

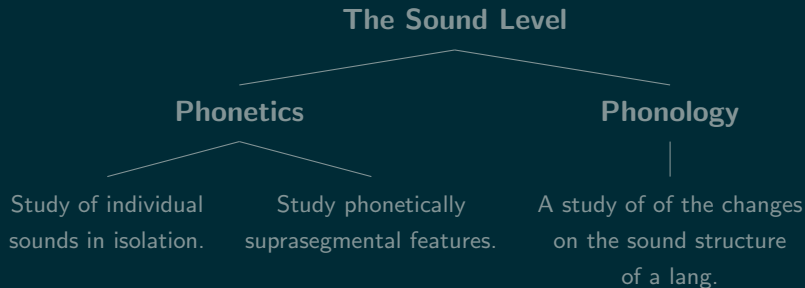
# Phonology

## General Linguistics

Oujda Linguistics Club

[www.oujdalinguistics.club](http://www.oujdalinguistics.club)

# Phonology vs. Phonetics



# Phonology?

**Phonology:** the study of mental representations of speech sounds, and the rules governing systematic variation in speech sounds.

**Phoneme** is the smallest contrastive, meaningful unit of sound in a given language.

It is called so because:

- ▶ It is articulated differently.
- ▶ It occurs in the same environment. (contrastive)
- ▶ The change affects the meaning.

# The History of Phonology

- ▶ SPE Model (Chomsky & Halle, 1968):
  - Linear approach to phonology.
  - Focus was on features.
  - Disregarded the existence of a syllable, and stress was assigned to the vowel.
- ▶ Autosegmental Phonology (Goldsmith, 1970s)
  - Non-linear approach to phonology.
  - Focus was on the tonal phenomenon (Igbo).
  - Features are placed on separate 'tiers' which are connected by 'association lines'.

# The History of Phonology (cont.)

## Metrical Phonology (Liberman, 1970s)

- Recognizes syllable as a 'significant unit' in phonological theory.
- Initially developed as a theory of stress.

## Optimality Theory (Prince & Smolensky, 1990s)

- Constraint-based rather than rule-based.
- A universal set of constraints are ranked differently by the phonologies of different languages.
- The functions generative and evaluation produce possible surface form candidates and determine which one is 'optimal' based on the constraint rankings.

# Allophone

**Allophone** is the phonetic variety of a phoneme in a particular language.

Allophones are:

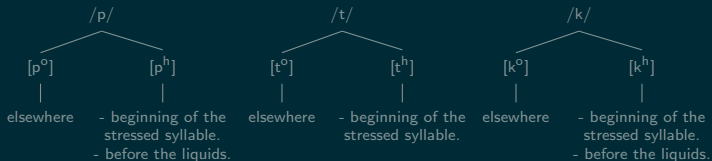
- ▶ Articulated differently.
- ▶ Never occurs in the same environment. (complementary distribution<sup>1</sup>)
- ▶ Do not change the meaning of the word.

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<sup>1</sup>If two sounds never occur in the same environment, we say that they are in complementary distribution.

## Example of Allophony: Aspiration

- ▶ In English, voiceless stops ([p], [t], [k]) are **aspirated** in certain positions. This means that there is a short delay between the release of the stop and the point at which the voicing of the next vowel starts.
- ▶ Aspirated stops are transcribed with a superscript 'h': [p<sup>h</sup>], [t<sup>h</sup>], [k<sup>h</sup>].



# Minimal Pair Test

- ▶ A simple test to check if two sounds are contrastive, and hence belong to different phonemes, is the **minimal pair test**.
- ▶ If you can find two words that *only* differ with respect to the two sounds you are investigating, you may conclude that they are belonging to different phonemes.

[tɪp]	[dɪp]
[p <sup>h</sup> ej]	[wej]
[rɪd]	[lɪd]

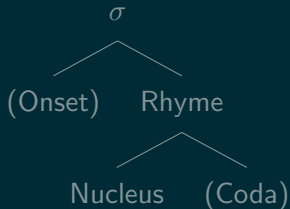


# Narrow vs. Broad transcription

- ▶ **Narrow transcription** (or phonetic transcription) is a transcription that includes allophonic detail. It is written between slashes, only represents phonemic contrasts: /hawz/, /haws/.
- ▶ **Broad transcription** (or phonemic transcription) is a transcription that includes only phonemic segments and less phonetic detail. It is written between square brackets, represents allophonic contrasts: [hawz], [haws].

# Syllable Structure

- ▶ A **syllable** is a peak of sonority that is surrounded by less sonorous sounds.
- ▶ The vowel (or syllabic consonant) part of the syllable is called the nucleus . Every syllable has a **nucleus**.
- ▶ Consonants in a syllable preceding the nucleus constitute the **onset**, consonants following the nucleus form the **coda**.



# Phonotactics

- ▶ Part of a speaker's phonological knowledge has to do with which sequences of consonants are possible. This part of the grammar is called **phonotactics**.
- ▶ English speakers know that [blik] is a possible (but non-existing) English word, but that \*[lbik] is not.
- ▶ Every language has different phonotactic constraints. For example, Russian allows more clusters than English does:

(1) [rtut] 'mercury', [mgla] 'fog'

# Syllable Structure

- ▶ **Sonority** has to do with the amount of acoustic energy that a sound has.
- ▶ **Sonority hierarchy:**  
stops < affricates < fricatives < nasals < liquids < glides
- ▶ **Sonority principle:** Within a syllable, sonority is increasing towards the nucleus, and falling after the nucleus.

