

# PHONETICS: PRAAT I

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Bielefeld University, Germany

JNU, Guangzhou, 2022-02-28

# OBJECTIVES

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

1. record and analyse speech data with Praat
2. annotate speech data with Praat
3. extract duration information from a recording, using Praat
4. extract fundamental frequency information from a recording, using Praat
5. transfer Praat data to a spreadsheet (Excel, LibreOffice Calc, etc.)
6. create vowel formant charts
7. analyse speech timing

Motivation for using Praat:

Essential for providing, editing, analysing speech data for

1. Term papers
2. Research projects, theses
3. Clinical phonetics: diagnosis, therapy, assessment
4. Music analysis and synthesis basics
5. Preparation of teaching materials

# COURSE PROGRAMME: PRAAT I

## Basic functions of the Praat software:

- Speech recording principles: basic advice
- Recording your own voice
- Loading speech recordings

## Visualising Waveform, Amplitude and intensity

- editing speech: selecting, zooming
- distinguishing consonants and vowels in the speech waveform of your own voice.

## Vowel formant charts with a spreadsheet, using your Praat data.

You must have the following software on your laptops:

1. Praat (<http://www.praat.org>)
2. A spreadsheet application such as Microsoft Excel or LibreOffice Calc.

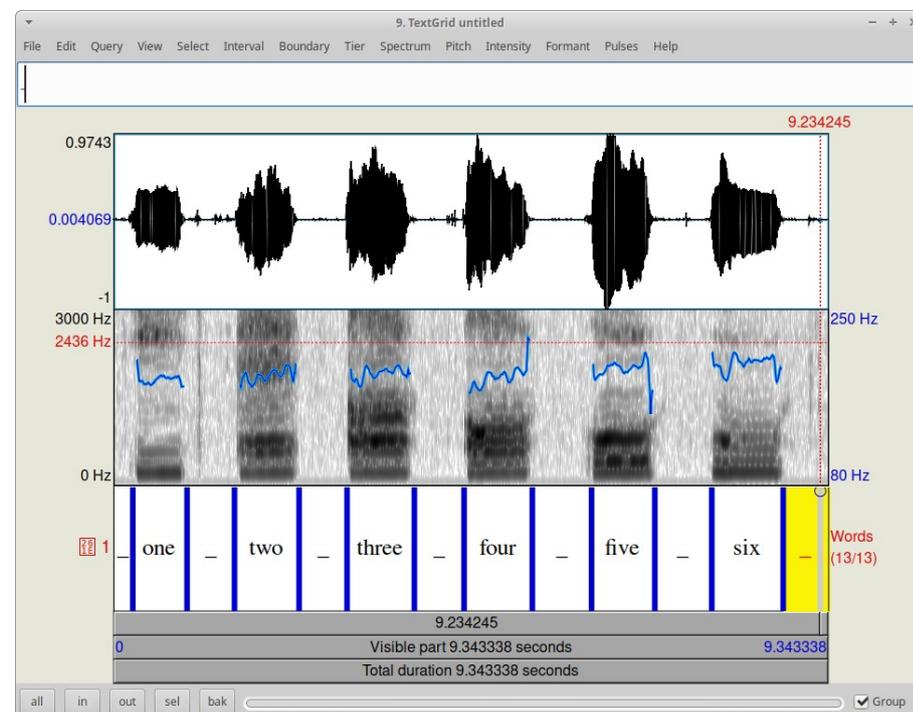
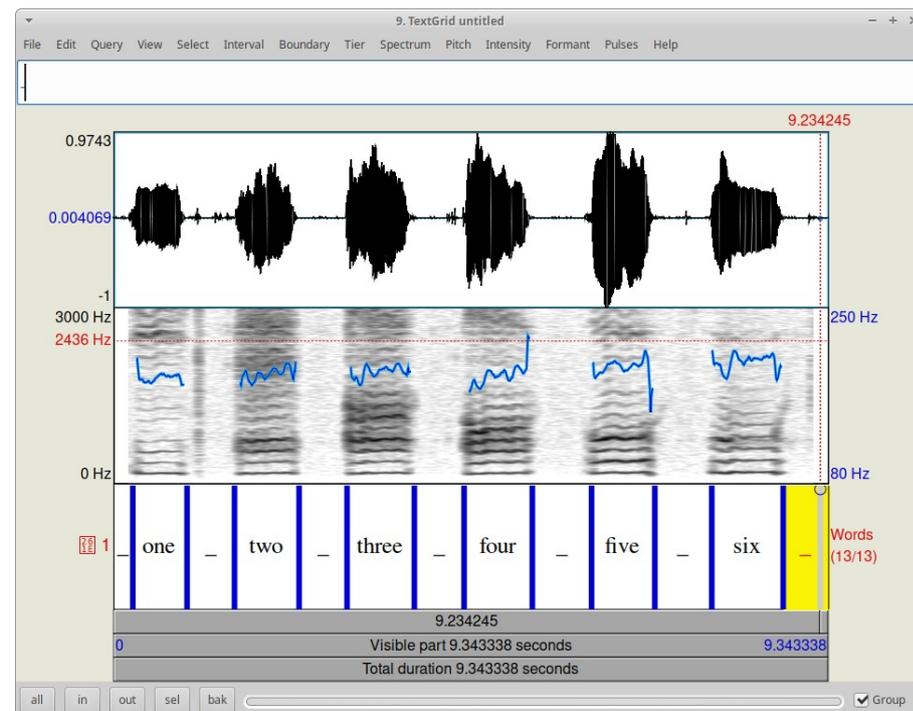
# PRAAT: BASIC FUNCTIONALITY

## Input:

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

## Methods:

- waveform selection and analysis
- spectral analysis
- frequency and intensity analysis
- transcription and annotation of speech
- speech synthesis
- Output:
  - saving speech files
  - saving files with analysis results:
    - annotations (TextGrid files)
    - fundamental frequency
    - spectral information



# BUT FIRST OF ALL: PHONETIC BASICS

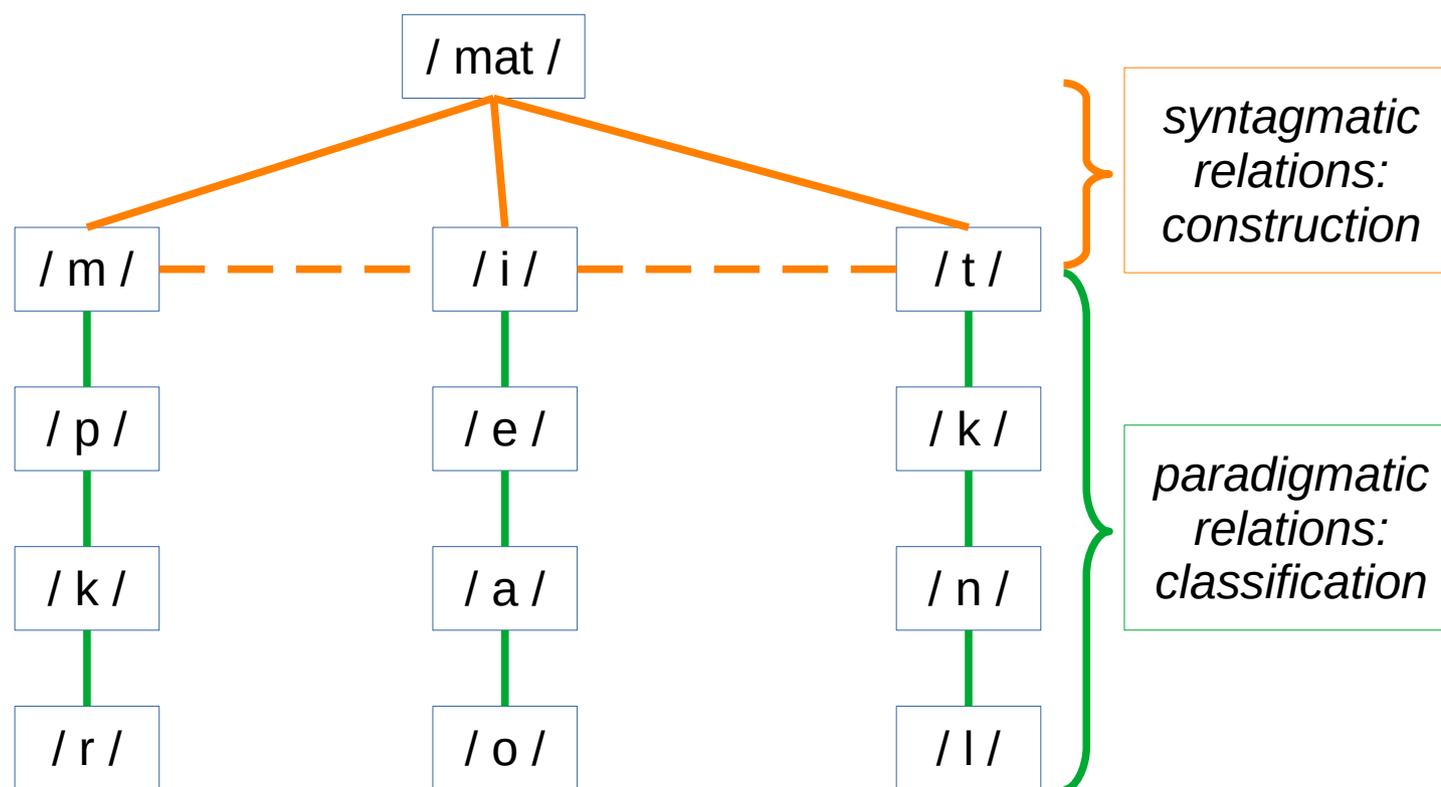
## FROM PHONOLOGY TO PHONETICS

# FROM PHONOLOGY TO PHONETICS

## PHONOLOGY:

the linguistic modelling of sound representations in the dictionary as phonemes, syllables, word segments:

- sets of contrasting units in paradigmatic relations (classification)
- sequences linked units in syntagmatic relations (construction)



# PHONETICS

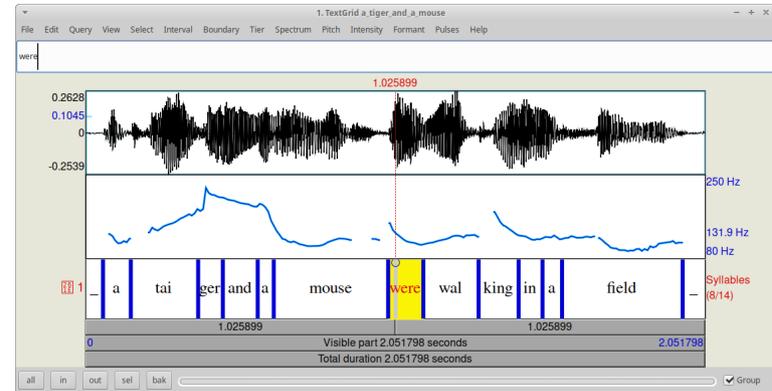
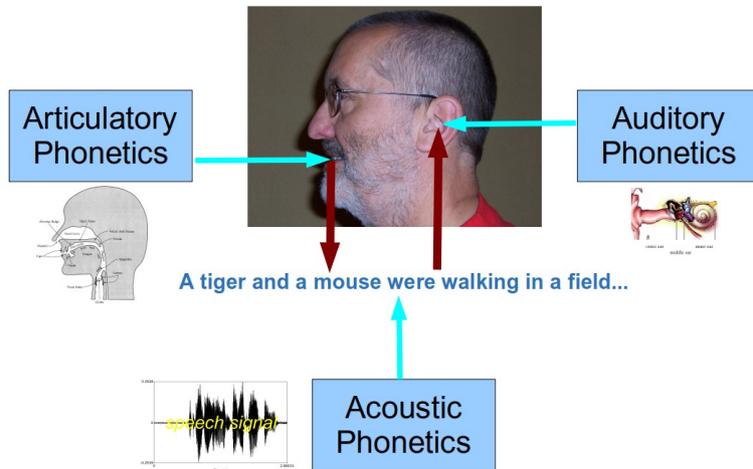
## the phonetic cycle

# PHONETICS

Phonetics:

