

24.900 Introduction to Linguistics

4/6/05

Phonology

NB: Quiz date has been changed to 4/20/05. It will cover only phonetics and phonology.

Topics for today's class:

1. Review of vowels
2. Syllabic Liquids and Nasals
3. Suprasegmentals
4. Phonemes

I. Syllabic Liquid and Nasals

- a. Liquids and nasals are more sonorous¹ than other consonants and in this respect are more like vowels than the other consonants.
- b. In fact, they are so sonorous that they can function as syllabic nuclei.
- c. Syllabic liquids and nasals are found in many of the world's languages, including English.
- d. Linguists are not always consistent in how they represent these syllabic consonants. Often, as you already noticed, they use a broad transcription and insert a schwa plus the liquid or nasal.
- e. When a syllabic liquid or nasal is used, they are often written with the diacritic short line beneath the consonant

Examples: funnel [fʌnl] her [hr] [hɹ] button [bʌtn]

II. Prosodic suprasegmental features:

a. Length: a:, k:, kk

Speech sounds that are identical in their place or manner features may differ in length (duration), pitch or loudness. Tense vowels are usually longer than lax vowels. However, when a vowel is prolonged to around twice its normal length, it is considered in some languages a different vowel, and it can make a difference between words.

¹ Sonorous: Characterized by a relatively open vocal tract with relatively little obstruction of airflow as a sound is made.

Japanese: *biru* building

bi:ru (*biiru*) beer

A long vowel is also called a geminate vowel.

Japanese, Finnish and Italian, for example, also have geminate consonants that make a difference in words. When a consonant is long, either the closure or obstruction is prolonged.

Japanese short “k” *saki* ahead

long “k” *sakki* before

English does not use vowel or consonant length to change a word.

No NOOOOOOO NOO all mean NO

b. Pitch: depends on how fast the vocal cords vibrate; the faster they vibrate, the higher the pitch. If the larynx is small, as in children and women, the shorter vocal cords vibrate faster and the pitch is higher, all else being equal.

c. Stress: In many languages, certain syllables in a word are louder, slightly higher in pitch, and somewhat longer in duration (but not geminate) than other syllables in a word. They are *stressed* syllables.

Digest (noun) **digest** (verb)

English is a **stress** language. In general, at least one syllable is stressed in an English word. French is not a stressed language. The syllables have approximately the same loudness, length and pitch.

d. Tone and Intonation: Speakers have the ability to control the level of pitch in their speech. This is accomplished by controlling the tension of the vocal folds and the amount of air that passes through the glottis. The combination of tensed vocal folds and greater air pressure results in higher pitch on vowels and sonorant consonants, while less tense vocal folds and

lower air pressure result in lower pressure. Two kinds of controlled pitch are *tone* and *intonation*.

- **Tone:** A language is a **tone** language when differences in word meaning are signaled by differences in pitch. Pitch on forms in tone languages function very differently from the movement of pitch in a non-tone language.

Compare: a car. A car?

Chinese: ma (five tones) (all signal different meanings; we will see that in some languages **tone** is **phonemic**)

- **Intonation** is pitch movement in spoken utterances that is not related to differences in word meaning. However, intonation often does serve to convey information of a broadly meaningful nature. For example, the falling pitch we hear at the end of statement in English such as *Susan blasted the flames*. Signals that the utterance is complete.
 - **Terminal** intonation contour
 - **Nonterminal** intonation contour: a rising or level intonation contour that signals incompleteness.

Length, pitch and stress are *prosodic* or *suprasegmental* features.

III. Differences between *Phonetics* and *Phonology*.

- Distinction between the two is not always made in a consistent manner within linguistics.
- In general, **phonetics** is more specifically the study of how speech sounds are produced, what their physical properties are, and how they are interpreted.

- **Phonology** investigates the organization of speech sounds in a particular language.
 - The shift involves one from more units to fewest units.
 - From huge variety to relative invariance
 - From absolutely concrete to relatively abstract
- ...In linguistic terms, it's not just that I say *tomahto*, and you say *tomayto*. It's that I say *tomahto*, and *tomahto*, and *tomahto*, and the three utterances are subtly different but we both think that I said the same thing three times (McMahon 2002: p. 3).
 - Focuses on language specific selection and organization of sounds to signal difference (in spite of individual variation of at least two forms).
 - While we might find the same sounds in two or more languages, no two languages organize their sound inventories in the same way.

