

# Phonological Theories

Relevant for:

Magisterstudium Phonetik (Phonologie II)

Masters in Speech and Language Technology

Session 1

# Aims of Course

- To provide an *overview and to further an understanding of phonological description*.
- To show how with constant overall goals, *phonology has reacted to changing views of science* and, in consequence abandoned old descriptive methodologies.
- To develop a *command of the different descriptive methodologies* (practice in the “Übung” Sessions).
- Overall: To further the realisation that, at any particular time, phonological description (and linguistic description in general) is the *joint product of the observed phenomena and the reigning scientific ideology* (which determines which observable phenomena are relevant).

# Overall goals of Phonology

*Phonology aims to describe the way [the] medium of human vocal sound is structured, in language in general as well as in individual languages*

(GUSSENHOVEN 1998, p. 22-3)

I.e. . . .

- . . . what “recurring elements” there are (e.g. what sounds?)
- . . . what restrictions there are on the ordering of these elements (distributional restrictions)
- . . . at what level of description the restrictions operate and what levels of description are to be assumed (hierarchy)
- . . . how the environment in which “elements” occur affects them (changes them)

*Different phonological theories have approached these goals in different ways and dealt with them to differing degrees*

# Different approaches

- 1 Identify distinctive sounds and describe their distribution within words.  
Describe the stress patterns of words and the accentual and intonational patterns of utterances separately from the segmental structure.
- 2 Define the distinctive sounds as different classes of related sounds, grouped by means of their common properties. Relate the sounds to the morphemic structure of words and formulate rules which capture formal changes in terms of changes to the sound properties (features).  
Derive stress patterns of words and sentences from the morphemic and syntactic structure of the utterance.

## Different approaches 2

- ③ Relate the features to the sounds, the sounds to the syllables, the syllables to accentual patterns on one level, to the melodic pattern on another, and to the morphemic and syntactic structures on yet another.  
Keep all the levels autonomous in their representation.  
Show the regularities of variation in the phonological form (rules) as changes in representation of the relationship between the levels.
- ④ Throw the rules away, and show the variations in form as a hierarchy of “constraints” that are “violable” to different degrees.

- The issue of “*psychological validity*”  
Is the phonological structure just a descriptive construct (“*hocus pocus*”) or is it a reflection of what the speaker-hearer is doing when speaking and listening (“*God’s truth*”)?
- Another, related question is: *Should* it reflect psychological structures and processes?
- Phonology is notoriously inconstant on this issue, opinions changing radically from one period to another, from one school to another and even within one person:
  - cf. Phoneme theories
    - DE SAUSSURE on Langue vs. Parole
    - CHOMSKY
- Many modern phonologists avoid the question completely!

## Beginnings: *Pre-structuralist Phonology*

- Phonology (and Linguistics as a whole) as a science occupied with the *structured use of vocal sound* for speech communication emerged slowly in the first quarter of 20th century.
- It followed a period from the end of 18th century, through most of 19th century where empirical observation of languages was focused on language typology and language change (cf. *Grimm's & Verner's Law* etc., cf. LYONS, p.22 ff.).
- F. DE SAUSSURE is the single most important person in the transition to a structuralist view of language (ANDERSON p.17ff).
- But there were very ancient precursors whose ideas came into their own:  
PANINI and the Sanskrit grammarians (India, 4th cent. BC);  
ANON (Iceland, Icelandic, 12th century AD)

# What do we mean by “structure”

- The concern of Phonology is with *sound structure* – but also in relation to *other structural aspects* of language;
- *Words* are the most accessible units of structure to naive observers of (many) language (but not in all languages!)  
Words can have internal structure: *morphological*  
They are combined in a structured way to form larger structures: *syntax*
- The *structured phonetic expression* of these other structures, i.e. *the relation between sound and the morpho-syntactic structure* of a language (and language in general) is *Phonology*.

# Sound structures are complex

- Utterances comprise *audibly distinguishable sounds*.  
But not all sequences of sounds are acceptable:  
[fɪmɪtʃpɪtɹl] is NOT, [fatamɔɡana] IS
- We hear a second-level sequence of sound events, made up of two phonetically different classes of sounds:  
We call them C & V and together they form *Syllables*
- The sequencing of sounds can be different *within* vs. *across* the boundaries of a syllable. E.g.:  
<sub>E</sub>[stækt] is a well-formed syllable; [tsætk] is *not*.
- In <sub>E</sub>[bʌt.sæt.kwɪətlɪ], however, it is acceptable.
- But, of course, languages differ in the syllable structures they allow.