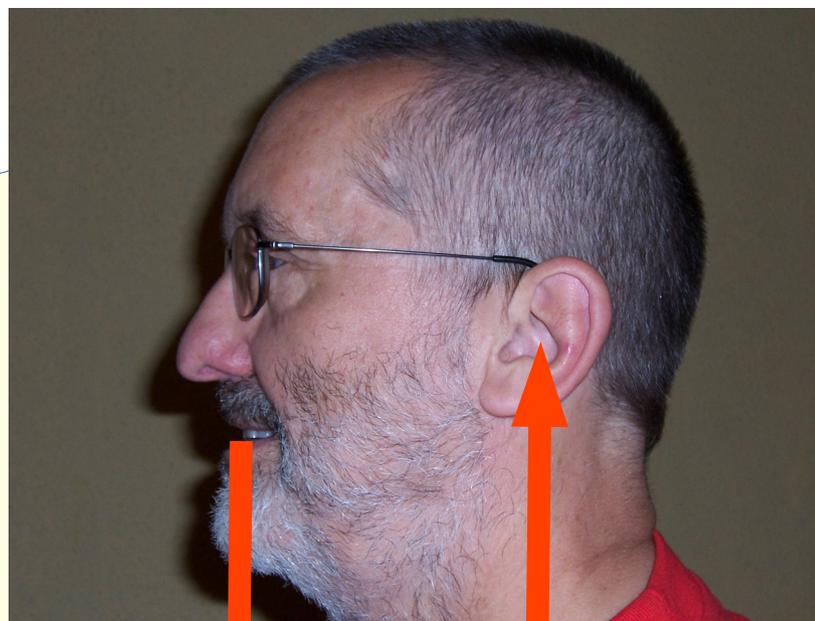
the perceptual, instrumental, experimental study of physical sounds in the phonetic cycle:

- production of speech
- transmission of speech
- perception of speech



phonetic  
analysis

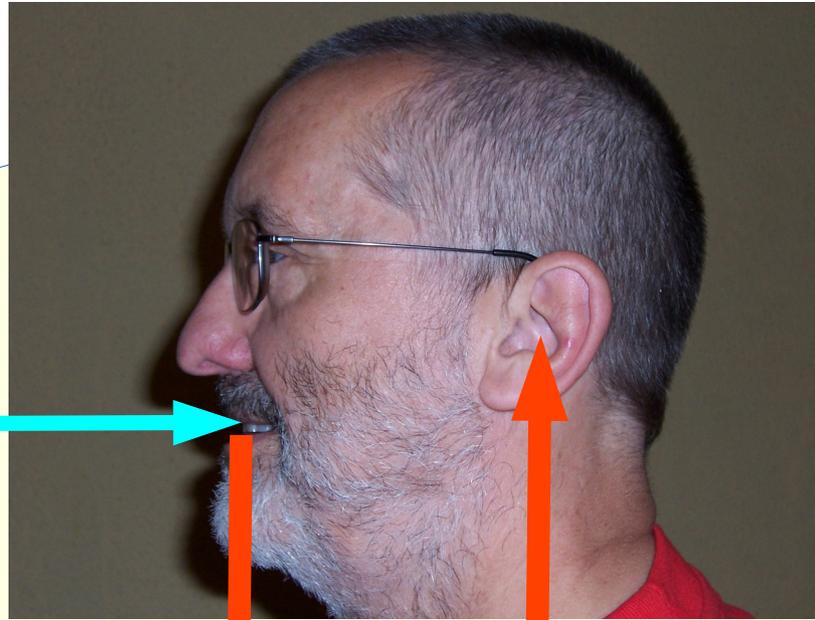
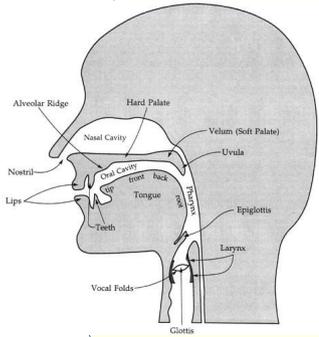
# PHONETICS: the phonetic cycle



**A tiger and a mouse were walking in a field...**

# PHONETICS: the phonetic cycle

## Articulatory Phonetics

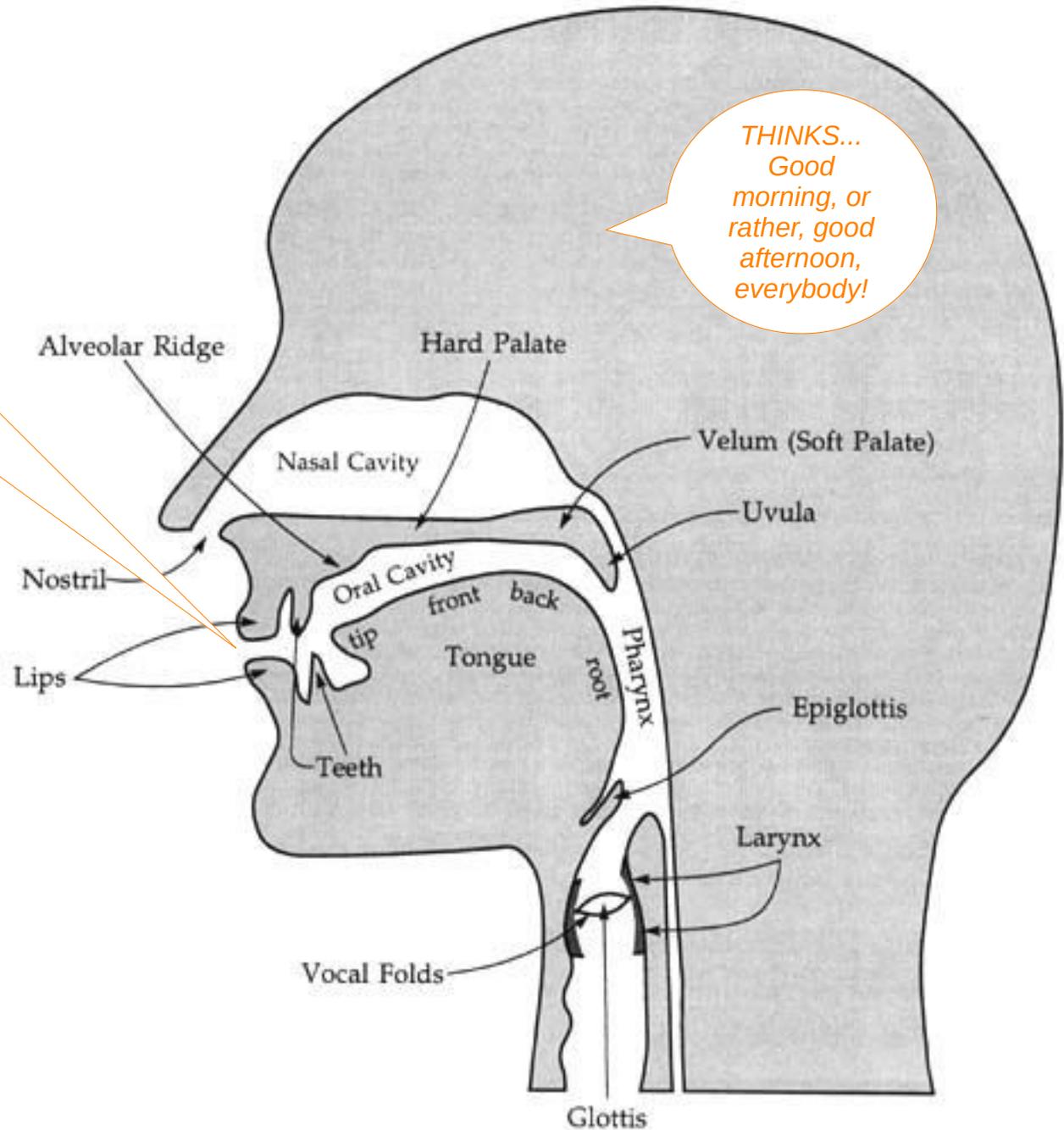


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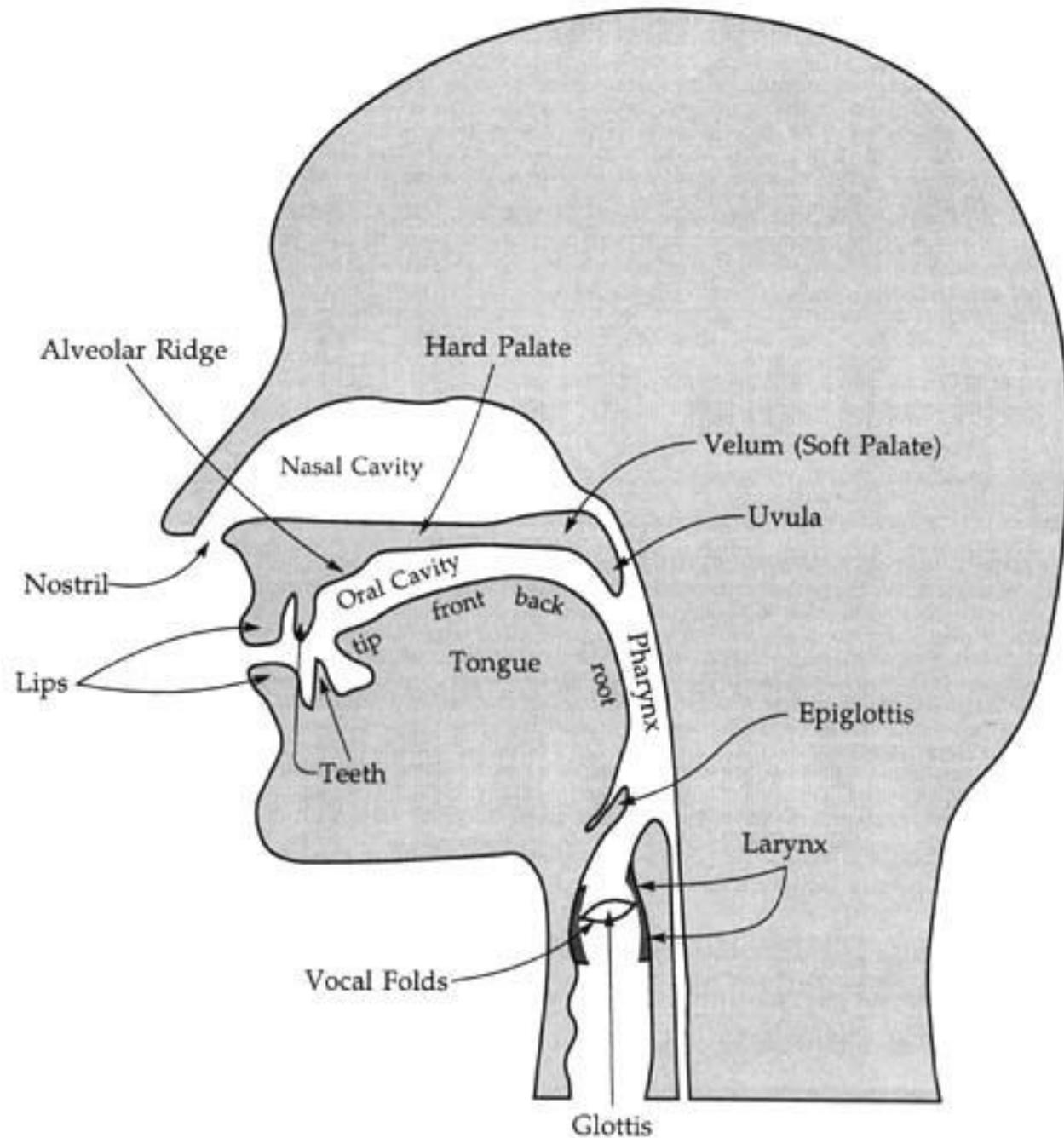
# ARTICULATORY PHONETICS: speech production

