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# Fluency and comprehension in simultaneous interpreting: Experimental design

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# What is fluency?

- **Fluency** is a function of a number of temporal variables. The impression of fluent or non-fluent speech is created through the complex interaction of *pauses*, *hesitations*, *false starts*, *repairs* and *speech rate*.
- **Hesitations, false starts and repairs** are always perceived as disfluencies, although they may sometimes aid comprehension.
- Whether **silent pauses** are perceived as disfluencies or not depends on *speech rate* and the *location* and *duration of pauses* (the threshold for pause perception is much shorter in non-syntactic than in syntactic positions).

# The experiment

- Two randomized groups of subject-matter experts (business college students)
- Visual input: Video recording of a lecture on a specialised subject
- Audio input: One fluent and one non-fluent version of the same interpretation
- Comprehension testing with written questionnaires distributed after listening to the interpretation

# Design issues

- Homogeneous groups - use students from same course, possible access to test scores
- Comprehension testing: questions should test comprehension and not memory – extensive use of pre-tests
- Production of experimental material: produce non-fluent version without modifying other parameters

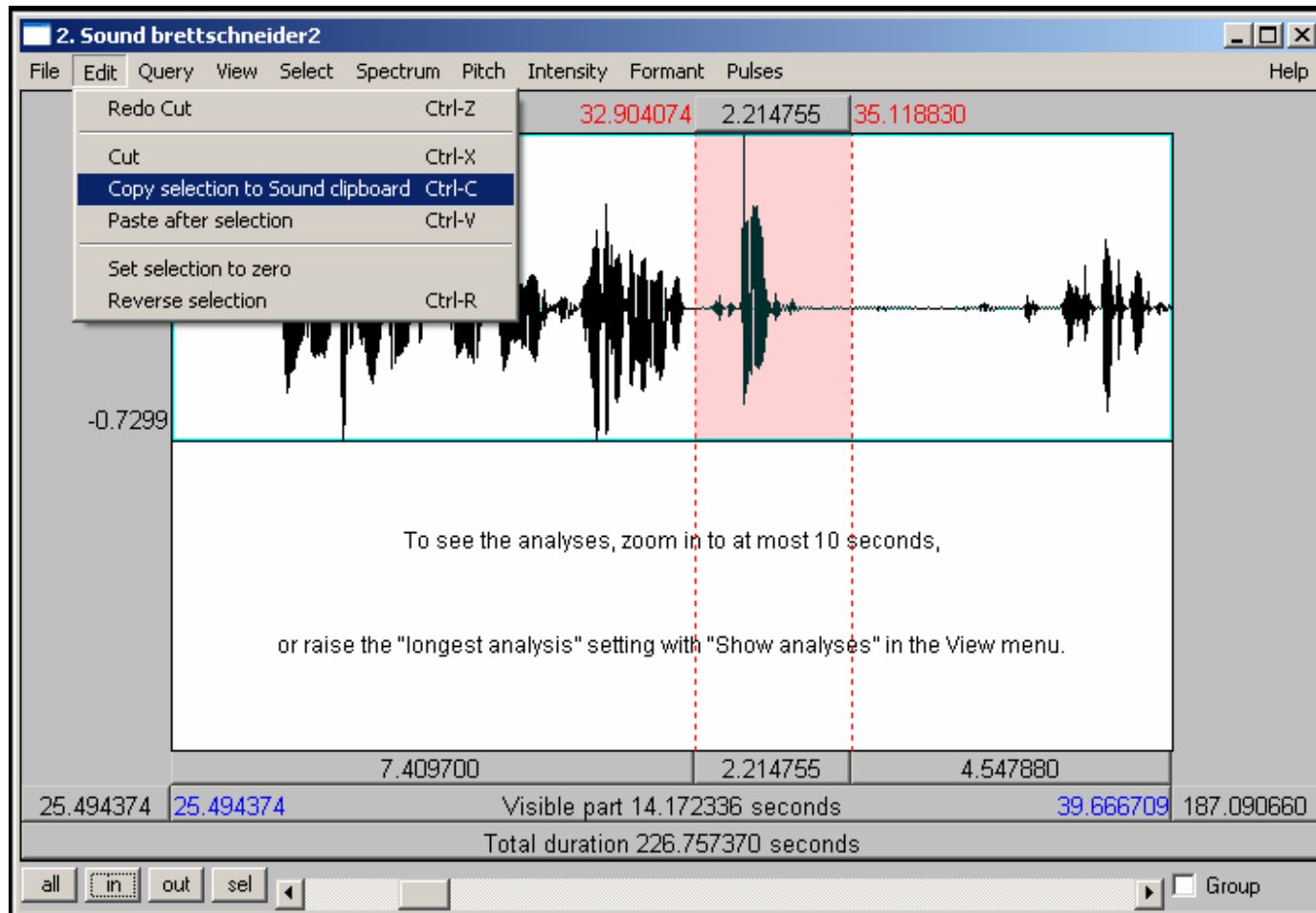
# Production of the experimental material

