

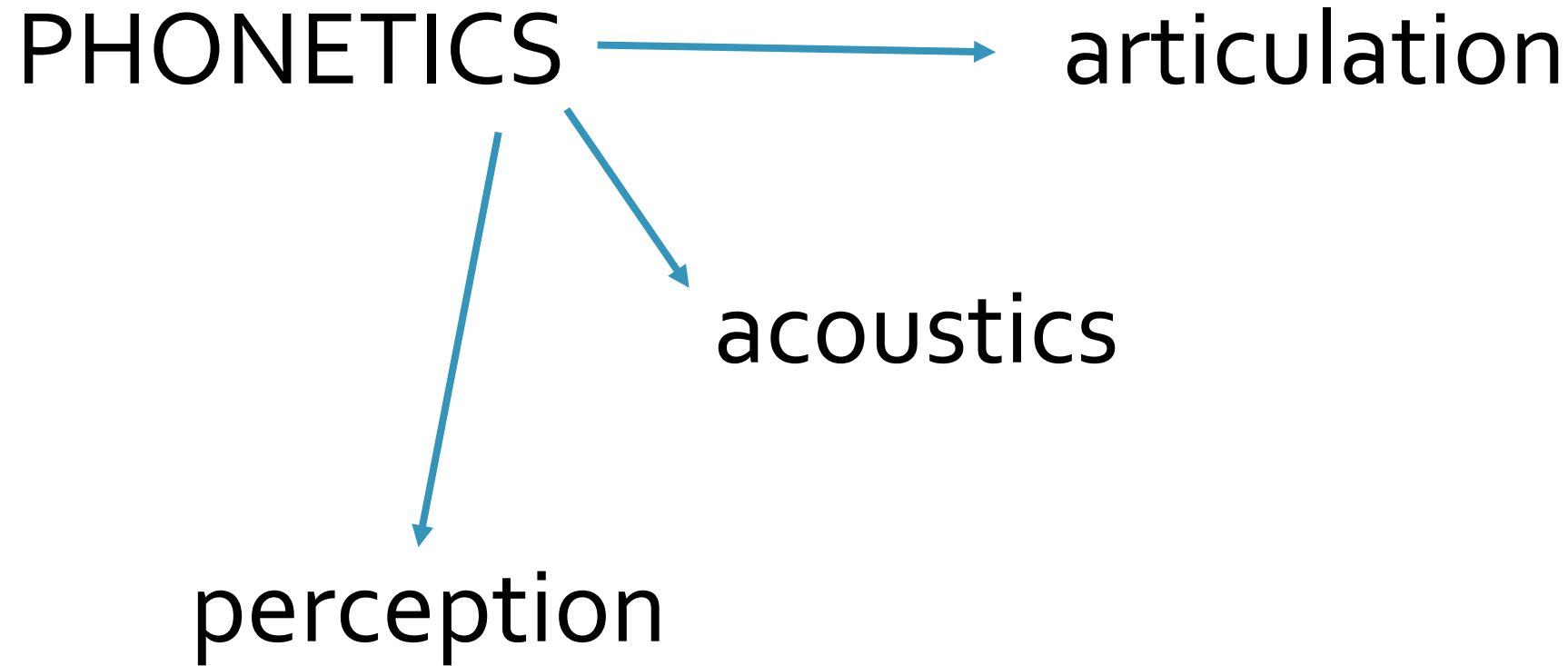
Speech perception

14.03.2019

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What can we study?