*SAYS...  
Good morning,  
or rather, good  
afternoon,  
everybody!*

*THINKS...  
Good  
morning, or  
rather, good  
afternoon,  
everybody!*



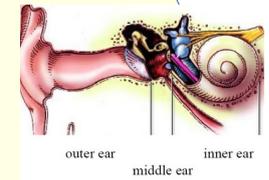
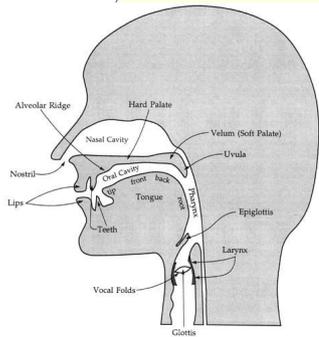
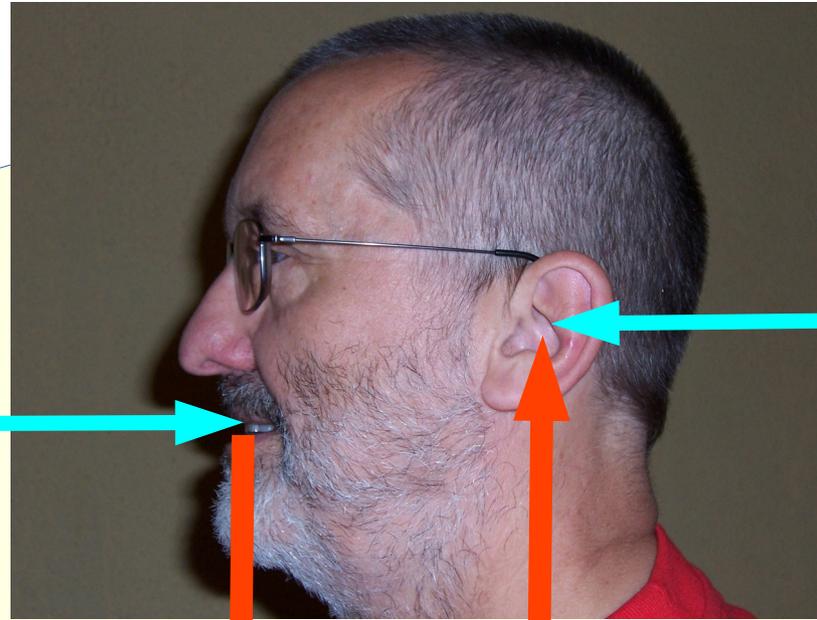
# ARTICULATORY PHONETICS: speech production



# AUDITORY PHONETICS: speech perception

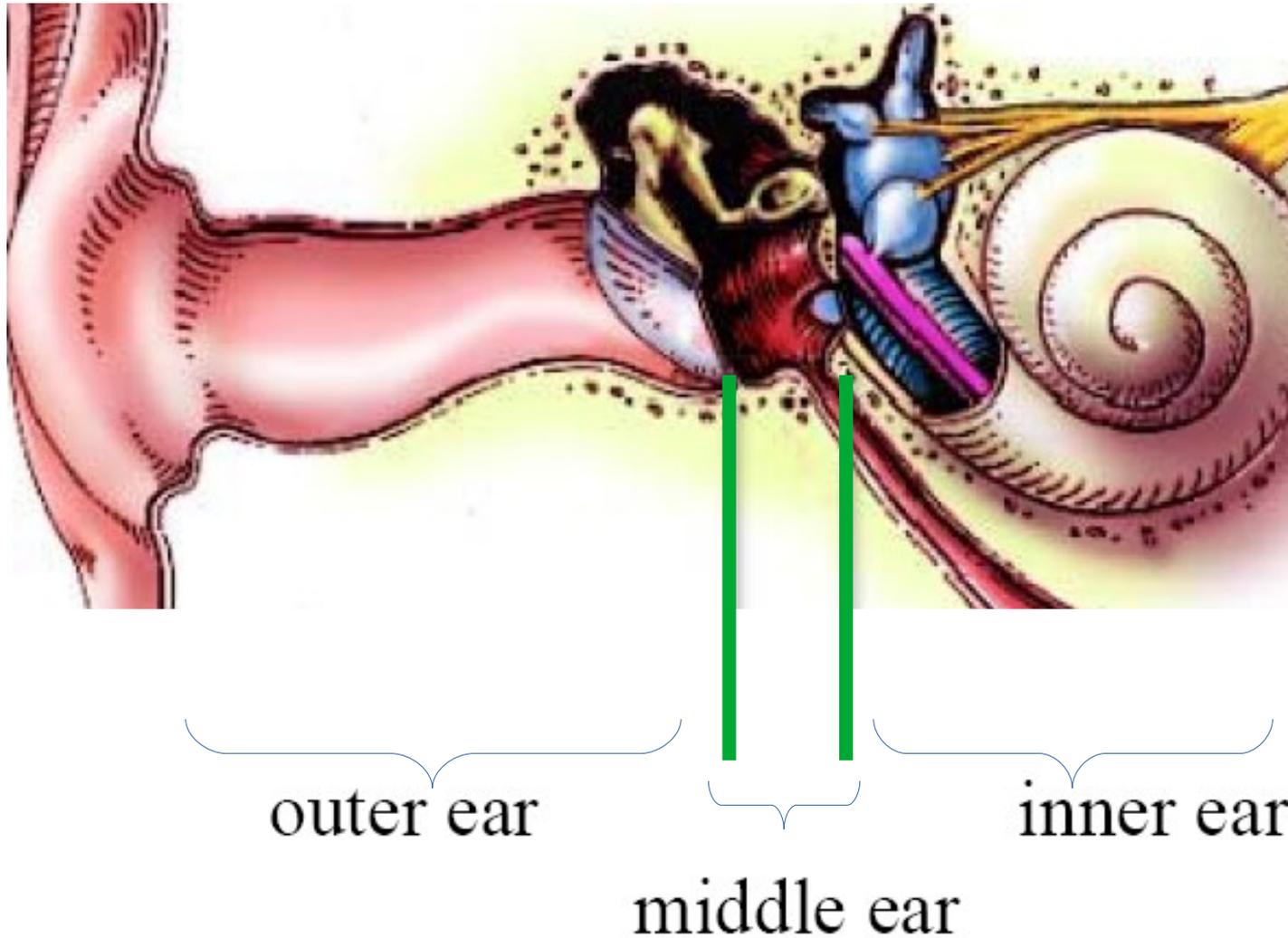
Articulatory  
Phonetics

Auditory  
Phonetics



**A tiger and a mouse were walking in a field...**

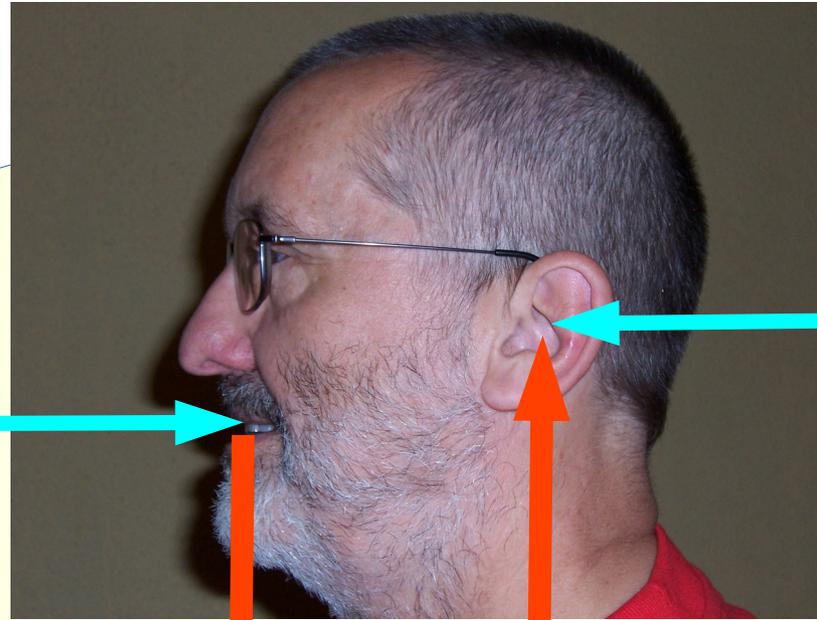
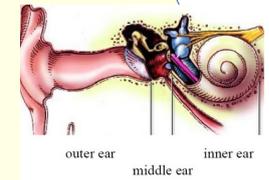
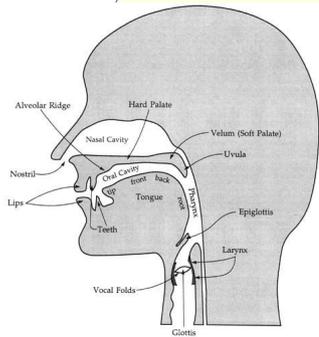
# AUDITORY PHONETICS: speech perception



# ACOUSTIC PHONETICS: speech transmission

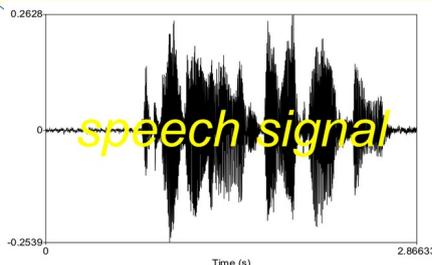
Articulatory Phonetics

Auditory Phonetics

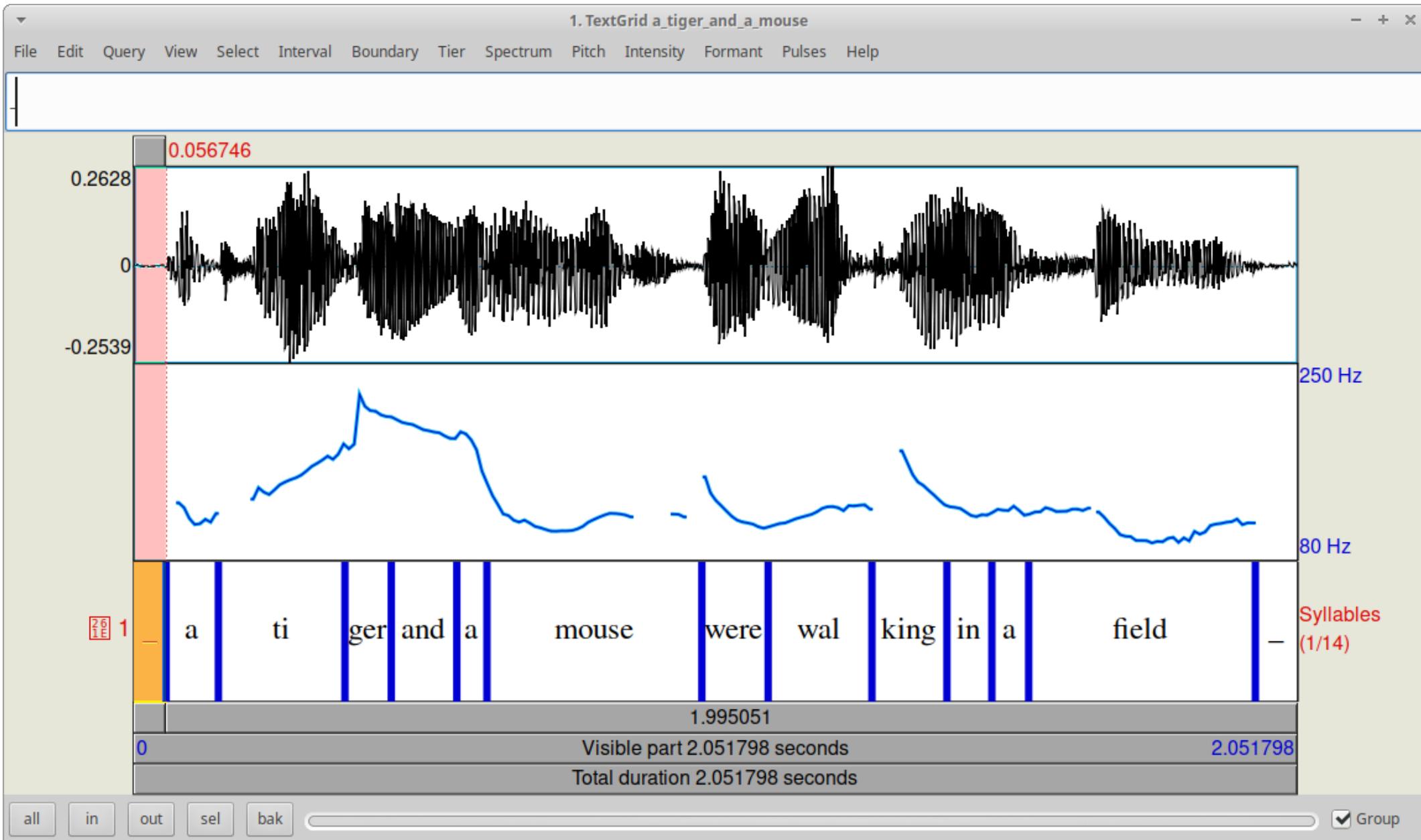


A tiger and a mouse were walking in a field...

