

# BA ENGLISH: PHONETICS 2

## THE SOUNDS OF SPEECH

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Bielefeld University, Germany

JNU, Guangzhou, 2022-03-29

# BY THE WAY: HOW DO YOU PRONOUNCE ...

GHOUGH PHTHEIGHT TEEAU

# BY THE WAY: HOW DO YOU PRONOUNCE ...

GHOUGHPTHTEIGHTTEEAU

If GH can stand for P as in 'hiccough,'

If OUGH can stand for O as in 'dough,'

If PHTH can stand for T as in 'phthisis,'

If EIGH can stand for A as in 'neighbour,'

If TTE can stand for T as in 'gazette,'

If EAU can stand for O as in 'plateau,'

Then the correct way to spell potato would be

GHOUGHPTHTEIGHTTEEAU.

*REVISION*

PROSODY: RHYTHM AND INTONATION

# PROSODY: METALOCUTIONARY POINTERS

## STRUCTURAL FUNCTIONS:

### METALOCUTIONARY POINTERS

*pitch accents ~ pointers to contrast,  
emphasis*

*pitch accents ~ pointers to new  
information*

*final pitch accent ~ pointer to new  
information AND utterance type*

*global intonation, accent sequence,  
boundary tones: pointer to utterance  
type and scope*

# INTONATION: METALOCUTIONARY POINTERS

## STRUCTURAL FUNCTIONS:

### METALOCUTIONARY POINTERS

*pitch accents ~ pointers to contrast,  
emphasis*

*pitch accents ~ pointers to new  
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*final pitch accent ~ pointer to new  
information AND utterance type*

*global intonation, accent sequence,  
boundary tones: pointer to utterance  
type and scope*

## EMOTIONAL FUNCTIONS:

### ICONS AND INDICES

*frequency ~ size*

*frequency ~  
excitement*

*loudness ~ anger*

*loudness ~ noisy place*

# INTONATION: METALOCUTIONARY POINTERS

## STRUCTURAL FUNCTIONS:

### METALOCUTIONARY POINTERS

*pitch accents ~ pointers to contrast, emphasis*

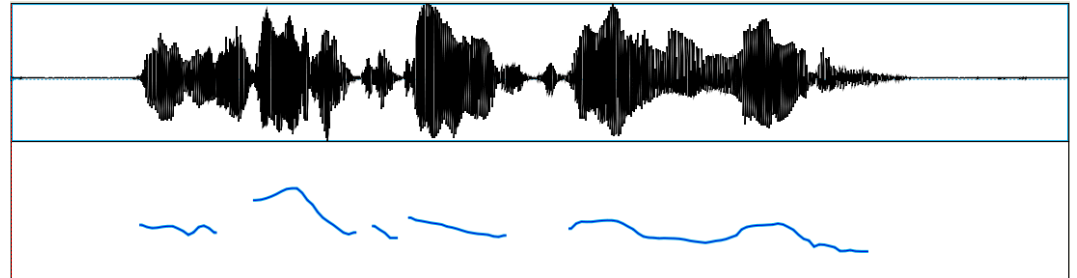
*pitch accents ~ pointers to new information*

*final pitch accent ~ pointer to new information AND utterance type*

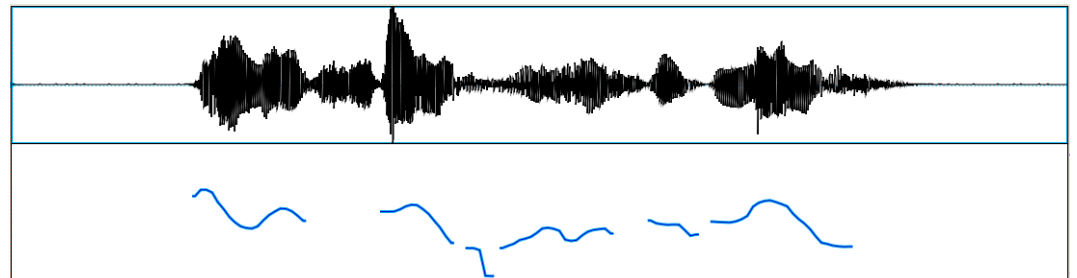
*global pitch contour, accent sequence, boundary tones: pointer to utterance type and scope*

*Imagine part of a telephone conversation...*

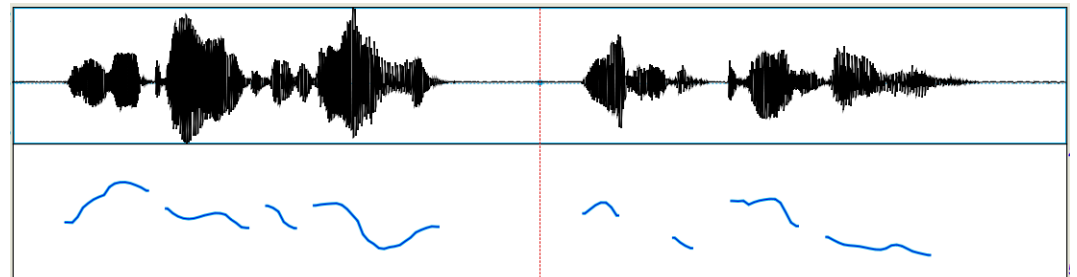
I de'cided to 'go into 'town on 'Monday.



No, not SUNday, I said "MONday".



Will you go into town? Yes, of course I will.



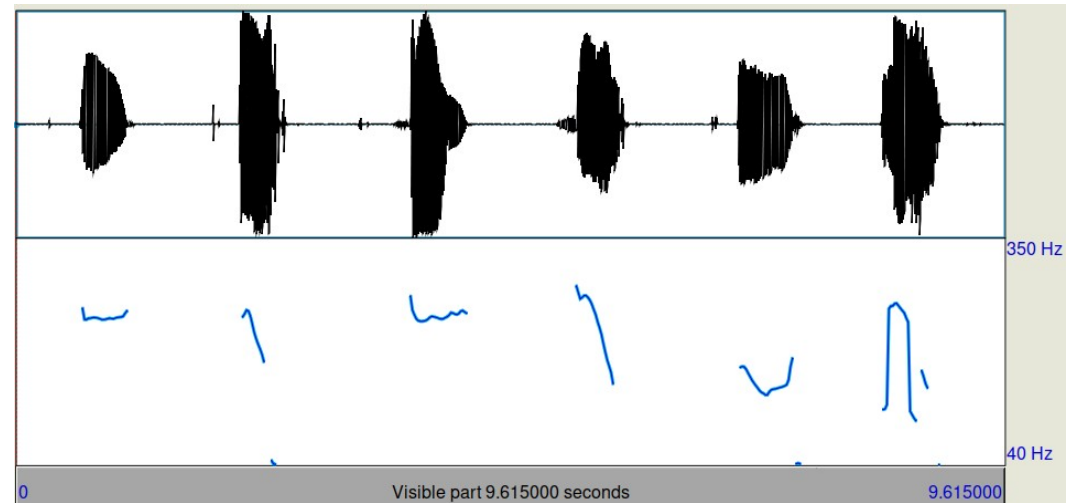
# PROSODY: ENGLISH AND CHINESE



# FREQUENCY MODULATION: ENGLISH PITCH ACCENTS

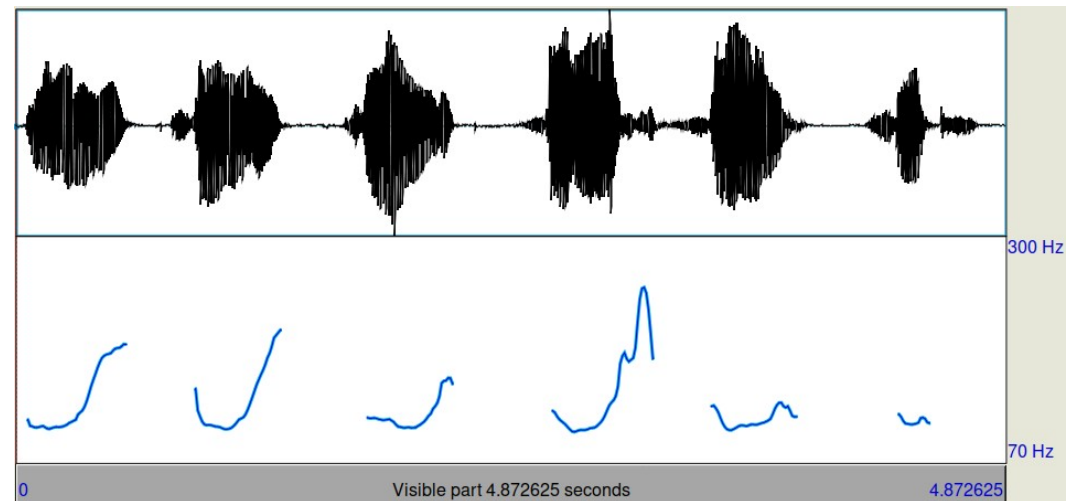
Chinese lexical tones:

function –  
phonemic lexical contrast



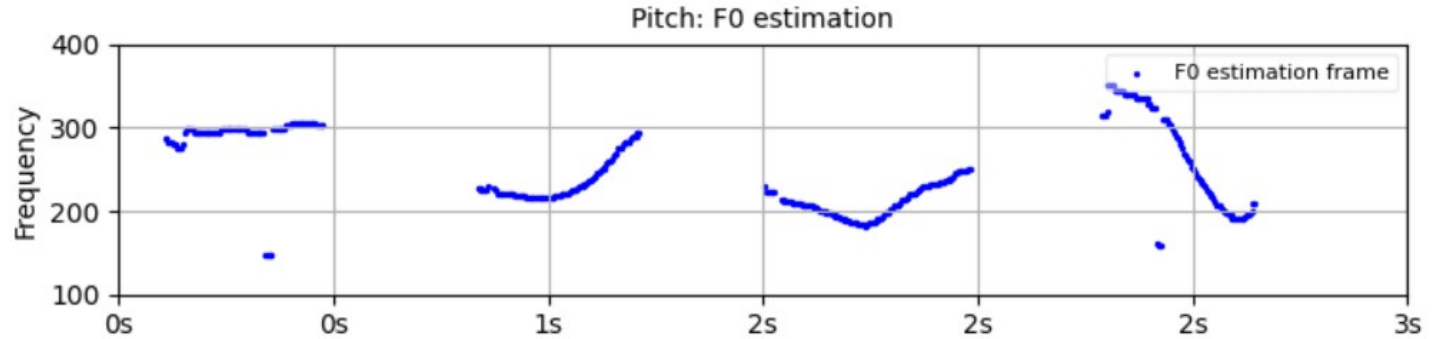
English pitch accents:

function –  
metacutionary morphemic  
pointing to positions in utterances

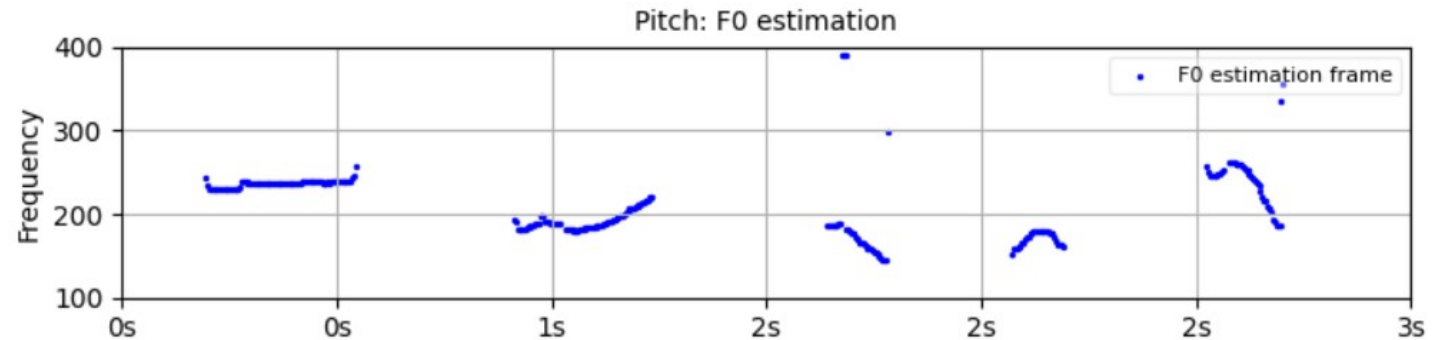


# FREQUENCY MODULATION: CHINESE LEXICAL TONES

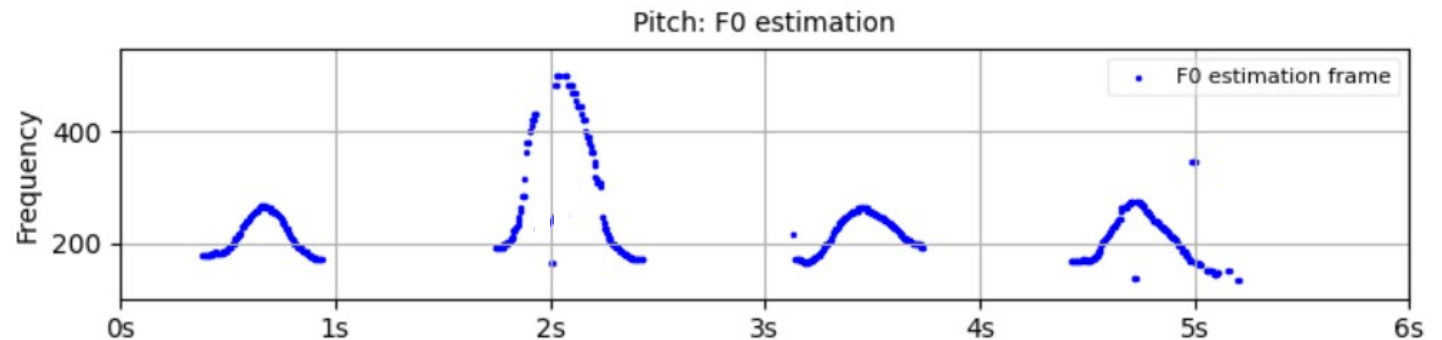
Phonemic tones  
Tones 1 ... 4  
*high female voice*



