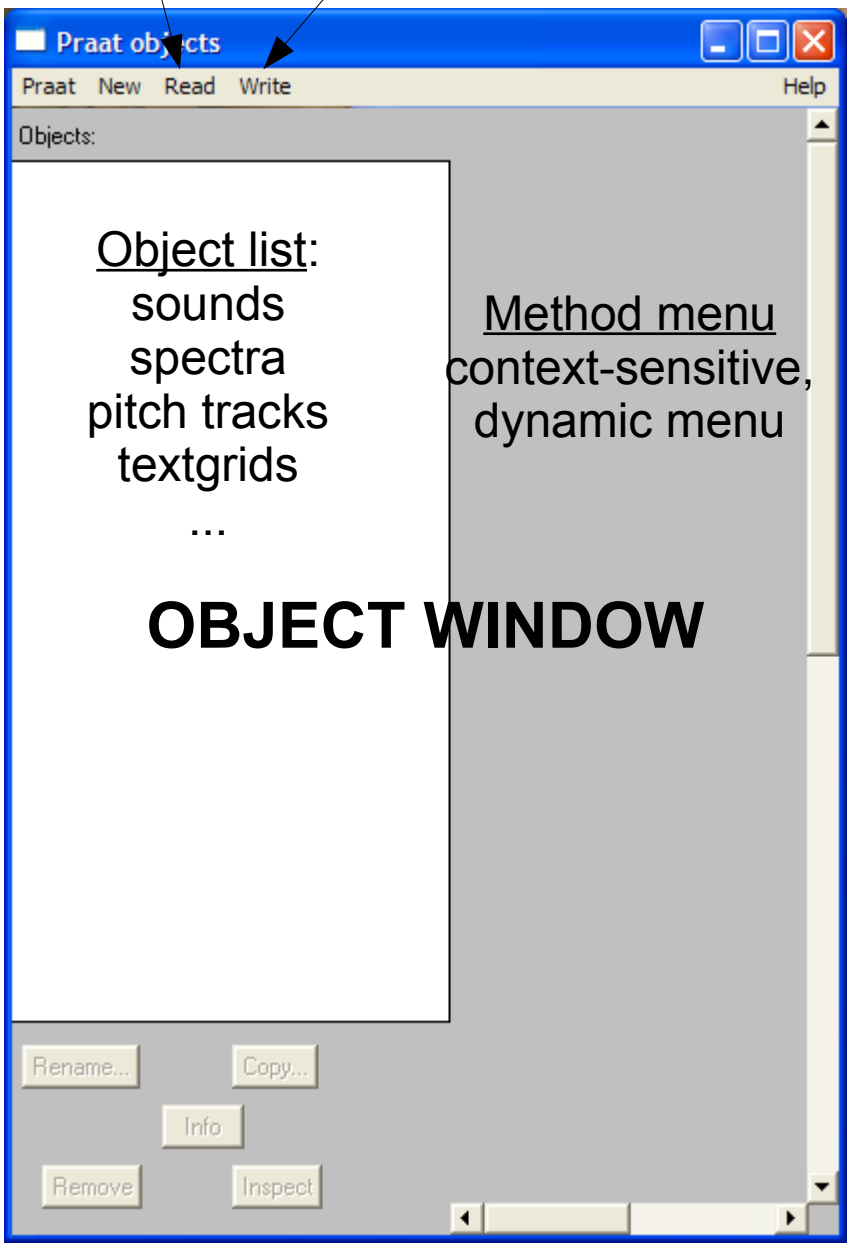
- negotiate scenario with chiefs, elders, speakers
- ensure the recording location is quiet
- if possible ensure the microphones, video tripod etc. can be stably positioned

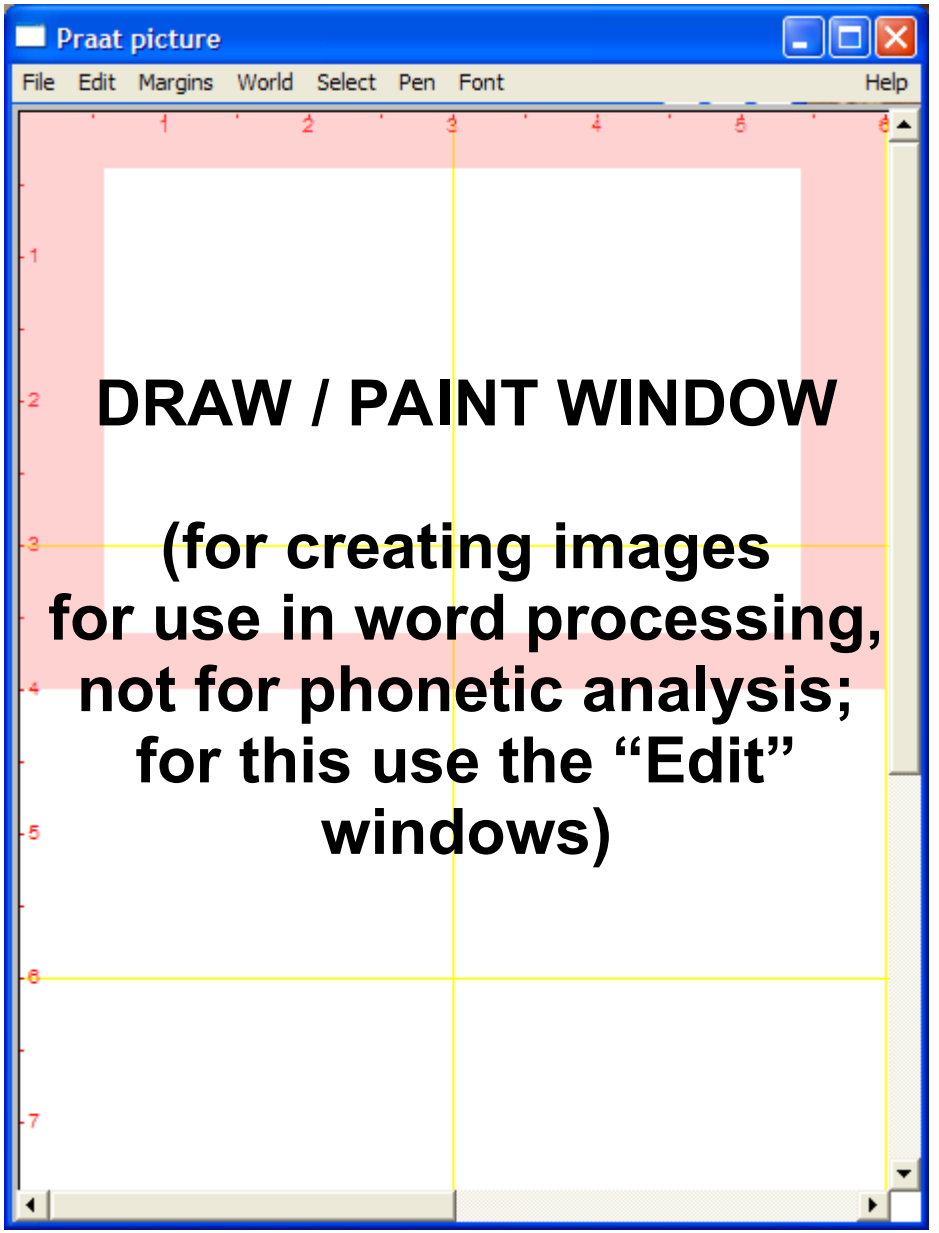
Post-recording phase:

- provide recordings with metadata immediately
- label the data media immediately
- make safety copies immediately

