# *Phonology 1: phonemes*

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# *Phonology 1: phonemes*

- Phonology and phonetics
- Establishing separate phonemes
  - **Minimal pairs**
  - Distinctive Features
- Free Variation/Redundancy
- Establishing allophones of the same phoneme
  - **Complementary distribution**

*Word of the day*

# Minimal pair

# *Phonology*

- Languages use different sets of sounds often pronounced in different ways.
- In addition, languages organize sounds (what we call **phones** — the actual physical sounds that are distinguishable) in different ways. Phonology is the study of the organization of speech sounds in a particular language.

# *Phonology*

- In a given language some phonetic differences are **distinctive** (= can produce a meaning difference) and others are not

# *Phonemes*

- **Phone**: a sound realized in a given language, a segment
- **Phoneme**: an abstract representation of the smallest distinctive sound unit in a language (often realized by different phones referred to as **allophones** of this phoneme)

# *Phonemes*

- Phonemes are represented in slashes, not square brackets

  [pʰɪn]

  /pɪn/

- Phonemic representations do not have complete phonetic detail

# *Phonemes: minimal pair*

- **Minimal pair**: a pair of words distinguished by only one phoneme occurring in the same place in the string
  - /f//v/ [fæt] *fat* [væt] *vat* [straɪf] *strife* [straɪv] *strive*
  - /æ//eɪ/ [spæt] *spat* [speɪt] *spate* [æt] *at* [eɪt] *ate*

# *Phonemes: minimal pair*

- The first step in establishing a phonemic inventory is to describe the phonetic realizations of all possible sounds of a given language

# *Phonemes: minimal pair*

- Next, one needs to find which of the sounds are capable of distinguishing meaning
- This  can be done by finding a minimal pair
- A minimal pair refers to a pair of words that differ only with respect to a sound in the same place (e.g. at the beginning) that produce a difference in meaning
- The two sounds in question are said to be distinctive since they produce the meaning difference.

# Phonemes: minimal pair

- [fæt] *fat* [væt] *vat* — initial
- [straɪf] *strife* [straɪv] *strive* — final
- /æ//e/
- [spæt] *spat* [speɪt] *spate* — medial
- [æt] *at* [eɪt] *ate* — initial

# *Phonemes: minimal pair*

- We have minimal pairs for [f] and [v], and for [æ] and [eɪ].
- We can conclude that [f] and [v] belong to separate phonemes, and that [æ] and [eɪ] belong to separate phonemes.

# *Distinctive features*

- **Distinctive features** are phonetic properties of phonemes that account for their ability to contrast meanings of words
- For example, the fact that [f] and [v] belong to separate phonemes shows that … is a distinctive feature (Q: Fill in the space …)
- [answer] voicing

# *Distinctive features*

- These phonemic features distinguish the set of significant sounds (phonemes) of a language.
- Phonemes are described with the smallest number of distinctive features necessary to distinguish them from one another
- /l/ = lateral liquid; /u/ = high, back, tense vowel

# *Redundancy and variation*

- Sounds that are substitutable one for another in a given environment are said to be in **free variation**
- For example, *route* is pronounced [rut] or [raʊt]
- tomato [təmeɪtoʊ] or [təmatoʊ]

# *A Song about Free Variations (sort of)*

Let's Call the Whole Thing Off

- You say [iðɻ] and I say [aɪðɻ],
- You say [niðɻ] and I say [naɪðɻ]

  [iðɻ], [aɪðɻ]. [niðɻ], [naɪðɻ]
- Let's call the whole thing off.
  - lyrics by Ira Gershwin

# *Redundant features*

- **Redundant features** are phonetic details that are predictable and not distinctive
- For example, in English back non-low vowels /u/, /oʊ/ are rounded, so in giving a phonemic description, the feature [rounded] may be omitted

# *Redundant features*

- Sometimes a feature is added to a phoneme in a particular environment
- For example, in the specific environment of word initial position, voiceless stops /p/. /t/, /k/ are aspirated in English
- How do we know that aspiration is redundant and not distinctive in English?

# *Who's Superman?*

- Clark Kent is always seen in the company of Lois Lane doing mundane newspaper reporting
- Superman is a loner who likes to fly faster than a jet plane and save people from imminent disaster

# *Who's Superman?*

- Clark Kent behaves very distinctively as a reporter; he is myopic, hopelessly infatuated with Lois Lane and rather a milquetoast
- Superman is only seen in high risk contexts where he displays great eyesight, near indifference to Lois, and superhuman strength

# *Complementary distribution*

- Superman never occurs in situations where Clark Kent is, and vice versa.
- Superman's behavior is distinct from that of Clark Kent, but it is predictable from the environment, the high risk situation requiring daring and superhuman strength
- Superman is in **complementary distribution** with Clark Kent

# *Complementary distribution*

- An inventory of all occurrences of [p] and [$p^h$] in English reveals that [$p^h$] only appears in word initial position
- pin [$p^hɪn$] spin *[$sp^hɪn$]
- [p] can be word final or medial, but not initial
- *[**p**ɪt] [s**p**ɪt] [$t^hɪ$**p**]
- [$p^h$] and [p] are in **complementary distribution**
- Note: * indicates impossible forms.

# *Complementary distribution*

- Phones that never occur in the same phonetic environment (e.g. [p] and [$p^h$]) (and jointly exhaust all possible environments) are said to be in **complementary distribution**

# *Complementary distribution*

- When two phonetically similar phones are in complementary distribution and their distribution is explainable by “rules”, they are **allophones of the same phoneme**
- Usually the phoneme is “named” for the phone that does not require specification of a phonetic environment (i.e. the “elsewhere one”).

# Aspiration: English Stops

- pin [$p^h$ɪn] spin [spɪn] *[$sp^h$ɪn]
- tick [$t^h$ɪk] stick [stɪk] *[$st^h$ɪk]
- kin[$k^h$ɪn] skin [skɪn] *[$sk^h$ɪn]
- In English, aspirated stops and unaspirated stops are allophones of each other since they are in complementary distribution.

# *Thai stops*

- Thai has voiceless unaspirated stops, voiceless aspirated stops and voiced stops, and aspiration is distinctive (makes a difference in meaning).
  - [tam] ‘to pound’
  - [t$^{h}$am] ‘to do’
  - [dam] ‘black’

# *What can we conclude about Thai stops?*

- In Thai, aspirated stops and unaspirated stops are different phonemes since they are found in minimal pairs (that produce a difference in meaning).