Phonemic tones  
Tones 1 ... 4  
*low female voice:  
creaky Tone 3*



Morphemic tone  
“Tone 6” 😊  
*low female voice:  
4 allotones*



***What is the meaning of this tone?***

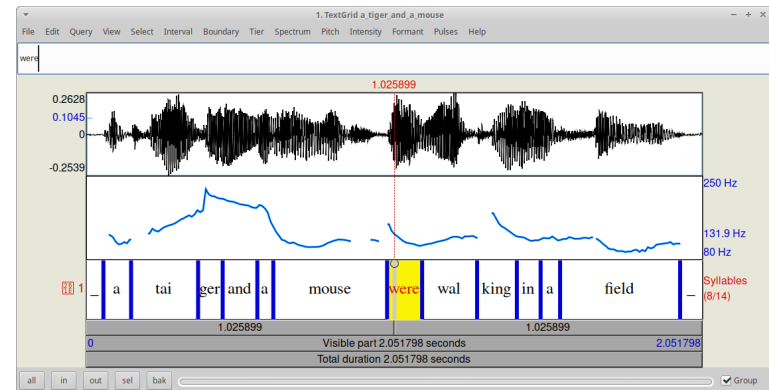
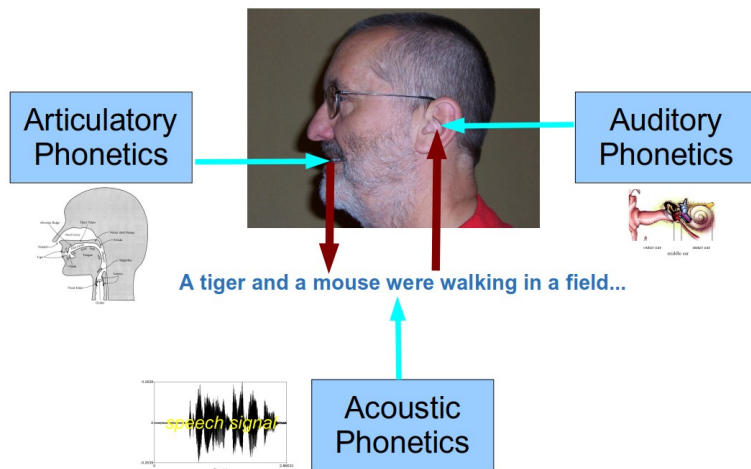
# PHONETICS

## the phonetic cycle

# PHONETICS

Phonetics:

the perceptual, instrumental, experimental study of physical sounds in  
production of speech  
transmission of speech  
perception of speech



phonetic  
analysis

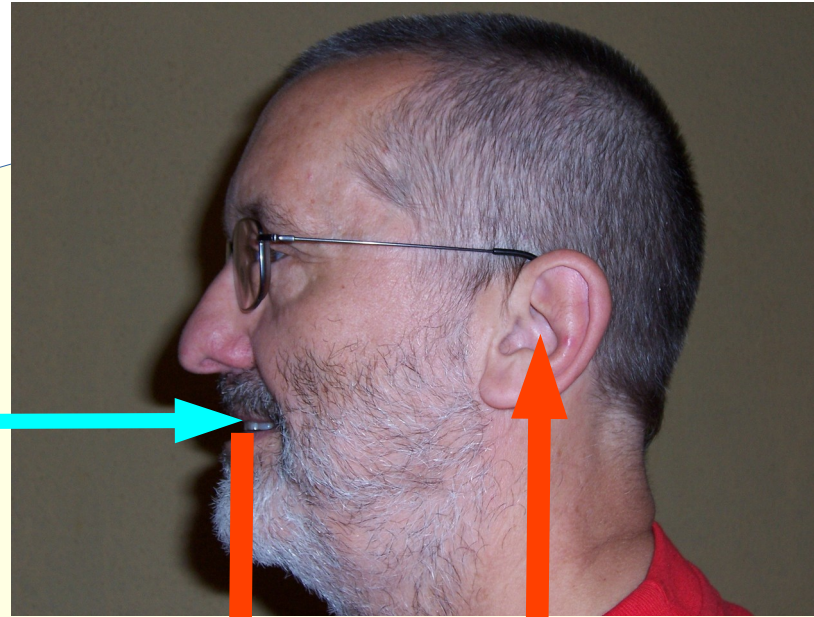
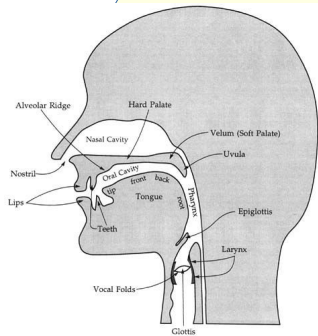
# PHONETICS: the phonetic cycle



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

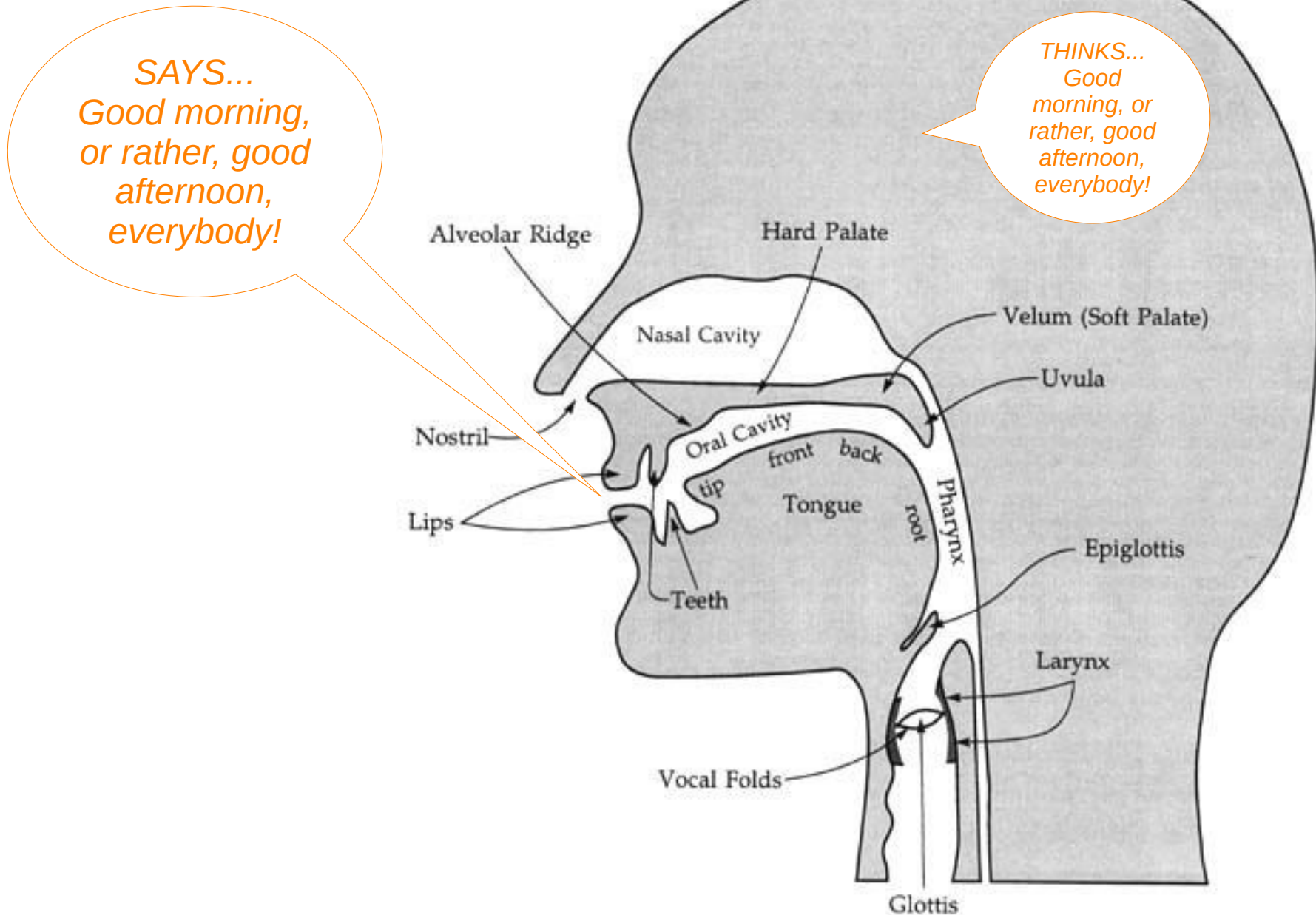
# PHONETICS: the phonetic cycle

## Articulatory Phonetics

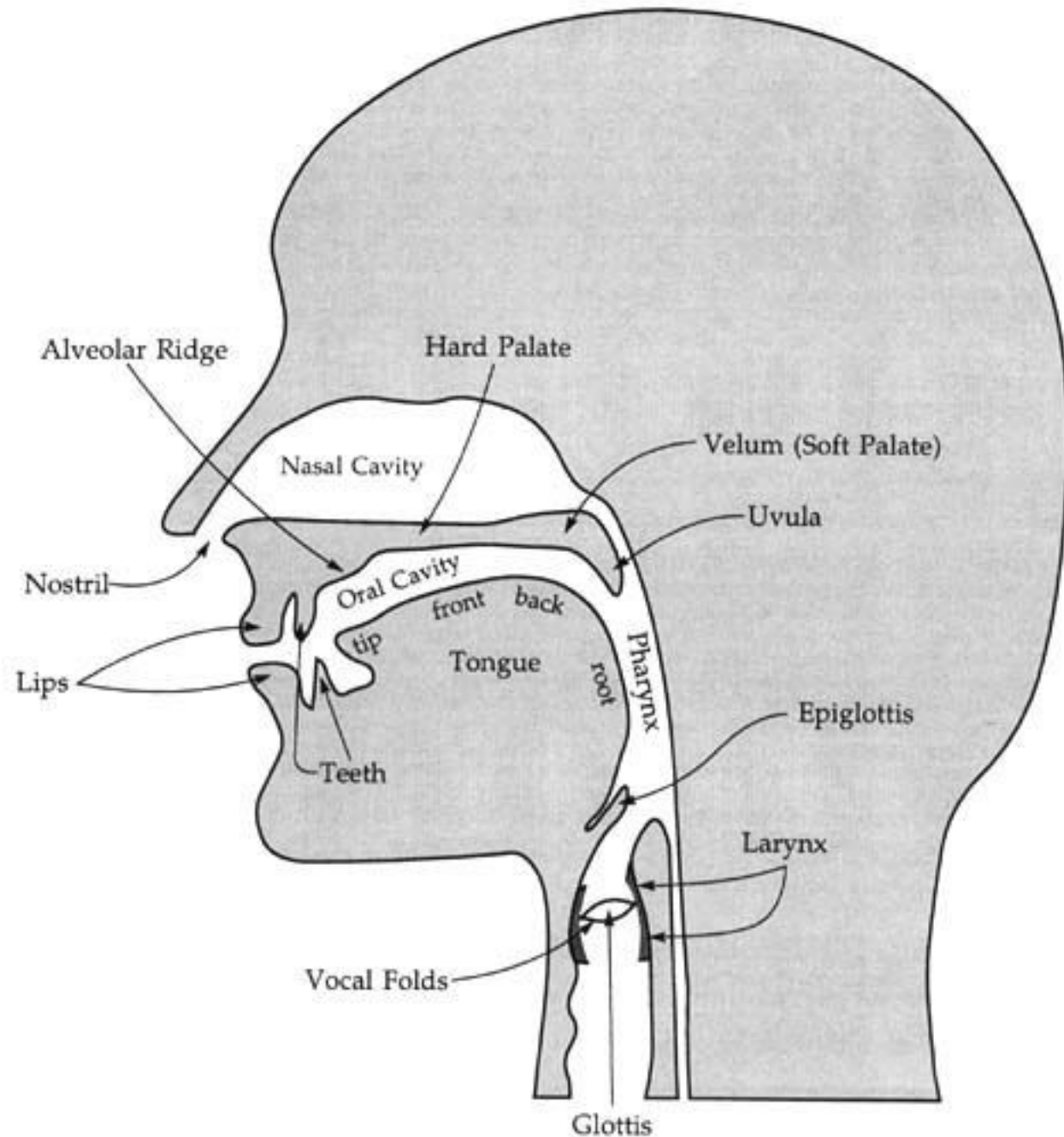


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# ARTICULATORY PHONETICS: speech production