Acoustic Phonetics



# ACOUSTIC PHONETICS: speech transmission



## the Praat phonetic workbench

IPA

THE INTERNATIONAL PHONETIC ASSOCIATION

THE INTERNATIONAL PHONETIC ALPHABET

# The International Phonetic Alphabet

CONSONANTS (PULMONIC)

© 2015 IPA

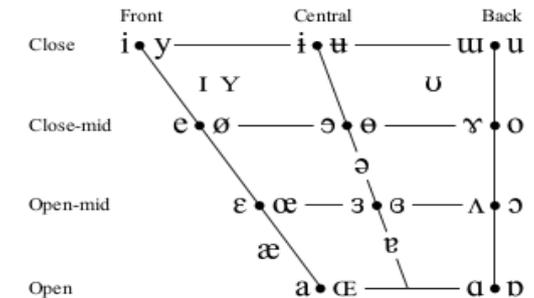
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			ʀ					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌ ʘ Bilabial	ɓ Bilabial	ʼ Examples:
◌ ǀ Dental	ɗ Dental/alveolar	pʼ Bilabial
◌ ǃ (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
◌ ǁ Palatoalveolar	ɡ Velar	kʼ Velar
◌ ǂ Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

- ɱ Voiceless labial-velar fricative
- ɰ Voiced labial-velar approximant
- ɰ Voiced labial-palatal approximant
- ħ Voiceless epiglottal fricative
- ʕ Voiced epiglottal fricative
- ʔ Epiglottal plosive
- ɕ ʑ Alveolo-palatal fricatives
- ɭ Voiced alveolar lateral flap
- ɥ Simultaneous ʃ and x
- Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.

ts k̟

DIACRITICS Some diacritics may be placed above a symbol with a descender, e.g. ŋ̥

◌ ɹ	Voiceless	◌ ̥	Breathy voiced	◌ ̤	Dental	◌ ̦
◌ ̣	Voiced	◌ ̨	Creaky voiced	◌ ̩	Apical	◌ ̪
◌ ̠	Aspirated	◌ ̢	Linguolabial	◌ ̣	Laminal	◌ ̤
◌ ̜	More rounded	◌ ̝	Labialized	◌ ̞	Nasalized	◌ ̟
◌ ̠	Less rounded	◌ ̡	Palatalized	◌ ̢	Nasal release	◌ ̣
◌ ̡	Advanced	◌ ̣	Velarized	◌ ̤	Lateral release	◌ ̥
◌ ̢	Retracted	◌ ̣	Pharyngealized	◌ ̤	No audible release	◌ ̥
◌ ̣	Centralized	◌ ̤	Velarized or pharyngealized	◌ ̥		
◌ ̤	Mid-centralized	◌ ̥	Raised	◌ ̦	(ɹ = voiced alveolar fricative)	
◌ ̥	Syllabic	◌ ̦	Lowered	◌ ̧	(β = voiced bilabial approximant)	
◌ ̦	Non-syllabic	◌ ̧	Advanced Tongue Root	◌ ̨		
◌ ̧	Rhoticity	◌ ̨	Retracted Tongue Root	◌ ̩		

SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress
- ː Long
- ˑ Half-long
- ◌ ˚ Extra-short
- ◌ ̥ Minor (foot) group
- ◌ ̦ Major (intonation) group
- ◌ ̧ Syllable break
- ◌ ̨ Linking (absence of a break)

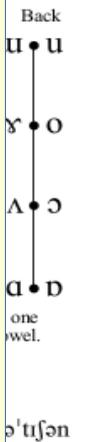
TONES AND WORD ACCENTS

- | LEVEL               | CONTOUR               |
|---------------------|-----------------------|
| ◌ ˥ or ˦ Extra high | ◌ ˧ or ˨ Rising       |
| ◌ ˦ High            | ◌ ˨ Falling           |
| ◌ ˧ Mid             | ◌ ˨˨ High rising      |
| ◌ ˨ Low             | ◌ ˨˨˨ Low rising      |
| ◌ ˩ Extra low       | ◌ ˨˨˨˨ Rising-falling |
| ◌ ˩˩ Downstep       | ↗ Global rise         |
| ◌ ˩˩˩ Upstep        | ↘ Global fall         |

# The International Phonetic Alphabet

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			ʀ					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			

Wow – all 7000 languages of the world, and only one page!



ɔ̹	More rounded	ɔ̹	ʷ	Labialized	tʷ dʷ	Nasalized	ẽ	
ɔ̥	Less rounded	ɔ̥	j	Palatalized	tʲ dʲ	n̠	Nasal release	d̠n̠
ɹ	Advanced	ɹ	ʲ	Velarized	tʲ dʲ	l̠	Lateral release	d̠l̠
ɹ̠	Retracted	ɹ̠	ʕ	Pharyngealized	tʕ dʕ	̠	No audible release	d̠̠
ɹ̠̠	Centralized	ɹ̠̠	~	Velarized or pharyngealized	ɬ			
ɹ̠̠̠	Mid-centralized	ɹ̠̠̠	̠	Raised	e̠ (ɹ̠̠̠ = voiced alveolar fricative)			
ɹ̠̠̠̠	Syllabic	ɹ̠̠̠̠	̠̠	Lowered	e̠̠ (β̠̠ = voiced bilabial approximant)			
ɹ̠̠̠̠̠	Non-syllabic	ɹ̠̠̠̠̠	̠̠̠	Advanced Tongue Root	ɹ̠̠̠			
ɹ̠̠̠̠̠̠	Rhoticity	ɹ̠̠̠̠̠̠	̠̠̠̠	Retracted Tongue Root	ɹ̠̠̠̠			

- Linking (absence of a break)
- TONES AND WORD ACCENTS
- LEVEL
- CONTOUR
- ě or ǃ Extra high
- é High
- ē Mid
- è Low
- è̇ Extra low
- ↓ Downstep
- ↑ Upstep
- ě or ǃ Rising
- ê Falling
- ē High rising
- è Low rising
- è̇ Rising-falling
- ↗ Global rise
- ↘ Global fall





# The International Phonetic Alphabet

## 1. Consonants

CONSONANTS (PULMONIC)												© 2015 IPA
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal	
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ	
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ			
Trill	ʙ			ʀ					ʀ			
Tap or Flap		ⱱ		ɾ		ɽ						
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ	
Lateral fricative				ɬ ɮ								
Approximant		ʋ		ɹ		ɻ	j	ɰ				
Lateral approximant				l		ɭ	ʎ	ʟ				

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

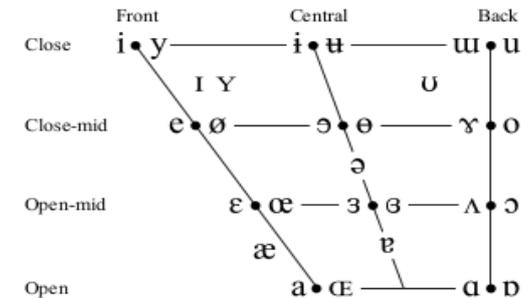
### CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌◌ Bilabial	ɓ Bilabial	ʼ Examples:
Dental	ɗ Dental/alveolar	pʼ Bilabial
! (Post)alveolar	f Palatal	tʼ Dental/alveolar
‡ Palatoalveolar	ɡ Velar	kʼ Velar
Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

### OTHER SYMBOLS

- ɱ Voiceless labial-velar fricative
- ɰ Voiced labial-velar approximant
- ɰ Voiced labial-palatal approximant
- ħ Voiceless epiglottal fricative
- ʕ Voiced epiglottal fricative
- ʔ Epiglottal plosive
- ɕ ʑ Alveolo-palatal fricatives
- ɻ Voiced alveolar lateral flap
- ɧ Simultaneous ʃ and x
- Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.

### VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

### SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress
- : Long
- ˑ Half-long
- ˘ Extra-short
- ◌◌ Minor (foot) group
- || Major (intonation) group
- Syllable break
- ◌◌◌ Linking (absence of a break)

### TONES AND WORD ACCENTS

- | LEVEL             | CONTOUR             |
|-------------------|---------------------|
| ē or ˥ Extra high | ē or ˨ Rising       |
| é ˦ High          | ê ˩ Falling         |
| ē ˧ Mid           | ẽ ˨˩ High rising    |
| è ˧ Low           | ẽ ˨˩ Low rising     |
| è ˩ Extra low     | ẽ ˨˩ Rising-falling |
| ↓ Downstep        | ↗ Global rise       |
| ↑ Upstep          | ↘ Global fall       |

### DIACRITICS

Some diacritics may be placed above a symbol with a descender, e.g. ɲ̰

◌◌ Voiceless	◌◌ Voiced	◌◌ Breathy voiced	◌◌ Creaky voiced	◌◌ Dental	◌◌ Apical
◌◌ Aspirated	◌◌ More rounded	◌◌ Less rounded	◌◌ Advanced	◌◌ Retracted	◌◌ Centralized
◌◌ Mid-centralized	◌◌ Syllabic	◌◌ Non-syllabic	◌◌ Rhoticity	◌◌ Raised	◌◌ Lowered
◌◌ Advanced Tongue Root	◌◌ Retracted Tongue Root	◌◌ Linguolabial	◌◌ Labialized	◌◌ Palatalized	◌◌ Velarized
◌◌ Palatalized	◌◌ Velarized or pharyngealized	◌◌ Laminar	◌◌ Nasalized	◌◌ Nasal release	◌◌ Lateral release
◌◌ No audible release	◌◌ Raised (ɹ = voiced alveolar fricative)	◌◌ Lowered (β = voiced bilabial approximant)	◌◌ Advanced Tongue Root	◌◌ Retracted Tongue Root	

# The International Phonetic Alphabet

## CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				r					ʀ		
Tap or Flap				ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

## 2. Special consonants

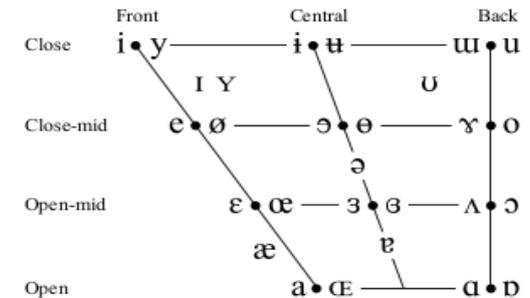
### CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌◌ Bilabial	ɓ Bilabial	ʼ Examples:
Dental	ɗ Dental/alveolar	pʼ Bilabial
! (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
‡ Palatoalveolar	ɡ Velar	kʼ Velar
Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

### OTHER SYMBOLS

ɱ Voiceless labial-velar fricative	ç ʝ Alveolo-palatal fricatives
ʋ Voiced labial-velar approximant	ɺ Voiced alveolar lateral flap
ɰ Voiced labial-palatal approximant	ɥ Simultaneous ʃ and x
ħ Voiceless epiglottal fricative	
ʕ Voiced epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
ʔ Epiglottal plosive	

### VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

### SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress
- ː Long
- ˑ Half-long
- ˚ Extra-short

ts k̟p

### DIACRITICS Some diacritics may be placed above a symbol with a descender, e.g. ɲ̥̄

◌◌ Voiceless	◌◌ Voiced	◌◌ Breathy voiced	◌◌ Creaky voiced	◌◌ Dental	◌◌ Apical
◌◌ Aspirated	◌◌ More rounded	◌◌ Less rounded	◌◌ Advanced	◌◌ Retracted	◌◌ Centralized
◌◌ Mid-centralized	◌◌ Syllabic	◌◌ Non-syllabic	◌◌ Rhoticity	◌◌ Raised	◌◌ Lowered
◌◌ Advanced Tongue Root	◌◌ Retracted Tongue Root				

- | Minor (foot) group
- || Major (intonation) group
- Syllable break
- Linking (absence of a break)

### TONES AND WORD ACCENTS

LEVEL	CONTOUR
é or ˥ Extra high	ě or ˨ Rising
é ˧ High	ê ˩ Falling
ē ˨ Mid	ẽ ˨˩ High rising
è ˩ Low	ẽ ˩˩ Low rising
è ˩ Extra low	ẽ ˩˩˩ Rising-falling
↓ Downstep	↗ Global rise
↑ Upstep	↘ Global fall