- What principles do you see behind the differentiation of sound sequences into syllable sequences?  
(Consider both the production and the perceptual implications)

- The relationship between sound structure and morphology is not straightforward:

*Morpheme*  $\geq$  *Syllable*  $\geq$  *Morpheme*

$G\{laʊf\} + \{əʌn\}_{Inf} \rightarrow [laʊ.fəʌn]$

$E\{rəʊz\} + \{s\}_{Pl} \rightarrow [rəʊ.zəz]$

$F\{zə\}_{Pr} + \{əpru:v\} \rightarrow [zə.pru:v]$

- Phonological structuring is clearly different from morpho-logical structuring – they are *different levels of organisation*.
- But this leads to a logical dilemma:  
The morphological structure (1-to-1 link to semantics) needs the sound structure to become manifest.  
The complex relationship between them has to be described as part of the overall linguistic model.

- Which scientific point of view is more plausible to you?
  - ① The sound units (phonology) and the meaning units (morphology) are organised differently. Therefore they should be treated separately in the science of language.
  - ② The sound units and the meaning units in a language all contribute to the function of communicating. Therefore they can only be treated together

# Differences between Languages

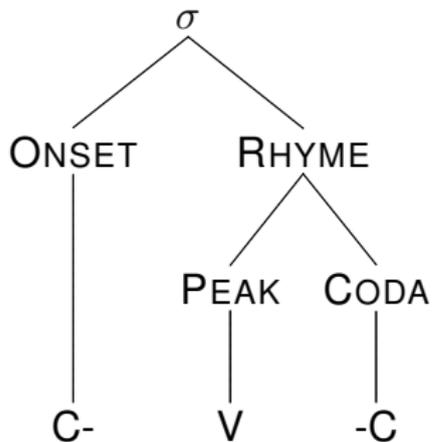
- Languages have different numbers of sounds in their inventories. E.g.:

Rotokas (Papua New Guinea) has 11

!Xū (Namibia & Angola) has 141

- They also have different restrictions on how the segments can be used to structure syllables:

The simplest is (C)V  
and very unconstrained:  
(C<sub>3</sub>)V(V)(C<sub>4</sub>)



- What sort of restrictions exist for the syllable structure of the European (or non-European) languages that you know?
- German?
- English?

# “Universals”

- Despite all the differences, *languages have much in common*:
  - All languages have *syllables*,
  - Their sounds can be divided into *vowels* and *consonants*,
  - All languages have (at least 2) *voiceless plosives*.
- Further “*near-universals*” are:
  - All languages except 2 (in UPSID) have *sonorants*,
  - All except *Hawaiian* have /t/,
  - All except 25(!) have /i/.
- Regarding frequency of categories:
  - Coronals* are generally more common, and are more differentiated than *labial* or *dorsal*.

- What lies behind these so-called “universals”? Can you think of any reasons why these properties should be found in (nearly) all languages?
- It might help if you consider the production mechanism (i.e. the phonetic aspects – the physiological (articulatory) and perceptual aspects) of these phenomena

# Implicational “Universals”

- There are also many phenomena that tend to co-occur across languages (cf. GUSSENHOVEN, p. 29 ff).
- *Less common* sounds (across languages) tend to be “*more complex*”.  
*More complex* sounds also occur *less commonly* within a language.  
If a language has *more complex* sounds, it usually has its *less complex* equivalent.
- Strangely, the *inventory size* of vowels and consonants in a language *correlates positively* across languages.
- Inventory size also correlates *positively* with the number of *different syllable types*, but *negatively* with *average word length*.

- 1 There are two positive and one negative correlations mentioned. My comment on one is the expression “strangely”.  
What would be the implications (in terms of the organisational principles underlying sound structure) if a language had a large number of consonants and a small number of vowels (or vice versa)?
- 2 In the last slide, we discussed the possible reason behind the “universals” that were introduced there. Does the same reason hold for all the observations mentioned here?

- 1 What restrictions exist for the syllable structure of the following languages?
  - 1 French?
  - 2 Italian?
  - 3 Spanish?
  - 4 a language of your choice?
- 2 How many words can be formed with:
  - 20 different sounds (15C and 5V), and
  - allowing “words” of up to 5 sounds per word, and
  - with only CV or CVC syllables?