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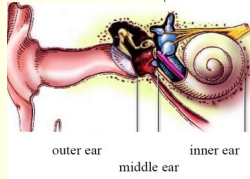
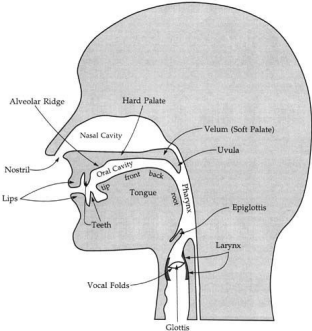
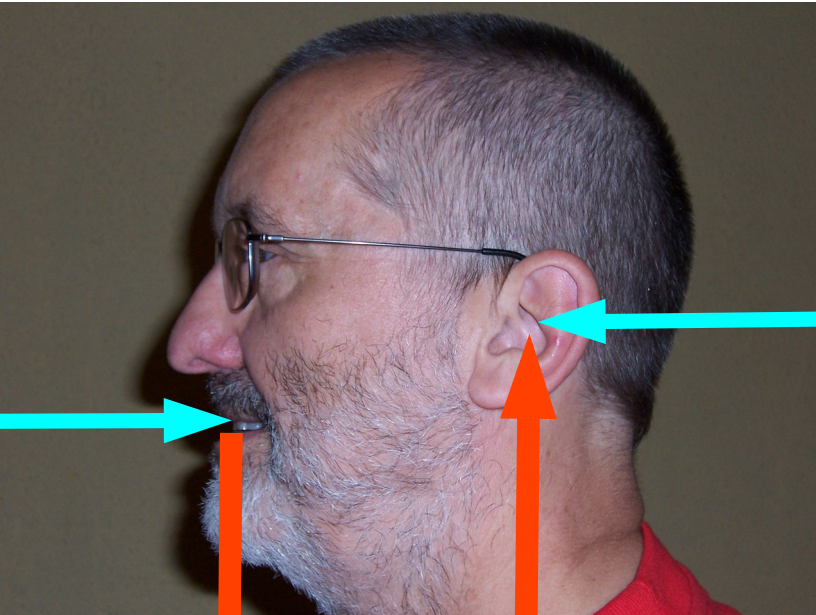




# AUDITORY PHONETICS: speech perception

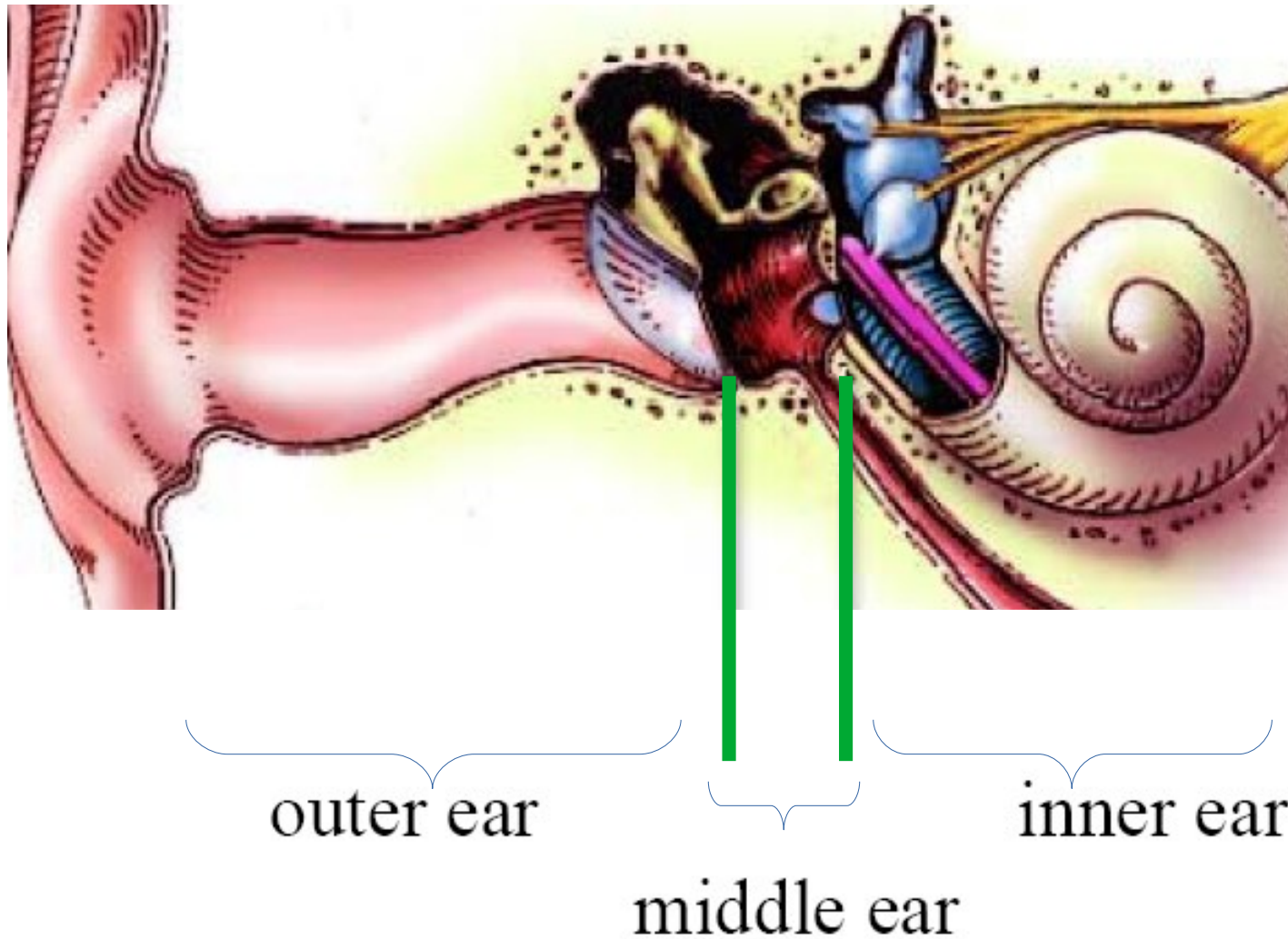
Articulatory  
Phonetics

Auditory  
Phonetics



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

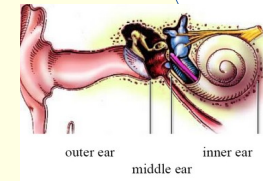
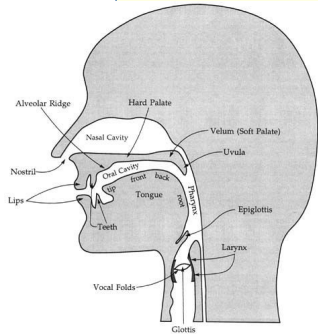
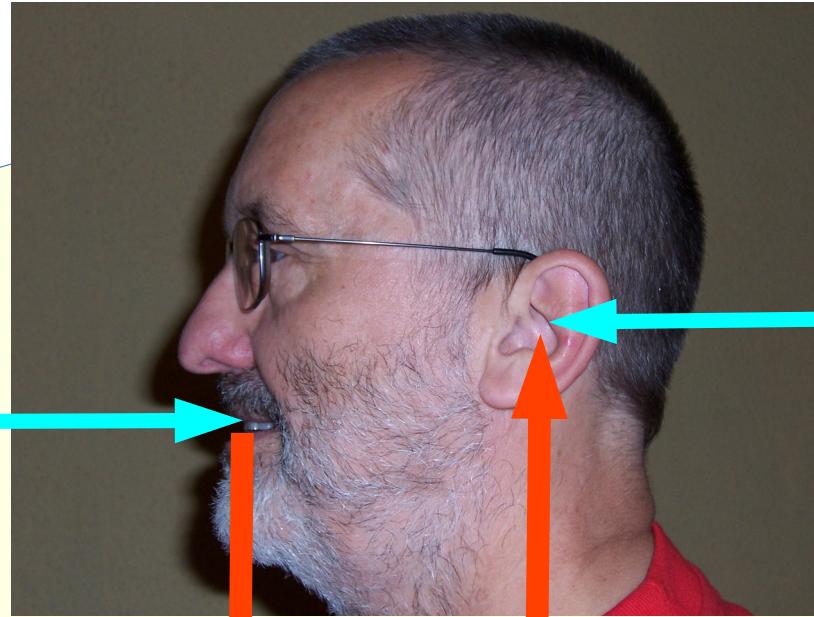
# AUDITORY PHONETICS: speech perception



# ACOUSTIC PHONETICS: speech transmission

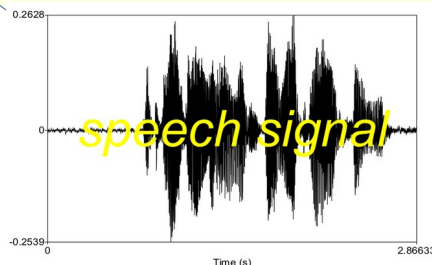
Articulatory  
Phonetics

Auditory  
Phonetics

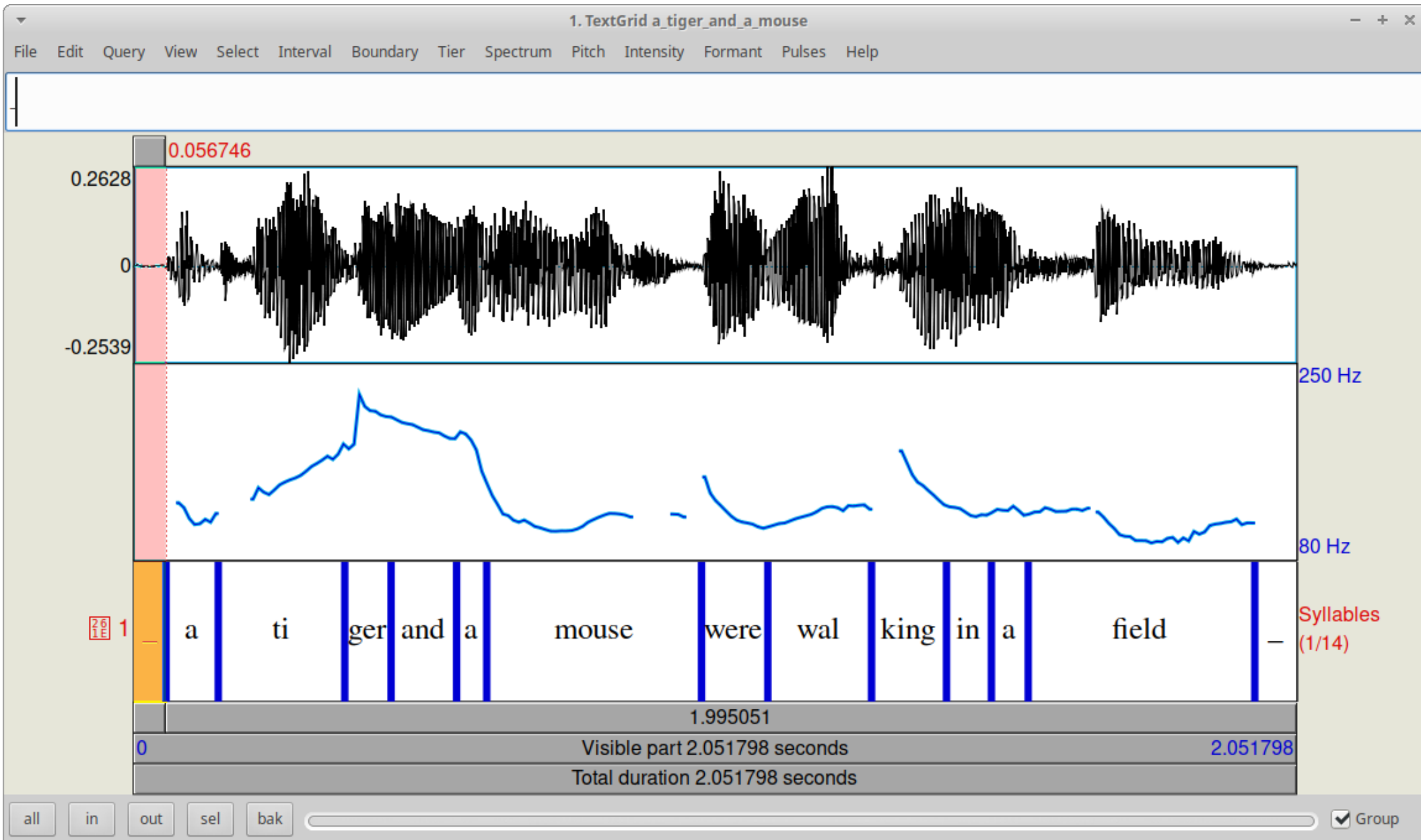


A tiger and a mouse were walking in a field...