Outline

1. The peripheral auditory system
2. Audition
3. Perception

The peripheral auditory system

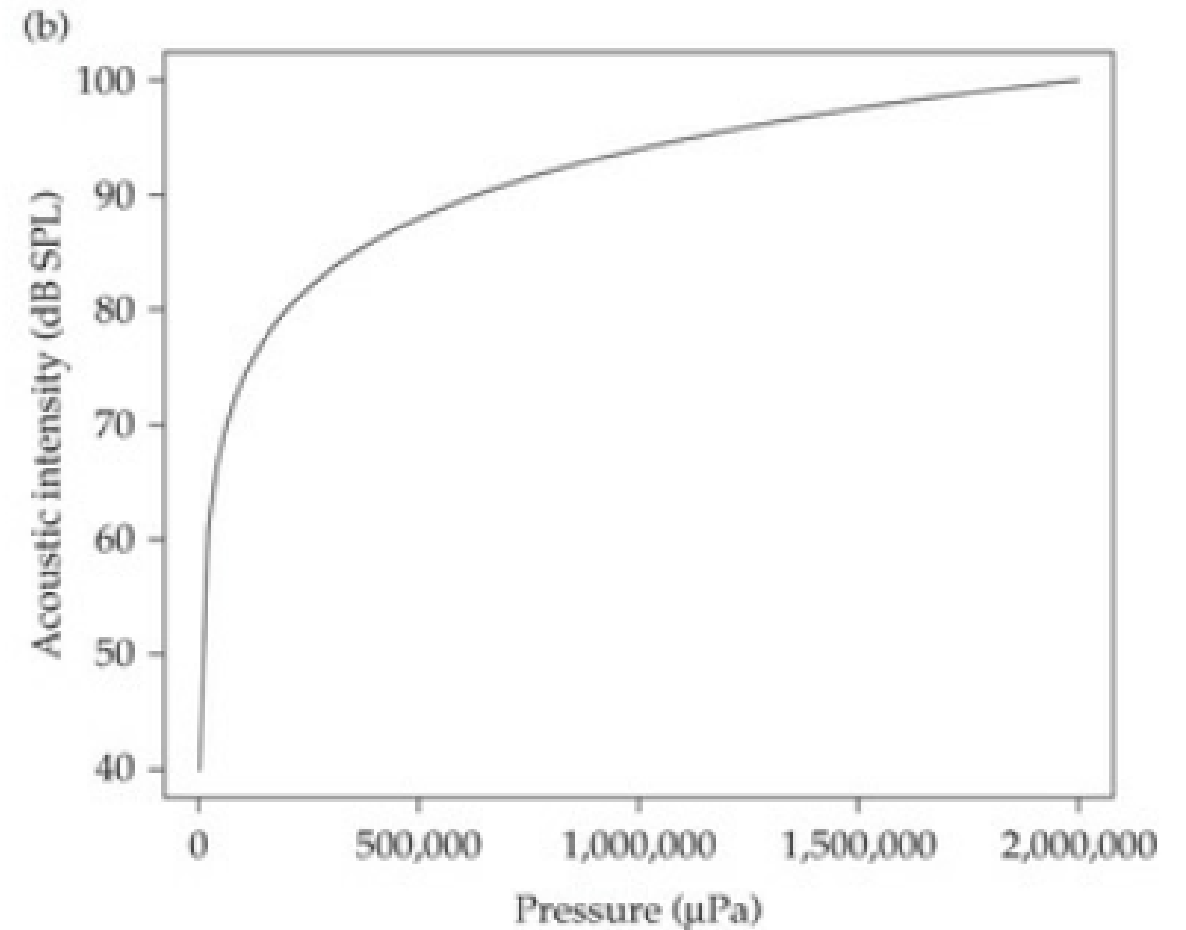
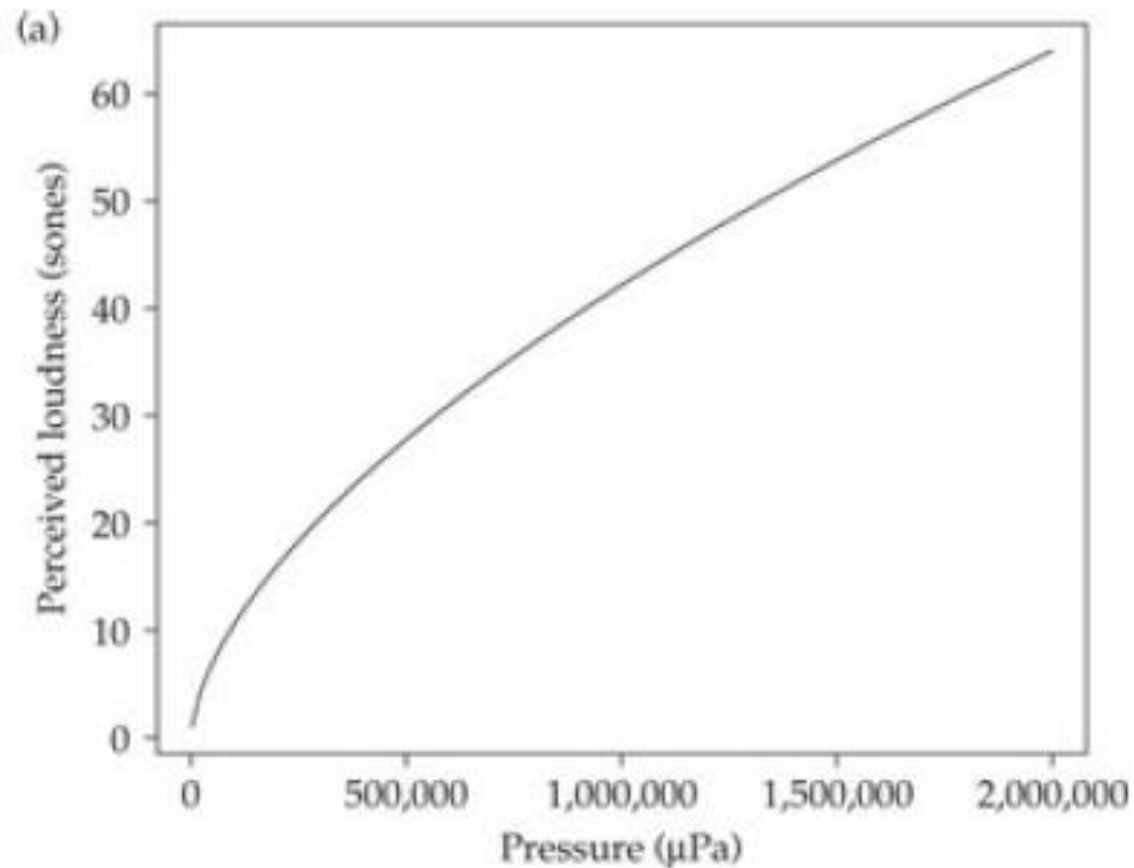
1. translates acoustic signals into neural signals
2. performs amplitude compression
3. performs a kind of Fourier analysis

Video!