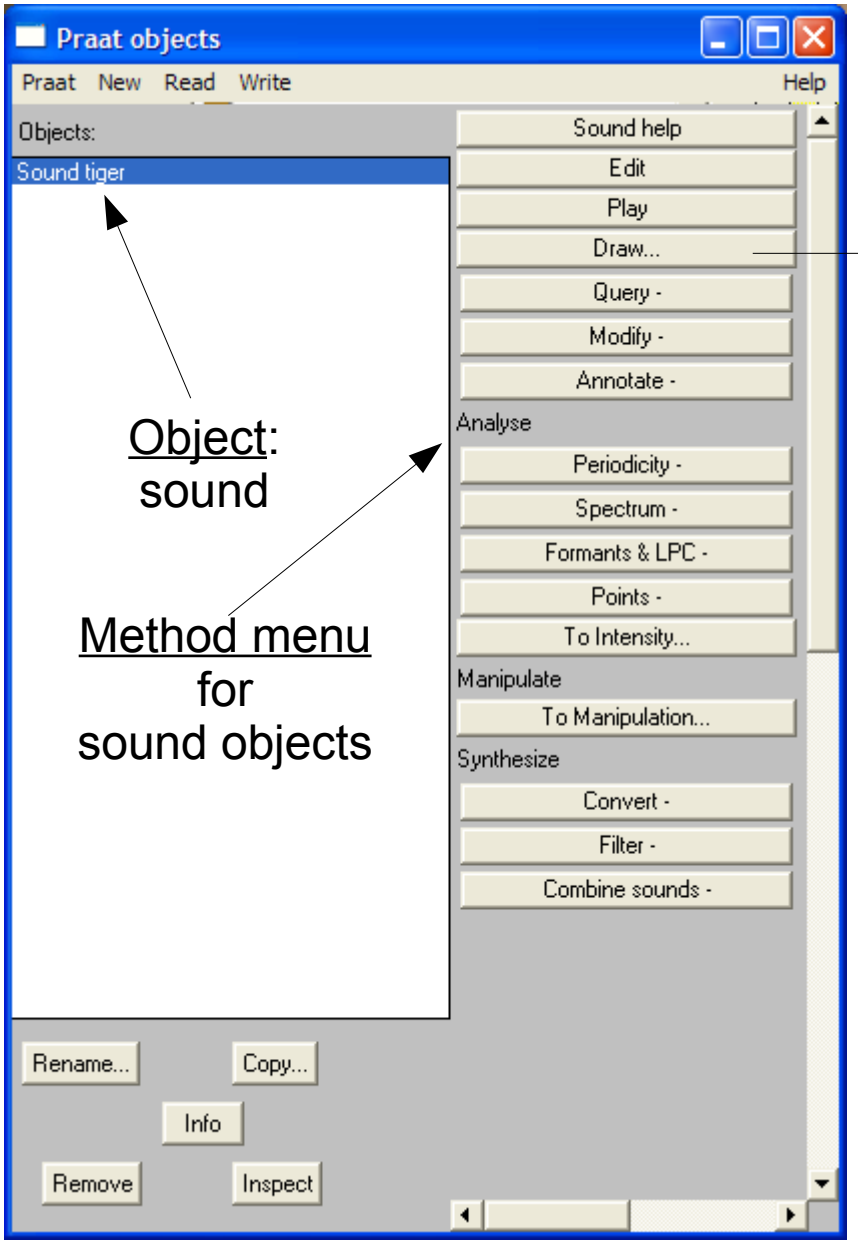
Basic Praat Methods and Operation

Praat Windows



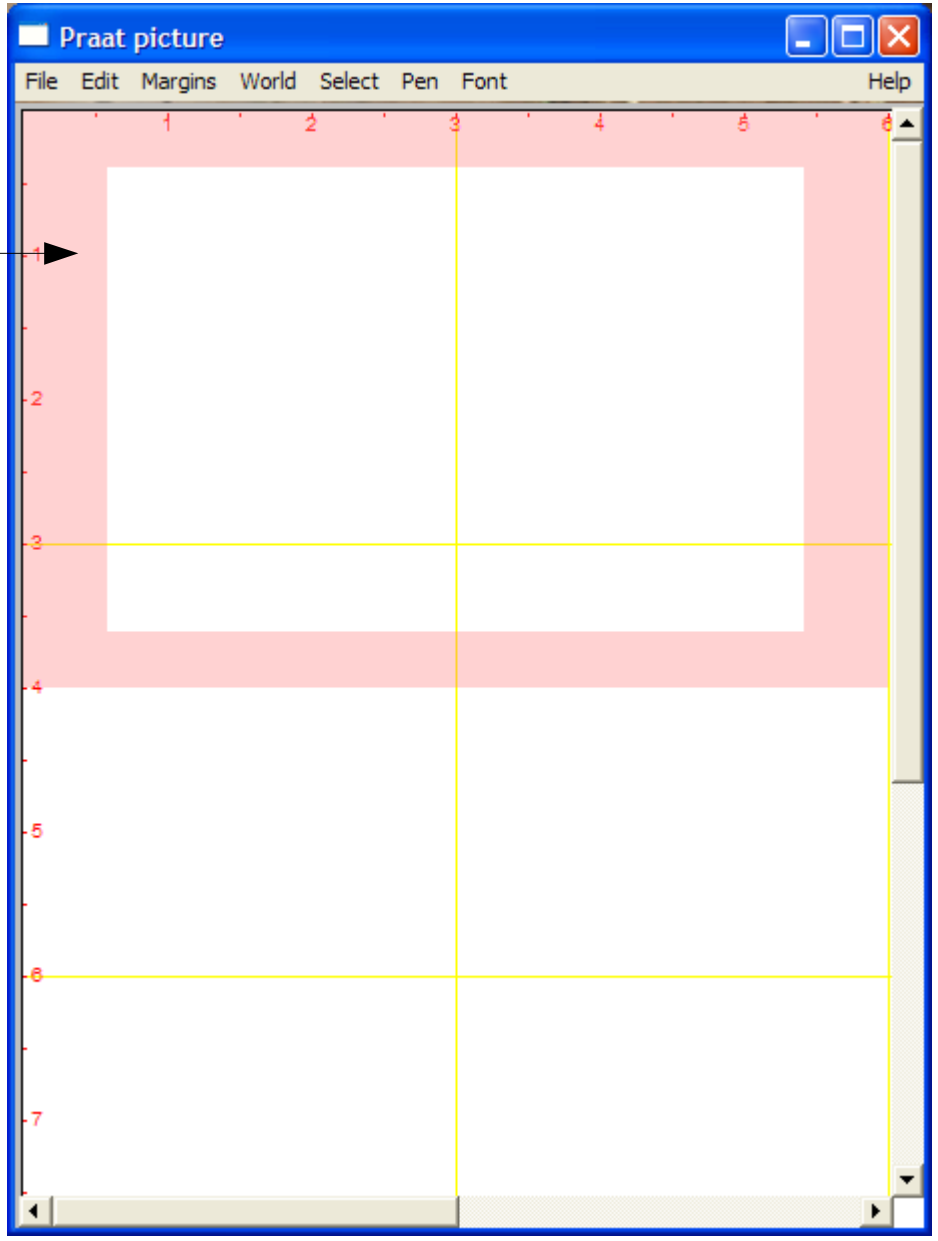


Processing Praat Objects



Object: sound

Method menu for sound objects



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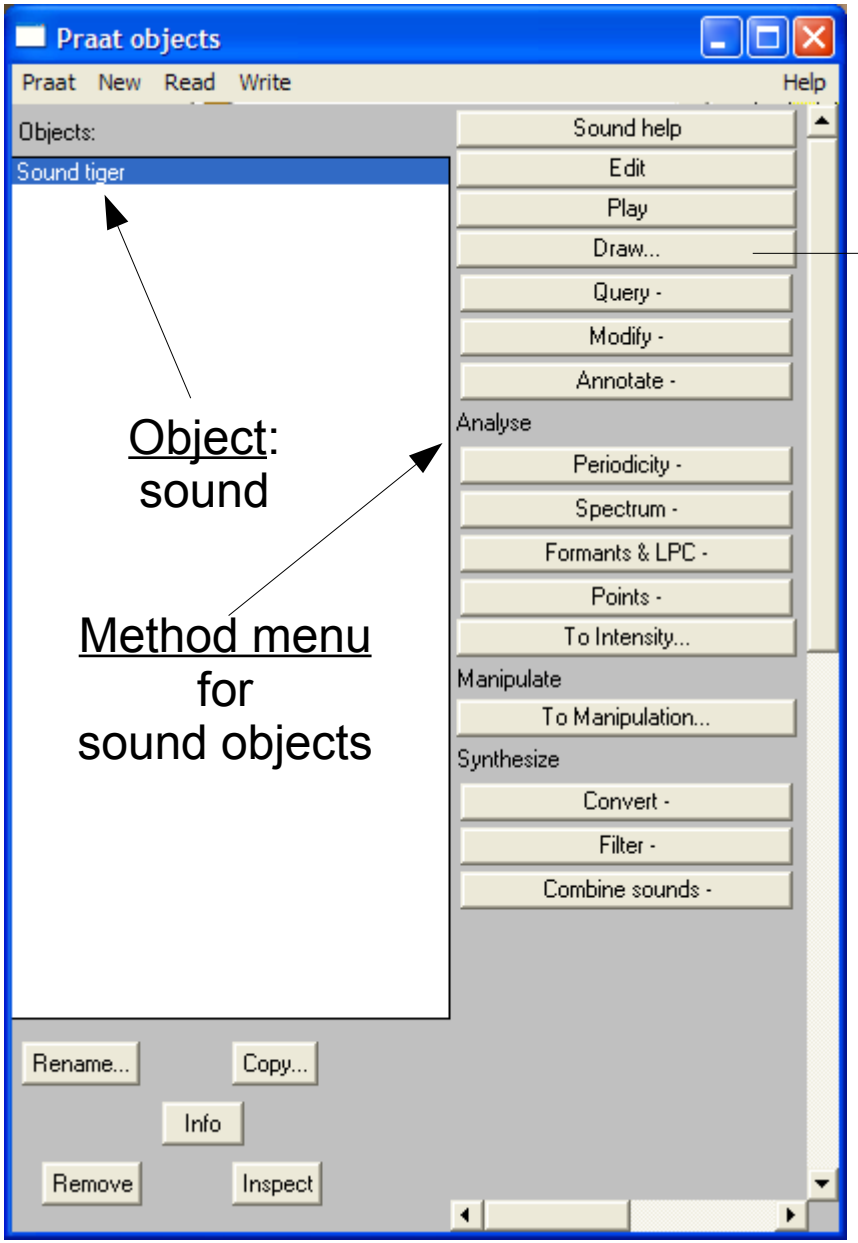