- How to produce a non-fluent interpretation?
  - Using different interpreters
    - differences in voice, intonation and other prosodic features
  - Reading/shadowing of text with/without pauses
    - easier to control speed and synchronicity
    - possible changes to intonation, speed
    - possible reading intonation
  - Audio manipulation (introduce pauses or disfluencies into fluent interpretation)
    - easier to control just one parameter
    - risk of artefacts, may sound unnatural
    - issues with synchronicity

# Production of the experimental material

- Selected method: manipulation of speech files with PRAAT
- Procedure
  - Record several versions of the interpretation, first version can (and should) be hesitant
  - Select fluent version as basis for experimental material
  - Select hesitations and pauses from other versions and edit into fluent version to produce non-fluent version

# Using PRAAT: Select hesitation



**2. Sound brettschneider2**

File Edit Query View Select Spectrum Pitch Intensity Formant Pulses Help

Redo Cut Ctrl-Z  
Cut Ctrl-X  
**Copy selection to Sound clipboard Ctrl-C**  
Paste after selection Ctrl-V  
Set selection to zero  
Reverse selection Ctrl-R

32.904074 2.214755 35.118830

-0.7299

To see the analyses, zoom in to at most 10 seconds,  
or raise the "longest analysis" setting with "Show analyses" in the View menu.