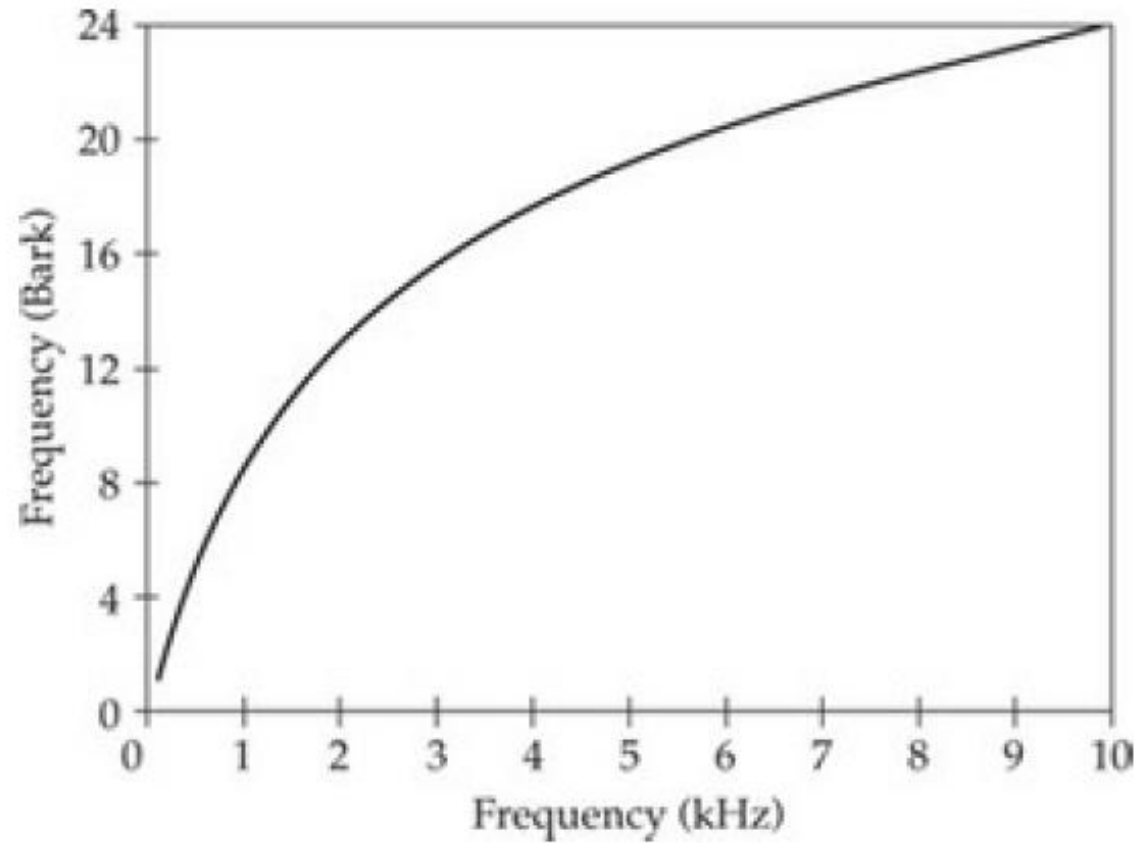
Audition

- Psychoacoustic scales

Perceived loudness: the sone scale



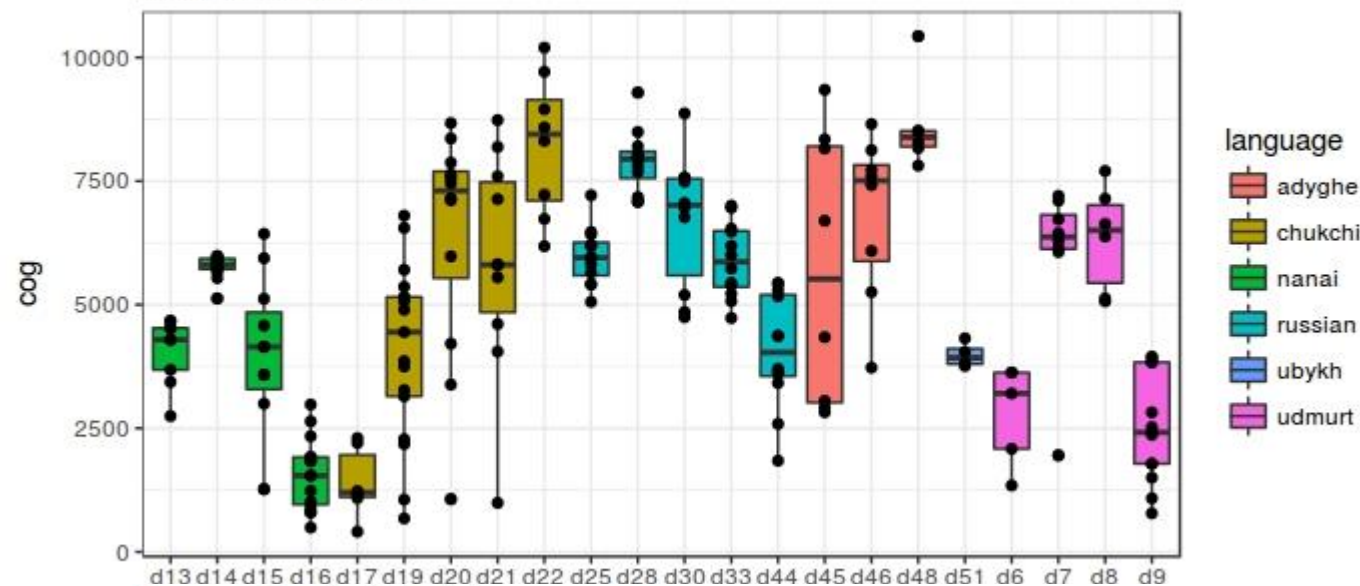
Perceived frequency: Bark scale



The spectrum of s

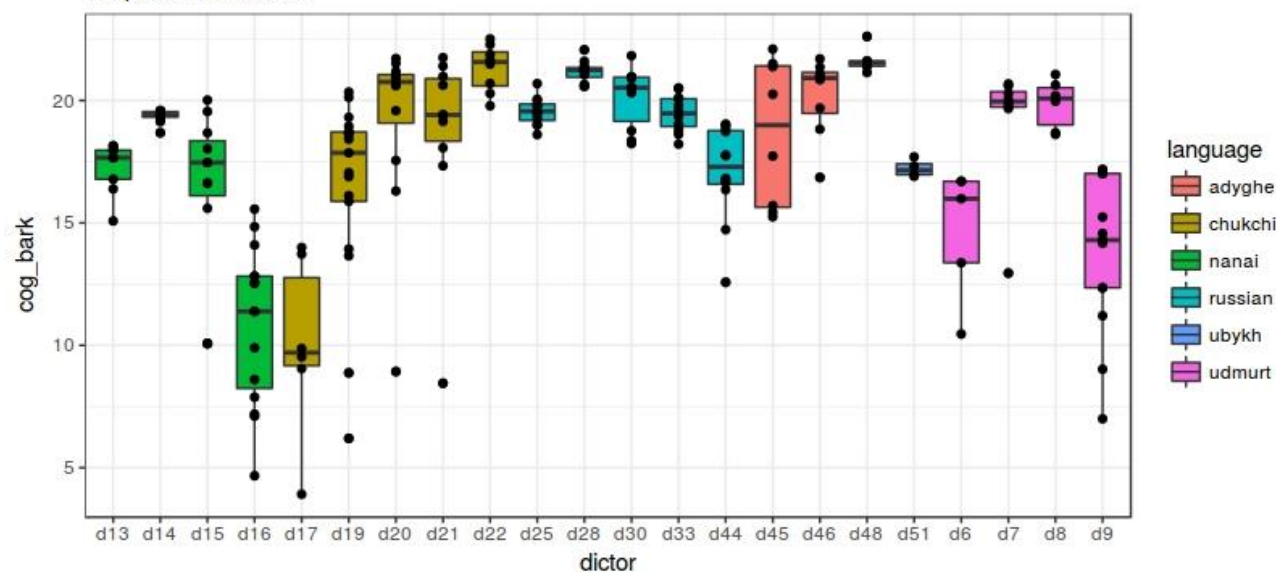
Center of Gravity (in Hertz)