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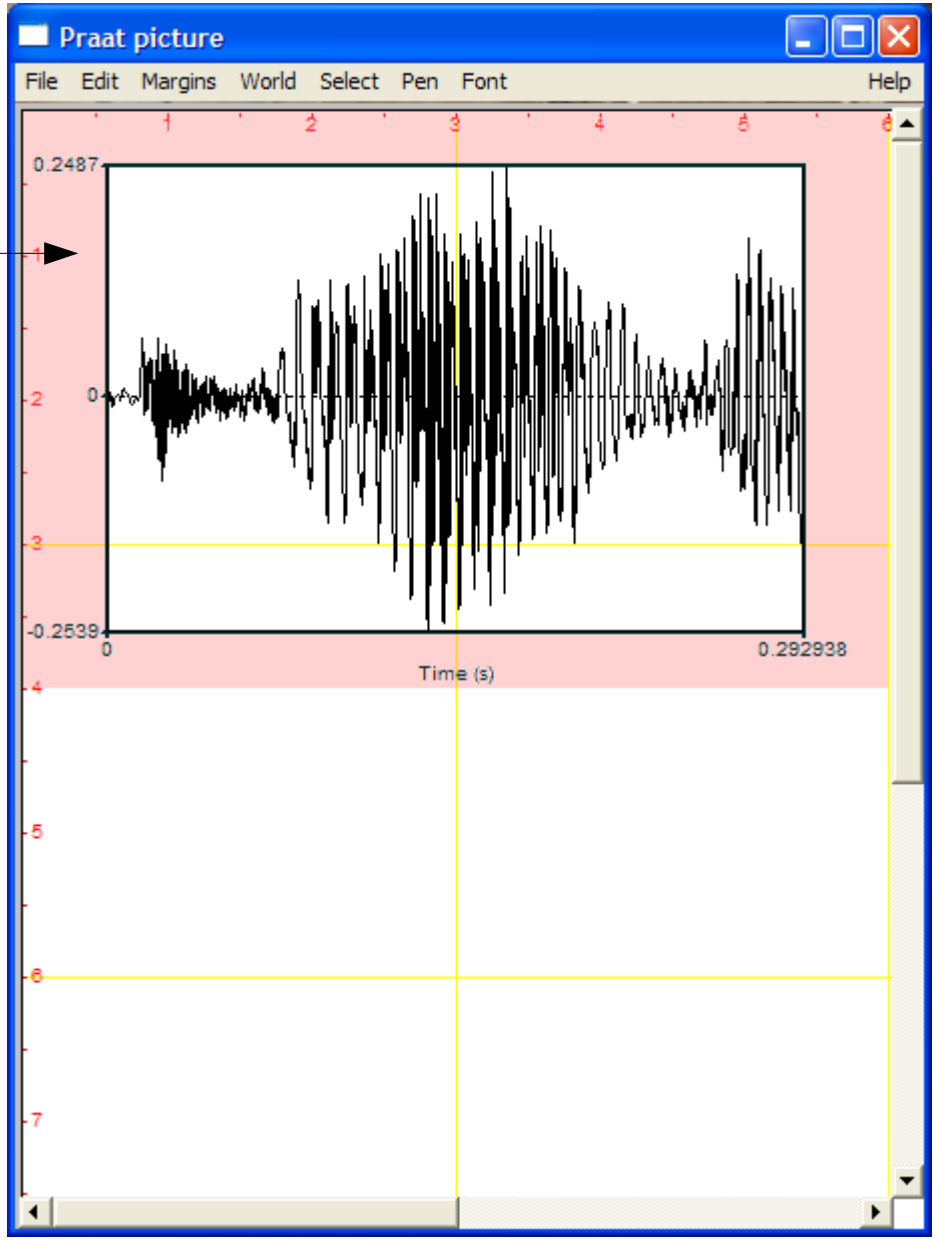

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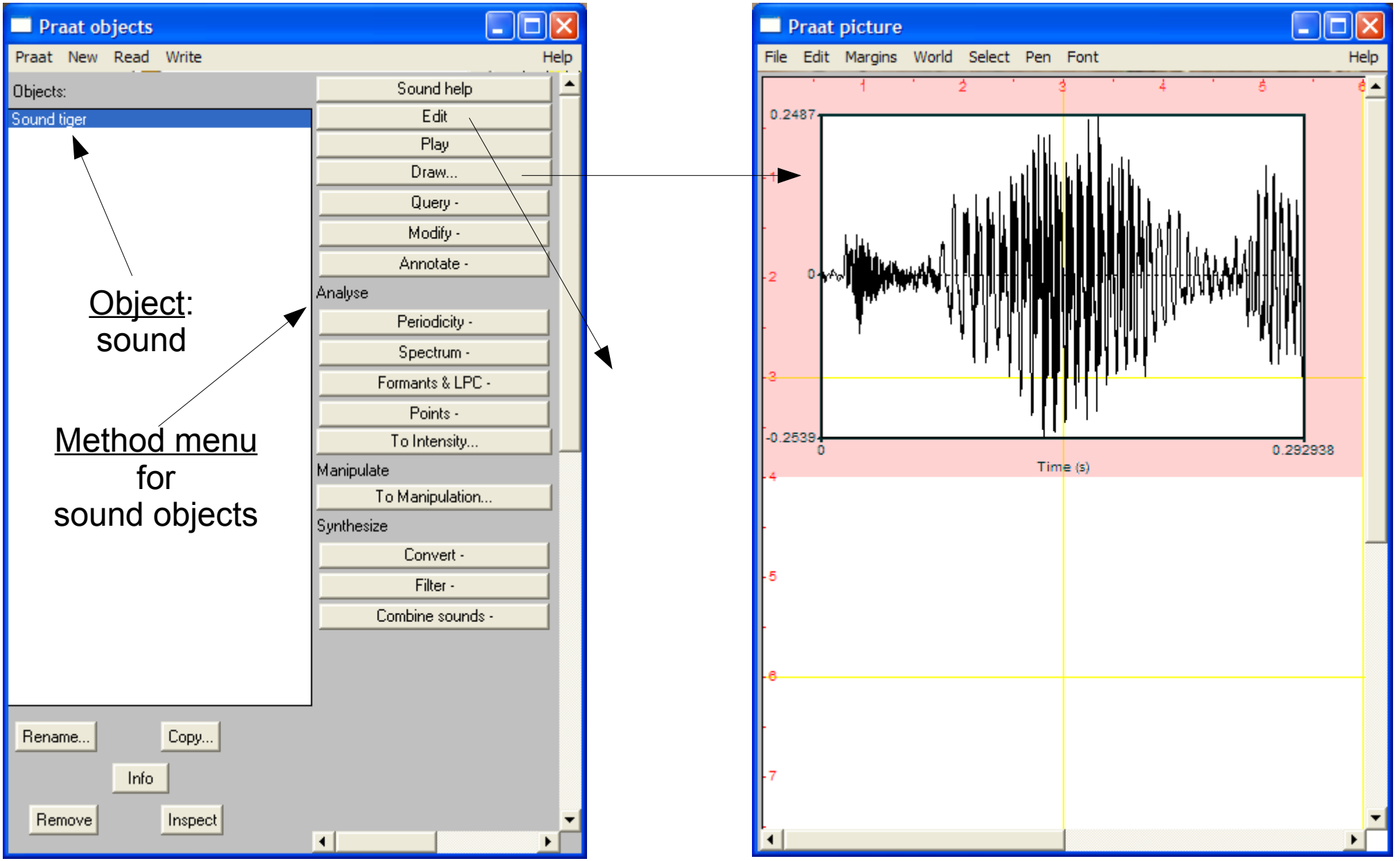

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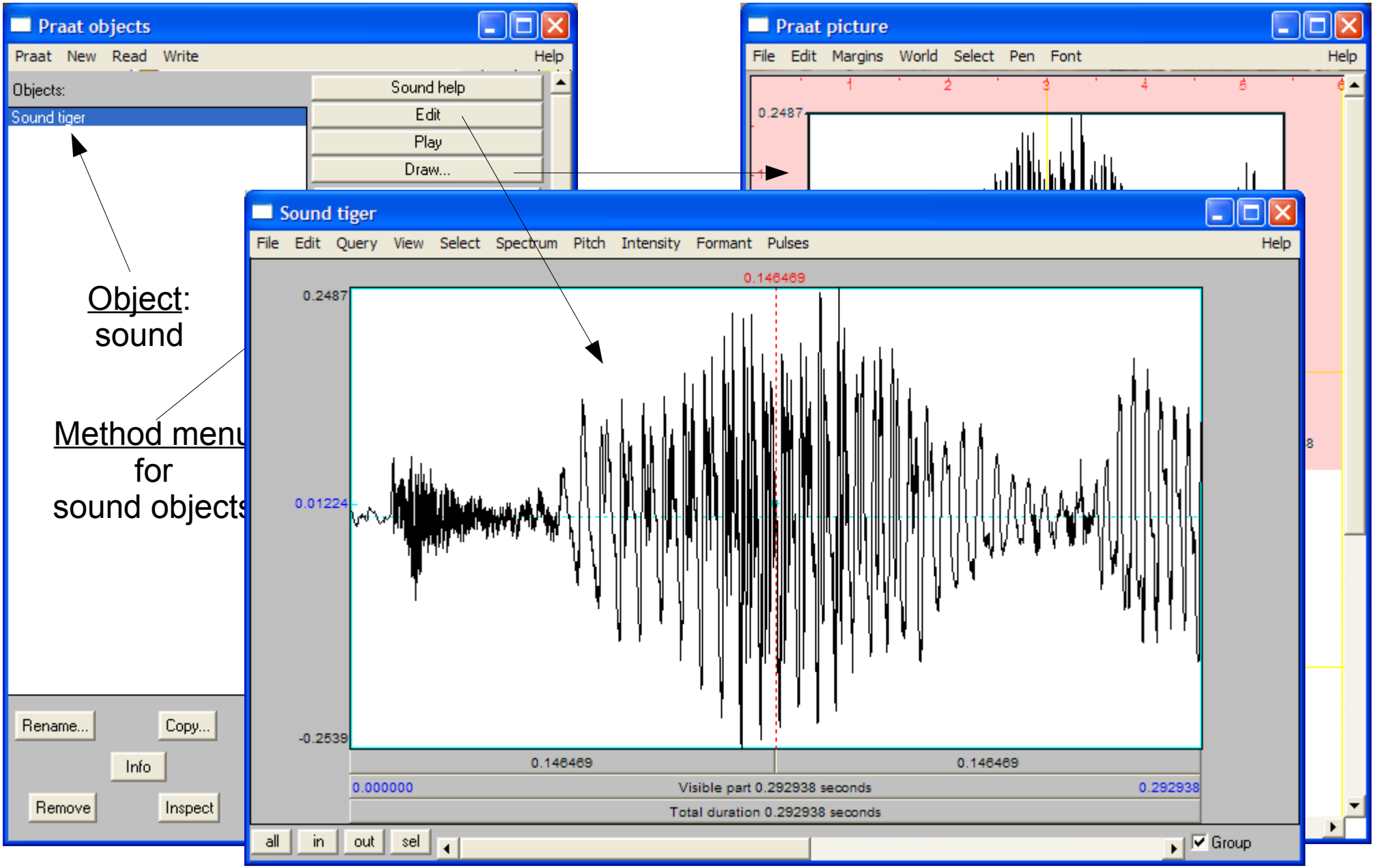