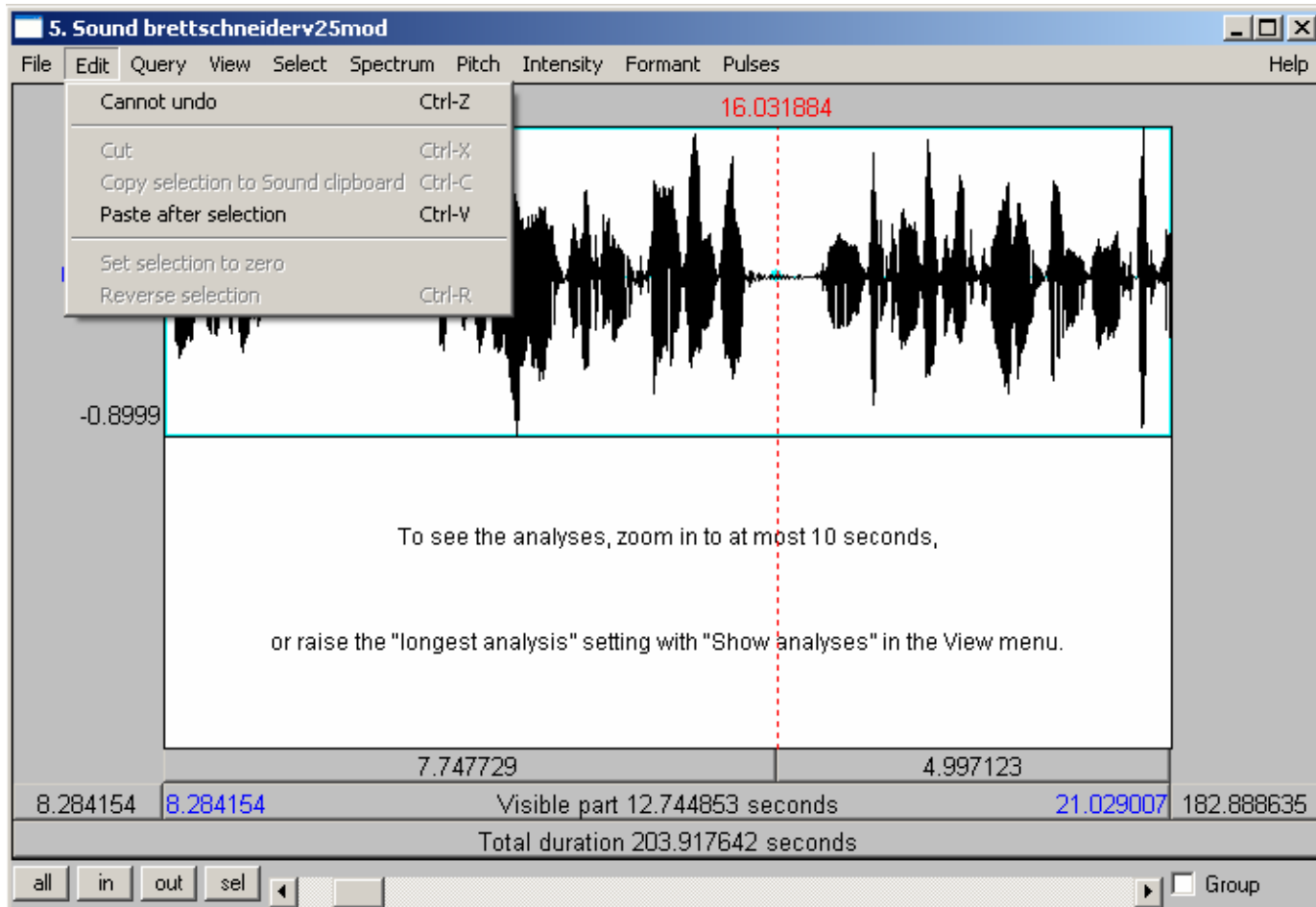
7.409700 2.214755 4.547880

25.494374 25.494374 Visible part 14.172336 seconds 39.666709 187.090660

Total duration 226.757370 seconds

all in out sel Group

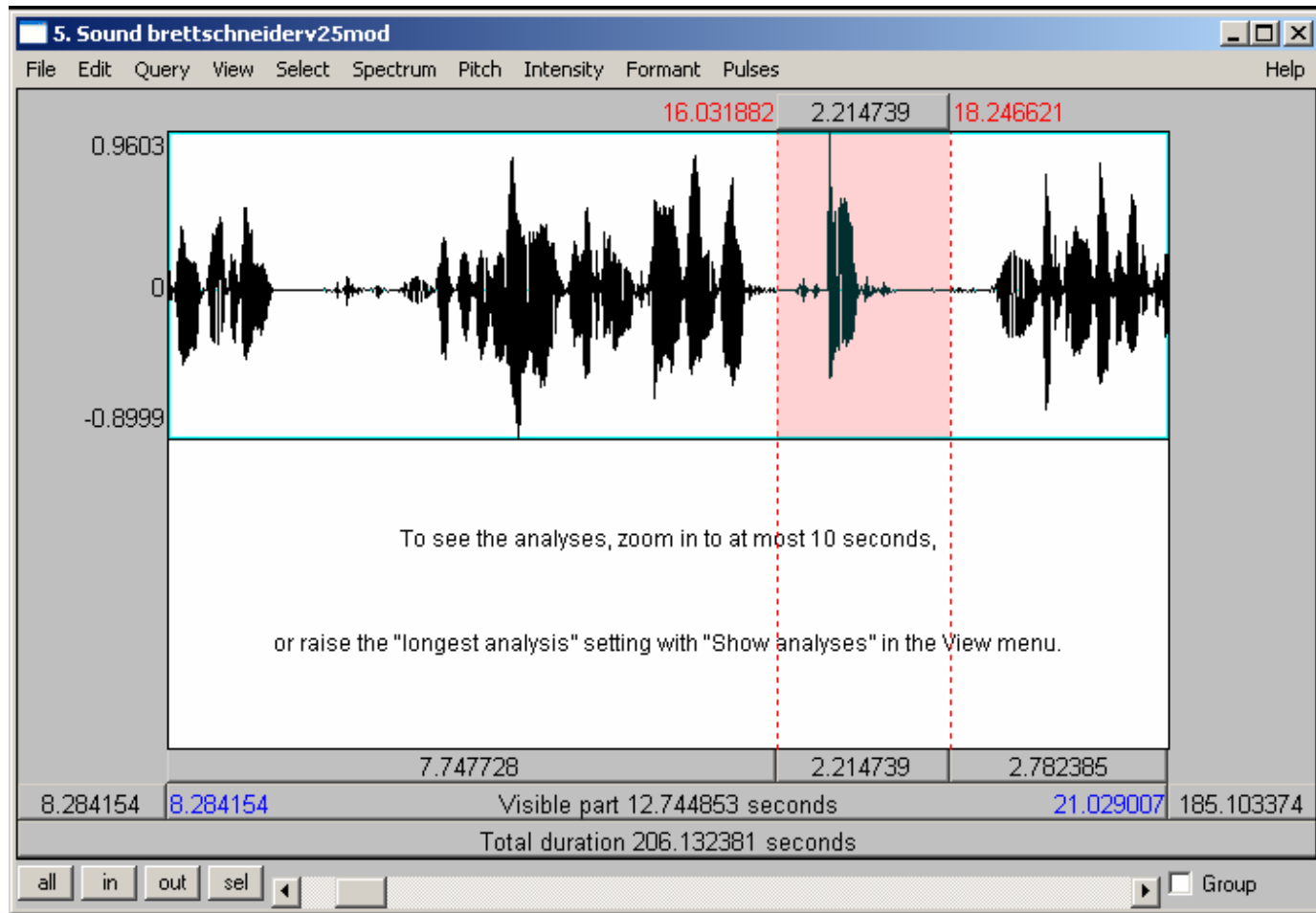
# Using PRAAT: Insert hesitation



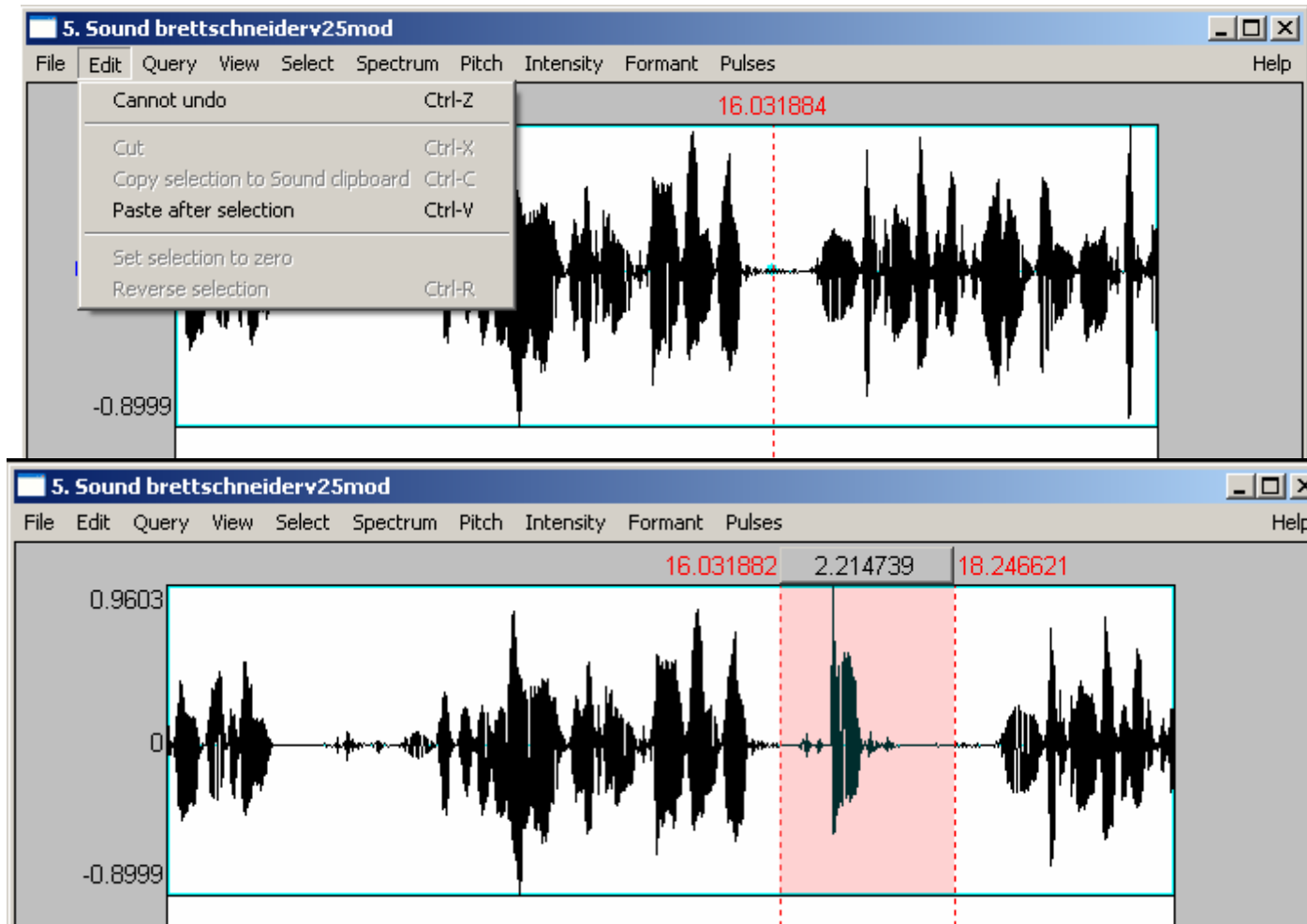
The screenshot shows the PRAAT software window titled "5. Sound brettschneiderv25mod". The menu bar includes File, Edit, Query, View, Select, Spectrum, Pitch, Intensity, Formant, Pulses, and Help. The Edit menu is open, showing options: Cannot undo (Ctrl-Z), Cut (Ctrl-X), Copy selection to Sound clipboard (Ctrl-C), Paste after selection (Ctrl-V), Set selection to zero, and Reverse selection (Ctrl-R). The main window displays a waveform with a cyan selection box. A red dashed vertical