Acoustic  
Phonetics



# ACOUSTIC PHONETICS: speech transmission



## the Praat phonetic workbench

THE INTERNATIONAL PHONETIC ASSOCIATION

THE INTERNATIONAL PHONETIC ALPHABET

IPA

# The International Phonetic Alphabet

CONSONANTS (PULMONIC)

© 2015 IPA

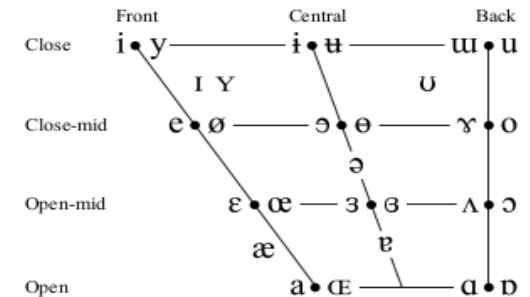
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				ʀ					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant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

◌◌ 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	◌◌		
◌◌ Syllabic	◌◌	◌◌ Lowered	◌◌		
◌◌ 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

The concept of the IPA was first suggested by Otto Jespersen in a letter to Paul Passy of the International Phonetic Association

It was developed by A.J. Ellis, Henry Sweet, Daniel Jones, and Passy in the late 19th century. ...

It was first published in 1888 and was revised several times in the 20th and 21st centuries.

(But actually the idea goes back to Alexander Graham Bell, the inventor of the telephone – and to all the cultures who have invented alphabetic scripts!)

## CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
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Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				ʀ					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			

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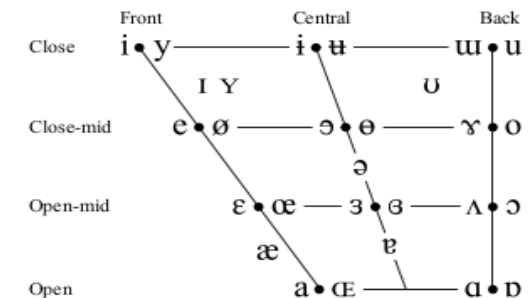
## CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
◌ ɸ 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

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- ɰ Voiced labial-velar approximant
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- 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
- ː 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
- ˥ High
- ˨ Mid
- ˩ Low
- ˩ Extra low
- ˩ Downstep
- ˩ Upstep
- ˥ or ˧ Rising
- ˥ Falling
- ˨ High rising
- ˩ Low rising
- ˩ Rising-falling
- ↗ Global rise
- ↘ Global fall

## DIACRITICS

◌ Voiceless	◌̥	◌̥ Breathy voiced	◌̤	◌̤ Dental	◌̤
◌ Voiced	◌̬	◌̬ Creaky voiced	◌̜	◌̜ Apical	◌̜
◌ Aspirated	◌̚	◌̚ Linguolabial	◌̚	◌̚ Laminar	◌̚
◌ 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	◌̠		
◌ Syllabic	◌̥	◌̥ Lowered	◌̥		
◌ Non-syllabic	◌̥	◌̥ Advanced Tongue Root	◌̥		
◌ Rhoticity	◌̥	◌̥ 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				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			

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## 1. Consonants

## 2. Special consonants

## 3. Vowels

## 4. Consonant and vowel modifications

## 5. Phrasal prosody

## 6. Lexical prosody

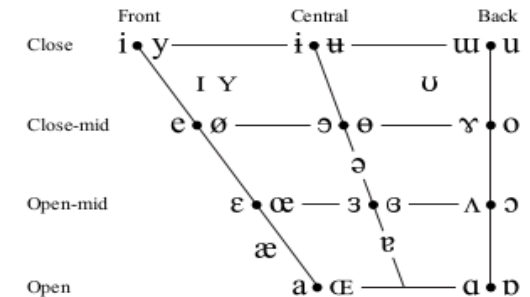
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! ◌ ɠ (Post)alveolar	ɠ Palatal	tʼ Dental/alveolar
‡ ◌ ɡ Palatoalveolar	ɡ Velar	kʼ Velar
◌ ɥ Alveolar lateral	ɥ Uvular	sʼ Alveolar fricative

## OTHER SYMBOLS

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

## VOWELS



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- ◌ Linking (absence of a break)

## TONES AND WORD ACCENTS

- | LEVEL              | CONTOUR          |
|--------------------|------------------|
| é or ɛ̃ Extra high | ě or ɛ̃ 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. ɲ̃

◌ Voiceless	◌ ɲ ɖ	◌ Breathy voiced	◌ ɓ ɗ	◌ Dental	◌ ʈ ɖ
◌ Voiced	◌ ɳ ʈ	◌ Creaky voiced	◌ ɓ̃ ɗ̃	◌ Apical	◌ ʈ̣ ɖ̣
◌ Aspirated	◌ ʈʰ ɖʰ	◌ Linguolabial	◌ ɓ̣ ɗ̣	◌ Laminal	◌ ʈ̣̥ ɖ̣̥
◌ More rounded	◌ ɔ̞	◌ Labialized	◌ ʈʷ ɖʷ	◌ Nasalized	◌ ẽ̃
◌ Less rounded	◌ ɔ̟	◌ Palatalized	◌ ʈʲ ɖʲ	◌ Nasal release	◌ ɖ̃ⁿ
◌ Advanced	◌ ɥ	◌ Velarized	◌ ʈˠ ɖˠ	◌ Lateral release	◌ ɖ̃ˡ
◌ Retracted	◌ ɛ̠	◌ Pharyngealized	◌ ʈˤ ɖˤ	◌ No audible release	◌ ɖ̃˦
◌ Centralized	◌ ẽ̜	◌ Velarized or pharyngealized	◌ ʈ̠		
◌ Mid-centralized	◌ ẽ̞	◌ Raised	◌ ɛ̥ (ɹ = voiced alveolar fricative)		
◌ Syllabic	◌ ɲ̩	◌ Lowered	◌ ɛ̜ (β = voiced bilabial approximant)		
◌ Non-syllabic	◌ ɛ̥	◌ Advanced Tongue Root	◌ ɛ̟		
◌ Rhoticity	◌ ɔ̞˞ ɔ̟˞	◌ Retracted Tongue Root	◌ ɛ̠		

# 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				

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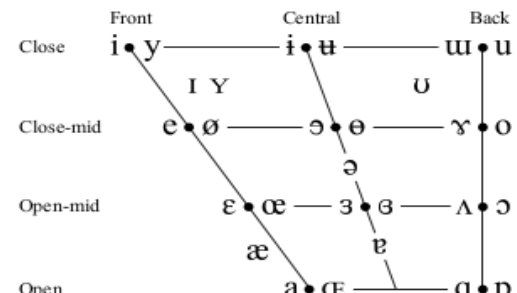
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Clicks	Voiced implosives	Ejectives
◌◌ Bilabial	ɓ Bilabial	ʼ Examples:
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! (Post)alveolar	ɟ Palatal	tʼ Dental/alveolar
‡ Palatoalveolar	ɡ Velar	kʼ Velar
Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative

### OTHER SYMBOLS

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

### 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
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. ɲ̥

◌◌ 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	
◌◌ Syllabic	◌◌ Lowered	
◌◌ Non-syllabic	◌◌ Advanced Tongue Root	
◌◌ Rhoticity	◌◌ 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				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.

## 2. Special consonants

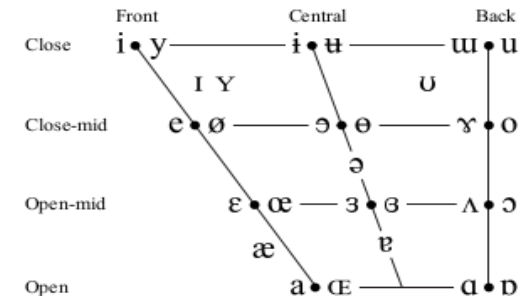
### CONSONANTS (NON-PULMONIC)

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	ɻ Voiced alveolar lateral flap
ɰ Voiced labial-palatal approximant	ɥ Simultaneous ʃ and x
ħ Voiceless epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
ʕ Voiced epiglottal fricative	
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 k̟

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

◌◌ 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	◌◌	◌◌	◌◌	◌◌

### 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)

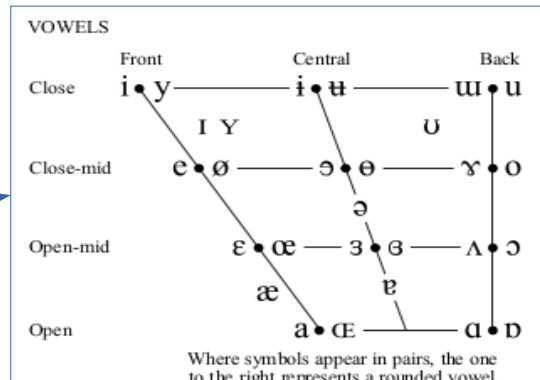
© 2015 IPA

	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				ʀ					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.

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	tʼ Dental/alveolar
‡ ◌ ɠ Palatoalveolar	ɠ Velar	kʼ Velar
◌ ʈ Alveolar lateral	ɠ Uvular	sʼ Alveolar fricative



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

## 3. Vowels

OTHER SYMBOLS

- ʍ Voiceless labial-velar fricative
- ʌ Voiced labial-velar approximant
- ɥ Voiced labial-palatal approximant
- ħ Voiceless epiglottal fricative
- ʕ Voiced epiglottal fricative
- ʡ Epiglottal plosive
- ɕ Alveolo-palatal fricatives
- ɺ 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 kp

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          |
| ē or ̄ Extra high | ē or ̂ Rising    |
| é ̂ High          | ē Falling        |
| ē ̄ Mid           | ē High rising    |
| è ̄ Low           | ē Low rising     |
| ē̇ Extra low      | ē Rising-falling |
| ↓ Downstep        | ↗ Global rise    |
| ↑ Upstep          | ↘ Global fall    |

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

◌ 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	◌ ̞ ̟		
◌ Syllabic	◌ ̰ ̱	◌ Lowered	◌ ̞ ̟		
◌ Non-syllabic	◌ ̰ ̱	◌ Advanced Tongue Root	◌ ̞ ̟		
◌ Rhoticity	◌ ̞ ̟	◌ Retracted Tongue Root	◌ ̞ ̟		

# The International Phonetic Alphabet

CONSONANTS (PULMONIC)

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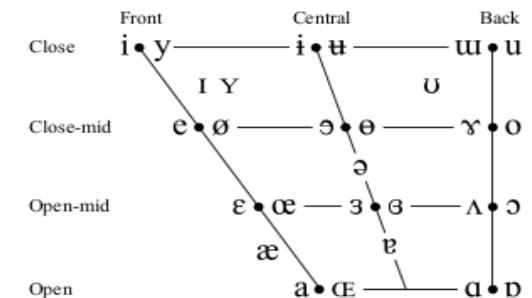
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				ʀ					ʀ		
Tap or Flap				ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		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	◌ ɓ' Bilabial
◌ ǃ (Post)alveolar	◌ ɟ Palatal	◌ ɗ' Dental/alveolar
◌ ǃ̥ Palatoalveolar	◌ ɡ Velar	◌ ɡ' Velar
◌ ǁ Alveolar lateral	◌ ɠ Uvular	◌ ɟ' Alveolar fricative

VOWELS



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

OTHER SYMBOLS

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

ts kp

SUPRASEGMENTALS

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

TONES AND WORD ACCENTS

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

## 4. Consonant and vowel modifications

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

◌ ˥ Voiceless	◌ ˦ Breathy voiced	◌ ˧ Dental
◌ ˨ Voiced	◌ ˩ Creaky voiced	◌ ˪ Apical
◌ ˫ Aspirated	◌ ˬ Linguolabial	◌ ˭ Laminar
◌ ˮ 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	
◌ ˾ Syllabic	◌ ˿ Lowered	
◌ ˿ Non-syllabic	◌ ˿ Advanced Tongue Root	
◌ ˿ Rhoticity	◌ ˿ 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	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.