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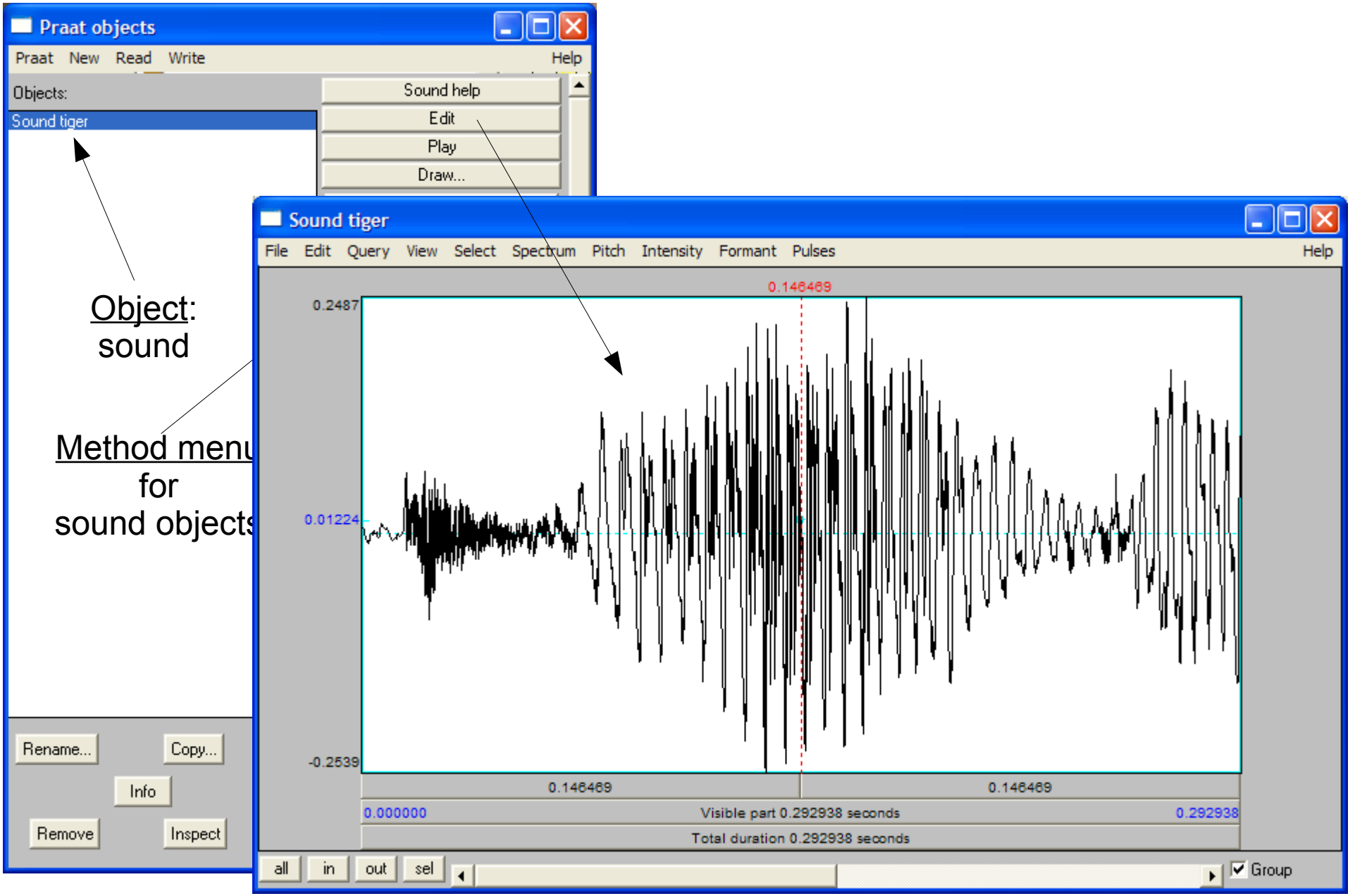
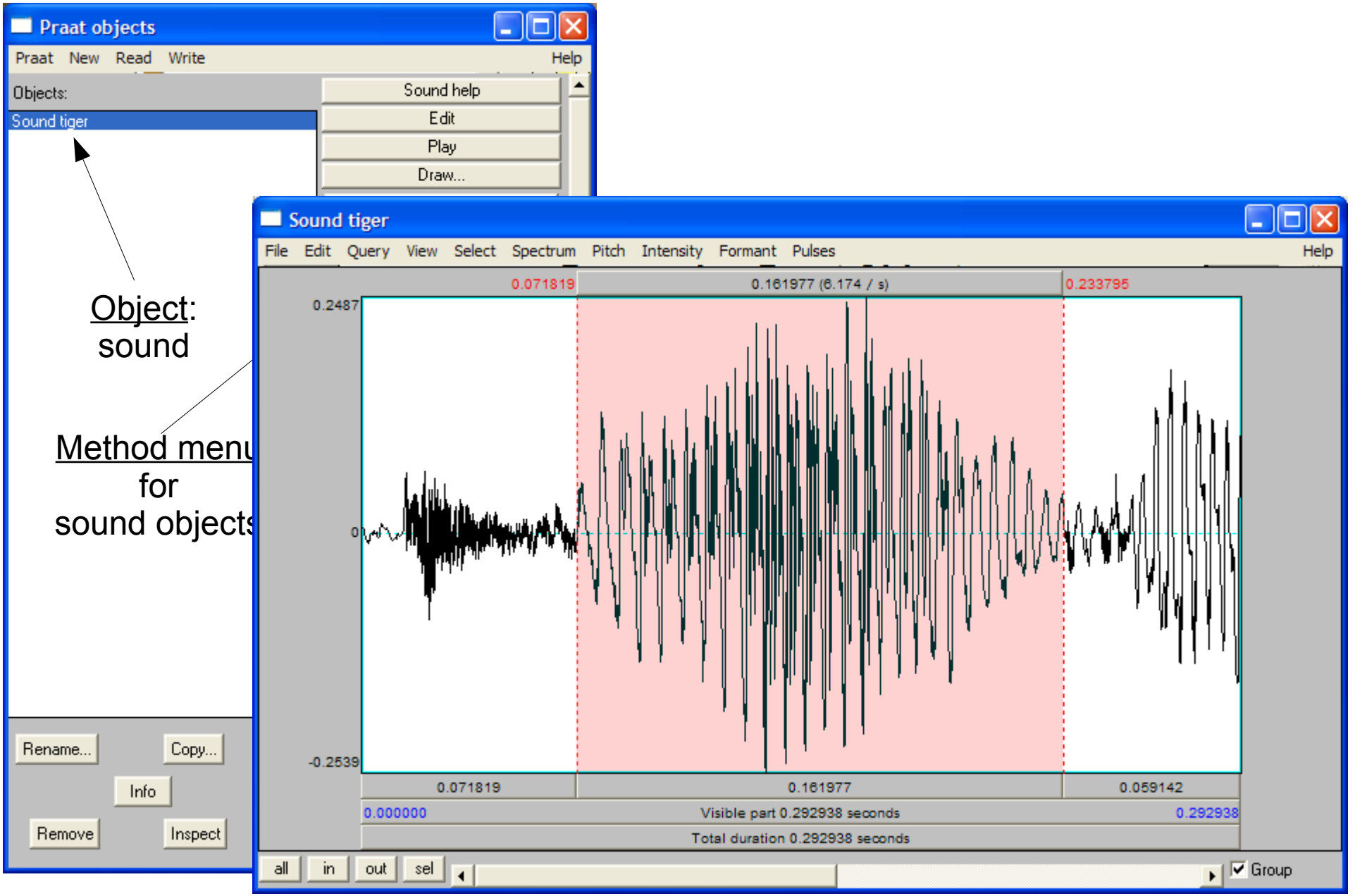
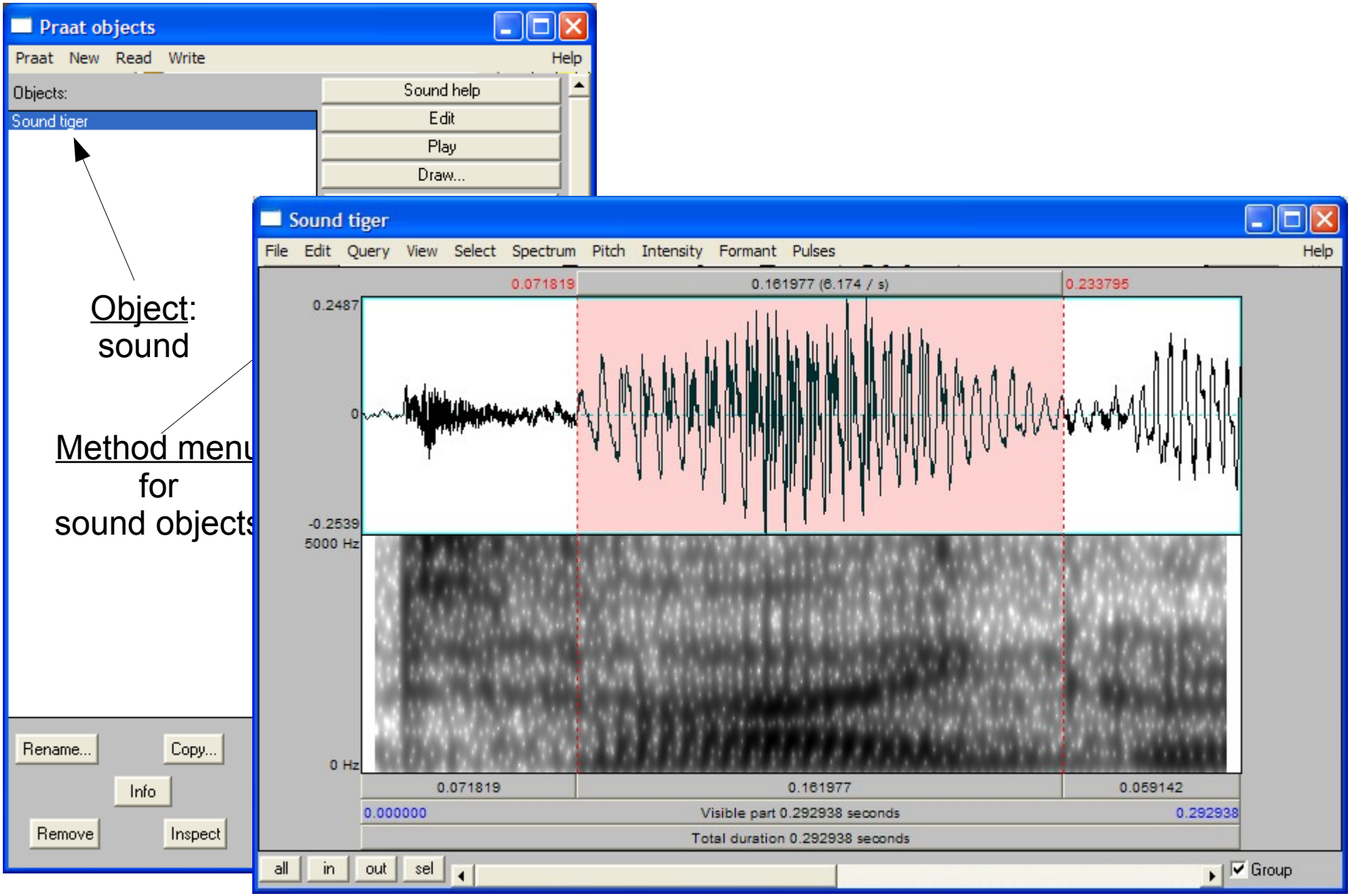