line is positioned at 16.031884 seconds. Below the waveform, a text box contains the instruction: "To see the analyses, zoom in to at most 10 seconds, or raise the 'longest analysis' setting with 'Show analyses' in the View menu." The status bar at the bottom shows time markers: 8.284154, 8.284154, 7.747729, 4.997123, 21.029007, and 182.888635. It also indicates "Visible part 12.744853 seconds" and "Total duration 203.917642 seconds". At the bottom of the window are buttons for "all", "in", "out", "sel", and a "Group" checkbox.



# Using PRAAT: Modified file



# Using PRAAT: Comparison



# Benefits

- Easy manipulation of speech files; changes can be made without having to re-record everything
- Only difference between fluent and non-fluent version is fluency; intonation and other parameters remain the same

# Issues and possible solutions

- Length of interpretations should remain similar and more or less synchronous to original
  - select relatively slow source speech to provide greater flexibility
  - lengthen existing pauses in fluent version
  - speed up parts of non-fluent version – only possible to a certain extent
- Positioning of pauses and hesitations
  - several interpretations to identify likely positions for pauses/hesitations
  - lengthen existing pauses in non-syntactic positions
  - replace existing pauses (syntactic and non-syntactic) with hesitations
  - use pre-testing to verify natural impression of experimental material

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Thank you for your attention!

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