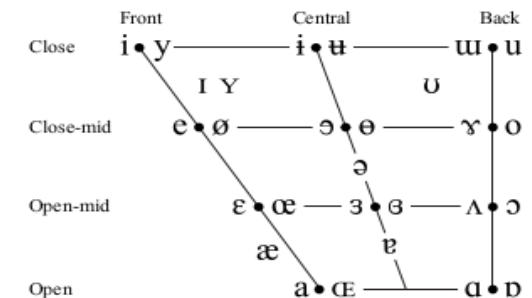
CONSONANTS (NON-PULMONIC)

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

OTHER SYMBOLS

ʍ Voiceless labial-velar fricative      ɕ ʑ Alveolo-palatal fricatives  
 ʋ Voiced labial-velar approximant      ɺ Voiced alveolar lateral flap  
 ɥ Voiced labial-palatal approximant      ɥ Simultaneous ʃ and x  
 ʜ Voiceless epiglottal fricative  
 ʕ Voiced epiglottal fricative      Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary. *ts̺ kp̺*  
 ʡ Epiglottal plosive

VOWELS



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

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

◌◌ 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	◌̙ ◌̚ (ɹ̥ = voiced alveolar fricative)		
◌◌ Syllabic	◌̚ ◌̜	◌◌◌ Lowered	◌̙ ◌̚ (β̙ = voiced bilabial approximant)		
◌◌ Non-syllabic	◌̚ ◌̜	◌◌◌ Advanced Tongue Root	◌̙ ◌̚		
◌◌ Rhoticity	◌̚ ◌̜	◌◌◌ Retracted Tongue Root	◌̙ ◌̚		

SUPRASEGMENTALS

ˈ Primary stress      ˌ Secondary stress      ː Long      eː  
 ˙ Half-long      e˙  
 ˘ Extra-short      ɛ̘  
 | Minor (foot) group  
 || Major (intonation) group  
 . Syllable break      .i.i.ækt  
 ~ Linking (absence of a break)

TONES AND WORD ACCENTS

LEVEL	CONTOUR		
é or ɛ̥ or ɛ̥	Extra high	ě or ɛ̥	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

5. Phrasal prosody

6. Lexical prosody

# HOW IS INFORMATION TRANSMITTED WITH SOUND?

# HOW IS INFORMATION TRANSMITTED WITH SOUND?

## Amplitude modulation by CV alternation and oral/nasal filtering:

- phonetics:  
amplitude curve, syllable, stress-accent
- phonology:  
sonority curve, syllables, stress



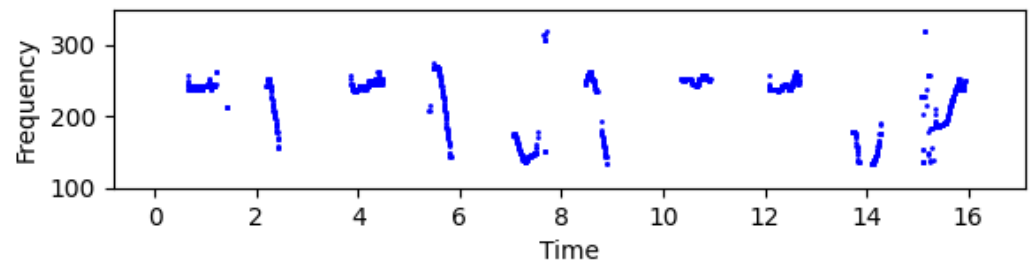
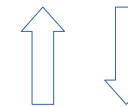
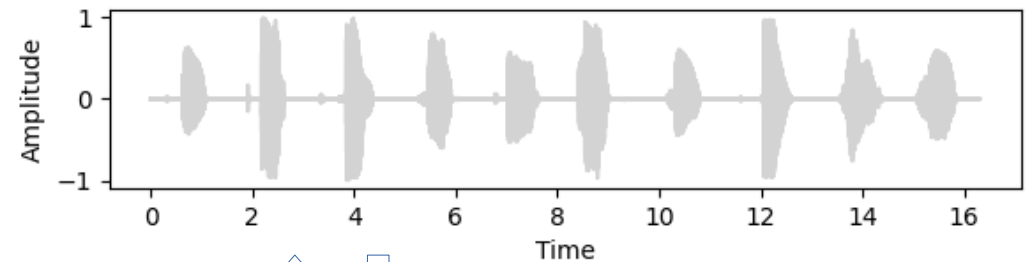
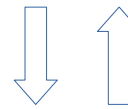
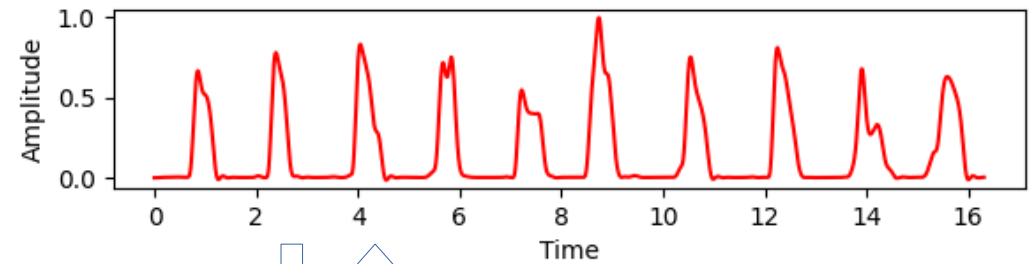
## Carrier signal:

- larynx:  
harmonic sounds
- constriction:  
noise sounds



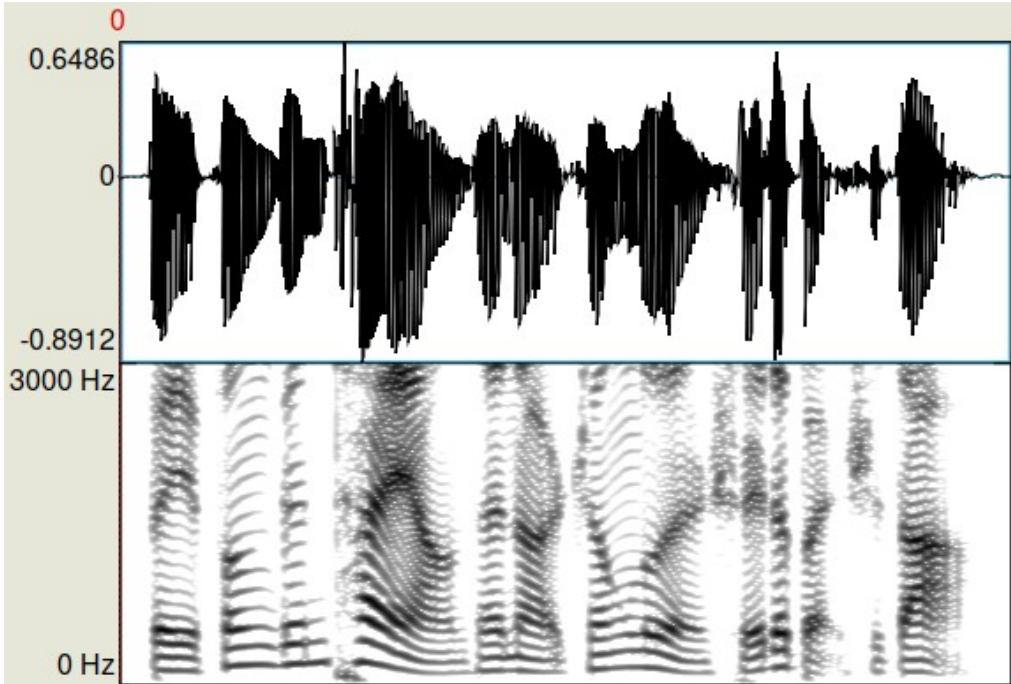
## FM envelope modulation at the source:

- phonetics:  
F0, pitch track
- phonology:  
tones, pitch accents, intonation





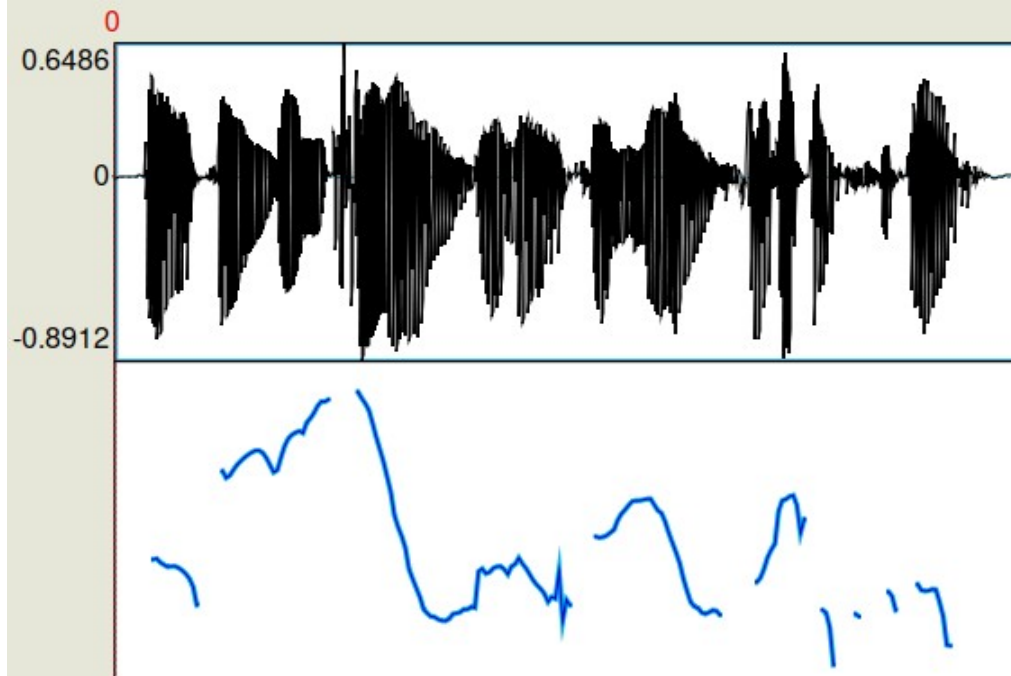
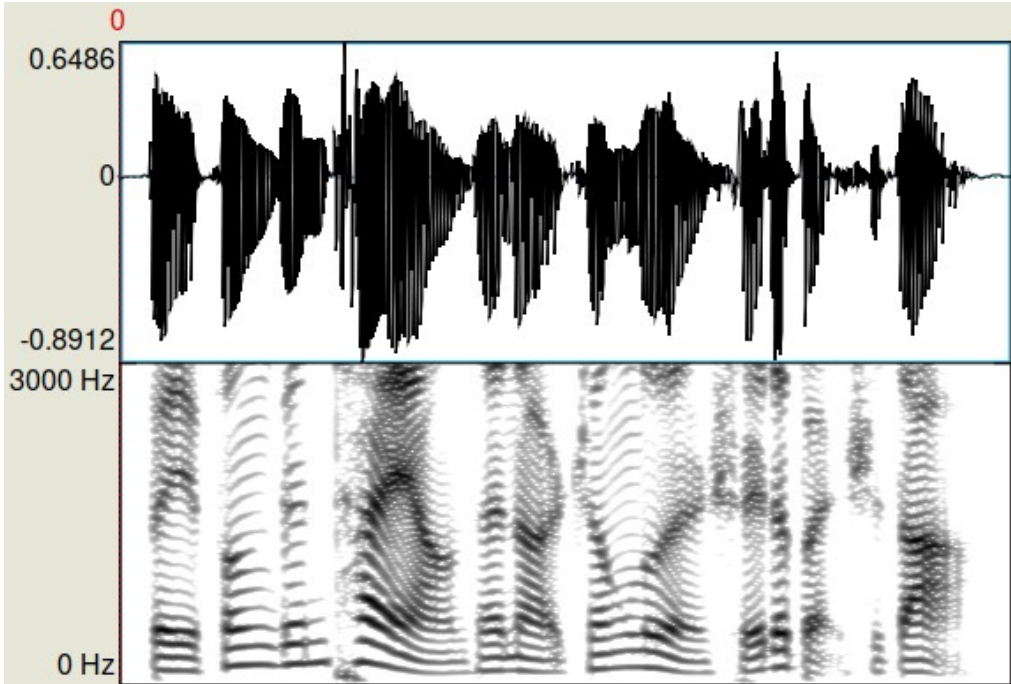
# THE FREQUENCIES OF SPEECH



