Phonology

What Is Phonology?

- Phonology is the study of how sounds are organized in particular languages.
- This contrasts with phonetics, which deals with the properties of the human vocal system, irrespective of which language is being spoken.
- Phonology is an abstraction away from the physical data provided by phonetics. It seeks to discover the psychological patterns and underlying organization of sounds shared by native speakers of a certain language.
- In the preceding sense it is essentially a bridge from phonetics (performance) to linguistic competence.

The Concept of a Phoneme

It is sometimes difficult for native speakers of a language to tell the difference between sounds which may be completely distinctive for speakers of another language.

1. In English, pit vs spit
2. But in Hindi /pʰʌɾ/ "fruit" vs /pol/ "moment" → distinguished only by aspiration.

- The [pʰ] and the [p] are considered to be the same sound, despite some seemingly irrelevant technical articulatory details. But these same details are enough to completely differentiate the two sounds in Hindi, making them as different as [p] and [b] are in English.

The Concept Of A Phoneme (cont.)

- We can say that [p] and [pʰ] belong to the same class in English, that class of sounds identified by a native speaker as being insignificant variants of the consonant /p/. Such classes are called phonemes, and the individual sounds belonging to them are called allophones of a particular phoneme.
  Thus, [p] and [pʰ] are allophones of the phoneme /p/ in English, but not in Hindi, where they are considered to be different sounds.
- More examples of phonemes:
  LF p.70: top, stop, little, kitten, hunter (/t/)

Some of the Characteristics of the Distribution of Phones in a Language

The occurrence of certain groups of sounds may be either unpredictable or predictable.

Unpredictable: consider the sounds [s] and [r]. In English, given the information that a word ends in [-ert], we cannot predict which of the two consonants forms the beginning of the word because both [sɛrt] and [rɛrt] are English words.

Thus their appearance is unpredictable → no hard-and-fast rules can be given to predict which will appear, given all other phonetic information about a word.
Cross-linguistic examples

Just as different languages have different phonemes, different languages have different patterns of predictability:

Japanese: [s] vs [s]. In [an] we must choose [s] (saru = monkey), but in [anru] we must choose [s] (shiru = to know). Before any vowel but [i], only [s] can occur, while only [s] can occur before [i]. [s] cannot occur in any context other than before [i]. Thus the appearance of these two sounds is predictable.

Korean: LF p. 73 [l] vs [r] predictable

Distribution Of Phones

- The distribution of a phone is the set of phonetic environments in which that phone can appear, e.g. nasalized vowels occur in English immediately before nasal consonants.

One needs to consider the distribution of sounds in order to determine whether sounds in a language are allophones of a single phoneme or allophones of separate phonemes.

- Example: in Hindi, the two sounds [pʰ] and [p] can affect the meaning of a word, as in [pʰuːd] “fruit” vs [puːd] “moment”. They are contrastive and therefore allophones of separate phonemes. We used a minimal pair to test this.

- A minimal pair is a pair of words which have different meanings and whose pronunciation differs by only one phone. e.g. dog-bog, hat-rat, toe-two.
Free variation:
The phones may appear in the same environments, but none ever causes a change in meaning. Hence there are no minimal pairs involving phones in free variation. Allophones of the same phoneme. See example LF p. 74

Contrastive distribution:
The set of environments of the two (or more) phones are contrastive – i.e., choices among them can lead to differences in meaning. Allophones of different phonemes, e.g. [pʰ] and [p] in Hindi.

Complementary distribution:
Which of a set of sounds will appear in any given environment is predictable → only one can appear in any given circumstance. Thus there are no minimal pairs, simply because no two sounds ever appear in the same place. Allophones of the same phoneme, e.g. [pʰ] and [p] in English.

Distribution Of Phones (cont.)

Natural Classes
• Groups of sounds which share some articulatory or auditory feature(s)
• Natural classes are all or nothing (no class such as “all voiced consonants except [b]”)
• Can be used in making generalizations:
  German: word-final voiced consonants become unvoiced
  (3) a. Hund → [hunt] “dog”
     b. Tag → [tak] “day”

Phonological Rules
Phonological rules are mappings between linguistic levels – from the level of psychological representation of sounds to the actual sounds produced by the vocal system.

Phonemic form → rules → phonetic form

Natural Classes

Phonological Rules
- **Voiceless stops**: [p, t, k]
- **Nasals**: [m, n, ŋ]
- **Rounded**: [u, ə, o, ɔ]
- **Sibilants**: auditory phenomenon
  “hissy”: [s, z, ʃ, ʒ, ʂ, ʐ]
- **Obstruents**: stops, fricatives, affricates
- **Sonorants**: nasals, liquids, glides
- One can use multiple features to characterize a class. e.g. “velar stops” = [k, ɡ]

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**Kinds Of Phonological Rules**

**Assimilation**: a process by which a sound becomes more like a nearby sound in terms of some features
- (English) bit [t] vs. bin [i] (nasalization)
- (English) Would you [kl] → [l] (palatalization)
  → ease of production

**Dissimilation**: a process by which two nearby sounds become less alike with respect to some feature.
- derivational suffix -alis in Latin changes to -aris when the noun it is added to already contains a liquid [l].
  These words came into English as adjectives ending in -al or -ar.
  - al: annecdot-al, annu-al
  - ar: angul-ar, annul-ar

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**Insertion**: phonological process by which a segment not present in the phonemic form is added in the phonetic form

- prince [prɪnts]: [s] → [ts]
  hamster [ˈhæmstər]: [s] → [ps]
  (voiceless stop insertion)

**Deletion**: a process by which a sound present in the phonemic form is removed from the phonetic form in certain environments

- (English): okay [oka] → [ʔke]
- (English): Toledo [təˈlido] → [tliˈdo]
  → ease of production

Rules may be obligatory (e.g. nasalization of vowels in English) or optional (alveolar stop assimilation)

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**Reasons For Phonological Rules**

- make sequences easier to pronounce
- make sounds easier to perceive