# The International Phonetic Alphabet

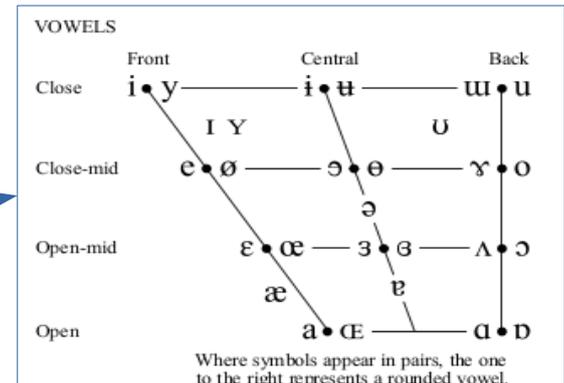
CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				ʀ					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌ ɓ Bilabial	ɓ Bilabial	ʼ Examples:
◌ ɗ Dental	ɗ Dental/alveolar	ɓʼ Bilabial
◌ ʄ (Post)alveolar	ʄ Palatal	ɗʼ Dental/alveolar
◌ ɠ Palatoalveolar	ɠ Velar	ɠʼ Velar
◌ ʄ Alveolar lateral	ɠ Uvular	ɠʼ Alveolar fricative



## 3. Vowels

OTHER SYMBOLS

- ɸ Voiceless labial-velar fricative
- ʋ Voiced labial-velar approximant
- ɰ Voiced labial-palatal approximant
- ħ Voiceless epiglottal fricative
- ʕ Voiced epiglottal fricative
- ʔ Epiglottal plosive
- ɕ Alveolo-palatal fricatives
- ɻ Voiced alveolar lateral flap
- ɰ Simultaneous ʃ and x
- Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.

ts k̟

SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress
- ː Long
- ˑ Half-long
- ˚ Extra-short
- ◌ Minor (foot) group
- ◌ Major (intonation) group
- ◌ Syllable break
- ◌ Linking (absence of a break)

TONES AND WORD ACCENTS

- | LEVEL             | CONTOUR            |
|-------------------|--------------------|
| é or ˥ Extra high | ě or ˨ Rising      |
| é ˥ High          | ê ˨ Falling        |
| ē ˨ Mid           | ẽ ˨ High rising    |
| è ˨ Low           | ẽ ˨ Low rising     |
| è ˨ Extra low     | ẽ ˨ Rising-falling |
| ↓ Downstep        | ↗ Global rise      |
| ↑ Upstep          | ↘ Global fall      |

DIACRITICS Some diacritics may be placed above a symbol with a descender, e.g. ɲ̥̄

◌ Voiceless	◌ ̥ ̦	◌ Breathy voiced	◌ ̤ ̧	◌ Dental	◌ ̪ ̫
◌ Voiced	◌ ̬ ̭	◌ Creaky voiced	◌ ̰ ̱	◌ Apical	◌ ̽ ̾
◌ Aspirated	◌ ̰ ̱	◌ Linguolabial	◌ ̼ ̽	◌ Laminal	◌ ̻ ̼
◌ More rounded	◌ ̹	◌ Labialized	◌ ̺̟ ̻̟	◌ Nasalized	◌ ̃
◌ Less rounded	◌ ̺	◌ Palatalized	◌ ̺ʲ ̻ʲ	◌ Nasal release	◌ ̟̚
◌ Advanced	◌ ̟	◌ Velarized	◌ ̟ˠ ̟ˡ	◌ Lateral release	◌ ̟̚ˀ
◌ Retracted	◌ ̠	◌ Pharyngealized	◌ ̟ˤ ̟˥	◌ No audible release	◌ ̟̚̚̚
◌ Centralized	◌ ̞	◌ Velarized or pharyngealized	◌ ̠ˠ		
◌ Mid-centralized	◌ ̠̞	◌ Raised	◌ ̠̥ (̠̥ = voiced alveolar fricative)		
◌ Syllabic	◌ ̩ ̪	◌ Lowered	◌ ̠̞ (̠̞ = voiced bilabial approximant)		
◌ Non-syllabic	◌ ̯	◌ Advanced Tongue Root	◌ ̠̠		
◌ Rhoticity	◌ ̠̠̠ ̡̠̠	◌ Retracted Tongue Root	◌ ̠̠̠		

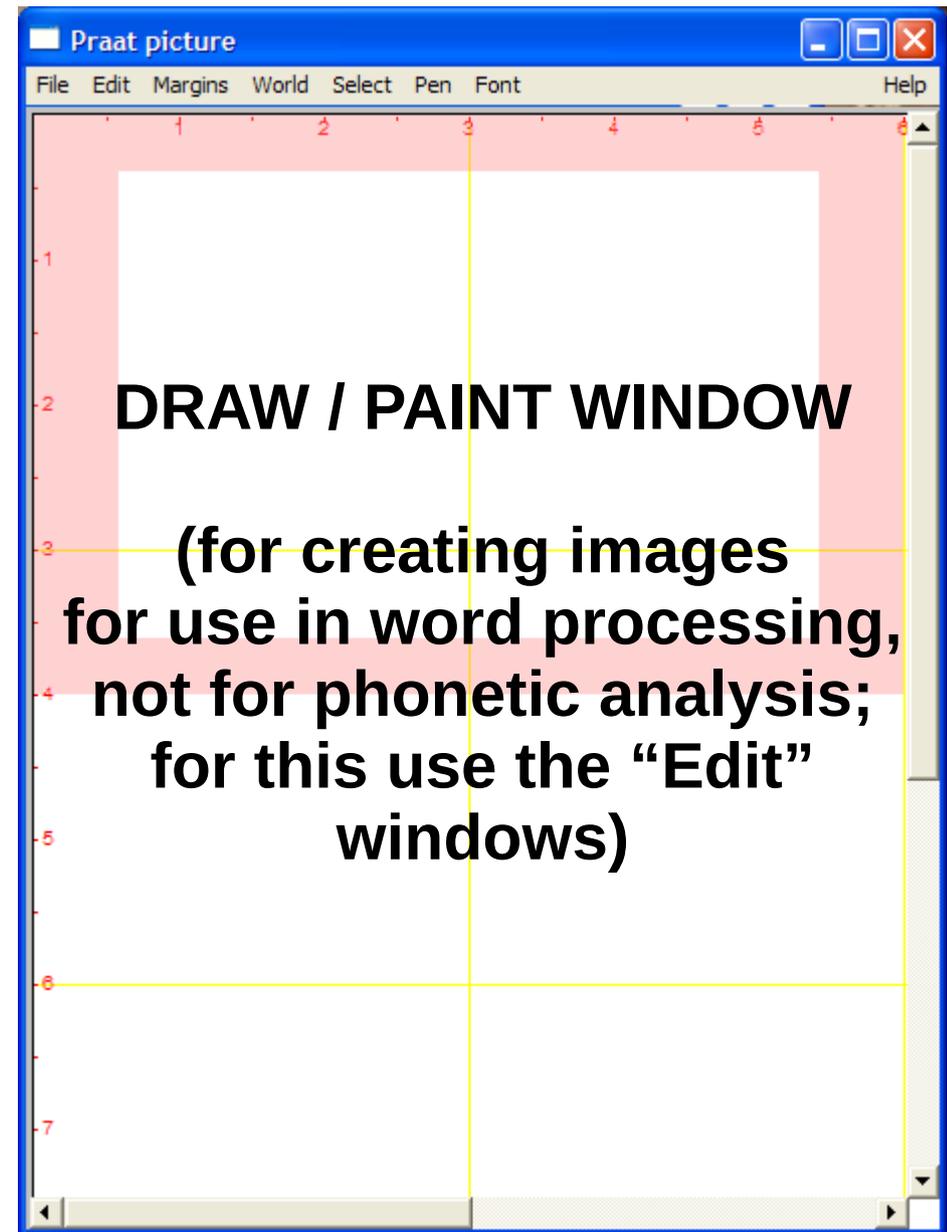
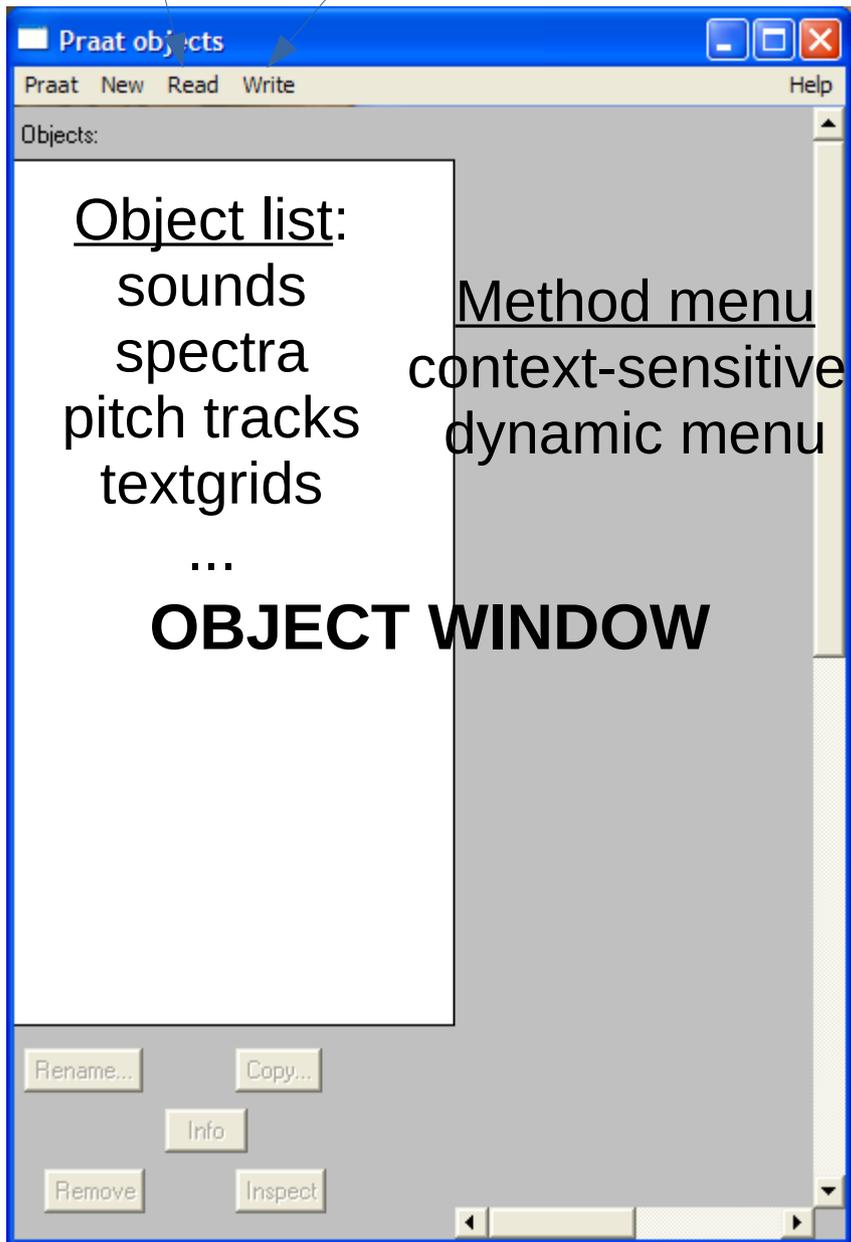