Selecting Part of a Sound Object



Displaying More Properties of a Sound Object



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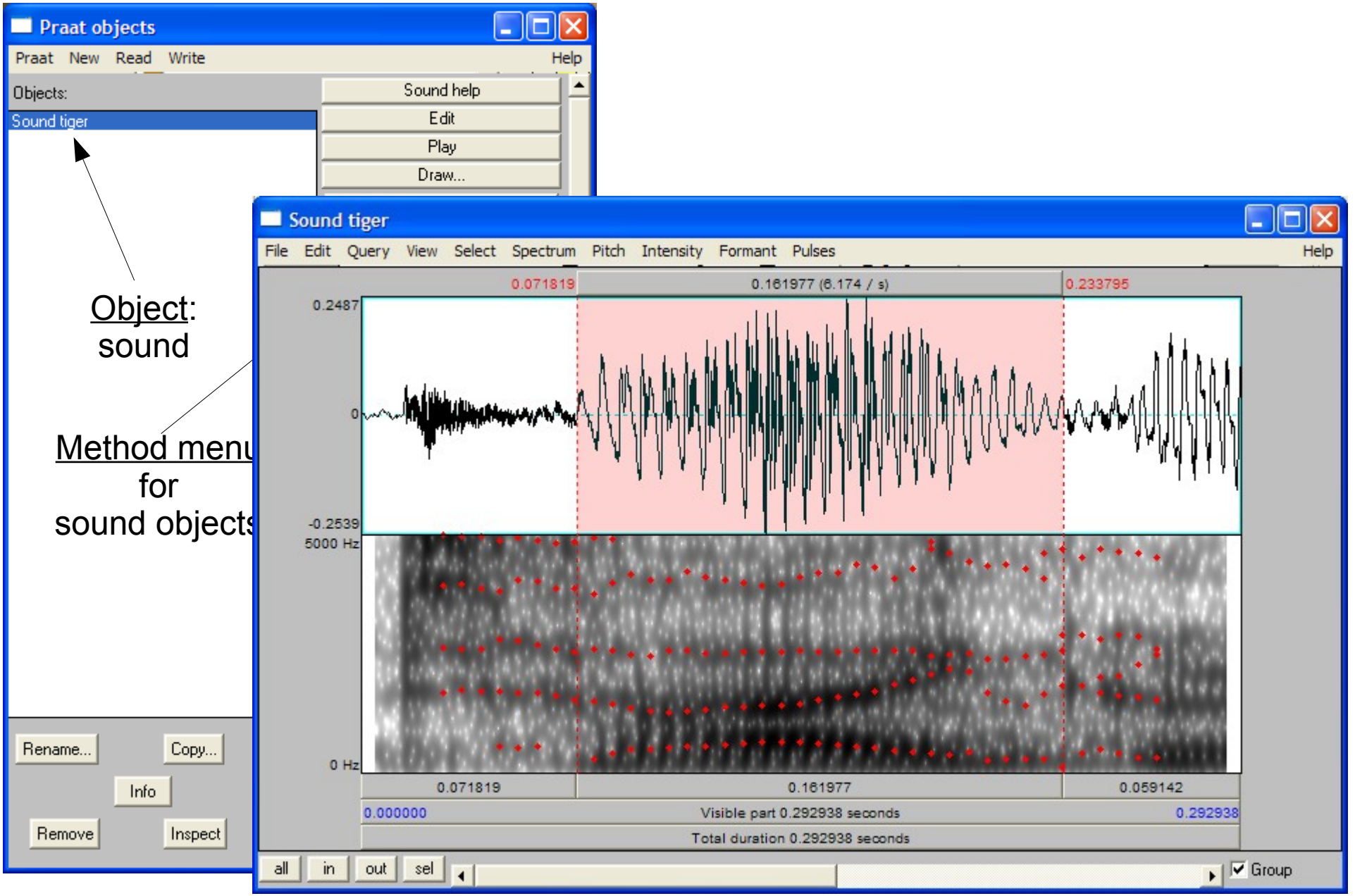