Waveform, oscillogram

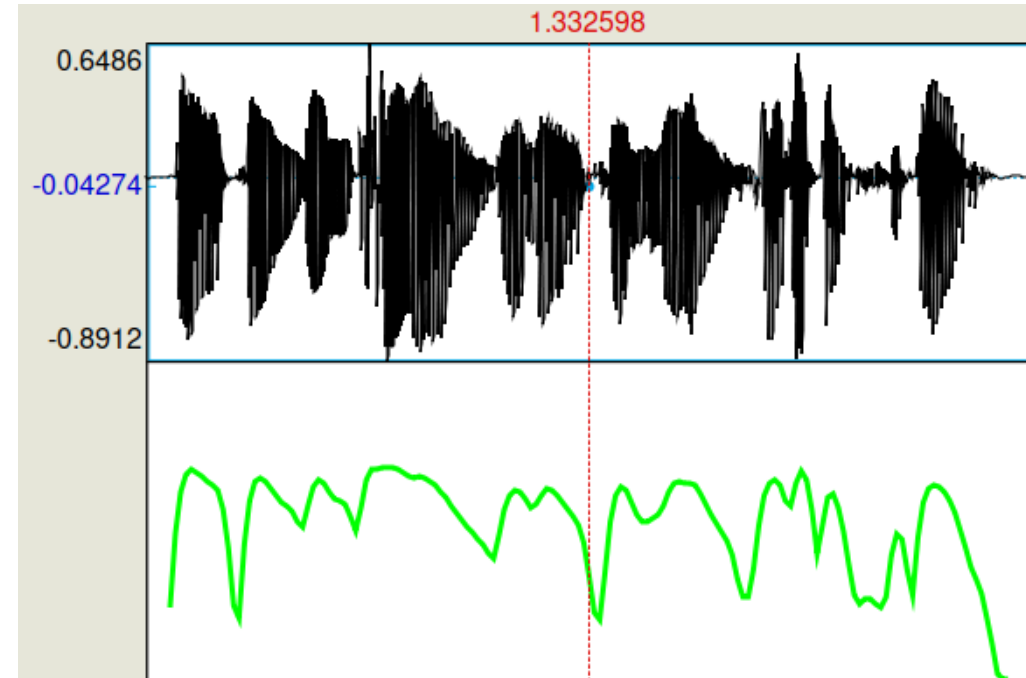
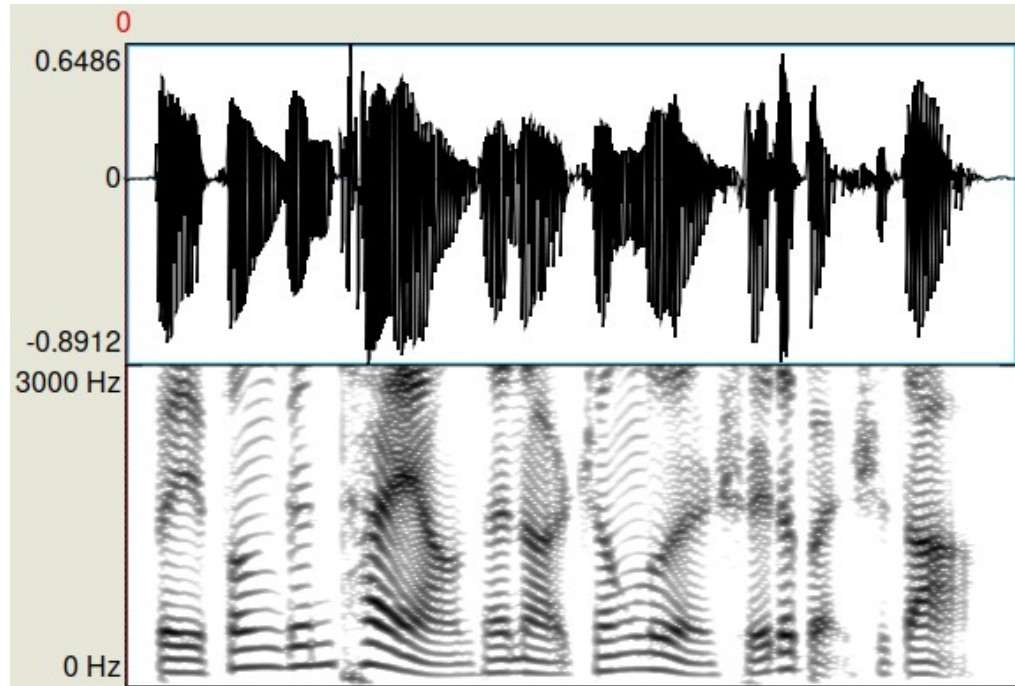
Spectrogram

# THE FREQUENCIES OF SPEECH



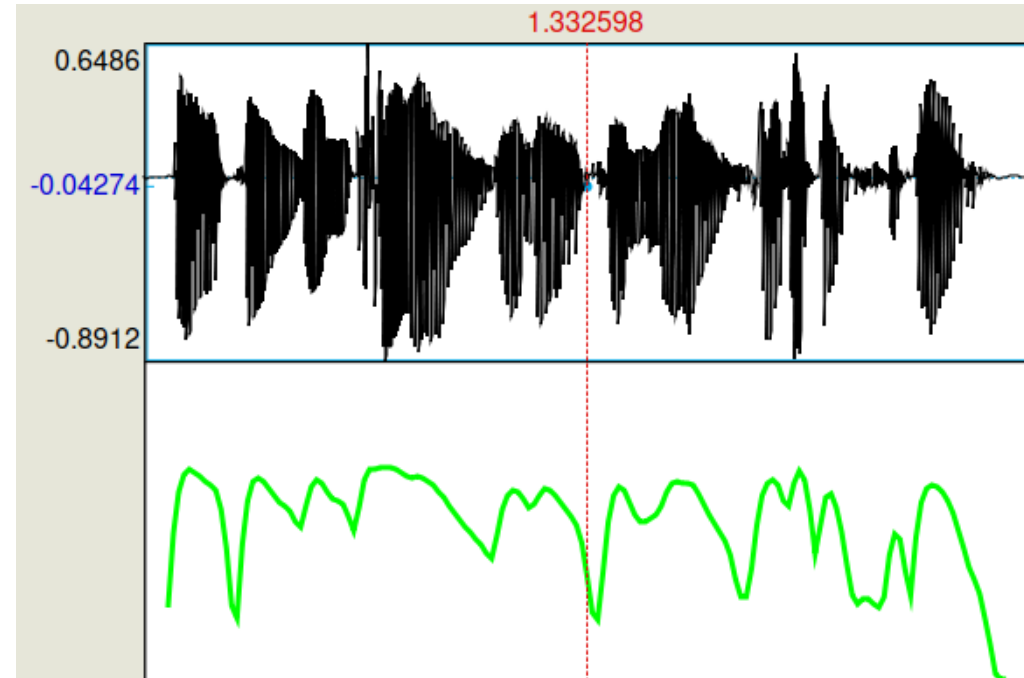
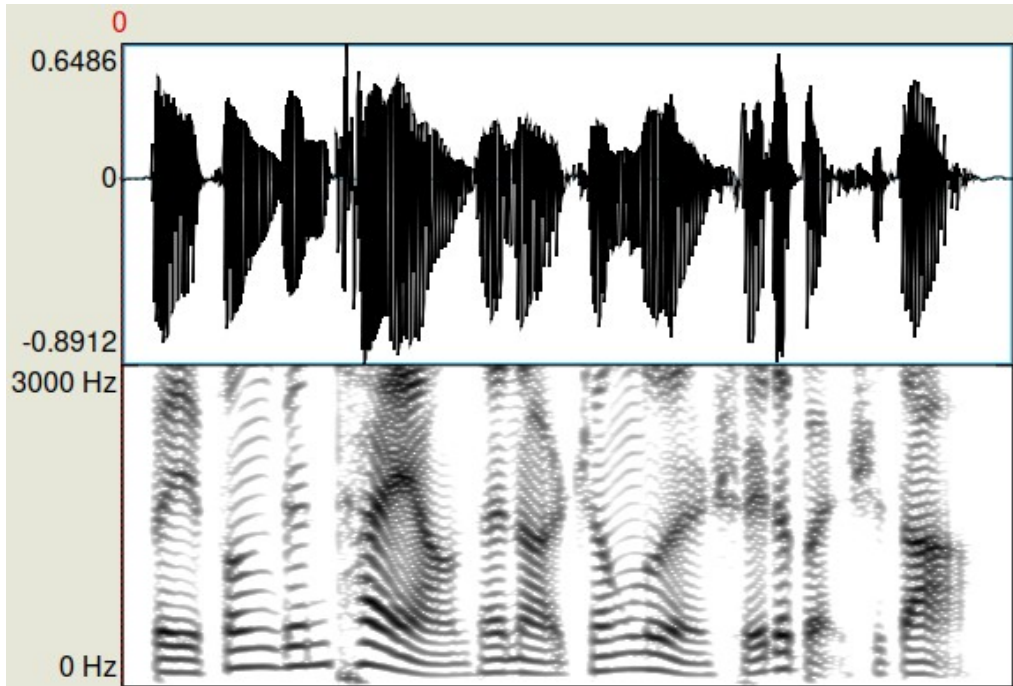
FM, frequency modulation