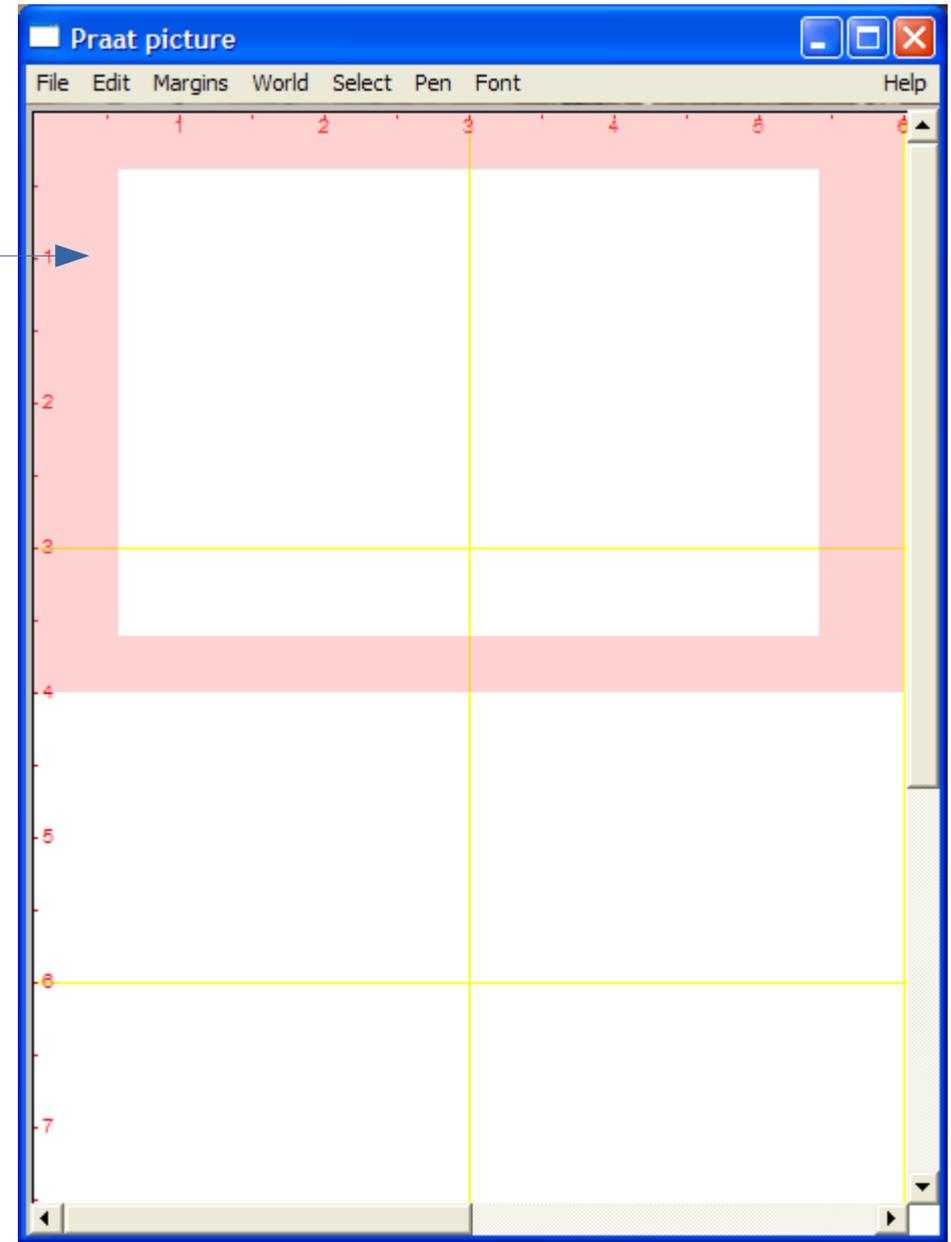
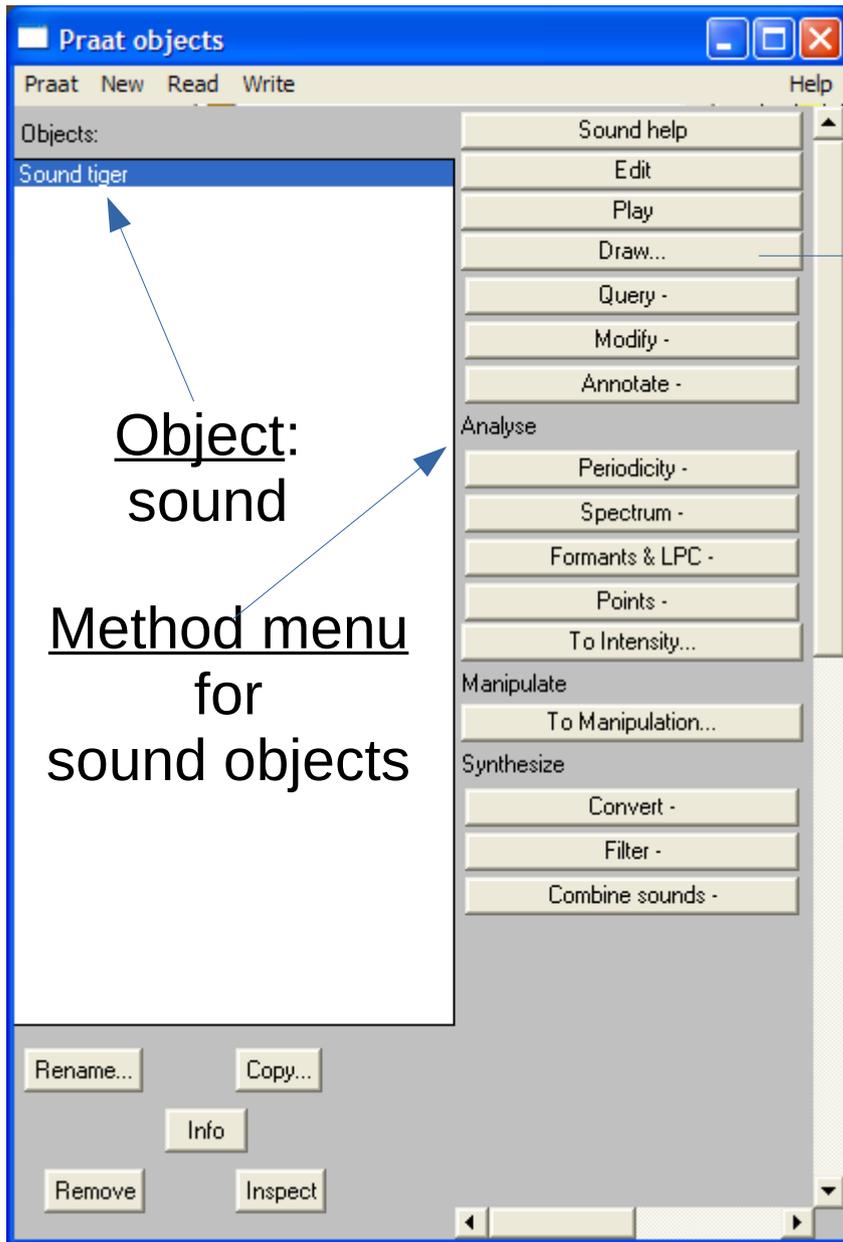
# PRAAT OBJECTS AND PRAAT METHODS

# PRAAT WINDOWS

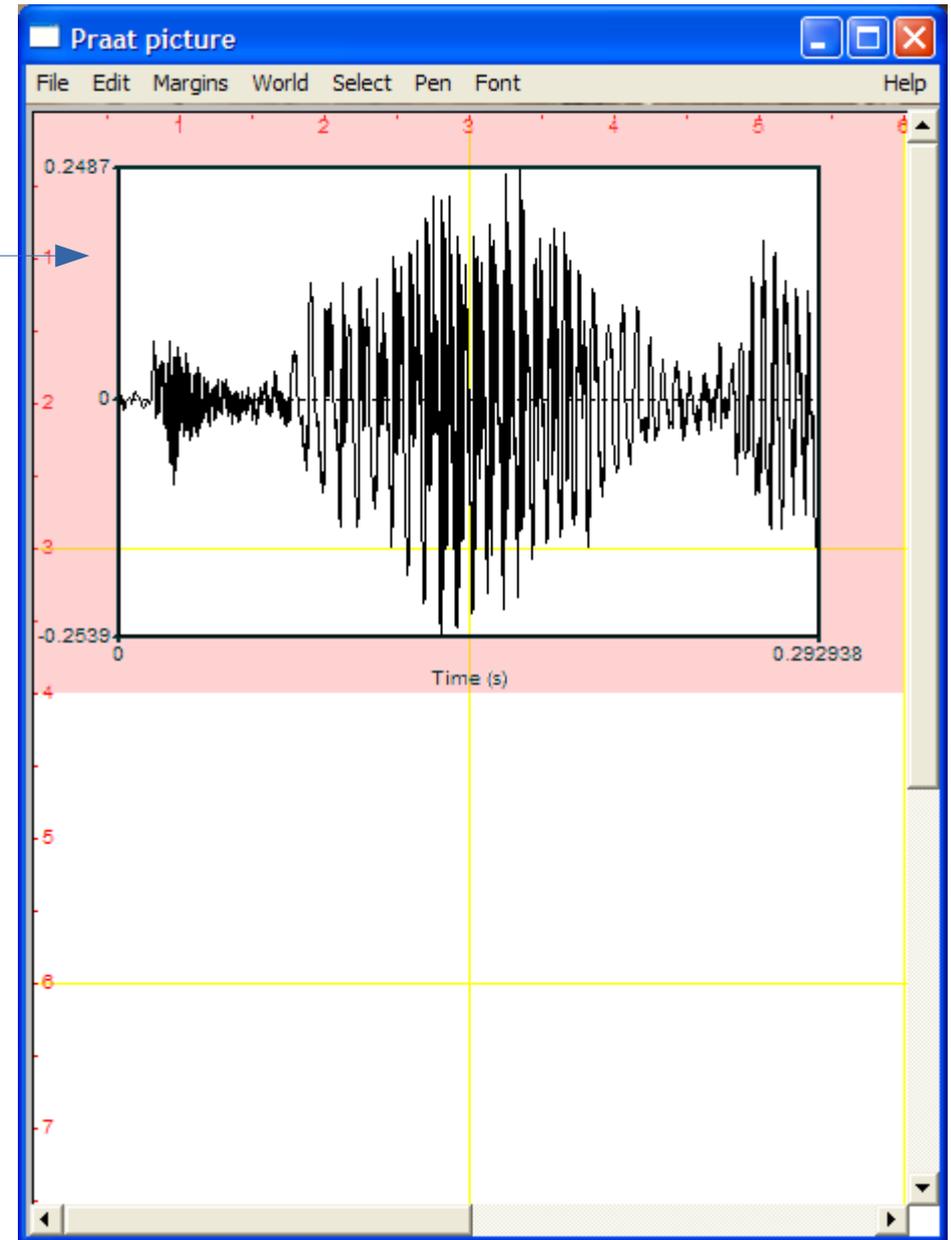
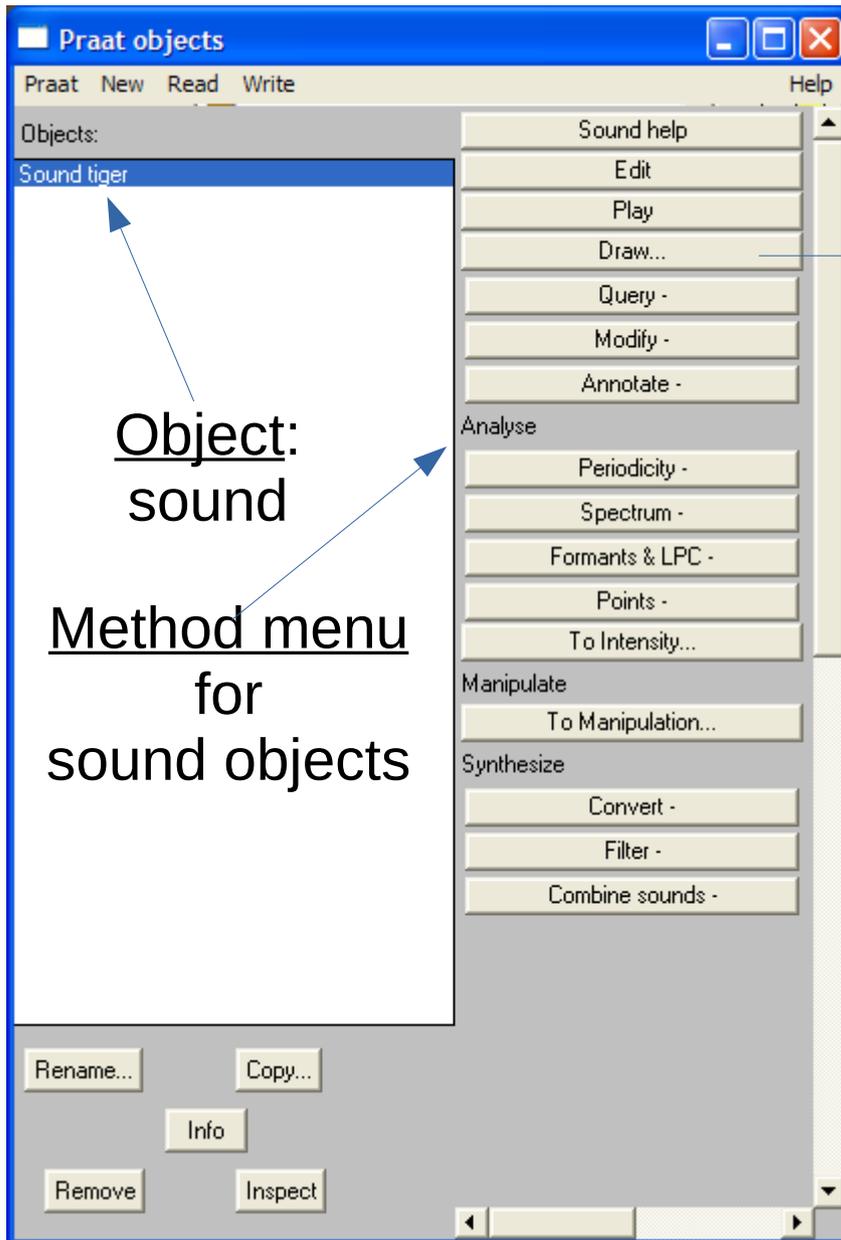
Load file Save file



# PROCESSING PRAAT OBJECTS



# PROCESSING PRAAT OBJECTS



# PROCESSING PRAAT OBJECTS

The image shows three overlapping windows from the Praat software interface:

- Praat objects:** Located at the top left, it lists the current objects. 'Sound tiger' is selected. A context menu is open over it, showing options: 'Sound help', 'Edit', 'Play', and 'Draw...'. An arrow points from the 'Edit' option to the 'Praat picture' window.
- Praat picture:** Located at the top right, it shows a waveform visualization. A red vertical line is positioned at 0.2487 seconds. An arrow points from the 'Draw...' option in the 'Praat objects' window to this line.
- Sound tiger:** The main window in the foreground, showing a detailed waveform. A red vertical line is at 0.146469 seconds. A blue horizontal line is at 0.01224. The x-axis shows 'Visible part 0.292938 seconds' and 'Total duration 0.292938 seconds'. At the bottom, there are buttons for 'all', 'in', 'out', 'sel', and a 'Group' checkbox.