sample from all our data



Center of Gravity (in barks)

sample from all our data



Why low frequencies?

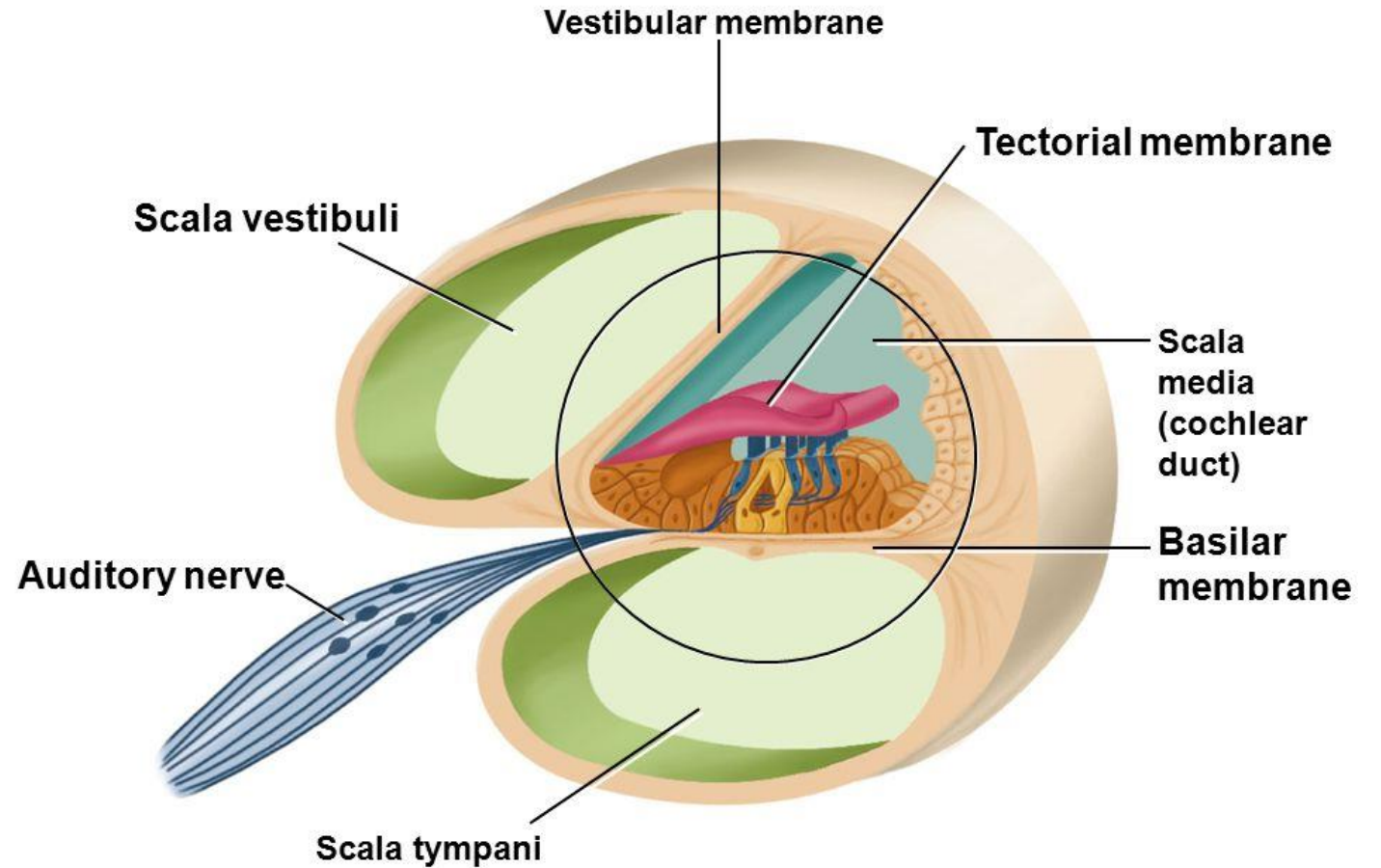


Figure 6-19b p228

The main idea

Praat is not ears

Perception and audition

- The auditory system shapes speech perception
- The auditory system constrains speech perception

