Theoretical Phonology: Suprasegmental Phonology

Introduction to the course

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Outline

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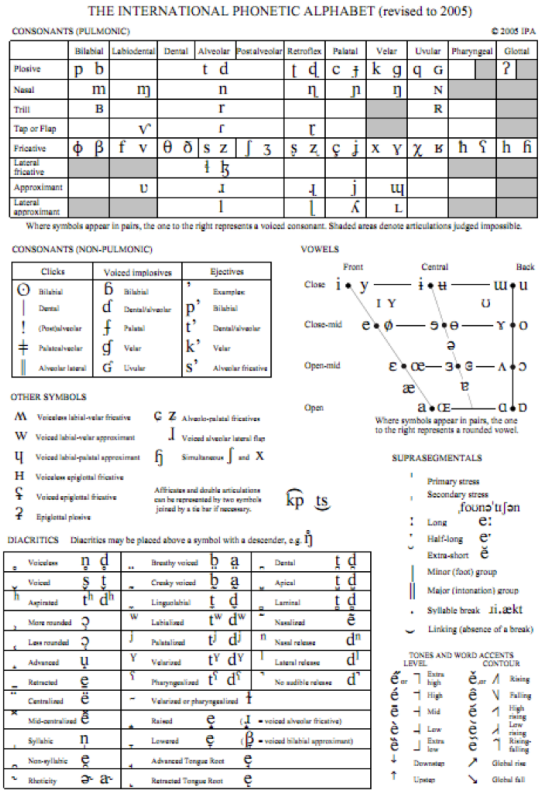
Outline

Sounds and Languages

- Only two or three hundred sounds are need to represent all the sounds found in all languages of the world (estimated between 5000 to 8000).
- The human speech apparatus, which produces sounds, and the hearing mechanism, which perceives them, are exactly the same all over the world.
- Languages select from the stock of humanly possible sounds.

Sound Symbols: The International Phonetic Alphabet



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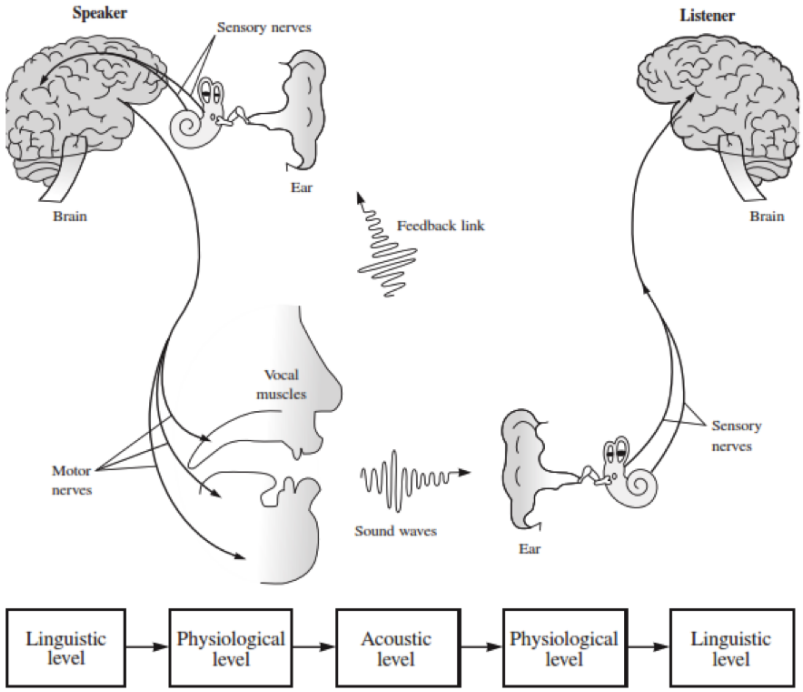
The Classic Communication Model



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Phonetics and Phonology

> We designate the study of speech pertaining to the act of speech by the term *phonetics*, the study of sound pertaining to the system of language by the term *phonology*.
>
> Trubetzkoy (1969:4)

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Phonetics and Phonology

⇒*Phonetics and Phonology are related yet autonomous and distinct in their subject, goals, and methodologies.*

Phonetics and Phonology

- Phonetics
  - examines the articulation, perception, and production of speech sounds;
  - approaches sounds *language independently*;
- Phonology
  - studies sound structure;
  - examines the systematic/*language dependent* aspects of sounds.