Annotations on the left side of the image:

- Object: sound (with an arrow pointing to 'Sound tiger' in the 'Praat objects' window)
- Method menu for sound object (with an arrow pointing to the context menu in the 'Praat objects' window)

# PROCESSING PRAAT OBJECTS

**Praat objects**

Praat New Read Write Help

Objects:

Sound tiger

Sound help  
Edit  
Play  
Draw...

**Sound tiger**

File Edit Query View Select Spectrum Pitch Intensity Formant Pulses Help

0.2487

0.01224

0.146469

-0.2539

0.146469

0.000000 Visible part 0.292938 seconds 0.292938

Total duration 0.292938 seconds

all in out sel Group

Object:  
sound

Method menu  
for  
sound object

# SELECTING PART OF A SOUND OBJECT

The image shows two windows from the Praat software. The top window, titled 'Praat objects', has a menu bar with 'Praat', 'New', 'Read', 'Write', and 'Help'. Below the menu is a list of objects with 'Sound tiger' selected. To the right of the list are buttons for 'Sound help', 'Edit', 'Play', and 'Draw...'. The bottom window, titled 'Sound tiger', has a menu bar with 'File', 'Edit', 'Query', 'View', 'Select', 'Spectrum', 'Pitch', 'Intensity', 'Formant', 'Pulses', and 'Help'. The main area is a waveform plot with a red shaded region indicating a selected segment. The time markers for the selection are 0.071819, 0.161977 (6.174 / s), and 0.233795. The y-axis ranges from -0.2539 to 0.2487. At the bottom, it shows 'Visible part 0.292938 seconds' and 'Total duration 0.292938 seconds'. There are also buttons for 'Rename...', 'Copy...', 'Info', 'Remove', and 'Inspect'.

Object: sound

Method menu for sound object

# SELECTING PART OF A SOUND OBJECT

The image shows the Praat software interface. The 'Praat objects' window is open, showing a list of objects with 'Sound tiger' selected. A blue arrow points from the text 'Object: sound' to the 'Sound tiger' entry. Below this, the text 'Method menu for sound object' is visible. The 'Sound tiger' window is open, displaying a waveform and a spectrogram. A red shaded region highlights a segment of the sound, bounded by vertical dashed lines at time markers 0.071819, 0.161977 (6.174 / s), and 0.233795. The spectrogram shows frequency components up to 500 Hz, with a blue line indicating the pitch contour. The visible part of the sound is 0.292938 seconds long, and the total duration is also 0.292938 seconds. The bottom of the window shows a selection menu with 'all', 'in', 'out', and 'sel' options, and a 'Group' checkbox.

Object: sound

Method menu for sound object

# CREATING A NEW PRAAT OBJECT

**Praat objects**

Praat New Read Write Help

Objects:

- Sound tiger
- Sound untitled

Sound help  
Edit  
Play  
Draw...

**Sound tiger**

File Edit Query View Select Spectrum Pitch Intensity Formant Pulses Help

0.071819 0.161977 (6.174 / s) 0.233795

0.2487  
0  
-0.2539  
5000 Hz

500 Hz  
155.34 Hz  
76 Hz

0 Hz 0.071819 0.161977 0.059142

0.000000 Visible part 0.292938 seconds 0.292938

Total duration 0.292938 seconds

all in out sel Group

**Object: sound**

**Method menu for sound object**

**Extract sound selection**

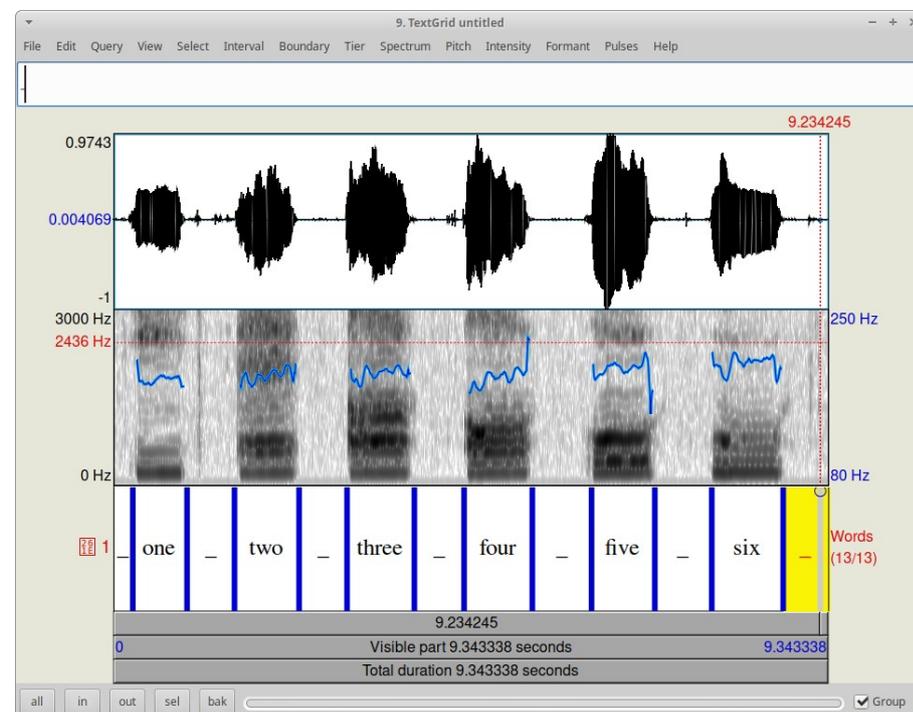
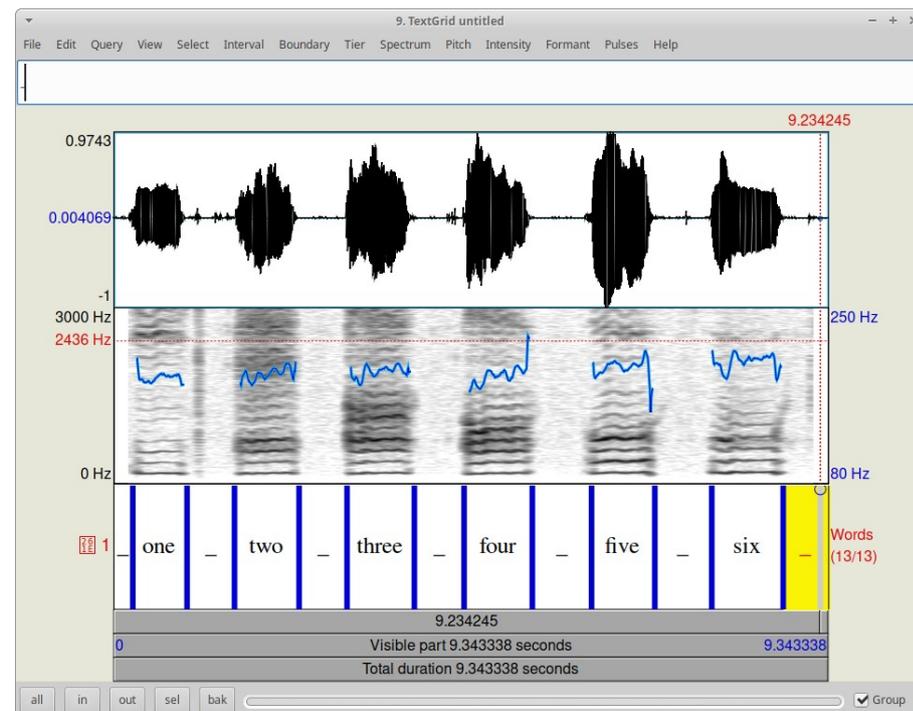
# PRAAT: BASIC FUNCTIONALITY

## Input:

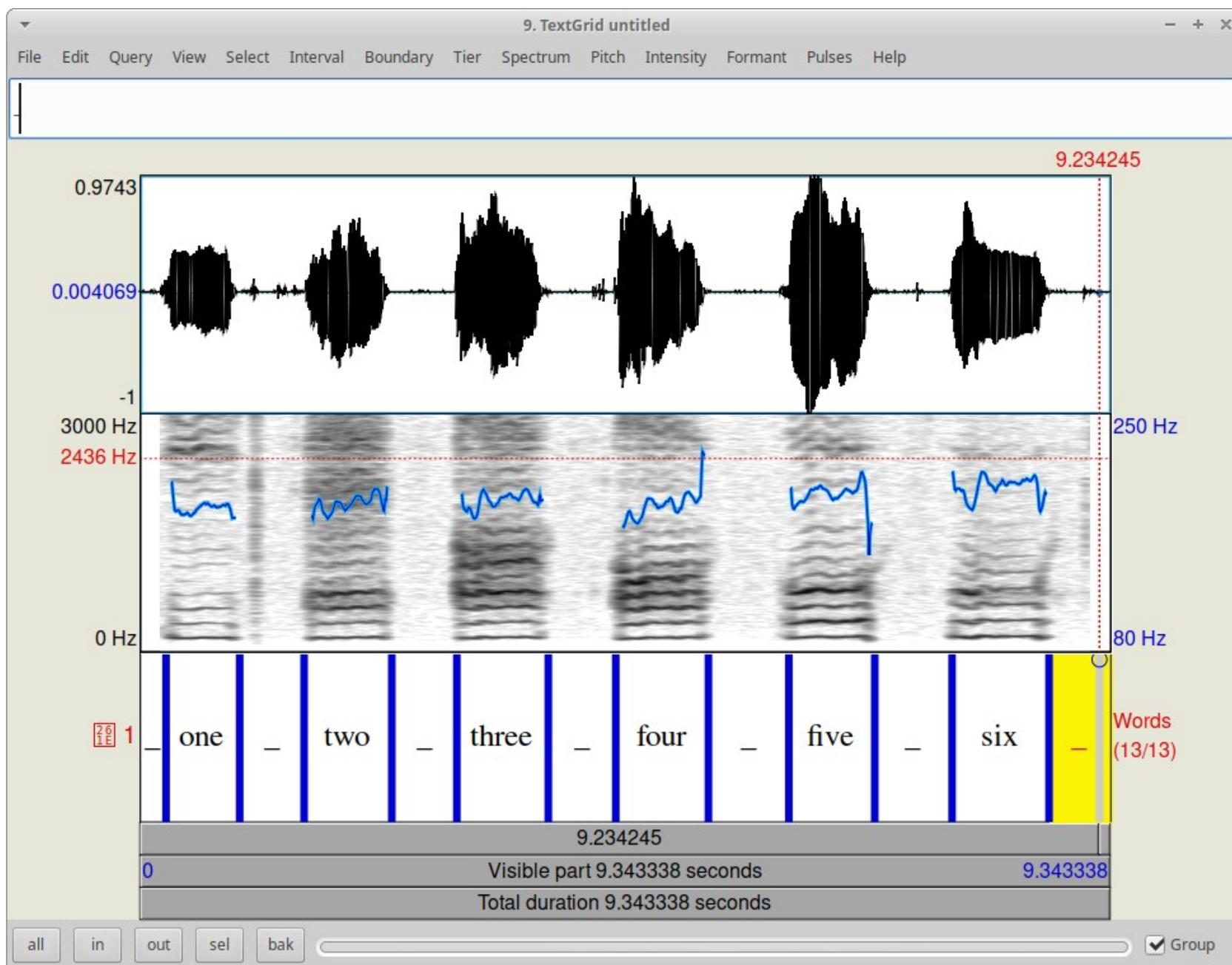
- recording speech from microphone or other sources
- reading from files