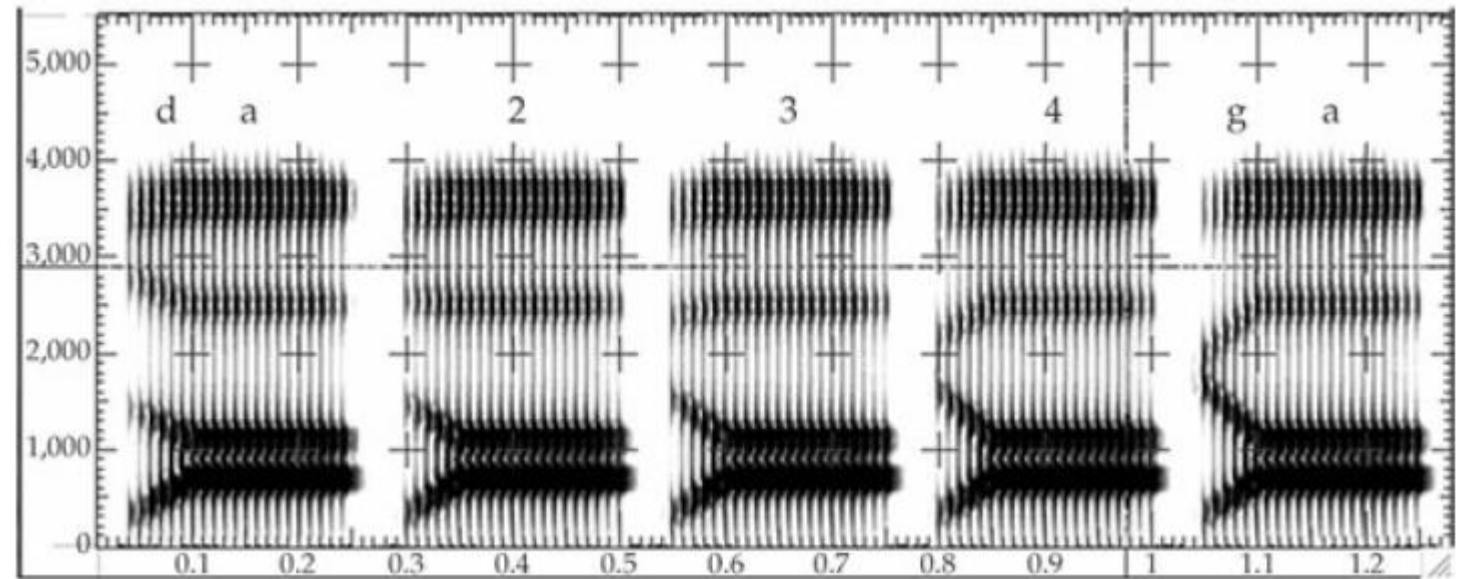
Perception and phonetic knowledge

- Phonetic knowledge shapes perception?
 - categorical perception
 - phonetic coherence

Categorical perception

A stimulus continuum:
da to *ga*

- “Please write down what you hear”
- “Please guess are the who sounds equal or not”



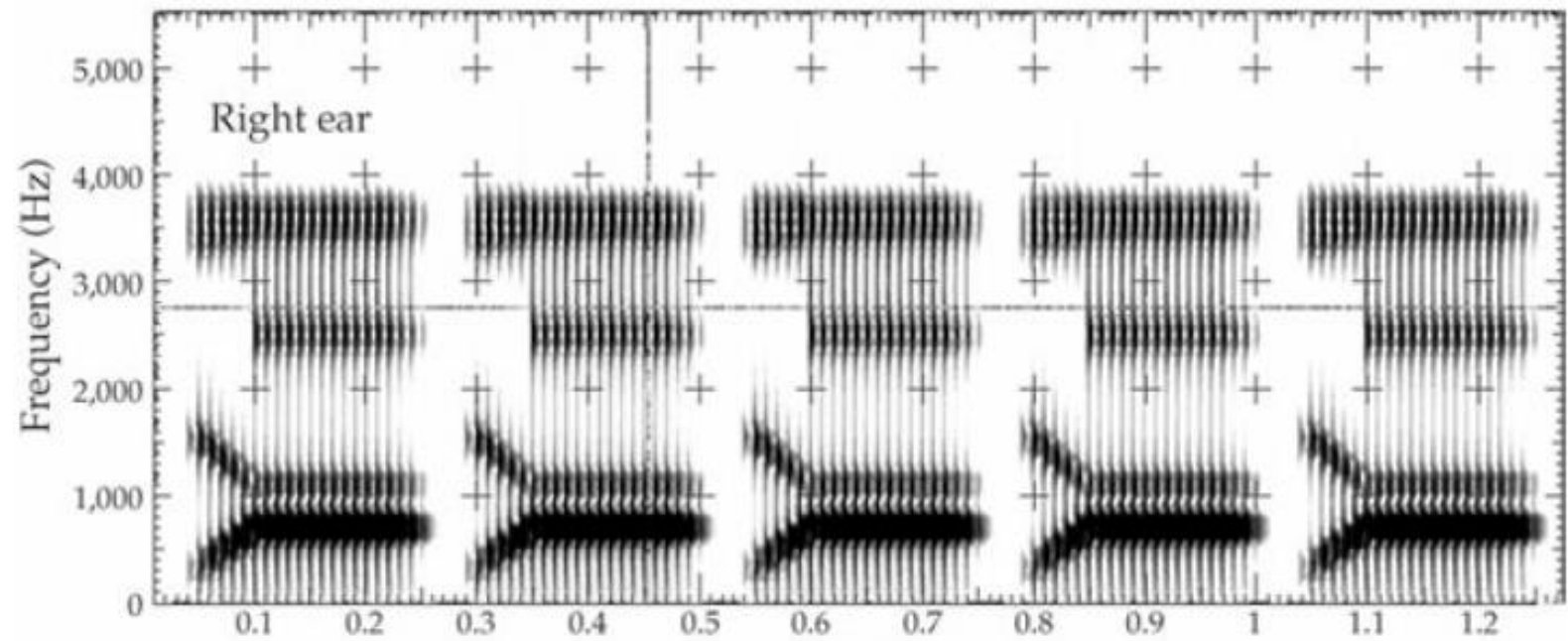
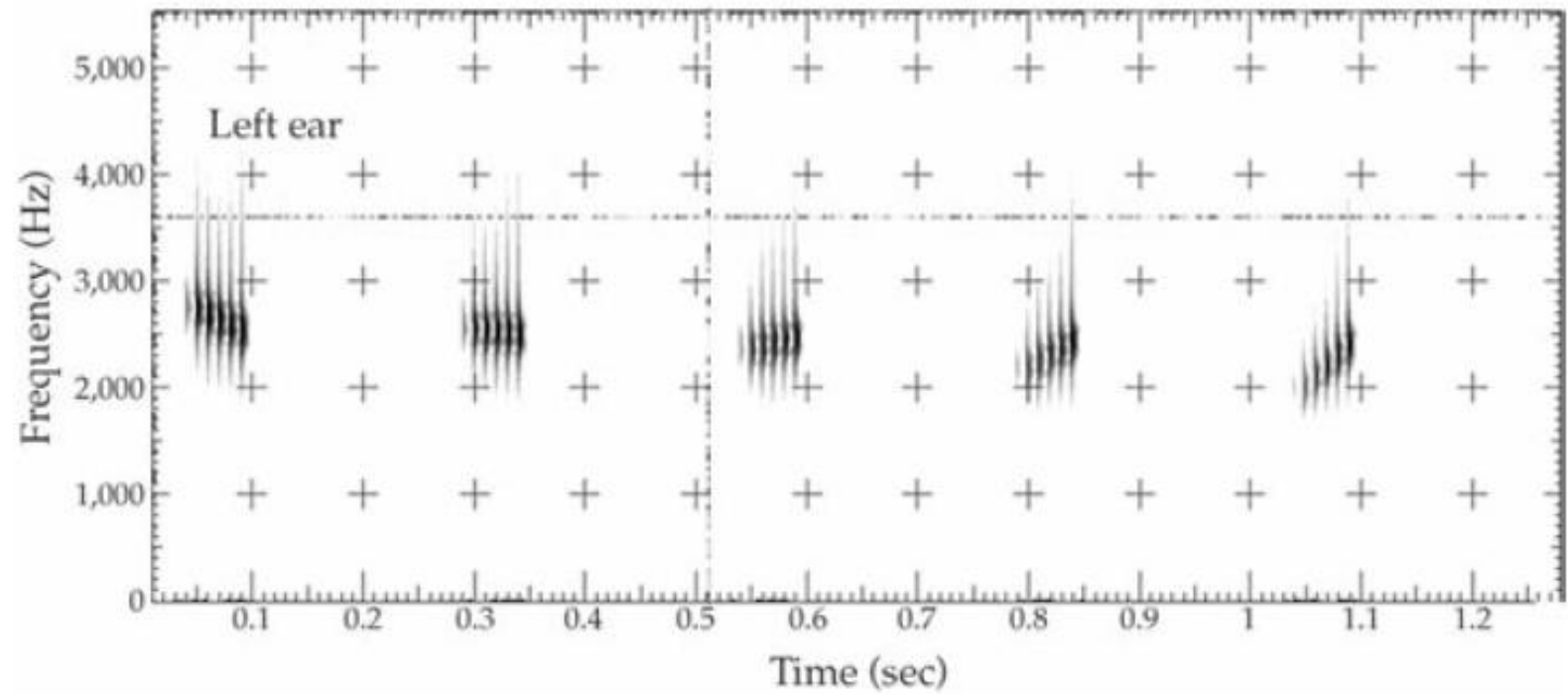
Categorical perception