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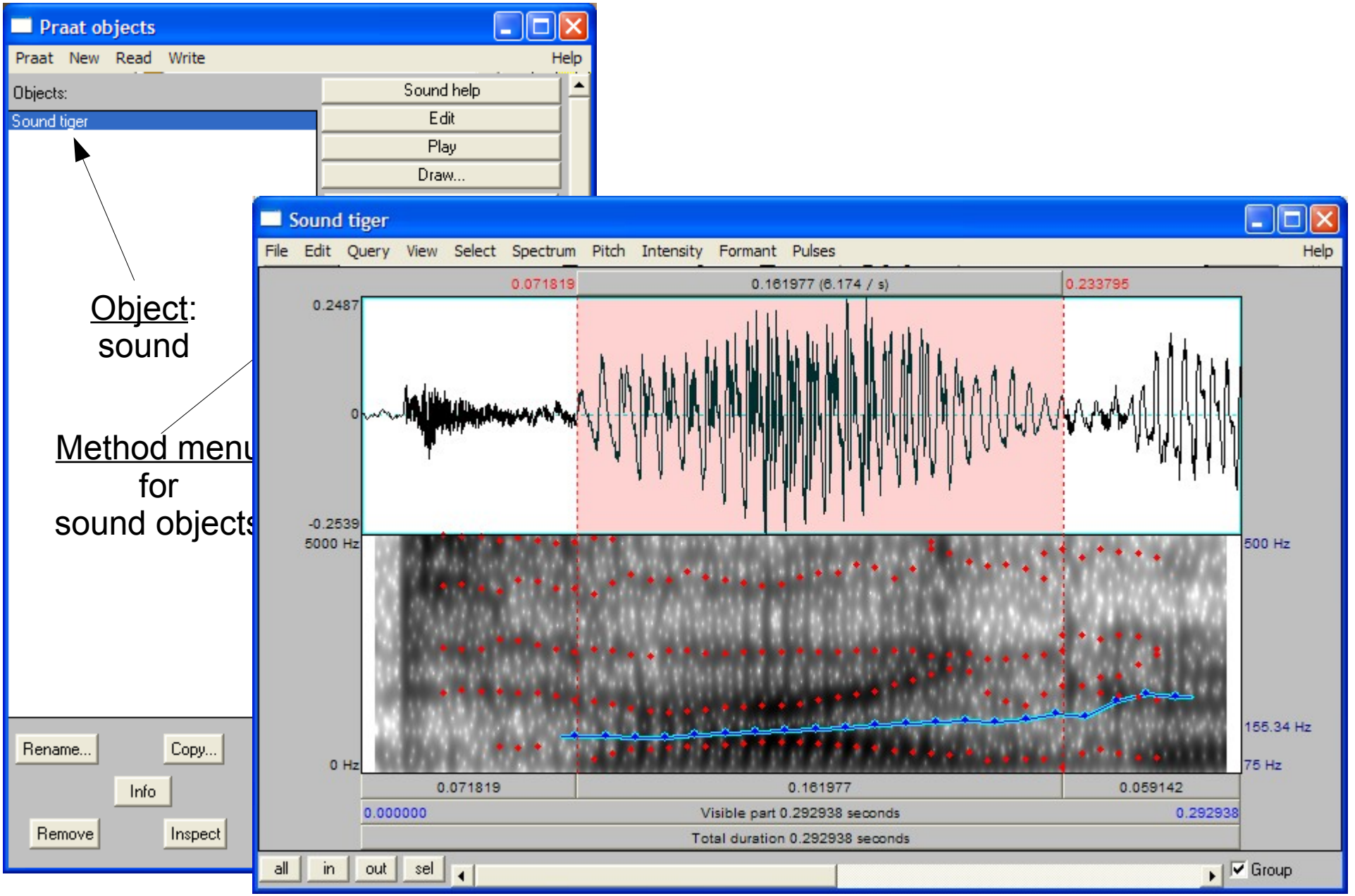
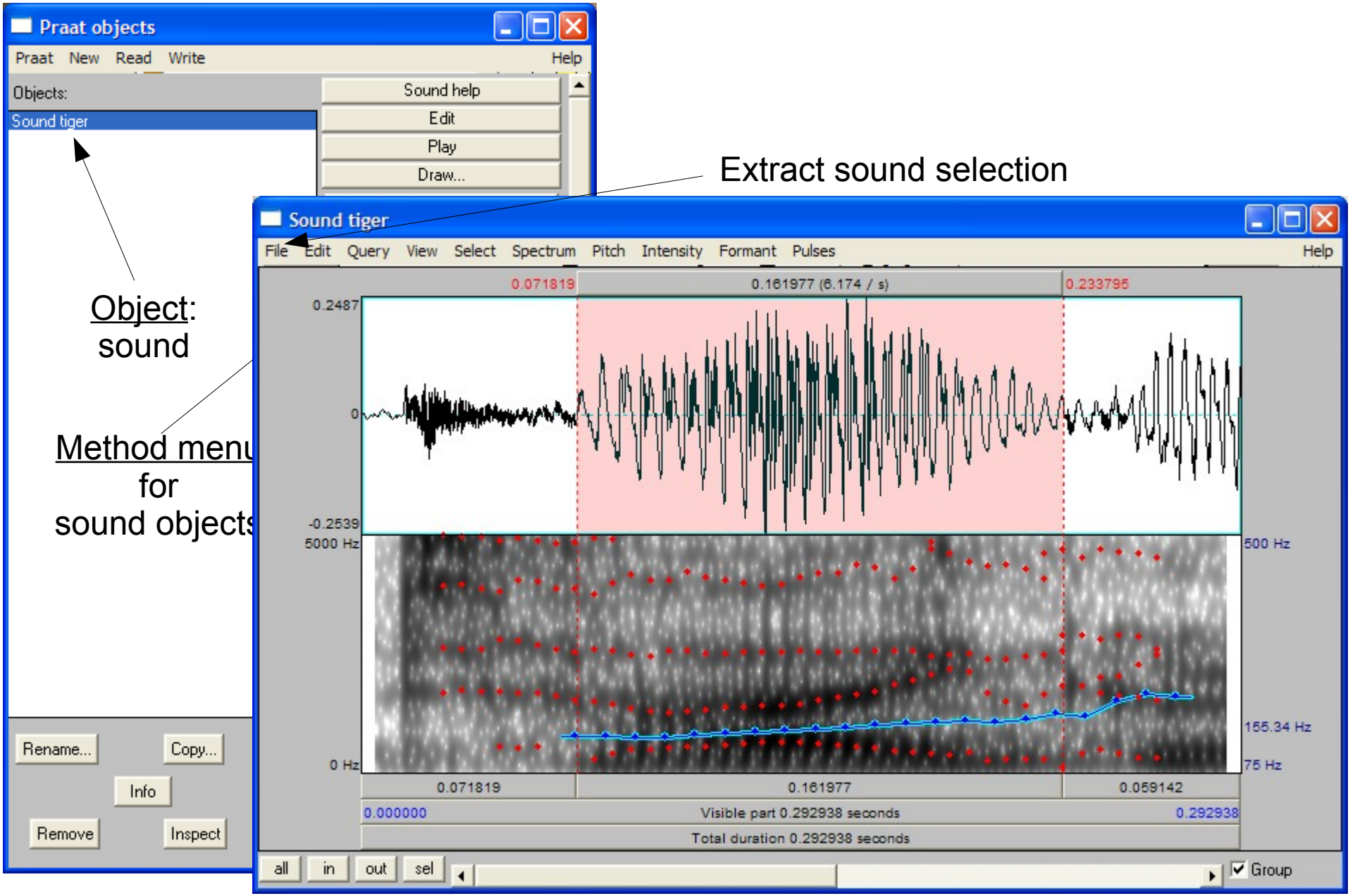


Creating a New Object



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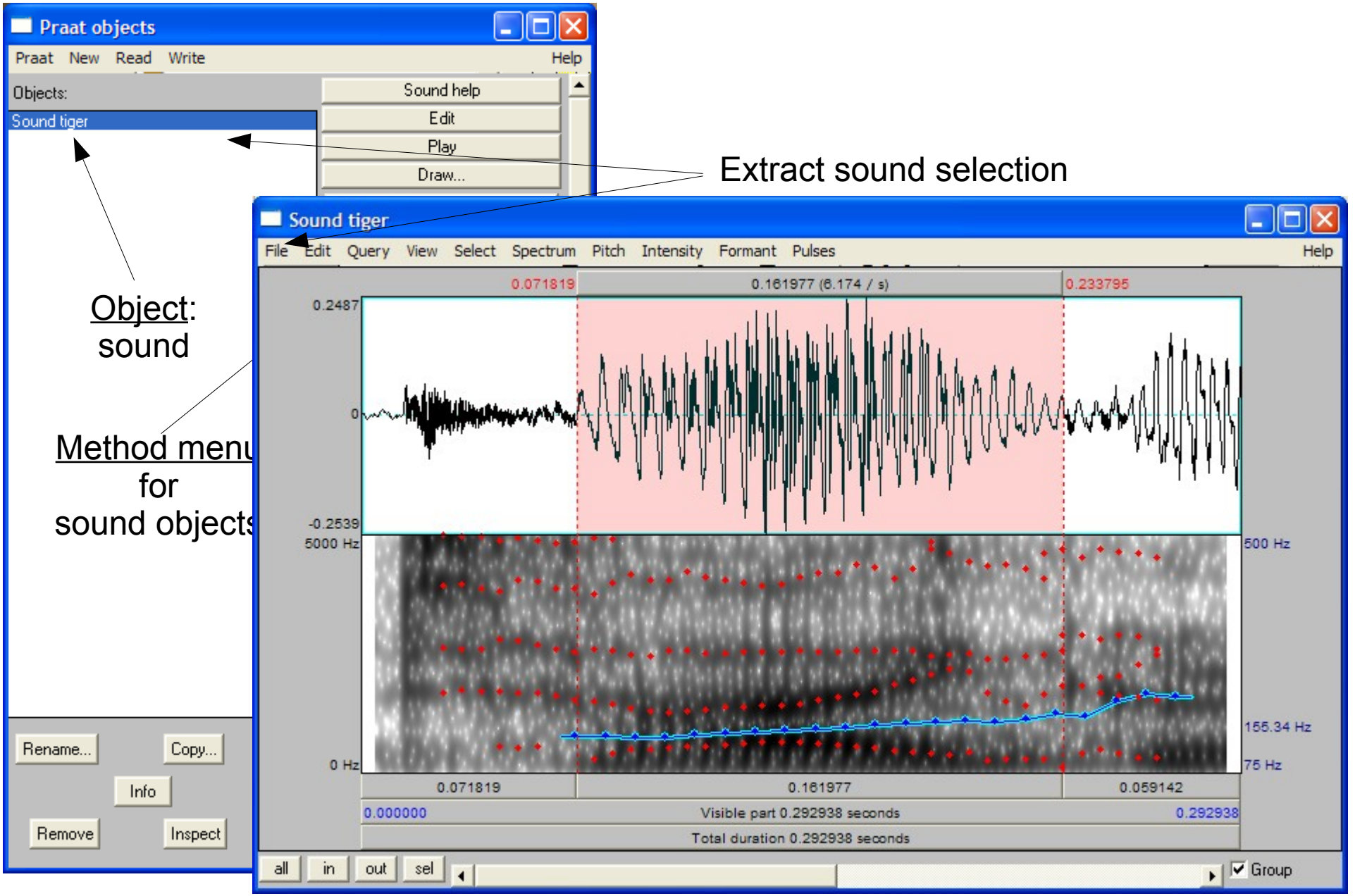