## Methods:

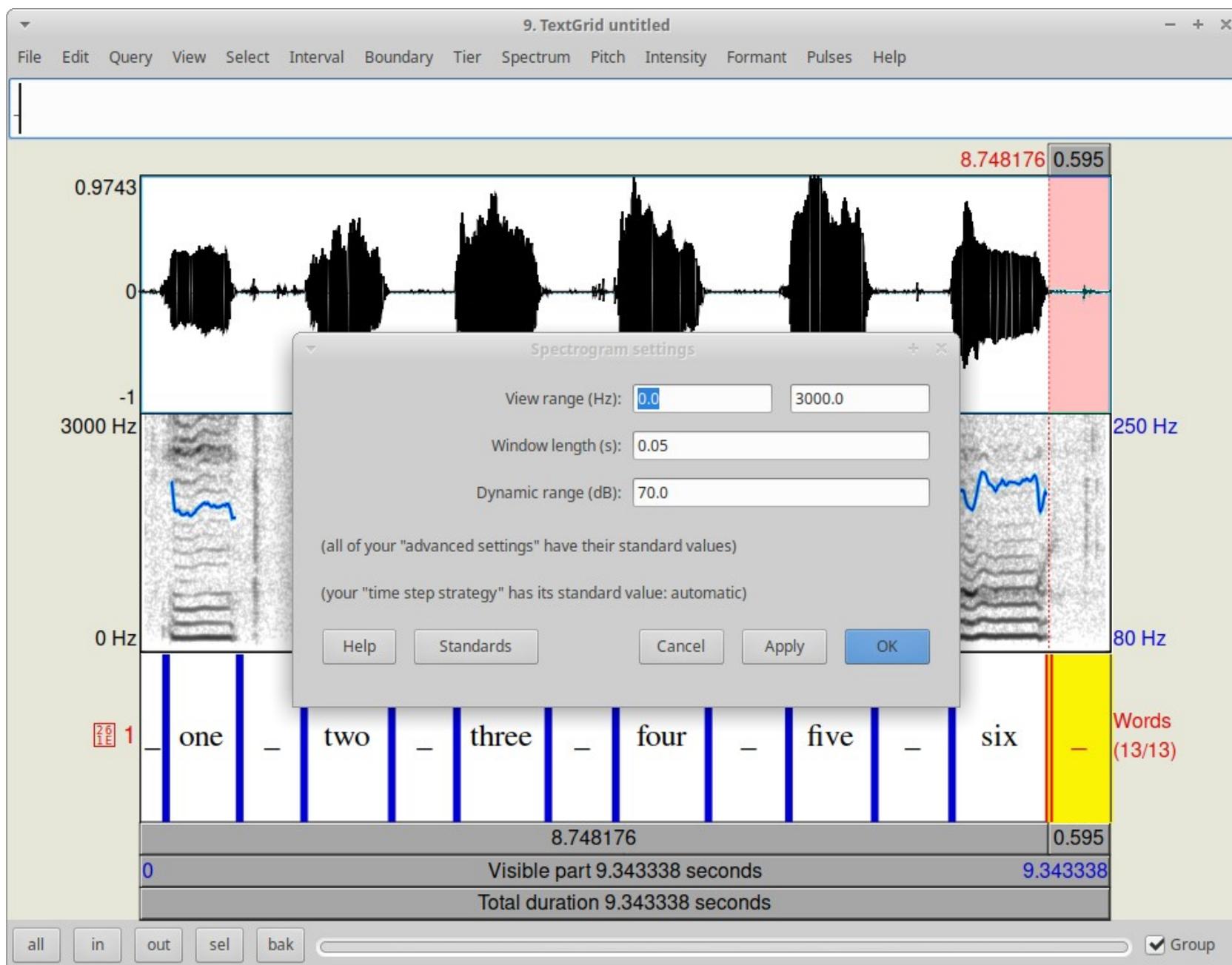
- waveform selection and analysis
- spectral analysis
- frequency and intensity analysis
- transcription and annotation of speech
- speech synthesis
- Output:
  - saving speech files
  - saving files with analysis results:
    - annotations (TextGrid files)
    - fundamental frequency
    - spectral information



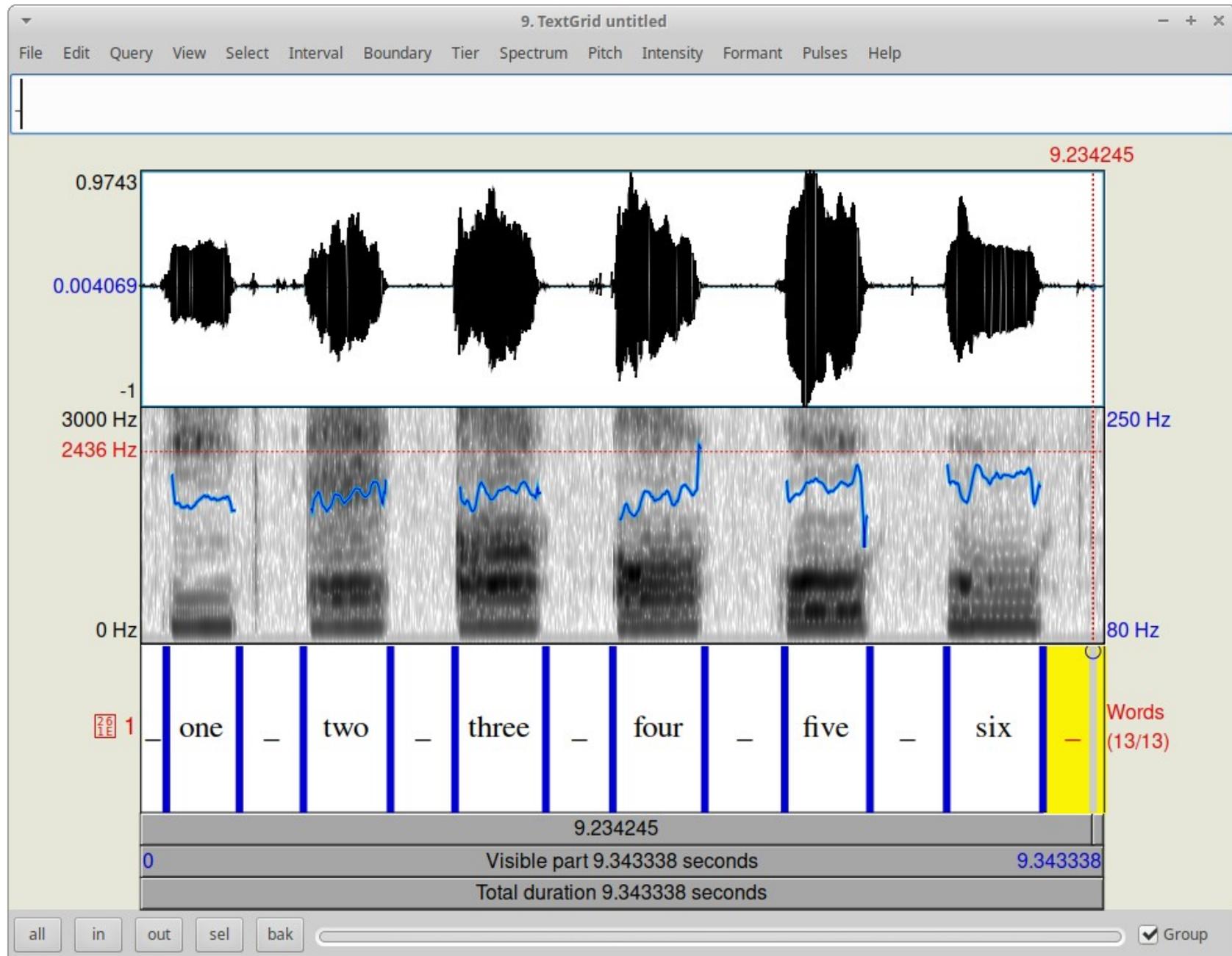
# RECORDING SPEECH



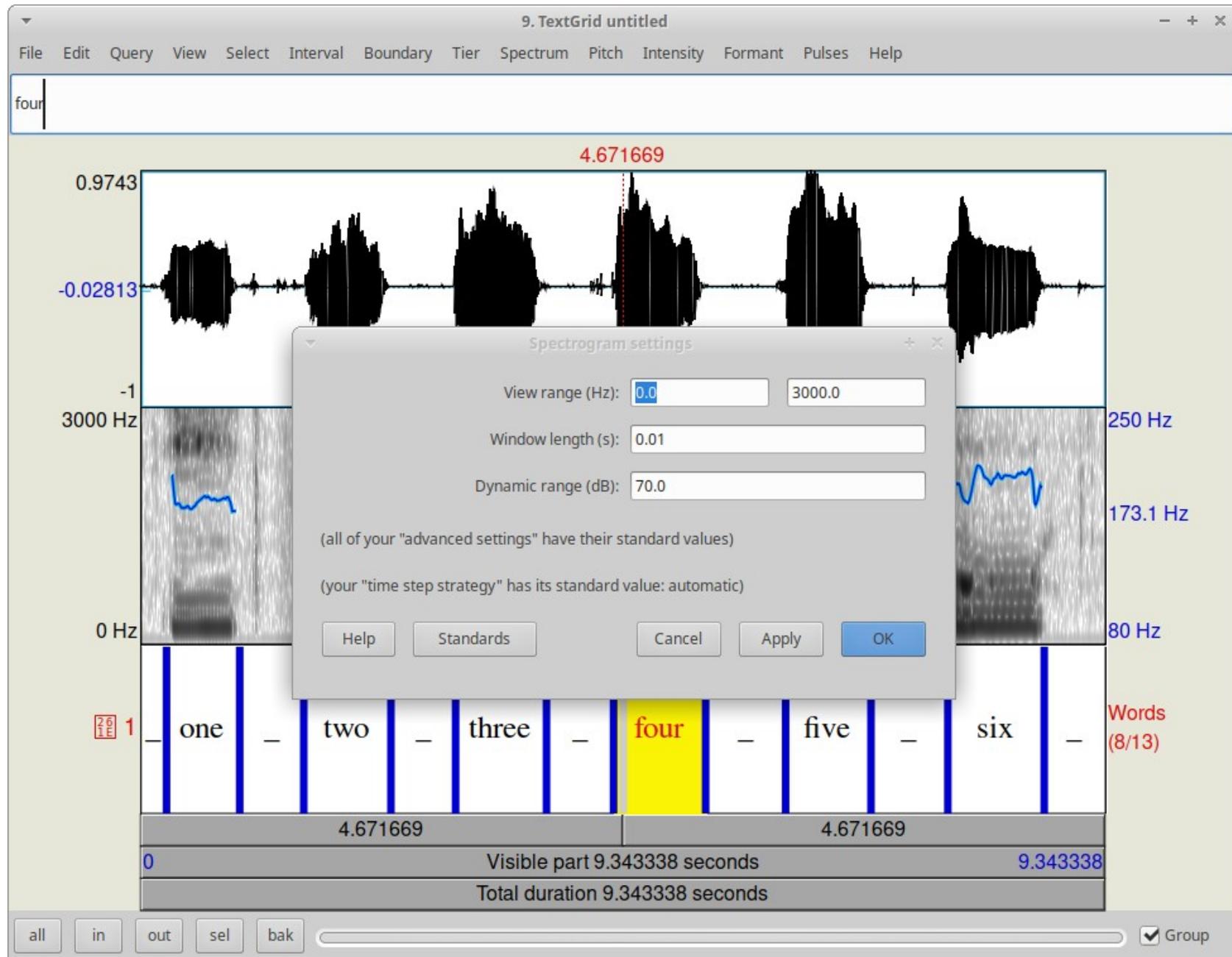
# RECORDING SPEECH



# RECORDING SPEECH



# VISUALISING SPEECH



# PRACTICAL PRAAT

THANKS – NOW PLEASE PRACTICE !