<i>Token number</i>	<i>F₂ onset</i>	<i>F₃ onset</i>	<i>Identified as</i>
1	1,480	2,750	"da"
2	1,522	2,562	"da"
3	1,565	2,375	"da"
4	1,607	2,187	"ga"
5	1,650	2,000	"ga"

Categorical perception

- Our perceptual systems are tuned by linguistic experience
- Children's speech, speech pathology: categories differ

Phonetic coherence

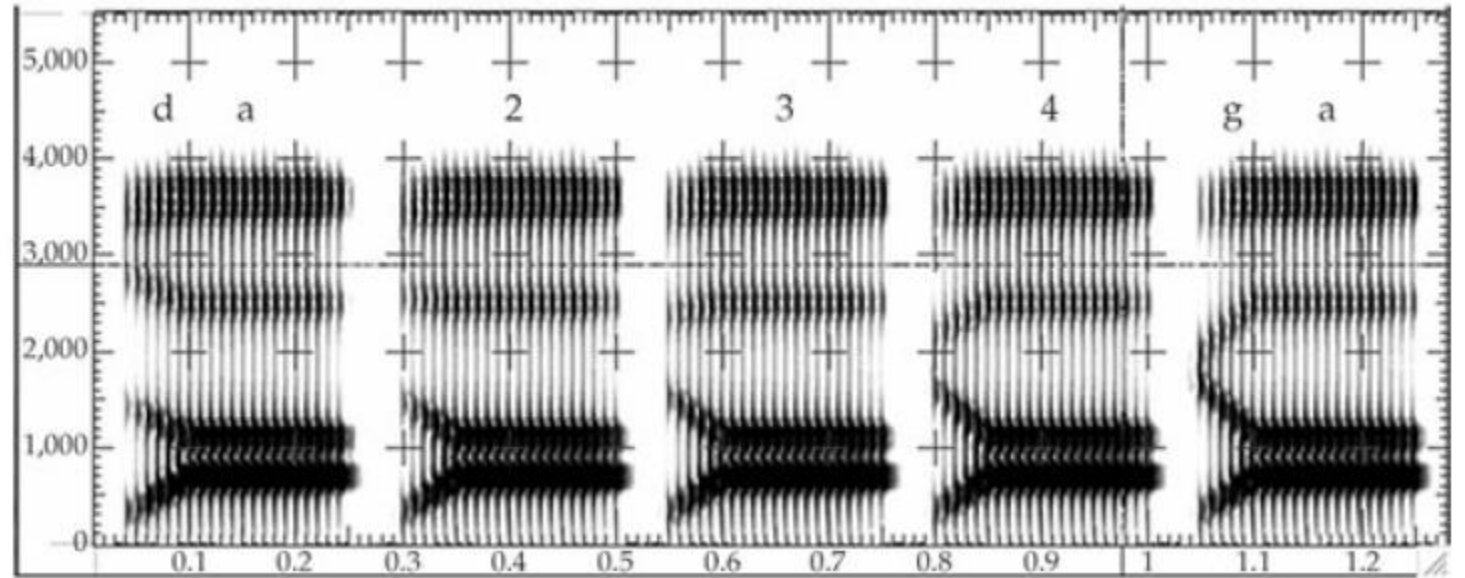


Phonetic coherence

- Leading ear matters
- Lips matter? McGurk effect

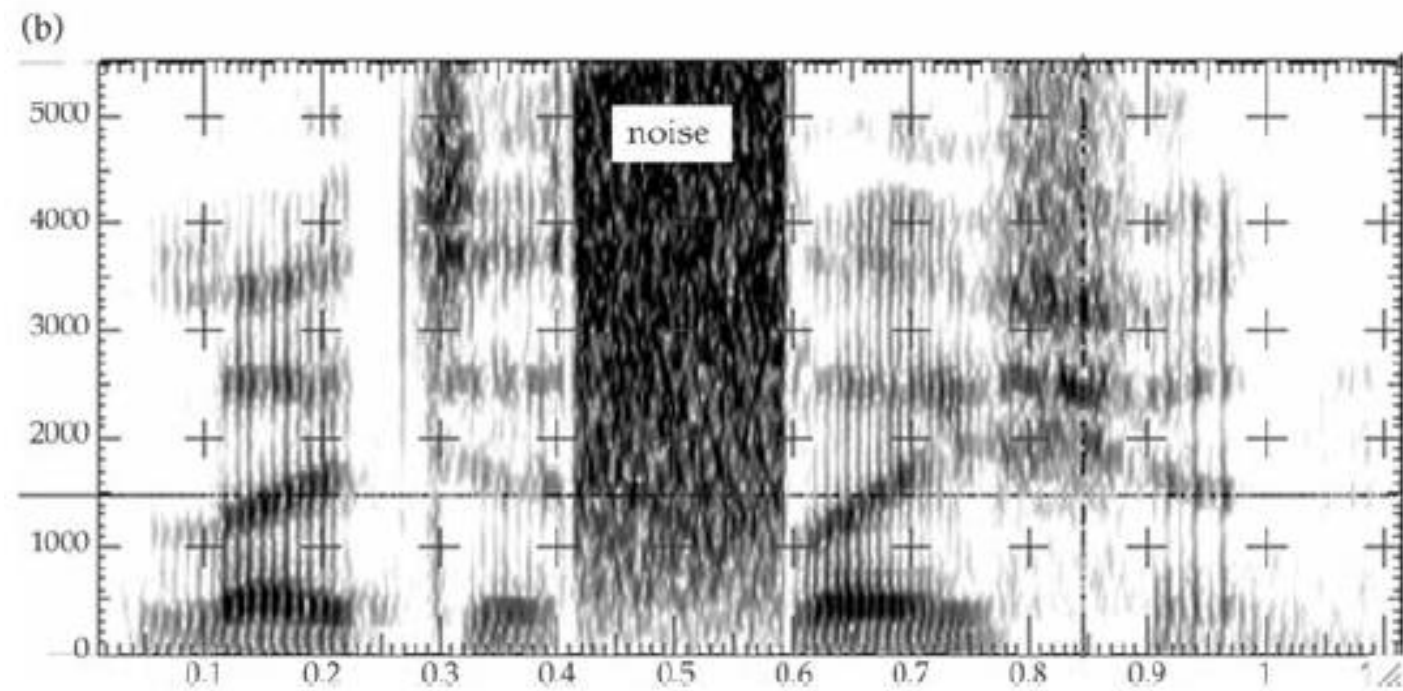
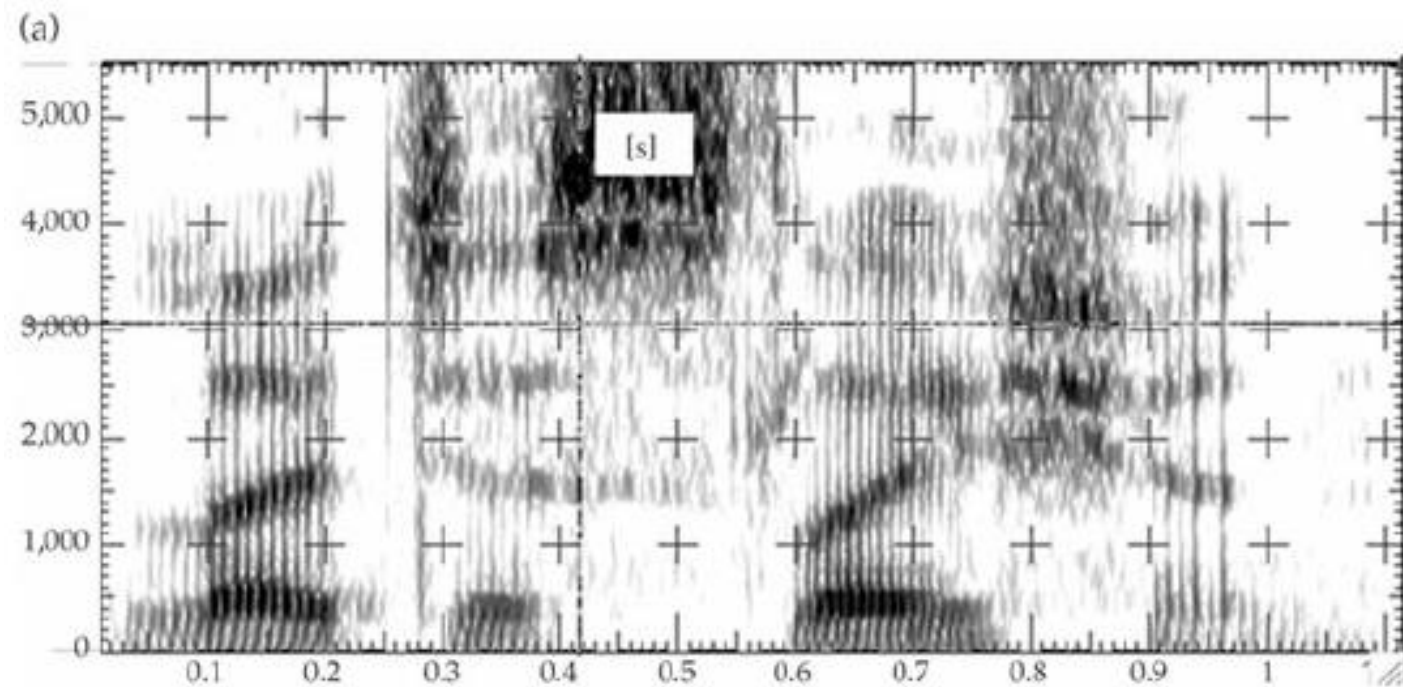
Perception of sounds vs. that of words

- Ganong effect:
more dogs!