Example:



# Syllable Structure

- ▶ The sonority principle does not work for all words.
- ▶ Only certain sequences of sounds of the same sonority class are allowed in English. This is not predicted by the sonority principle:

(2) a. [k<sup>h</sup>rɪpt] , [k<sup>h</sup>ɔn.dʌkt]

b. \*[ptlk] , \*[ktup]

- ▶ The [s] sound often forms an exception. The following words all violate the sonority principle:

(3) [skɪp] , [stri:p] , [k<sup>h</sup>rʌsts]

# Syllable Constraints

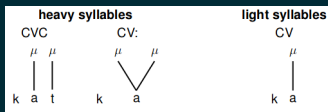
- ▶ English allows various complex types of onsets and codas with up to three consonants in an onset, and up to four consonants in a coda.

(2) [skrim], [tɛksts]

- ▶ The general syllable pattern of English can therefore be represented as (C)(C)(C)V(C)(C)(C)(C).
- ▶ Syllables that do not have a coda are called **open**. These have the shape (C<sub>0</sub>V). Syllables that have a coda are called **closed**. These have the shape (C<sub>0</sub>)VC(C<sub>0</sub>).

# Syllable Weight

- ▶ **Mora** ( $\mu$ ) is a phonological unit larger than a segment, but typically smaller than a syllable. It measures the syllable weight (whether heavy or light).
- ▶ A **light syllable** consists of a single mora, while a heavy syllable consists of two.
- ▶ The mora appears to be an important rhythmic element in some languages, such as Japanese and Ancient Greek, but is possibly of no relevance in others.



# Prosodic Hierarchy

Suprasegmental features (stress, tone...) are the bearing units of prosodic units in Figure ??

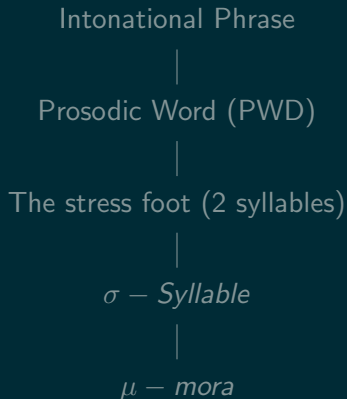


Figure: Prosodic Hierarchy (projected by *Prosodic Licensing Principle*)



# Features

**Distinctive features:** encodes the physical articulation of a sound. Phonemes are bundles of simultaneous distinctive features.

Their functions are:

- ▶ Contrastive.
- ▶ Classifictory: To classify segments into **natural classes**.

Segments can be represented by a collection of features, which we write in a **matrix**.

# Major Class Features (also Major Phonetic Classes)

- [ $\pm$ consonantal]: all consonants, except glides and glottal consonants, are [+consonantal]
- [ $\pm$ syllabic]: vowels and syllabic consonants (nasals & liquids) are [+syllabic]
- [ $\pm$ sonorant]: obstruents are [-sonorant] sonorants are [+sonorant]

# Manner Features

- [ $\pm$ continuant]: sounds made with air flowing through the *oral* cavity. (vowels, glides, liquids, fricatives)
- [ $\pm$ delayed release]: affricates
- [ $\pm$ nasal]: nasals and nasalized sounds are [+nasal]
- [ $\pm$ lateral]: laterals ([l]-like sounds) are [+lateral]

## Other Features

- $[\pm\text{high}]$ : high vowels are  $[+\text{high}]$ , low vowels are  $[-\text{high}]$
- $[\pm\text{low}]$ : this is needed for mid vowels  $[-\text{high}, -\text{low}]$
- $[\pm\text{back}]$ : back vowels are  $[+\text{back}]$ , front ones are  $[-\text{back}]$
- $[\pm\text{round}]$ : round back vowels are  $[+\text{round}]$
- $[\pm\text{long}]$ : long vowels are  $[+\text{long}]$ , short ones are  $[-\text{long}]$
- $[\pm\text{voiced}]$ : voiced consonants and all vowels are  $[+\text{voiced}]$
- $[\pm\text{stressed}]$ : for stressed vowels only

# Natural Classes

- **Natural classes** are sounds that have one or more features in common.

## Examples

$/p, t, k/ \rightarrow \begin{bmatrix} \text{-continuant} \\ \text{-voiced} \end{bmatrix}$

$/t, p, k, f, \int, t\int, \theta/ \rightarrow \begin{bmatrix} \text{-voiced} \end{bmatrix}$

# Rules and Derivations

- ▶ The phonemic representation of speech is also called **underlying representation** (UR). This presentation is stored in the lexicon, but never actually pronounced.
- ▶ Part of our grammar is a set of **phonological rules**. These rules represent all the systematic phonetic variation that is part of our phonological knowledge (unconsciously).
- ▶ The rules apply to the underlying representation, and yield the **surface representation**. This is the form that is actually pronounced.

## Example

Underlying representation /pæn/, apply Aspiration rule, surface representation [p<sup>h</sup>æn].

## Rules and Derivations (cont.)

UNDERLYING REPRESENTATION



Rules

SURFACE REPRESENTATION