# THE FREQUENCIES OF SPEECH

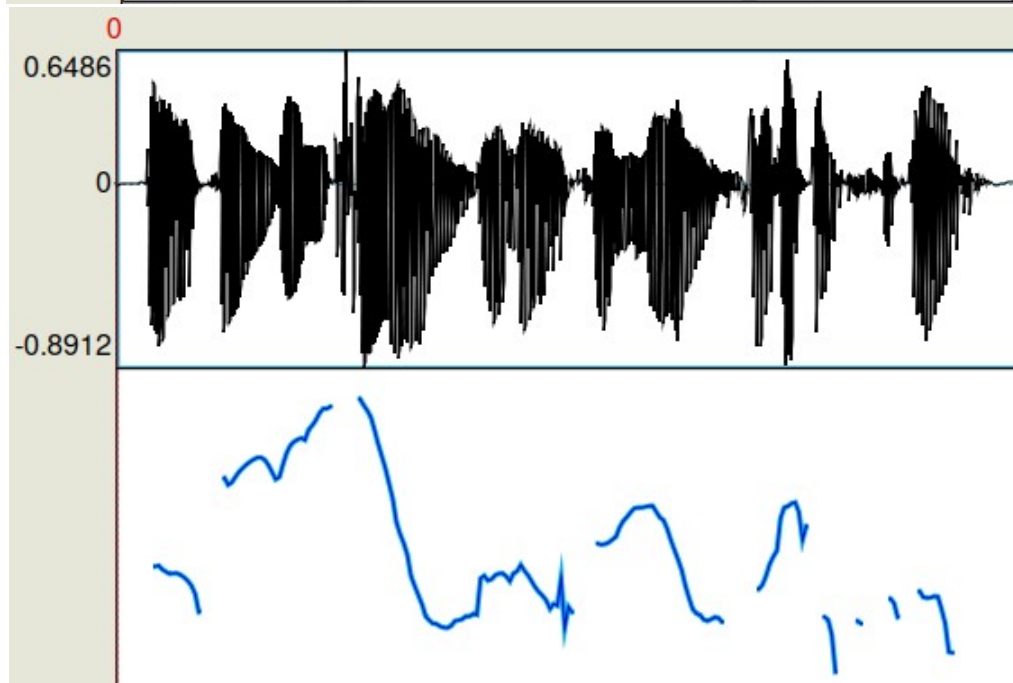


AM: amplitude modulation

# THE FREQUENCIES OF SPEECH

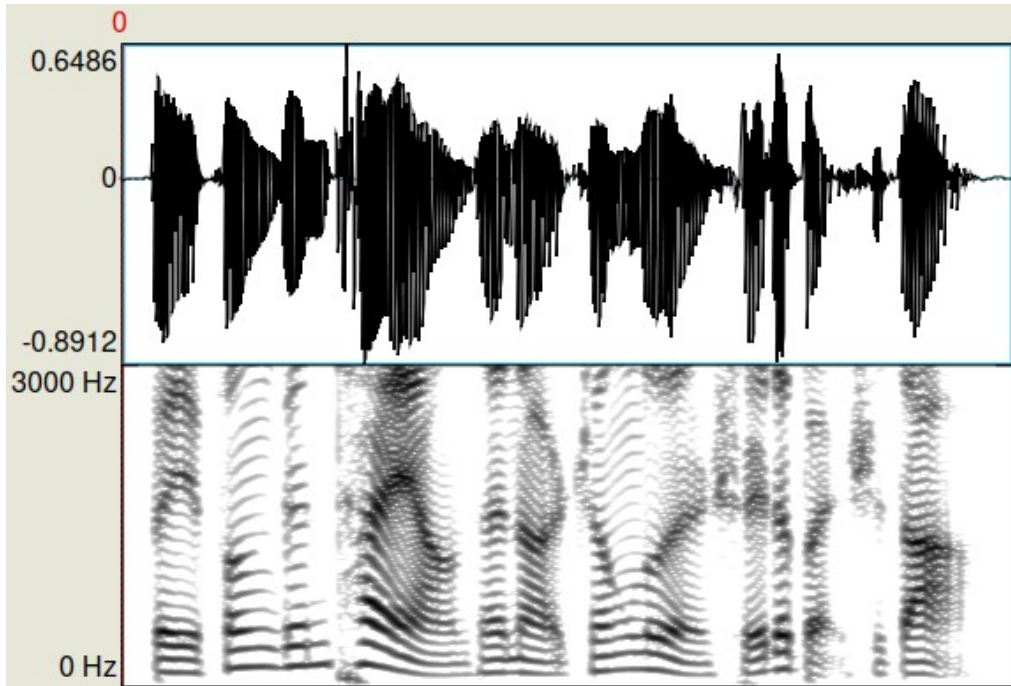


Low frequency AM



Low frequency FM

# THE FREQUENCIES OF SPEECH

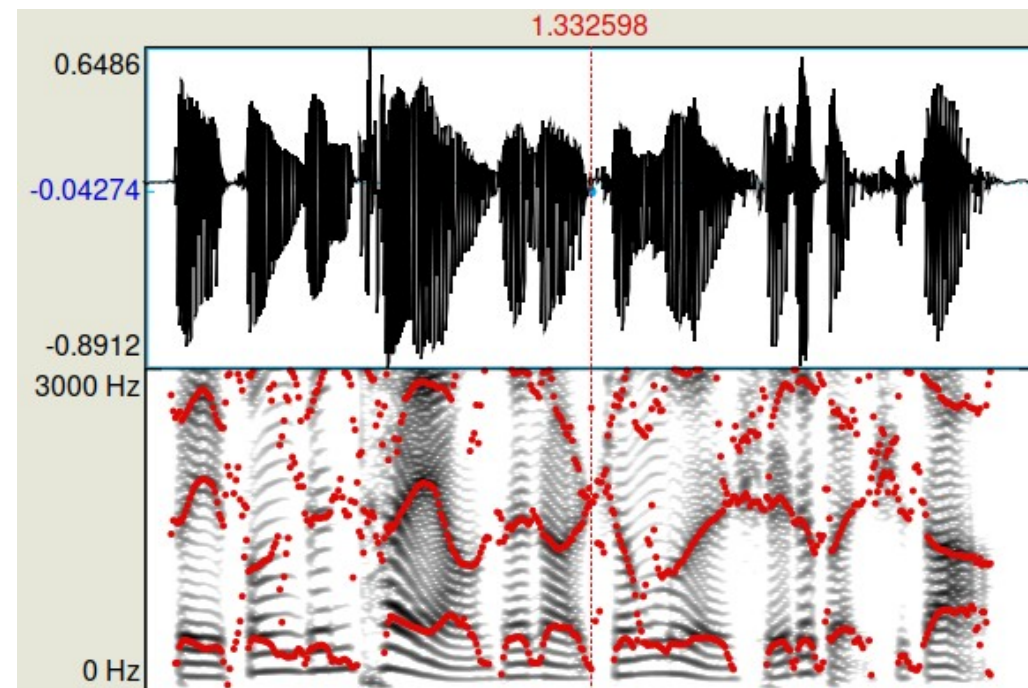


Harmonics: multiples of F0

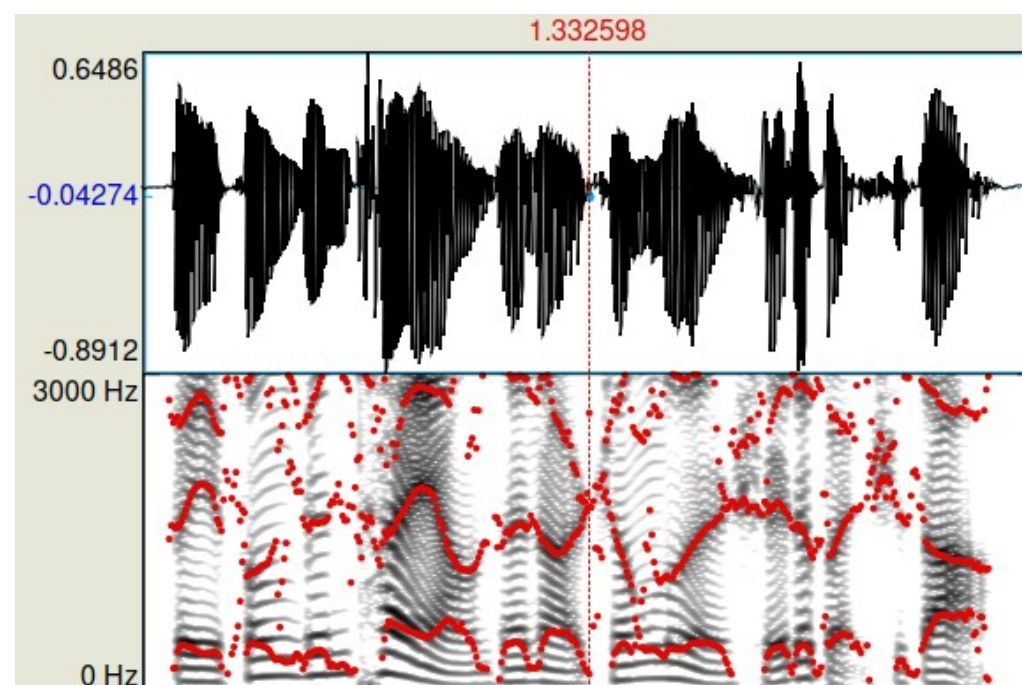
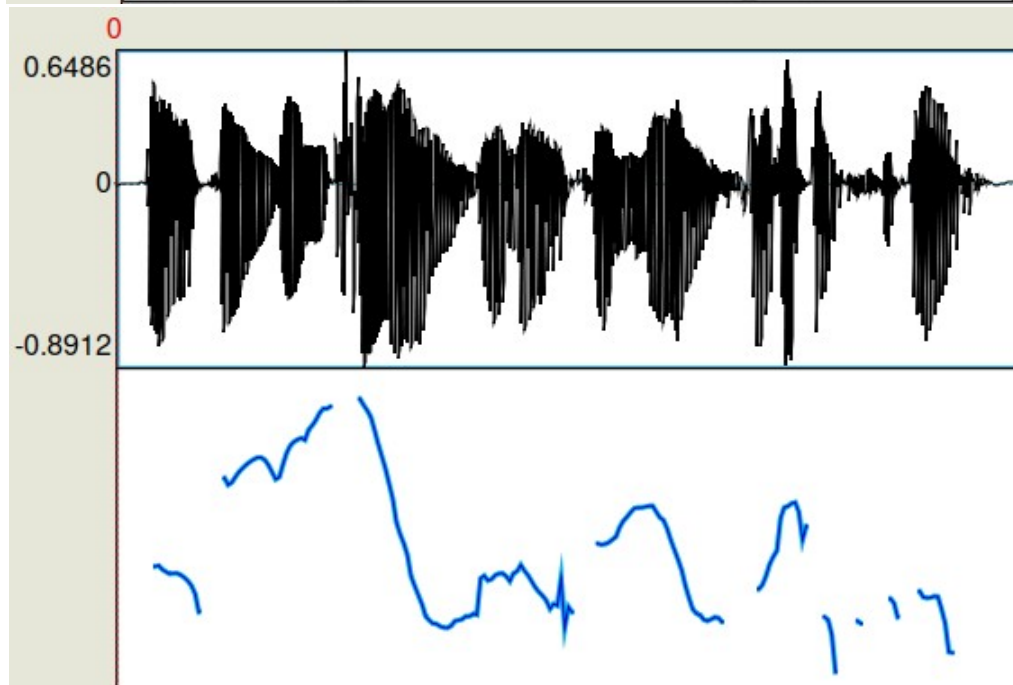
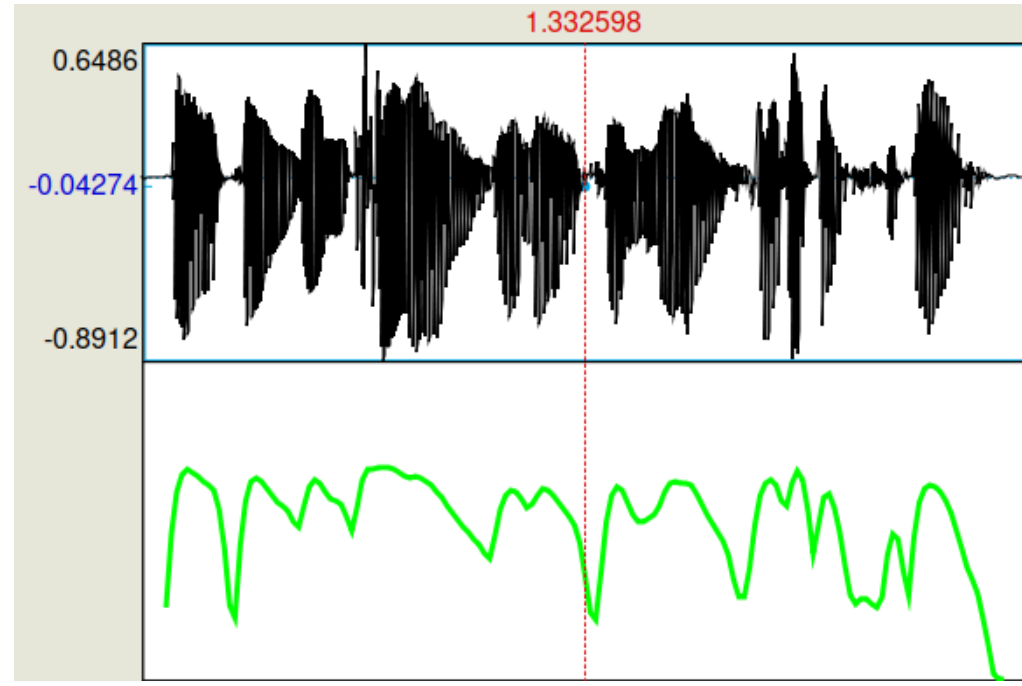
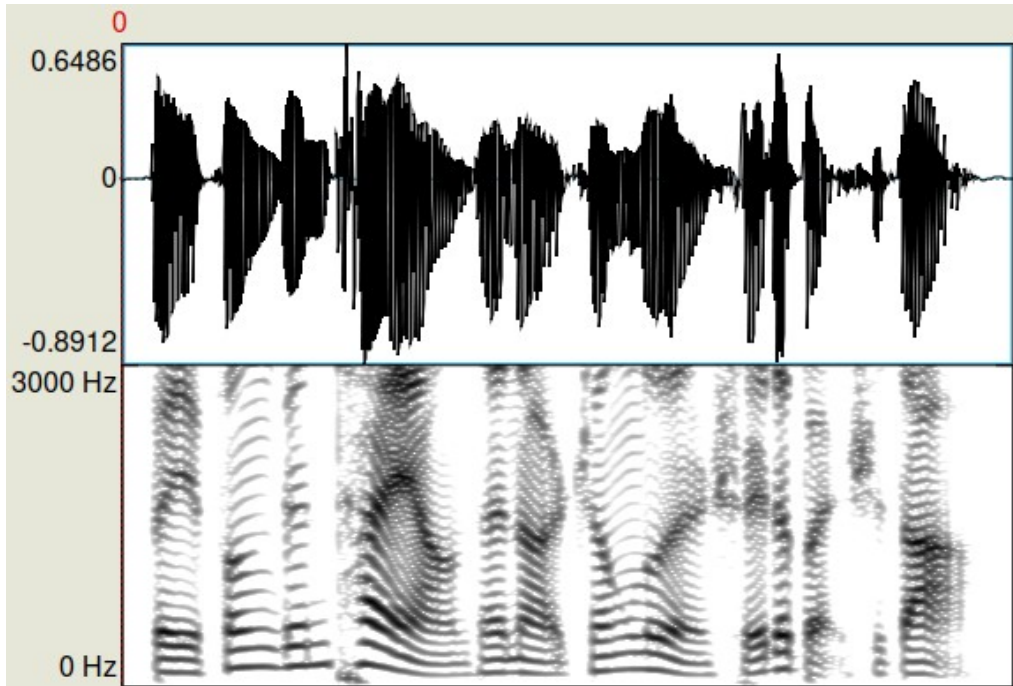
Formants: stronger harmonic regions

High frequency modulation,  
phone (consonant and vowel) modulation:

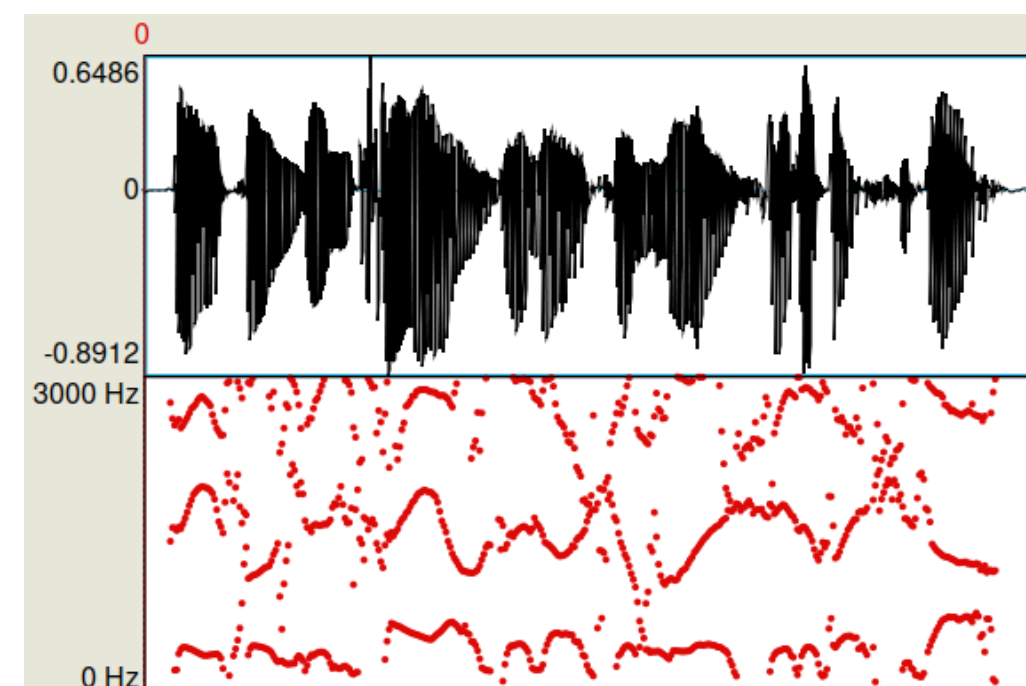
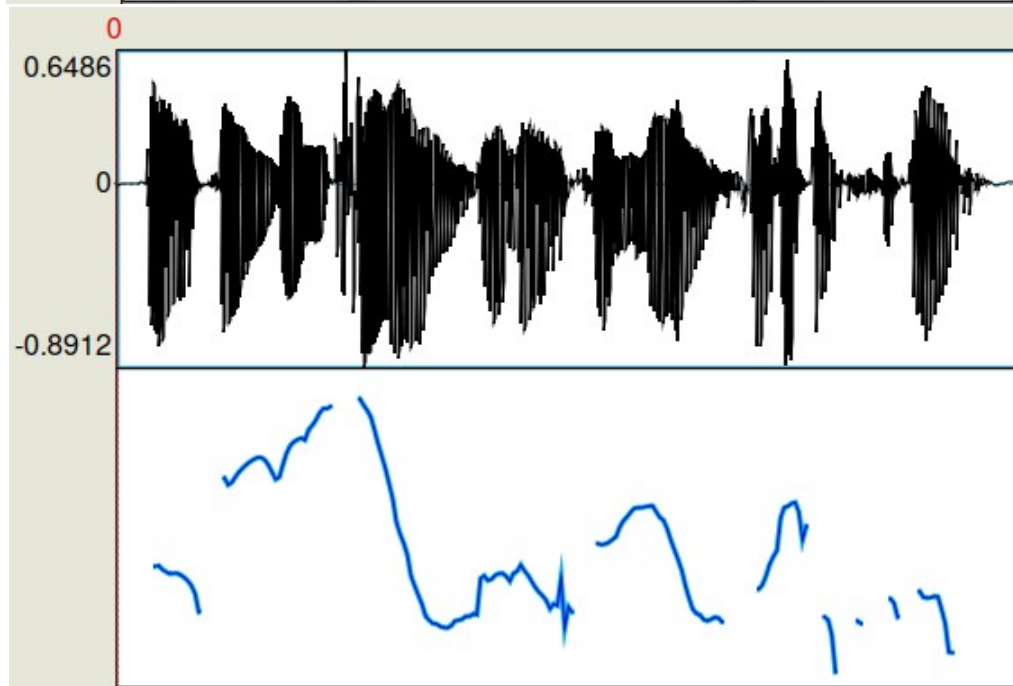
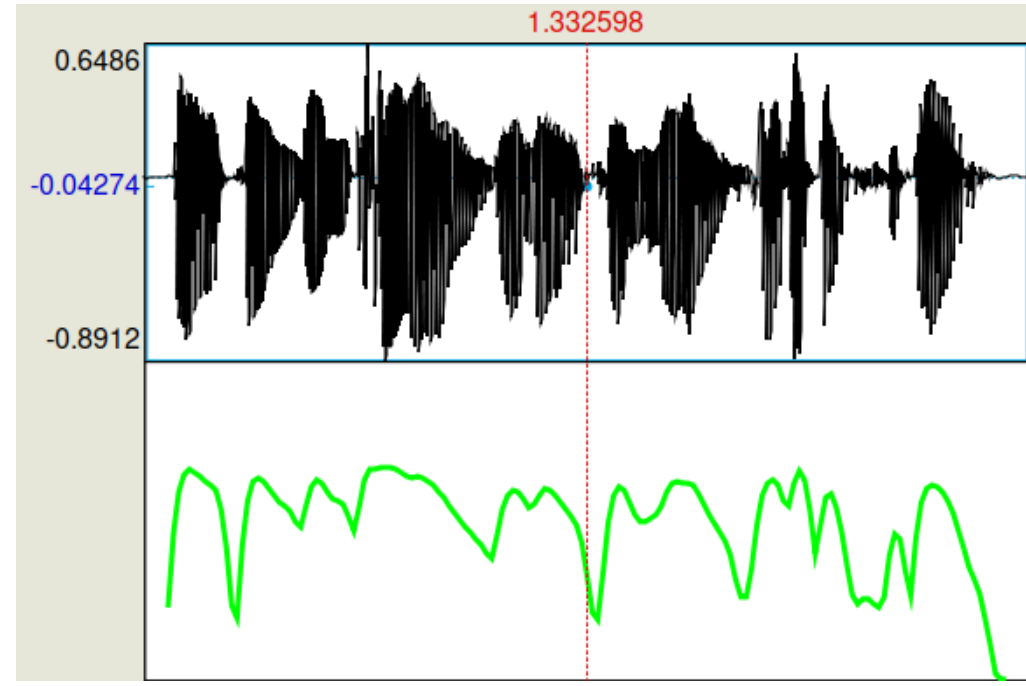
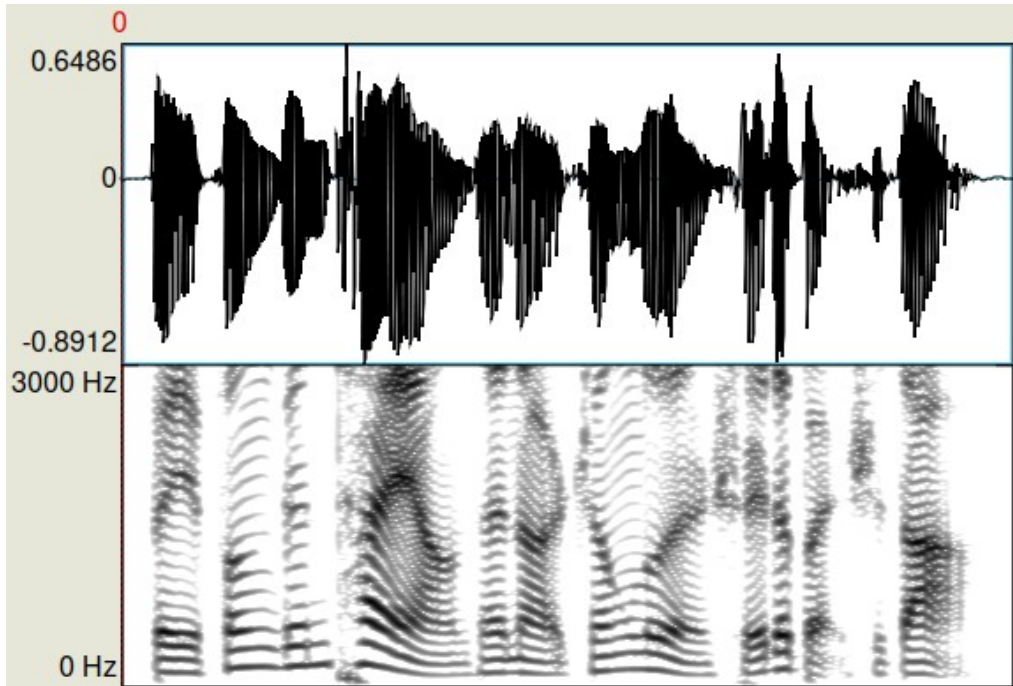
- High frequency amplitude modulation of the harmonics by the formants
- High frequency frequency modulation of the formants



# THE FREQUENCIES OF SPEECH



# THE FREQUENCIES OF SPEECH: MODULATION



# WORLD ENGLISHES AND THEIR SOUNDS



# WORLD ENGLISHES AND THEIR SOUNDS

- **British English**
  - Southern English
  - Northern English
  - Scottish
  - Welsh
- **North American English**
  - Canadian English
  - US English
- **Antipodean English**
  - Australian English
  - New Zealand English
- **South African English**

Braj B. Kachru: “The Three Circles of English”

<https://varietiesofenglishsite.wordpress.com/2016/11/07/classification-of-english-speakers-kachru-model/>

Kachru’s model is often referred to in English language learning contexts and is not a good model of the very complex actual situation of English accents and their distribution. For example, it ignores Australian English.

A better approach is provided by Wells (see below).

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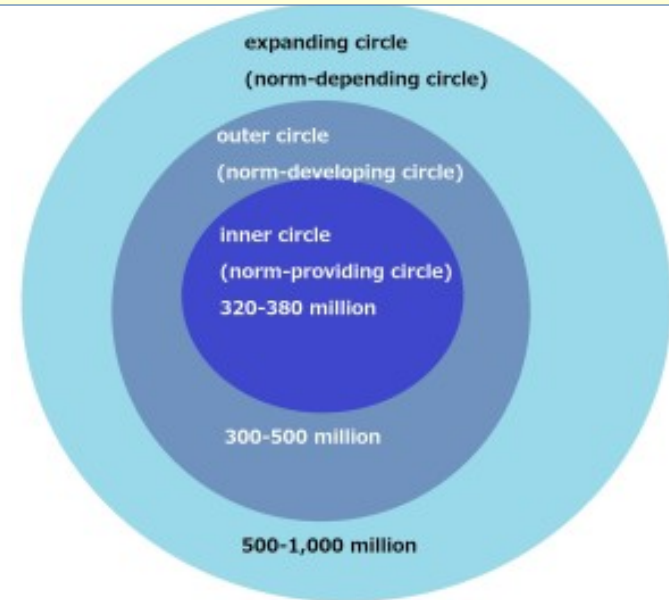
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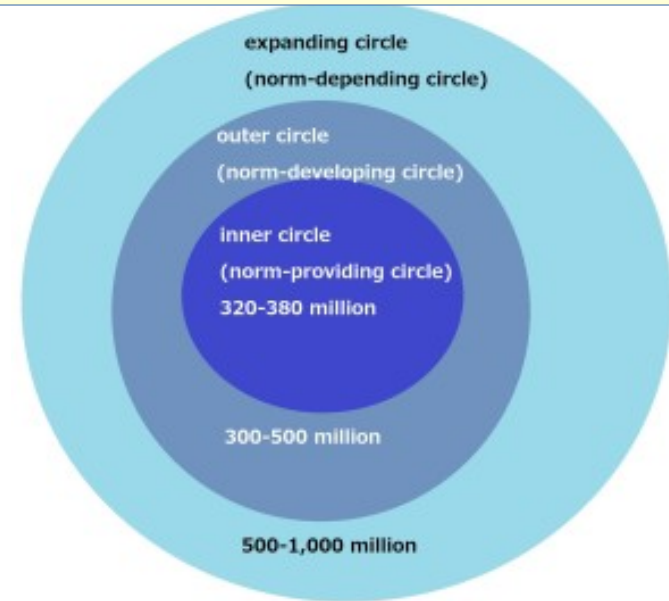
Not forgetting pidgin Englishes!

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Wells, John. 1982. *Accents of English*. Cambridge: Cambridge University Press.

See also: John Wells’ lexical sets for RP vowels:  
[https://en.wikipedia.org/wiki/Lexical\\_set](https://en.wikipedia.org/wiki/Lexical_set)

# WORLD ENGLISH ACCENTS: some historical influences

## British English

- Southern English: *Saxon and Norman French*
- Northern English: *Scandinavian (e.g. Viking)*
- Scottish: *Scottish Gaelic and Scandinavian (e.g. Viking)*
- Welsh: *Cymric (Welsh Celtic)*
- Irish: *Irish Gaelic*

## North American English

- very roughly, British influences: different regions and times:
- US & Canadian English: South-West England (US South, 17th century), South-East England (US North-East, 18th/19th century), Northern England, Scotland, Ireland (US Mid-West, 19th/20th century)

## Antipodean English

- Australian and New Zealand English: South-Eastern England, mainly London

## South African English

- Netherlands (Dutch, Afrikaans) and South-Eastern England

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- Australian and New Zealand English: South-Eastern England, mainly London

## South African English

- Netherlands (Dutch, Afrikaans) and South-Eastern England

Some entertainment:

[https://www.youtube.com/watch?v=1\\_Fzo5nmsL0](https://www.youtube.com/watch?v=1_Fzo5nmsL0)

<https://www.youtube.com/watch?v=H1KP4ztKK0A>

<https://www.youtube.com/watch?v=vpcG-xqPgRM>

<https://www.youtube.com/watch?v=-8mzWkuOxz8>

*But don't take these shows too seriously!*

es:  
South-East  
and, Ireland

# RECOMMENDED PRACTICE TEXT

## Little Red Riding Hood

Once upon a time there was a sweet little girl. Everyone who saw her liked her, but most of all her grandmother, who did not know what to give the child next. Once she gave her a little cap made of red velvet. Because it suited her so well, and she wanted to wear it all the time, she came to be known as Little Red Riding Hood. One day her mother said to her: "Come Little Red Riding Hood. Here is a piece of cake and a bottle of wine. Take them to your grandmother. She is sick and weak, and they will do her well. Mind your manners and give her my greetings. Behave yourself on the way, and do not leave the path, or you might fall down and break the glass, and then there will be nothing for your sick grandmother."

Little Red Riding Hood promised to obey her mother. The grandmother lived out in the woods, a half hour from the village. When Little Red Riding Hood entered the woods a wolf came up to her. She did not know what a wicked animal he was, and was not afraid of him. "Good day to you, Little Red Riding Hood." - "Thank you, wolf." - "Where are you going so early, Little Red Riding Hood?" - "To grandmother's." - "And what are you carrying under your apron?" - "Grandmother is sick and weak, and I am taking her some cake and wine. We baked yesterday, and they should give her strength." - "Little Red Riding Hood, just where does your grandmother live?" - "Her house is a good quarter hour from here in the woods, under the three large oak trees. There's a hedge of hazel bushes there. You must know the place," said Little Red Riding Hood. The wolf thought to himself: "Now there is a tasty bite for me. Just how are you going to catch her?" Then he said: "Listen, Little Red Riding Hood, haven't you seen the beautiful flowers that are blossoming in the woods? Why don't you go and take a look? And I don't believe you can hear how beautifully the birds are singing. You are walking along as though you were on your way to school in the village. It is very beautiful in the woods." [ ... ]

THANKS – NOW PLEASE PRACTICE !