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Main Fields of Phonetics

1. **Articulatory Phonetics:** Speech production *Speaker*
2. **Acoustic Phonetics:** Speech acoustics *Medium*
3. **Perceptual Phonetics:** Speech perception *Hearer*

Phonetics and Linguistic Structure

The aforementioned distinction between the language independent Phonetics and language dependent Phonology becomes more blurred:

- **Phonetics and linguistic structure:** syllabic and prosodic constituency, phrasing
- **Phonetics and sociolinguistic factors:** addressee identity, social and geographical accent (socio-phonetics).
- **Phonetics and individual characteristics of the speakers:** anatomical differences, gender etc.
- **Phonetics and Interaction:** e.g. discourse, turn-taking, emotional speech

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Phonetics: Experimental Methodologies

- **Articulation:** e.g., electropalatography, ultrasound, physiological measurements of nasal and oral flow.
- **Acoustics:** e.g., waveform, spectrogram, spectra, intensity curves and pitch tracks
- **Perception:** e.g., eye tracking, various types of identification and discrimination experiments with auditory stimuli.

Some phoneticians employ also *qualitative studies* and *corpora-based studies*.

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Main Topics of Phonology

1. Which sounds make up the phonemic inventory of language *X* ? *(phonemes)*
2. Which sounds alternate (that is, which sounds have different variations depending on their environment)? (*allophones)*
3. Which sound combinations does the language *X* allow? *(photactics)*.
4. How do sounds organise into syllables and larger prosodic units?

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Do we need Phonological Theory?

> *[i]t became soon clear to most investigators that impressions registered by the ear cannot be eliminated in favour of any instrumental analysis, however, perfect. Because these models approached acoustic properties such as fundamental frequency and duration as continuous acoustic properties, they failed to recognise that these properties are structured in meaningful ways in the minds of speakers.*

Hadding-Koch (1961, p. 13)

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Do we need Phonological Theory?

Evidence from the Sound Structure of Specific Languages

English and Cypriot Greek have voiceless aspirated stops and non-aspirated voiceless stops.

- Non aspirated stops: p t k
- Aspirated stops: p^h t^h k^h

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Do we need Phonological Theory?

Evidence from the Sound Structure of Specific Languages

In English and Cypriot Greek, the phonological status of aspirated stops is different: it changes word meaning in Cypriot Greek but not in English:

e.g., po'li 'very' vs. po'lːi 'many'.
Nevertheless, in English, they result automatically, so to speak

e.g., pin /p^hɪn/ vs. spin /spɪn/.

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Do we need Phonological Theory?

Evidence from the Sound Structure of Specific Languages

Most importantly, articulatory and perceptual studies or acoustic measurements cannot tell us about the function of sounds, no matter how detailed they are. What we need is a sound phonological theory that can *describe*, *predict*, and *interpret* a language's sound patterns (Themistocleous, in preparation).

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Phonemic Inventory

- A phonologist tries to find out "*Which are the sounds—vowels, consonants—that comprise a language's phonemic inventory?*"
- We can start our analysis by identifying which sounds contrast in a language system.
- *Minimal Pairs* help us find the contrasting sounds (see the following slide):

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Minimal Pairs

pin – tin:	/p/ – /t/
peg – beg:	/p/ – /b/
port – fort:	/p/ – /f/
top – mop:	/t/ – /m/
tell – yell:	/t/ – /j/
can – van:	/k/ – /v/
sheep – ship:	/iː/ – /ɪ/
tin – ten	/tɪn/ –/tɛn/

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Allophones

A phonologist tries to account why speakers judge sounds, which are clearly distinct phonetically, to be identical. For example, in American English /t/ is pronounced with 8 distinct pronunciations[1]:

[t]	*plain*	s**t**em
[tʰ]	aspirated	**t**en
[ʈ]	retroflexed	s**t**rip
[ɾ]	flapped	a**t**om
[ɾ̃]	nasal flapp	pan**t**y
[tˀ]	glottalized	h**t**it
[ʔ]	glottal stop	bo**tt**le
[ ]	zero	pan**t**s

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[1] Kenstowicz, 1994:66 (modified).

Allophones in Greek

In Greek, nasal /n/[2] has the following variants:[3]

[n]	*plain*	Άννα	Anna
[n̪]	dental	άνθος	flower
[n̲]	retracted alveolar	πένσα	pliers
[ɲ]	palatal	εννιά	nine
[ŋ]	velar	πάγκος	bench

[2] see also the discussion on 'Greek Prenasalisation' in your textbook.
[3] see Arvaniti, 2007:13.

Phomemic Contrast and allophonic Variation in Cypriot Greek

Did you noticed?

In Cypriot Greek, there are two rhotic consonants:

- a trill /r:/ (e.g., βορράς [vɔ'rːɐs], 'north') and
- a flap /ɾ/ (e.g., πέρα ['pɛɾɐ], 'beyond'), which has two variants:
  - a voiceless one when it precedes voiceless consonants (πόρτα ['pɔr̥tɐ], 'door', άρθρον ['ɐr̥θrɔn], 'article').
  - a voiced one in all other positions.

Phomemic Contrast and allophonic Variation in Cypriot Greek

→ You cannot find these two consonants in the same context: the voiceless variant always precedes voiceless consonants and you cannot find the voiced one in that position.

→ The difference between the flap and the trill is that of *a phonemic contrast*: the two consonants constitute phonemes.