Perception of sounds vs. that of words

- “Phoneme restoration”

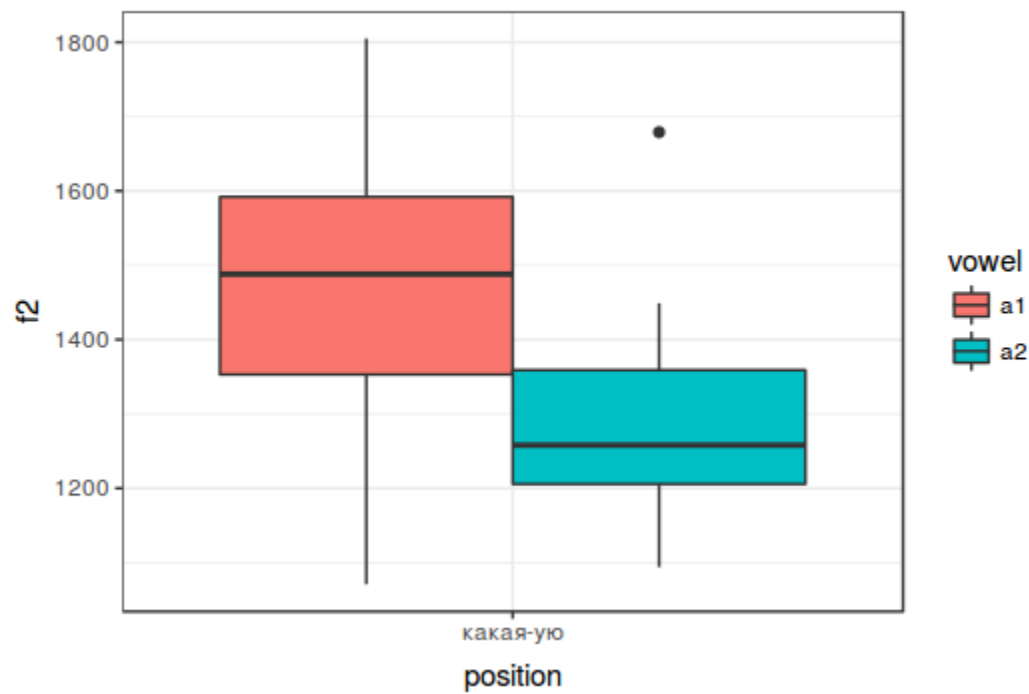


Examples

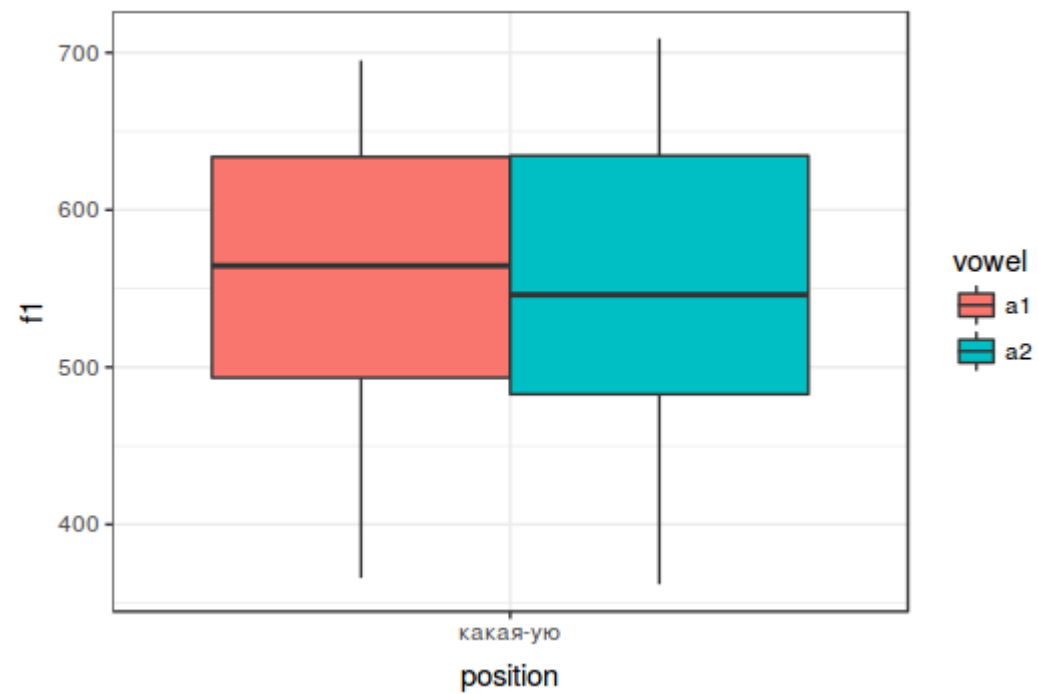
- Russian [tʲ] vs. [tsʲ]

Examples

Боксплот для F2 разных гласных а



Боксплот для F1 разных гласных а



Examples

- Beatbox vs. speech?

Reading

- Johnson K. Acoustic and Auditory Phonetics. Blackwell Publishing, 2003.
- The handbook of speech perception / edited by David B. Pisoni and Robert E. Remez. Blackwell Publishing, 2005.