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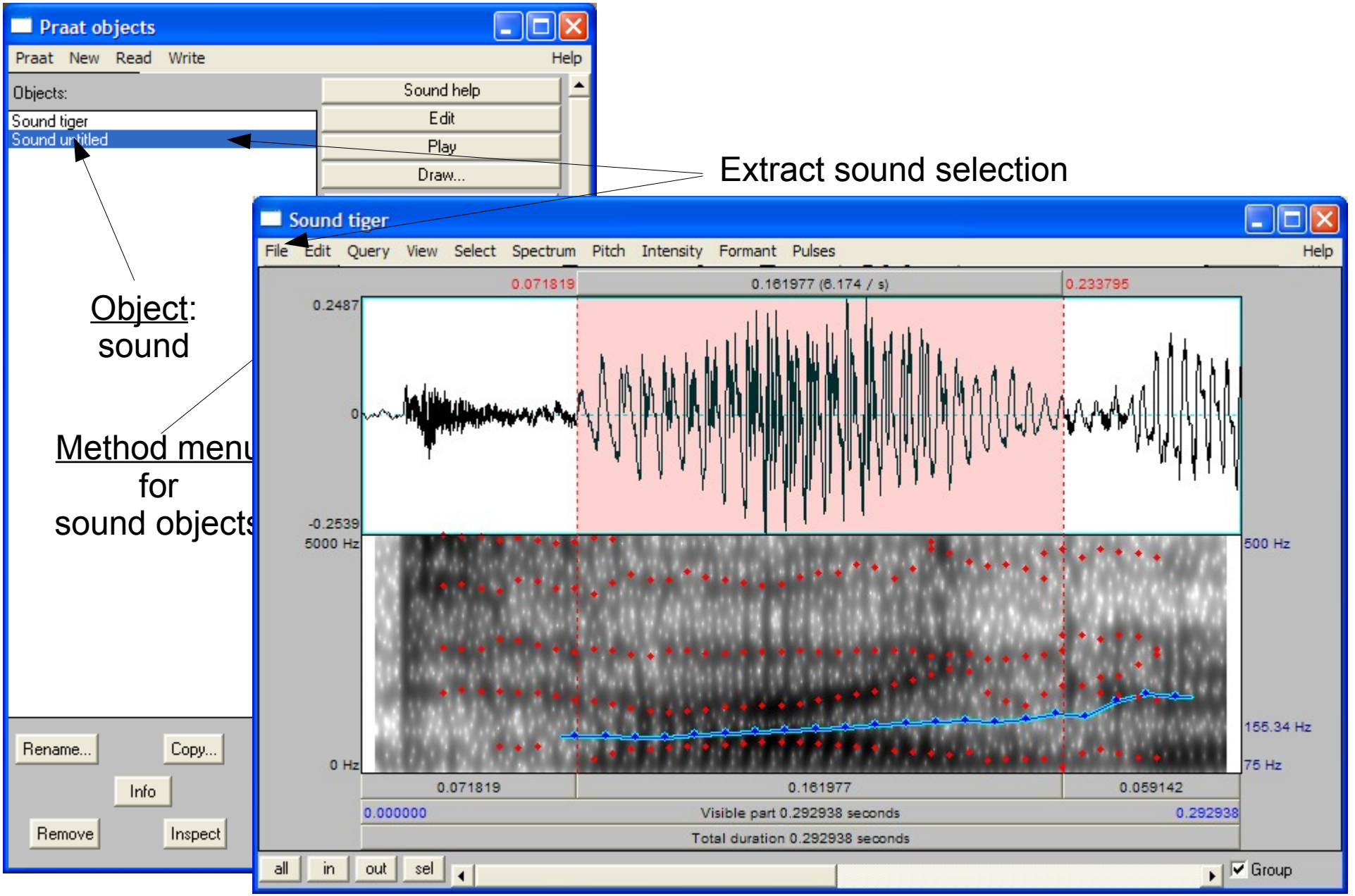
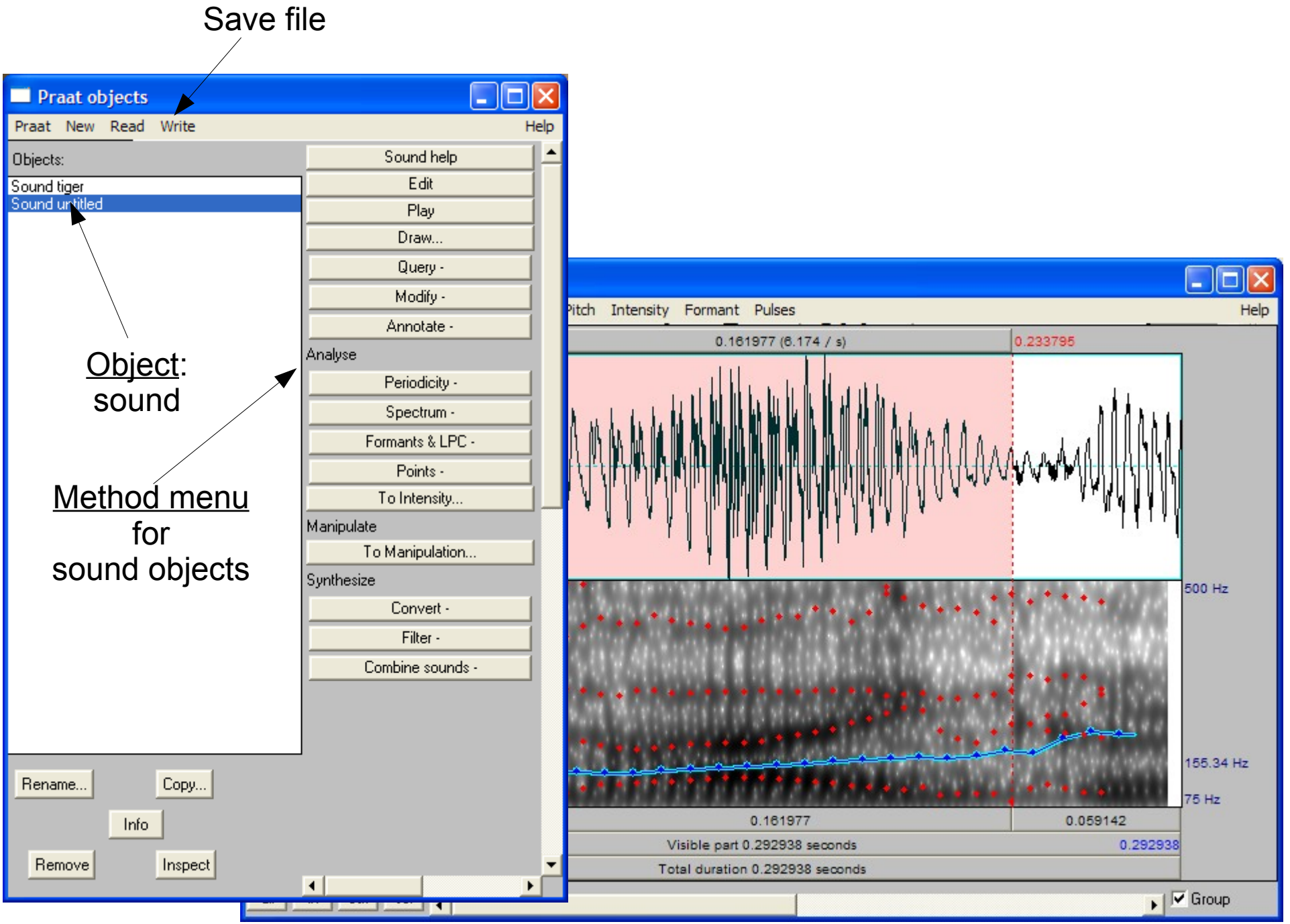


