

Intro to Linguistics

Phonological analysis.

How to solve phonology problems.

- 1) Look for patterns in the data:
 - o Are there minimal pairs? Near-minimal pairs?
 - o Complementary distribution? (never at the same place in the same time)
- 2) Describe the environments and what happens:
 - o Use features and natural classes to talk about sounds and changes
 - o Can you describe a consistent environment for one of the sounds that are in complementary distribution?
- 3) Write down the rules:
 - o What it starts out as → what features change / in what environment

Examples to be done in class.

Suprasegmental phonology.

Restrictions on arrangements of phonemes (phonological structure):

In English, the velar nasal [ŋ] **can't occur at the beginning of a word** -- cf. *map*, *nap*, **ngap*

Basic way in which languages differ is their **inventory of phonemes**. For example:

- German has the **voiceless velar fricative** [x], as in *Bach* "creek".
 - o English: voiceless fricatives - [s], voiceless velars - [k], but not both properties.
- German also has the **high front rounded vowel** [y], as in *kühhn* "clever".
 - o English: high front [i], high rounded [u], but these properties are not combined.
- English [θ] sets it apart from many languages, including German and French.
 - o They have several voiceless fricatives, but not the interdental.

Learning a new (or a first) language includes learning the "list" or inventory of sounds.

Syllables

Phonological structure - the way phonemes are organized - includes the notion of **syllable** and its subparts. This structure is crucially involved in describing the **possible words**.

- the **onset** = consonant(s) at the beginning of the syllable
 - o English normally permits up to two consonants
 - o but in addition, [s] can be added to the beginning of many syllables as well, making up to three consonants
 - o all phonemes can occur in this position except for [ŋ]
- the **nucleus** = vowel that is the core of the syllable
 - o sometimes a consonant can serve as the nucleus, as in the second syllable of *kitten* or *table*
- the **coda** = consonant(s) at the end of the syllable
 - o English normally permits up to two consonants at the end (*belt*, *jump*, *arc*)
 - o but in addition, certain sounds such as [s, t, θ] can be piled up (*belts*, *sixths*)

- No need memorize for each word: syllabification is a **general property of the language**.
- In these last two words, the **consonant serves as the sonority peak** - it is **syllabic (a nucleus)**. English permits **nasals and liquids** to be syllabic, at least in **unstressed** syllables:

prism, bottom, sump'm (for "something"), cap'm (for "captain"), hidden, button, kitten, risen, bottle, little, towel, swimmer, higher, butter

- For [r], the consonant can function as a vowel even in a **stressed syllable**: bird, fur, word

In some dialects, such as Standard British, Boston, and Coastal Southern US, any [r] in the rhyme of a syllable (whether nucleus or coda) loses its r-ness and becomes a schwa-like vowel. These are called "r-less" dialects.

- **Another general property of English**: restrictions on what consonants can be an **onset cluster** -sonority has to **increase by two steps**.

- actual words with obstruent+liquid (two steps):brick, true, free, crab; play, blue, flea, glib
- possible words with obstruent + liquid:blick, clee
- impossible words with obstruent + nasal (just one step) :*bnick, *fnee, *gmue, *dmay
- historical loss of initial obstruent in cluster (letter now silent):knee, knight, gnat, gnaw

- This is part of our **general knowledge** of the language: we can distinguish blick and *bnick

But what about **words like snow** (obstruent + nasal onset cluster)?

- Take (almost) any English onset, and **tack an [s]** on the front of it, ignoring sonority.

snow (cf. no), stop (cf. top), spray (cf. pray)

- This is a special property of [s] and no other obstruent in English: **loud fricative noise**: it doesn't depend on the normal syllable structure. In German (and Yiddish), it's the (alveo)palatal fricative, as in **Schmutz** "dirt."

Syllable structure is a way in which **languages differ**.

Hawaiian: no coda consonants, maximum of **one consonant** in the onset. So: borrowed words get a lot of extra vowels, to create **new syllables** of the proper type.

ink > 'inika Norman > Nolemana

Polish: allows **more consonants** at the beginning or end of a syllable than English. That's why some Polish names are hard for English speakers to say: Przepiorkowski, [Gdansk](#) or [Zbigniew Brzezinski](#).

bzdura "nonsense" babsk "witch" grzbiet [gzhbjɛt] "back" marnotrawstw [-fstf] "of wastes"

A language learner learns **what structures are possible** by observing the attested patterns.

What does phonology do for us?

Phonology of human language is an ingenious solution to a serious problem.

Apparent design features of human spoken language

1. Large vocabulary: 10,000-100,000 items
2. Open vocabulary: new items are added easily
3. Variation in space and time: different languages and "local accents"
4. Messages are typically structured sequences of vocabulary items

Compare the "referential" part of the vocal signaling system of other primates:

1. Small vocabulary: ~10 items
2. Closed vocabulary: new "names" or similar items are not added
3. System is fixed across space and time: widely separated populations use the same signals
4. Messages are usually single items, perhaps with repetition

Some general characteristics of other primate vocalizations that are shared by human speech:

1. Vocalizations communicate individual identity
2. Vocalizations communicate attitude and emotional state

Some potential advantages of the human innovations:

1. Easy naming of new people, groups, places, etc.
2. Signs for arbitrarily large inventory of abstract concepts
3. Language learning is a large investment in social identity

How can it work?

Children learn an average of more than 10 items per day, sometimes from hearing a word once!

Pronunciation learning problem: from very few examples, ignoring variation!

Perceptual error rate for spoken word identification is less than one percent.

If every word were an arbitrary pattern of sound, this problem would be impossible to solve.

So what makes it work?

The Phonological Principle

The sound of a word is not defined directly (in terms of mouth gestures or acoustic wave patterns). Instead, it is mediated by encoding in terms of a *phonological system*:

- A word's pronunciation is defined as a structured combination of a small set of elements
 - The available *phonological* elements and structures are the same for all words (though each word uses only some of them)
- The *phonological system* is defined in terms of patterns of mouth gestures and noises
 - This "grounding" of the system is called *phonetic interpretation*
 - Phonetic interpretation is the same for all words

How does the phonological principle help solve the pronunciation learning problem? Divide and conquer:

1. Phonological representations are **digital**, i.e. made up of discrete elements in discrete structural relations.
 - **Copying can be exact**: members of a speech community can share identical phonological representations
 - Within the performance of a given word on a particular occasion, **the small amount of information relevant** to the identity of the word is clearly defined.
2. Phonetic interpretation is **general**, i.e. independent of word identity
 - Every performance of every word by every member of the speech community helps teach phonetic interpretation, because it applies to the phonological system as a whole, rather than to any particular word.
 - Speakers of different dialects will have somewhat different phonetic interpretation of the phonemes, but because these are essentially the same units, once you learn the basics of a different dialect's phonetic interpretation, you can learn new words from speakers of that dialect, and interpret them phonetically in your own.