→ The other voiceless and the voiced flaps are *allophones* of the phoneme /r/.

Combinations of sounds (photactics)

- Why some sound combinations are allowed in a language and some are not allowed? For example, English allows only the sound combinations in the upper line of (1):

$$\begin{bmatrix} \text{pr br tr dr kr gr pl bl tl dl kl gl} \\ \text{*rp *rb *rt *rd *rk *rg *lp *lb *lt *ld *lk *lg} \end{bmatrix} \quad (1)$$

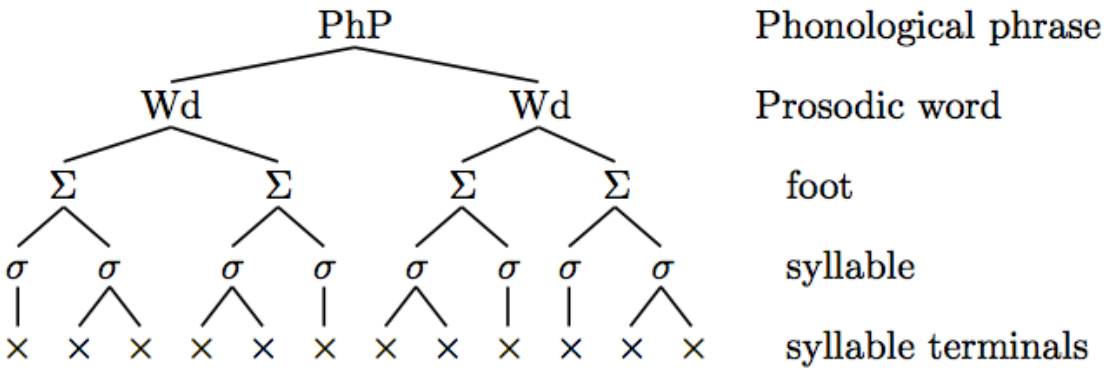
- The choice of sound combinations is language specific: In English there are no words starting with /pn/ but in Greek such combinations exist, e.g, *πνεύμα* 'pnevma 'spirit'.

Outline

Phonology: Methodologies

1. Intuition and impressionistic data collection (:transcriptions made from the auditory impressions of the investigators).
2. Experimental Phonology

The organisation of sounds into syllables and larger prosodic units[4]



[4]Reproduced from Blevins, 1995:210 (using XeLaTeX).

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Ferdinard de Saussure (1857 1913)

Course in General Linguistics (Cours de Linguistique Générale)

- The *langue* and the *parole*. The *langue* is the abstract linguistic system, the *parole* is the heterogeneous expression of the langue.
- The *sign*. The linguistic sign is made up of the signified (signifié), i.e., the concept and the signifier (signifiant), i.e., the representation of the concept, namely its form.

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Ferdinard de Saussure (1857 1913)

Course in General Linguistics (Cours de Linguistique Générale)

The relationship between signifié (meaning) and signifiant (form) is *arbitrary* (conventional). Consequently, the form varies depending on the language system:
⇒ e.g., the form for the meaning DOG is expressed as dog in English, *σκύλος* in Modern Greek, *hund* in Swedish, *chien* in French, *cane* in Italian and *perro* in Spanish, *κύων* in Ancient Greek, and *canis* in Latin.

The Evolution of Ideas in Phonology

Ferdinard de Saussure (1857 1913)

Course in General Linguistics (Cours de Linguistique Générale)

A sign is part of a system and alternates with other signs both in the paradigmatic axis speak (speaker, speaking, speech, speak etc., say, express etc.) and in the syntagmatic axis:

the man/the boy/the child . . . sleep/eat/drink. . .

Nikolai Trubetzkoy (1890 1938)

Principles of Phonology (Grundzüge der Phonologie)

- He defined the *phoneme* as the smallest distinctive unit.
- He established phonology as a discipline separate from phonetics.

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Phonology in the Generative Framework

Plato's Problem

any speaker knows many surprising things about the structure of his or her language, things whose internalization is difficult to understand if based solely on evidence from the linguistics environment. Kenstowicz, 1994.

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Phonology in the Generative Framework

- Generative Grammar
- Levels of Representation
  - LF Logical Form
  - PH Phonetic Structure
  - D-Structure

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Phonology in the Generative Framework

- The Sound Pattern of English.
- Non-linear Approaches.

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Summary

- Sounds and Communication.
- Subject of Phonetics
- Subject of Phonology
- Evolution of Ideas in Phonology

- In the following,
  - we will explore the articulatory and acoustic aspects of speech sounds and we will learn to classify them.
  - we will learn how to transcribe sounds using the International Phonetic Alphabet.

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For Further Reading I

J. Harris.
English Sound Structure.
Blackwell, 1994.

M. Kenstowicz
Phonology in Generative Grammar.
Blackwell, 1994

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