Saving a Praat Object



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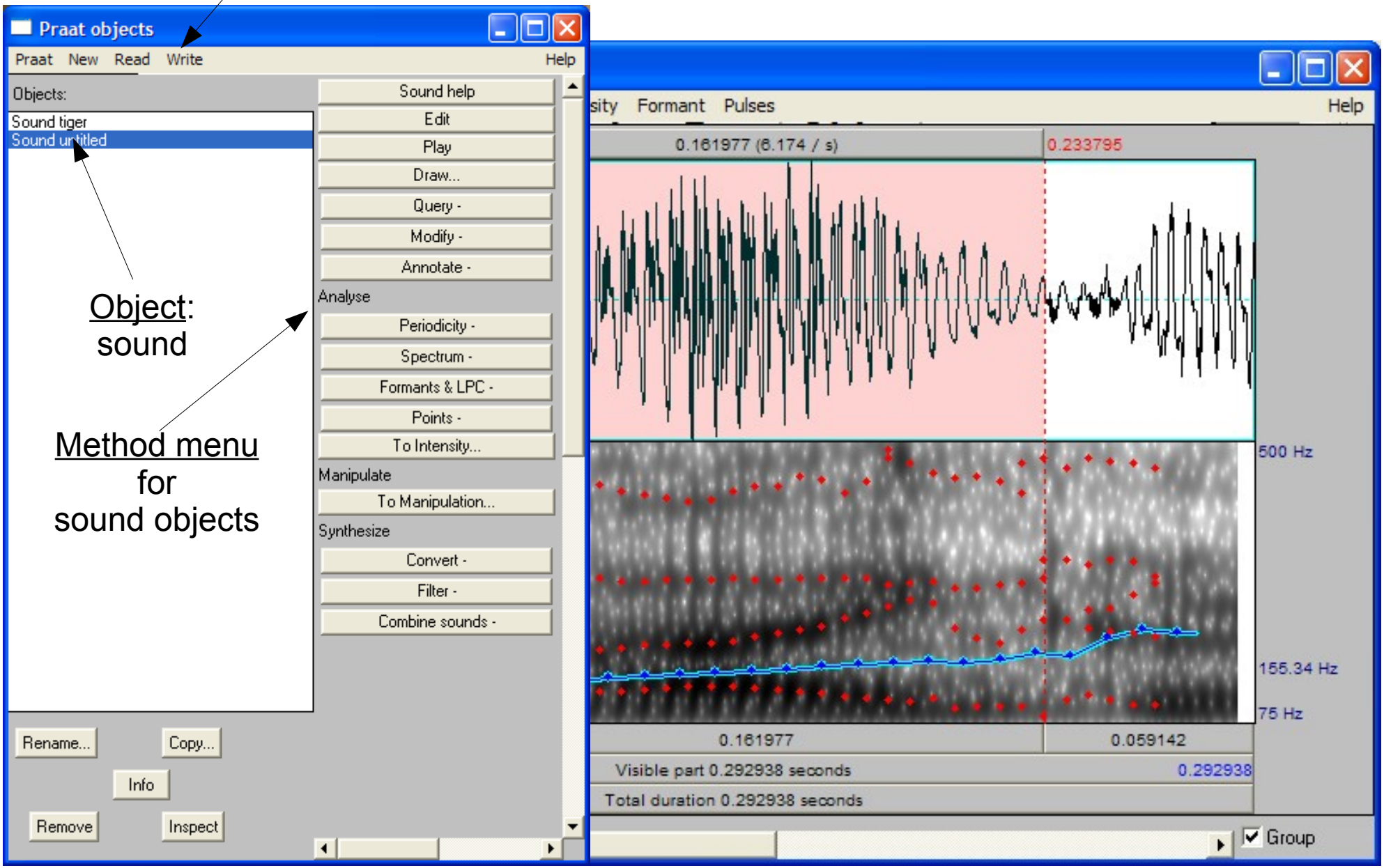
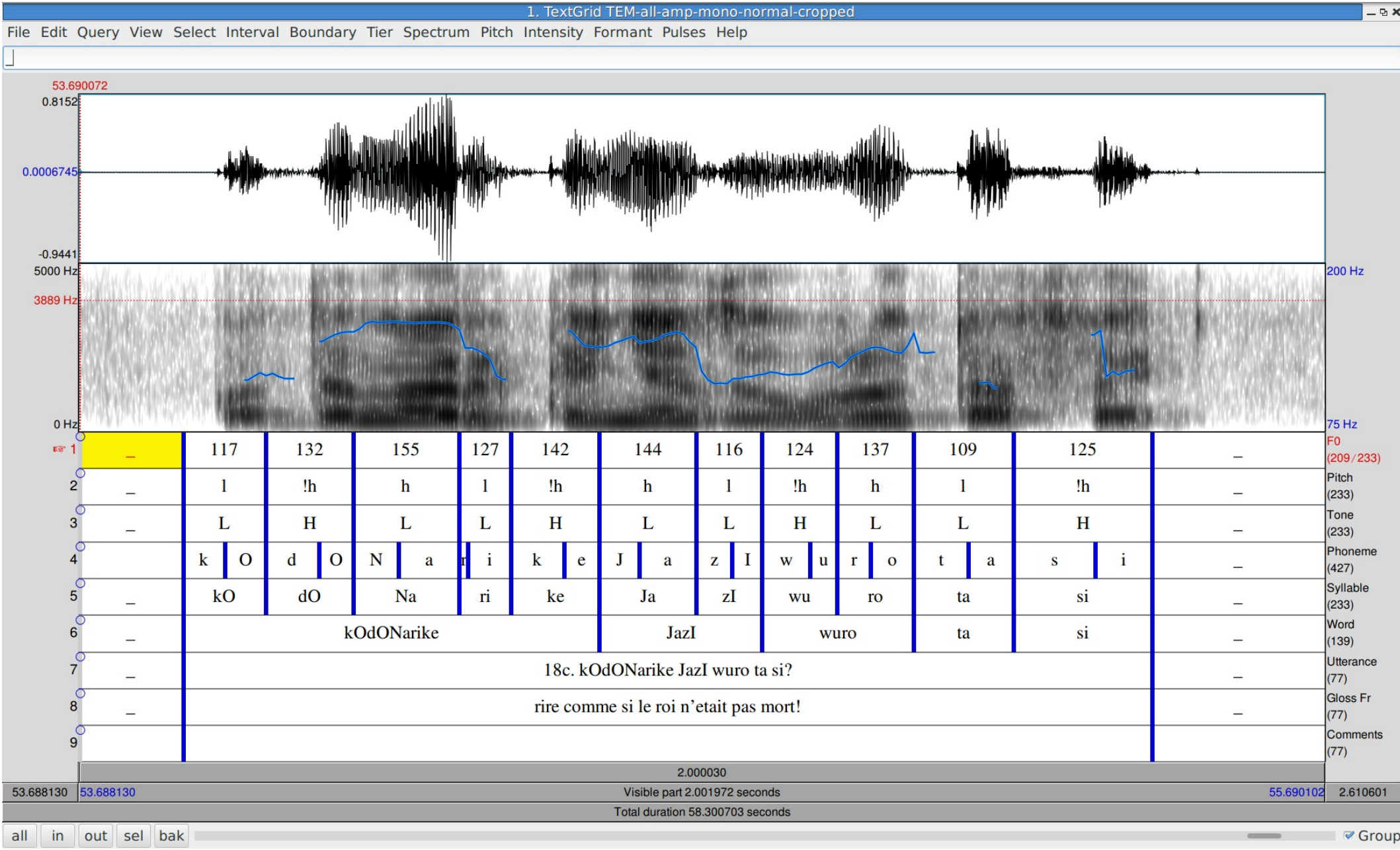


Annotating a speech signal



Praat Output

Praat Output

- Praat produces information which can be stored in a file.
- The file contents are not normally seen by the user.
- However, they can be seen and used for further analysis:
  - Excel, OpenOffice Calc
  - Praat scripting
  - Shell, Perl, Python scripting
  - Time Group Analyser online tool

```
intervals [1]:
    xmin = 0
    xmax = 0.3559744193778952
    text = "_"
intervals [2]:
    xmin = 0.3559744193778952
    xmax = 0.500147057910385
    text = "ta"
intervals [3]:
    xmin = 0.500147057910385
    xmax = 0.614452757446077
    text = "la"
intervals [4]:
    xmin = 0.614452757446077
    xmax = 0.885395026750859 9
    text = "sin"
intervals [5]:
    xmin = 0.885395026750859 9
    xmax = 1.096059981756913
    text = "Ge"
intervals [6]:
    xmin = 1.096059981756913
    xmax = 1.507995131584883 2
    text = "_"
```

Exercises

- Install Praat: http://www.fon.hum.uva.nl/praat/
- Make a folder “Praat” on your Desktop, for your recordings and annotations
- Record a speech signal:
  - menu New>Record mono sound
- Listen to individual words and syllables.
- Examine different displays (spectrogram, pitch track).
- Get highest, lowest and average frequencies
- Annotate the syllables, producing a ‘TextGrid’
- Save the Sound and TextGrid files with useful names
- Examine the TextGrid file using a text editor
  - make an Excel table in Excel, labels and times in columns
  - calculate durations (time differences)
  - calculate average duration

Extracting information about the speech signal

Tasks for next time:

- Plan a speech recording scenario:
  - Which questions are to be answered`using this recording?
  - Which speech style or genre: reading / spontaneous?
  - Which speaker parameters: gender / age?
  - Which recording equipment, location?
- Record a short speech utterance with Praat
- Save the speech file with a systematic file name
- Read the speech file into Praat
- Open an “Edit” window
- Select sections of the signal and listen carefully for tones
- Experiment with the menu options to show
  - pitch / spectrum / formants
- Experiment with pitch:
  - modify the analysis range for pitch