IV. Phonemes

-In every language, certain sounds are considered to be the same sound, even though they may be phonetically distinct.

lay (voiced) versus *play* (voiceless)

pin (aspirated) versus *spin* (unaspirated)

-Consider the [t] sound in each of the following words:

top stop little kitten hunter

-What differences exist among these [t]s?

-To a native speaker, in spite of the differences, all of the words have a /t/ in them, at least at some psychological level.

-A speaker of Hindi, however, could **not** ignore the differences in aspiration in the stops of English.

[k ^h ə]	wicked person
[kə]	yesterday, tomorrow

[kəp]	cup
[kəp ^h]	phlegm

[p ^h əl]	fruit
[pəl]	moment

-A native speaker of English can overlook the differences in aspiration of these stops because they do not signal meaning differences. We just hear different pronunciations of the same word.

-However, differences in aspiration signal differences in meaning for Hindi.

-Thus, aspirated and unaspirated stops have different values in the phonological systems of English and Hindi.

Definitions:

Phoneme: A class of speech sounds that are identified by a native speaker as the same sound.

Allophone: The members of these classes (of phonemes) which are actual phonetic segments produced by a speaker. Thus, an allophone is a phone that has been classified as belonging to some class or phoneme. (aspirated [t] vs. unaspirated [t] in English.)

V. Distribution of Speech Sounds:

- a. An important concept in phonology: whether the sounds are **contrastive** or not.
- b. If two sounds are separate **phonemes**, then the two speech sounds are **contrastive**. Interchanging the two sounds can change the meaning of a word.
- c. If the two phones are **allophones** of the same phoneme, then they are **noncontrastive**. The alternation of the two sounds does not result in a change of meaning.
- d. To determine which sounds are thought of by a native speaker as the same sound and which sounds are distinctive relative to one another, it is important to look at where these sounds occur in a language. In other words, linguists try to discover what the phonemes of a language are by examining the distribution of that language's phones.
- e. The **distribution** of a phone is the set of phonetic environments in which it occurs. For example, nasalized

vowels appear in English in the environment of a nasal consonant [næzl].

- f. In general, speakers will attend to phonetic differences between two or more sounds only when the choice between the sounds can change the meaning of a word- that is, can cause a distinction in meaning.
- g. Such sounds are said to be **distinctive** with respect to one another.
- h. One way to determine whether two sounds in a language are distinctive is to identify a **minimal pair**. A **minimal pair** is defined as a pair of words with different meanings which are pronounced exactly the same way except that one sound that differs. When you find a minimal pair, you know that the sound that varies from one word to another is contrastive.

Leaf vs. reef
Lack vs. rack
Team vs. deem
Team vs. teen

VI. Some Exercises:

- a. Consider the following data for Spanish:
(The sound [ɣ] is a voiced, velar fricative, [ɲ] is a palatal nasal, and [r] is a voiced, alveolar trill.

<i>Spanish</i>	<i>Gloss</i>		
[layo]	lake	[payo]	I pay
[kaða]	each	[kara]	face
[pato]	duck	[gato]	cat
[kana]	cane	[kaña]	pipe
[pero]	but	[pero]	dog

What are the minimal pairs in Spanish in the data above? What are the distinct phonemes, if any?

VII. More terms for *Distribution*:

- **Overlapping Distribution:** When two sounds occur in sets of phonetic environments that are partially or completely identical. For example, consider the environments in which [b] and [d] can occur in English:

Bait	[bet]	date	[det]
Lobe	[lob]	load	[lod]
Knobs	[nabz]	nods	[nadz]
Bleat	[blit]	----	*[dlit]

- The set of environments for [b] and [d] is partially similar:
 - Both occur word initially before a vowel and between [a] and [z].
 - Both also occur in environments that are not identical [bl...] vs. [[dl..].
 - Nonetheless, we say that their sets of possible phonetic environments overlap and thus we say that they are in overlapping distribution in English.

-Complementary Distribution: This is just the opposite of overlapping distribution. The situation in which phones never occur in the same phonetic environment, e.g., [t] and [t^h] in are in complementary distribution. (cf. allophones). Together the environments in which these allophones occur make up a whole class; thus, we say that they are complementary.

[t^hɒp] vs. [stɒp]

The appearance of one allophone or another is *predictable* when those allophones are in complementary distribution.

- **Free Variation:** Other phones that are in overlapping distribution are in free variation. As an example, consider the following words containing [p] and [p⁻]; [p⁻] represents an unreleased voiceless bilabial stop:

Leap	[lip]	leap	[lip ⁻]
Soap	[sɒp]	soap	[sɒp ⁻]
Troop	[trʊp]	troop	[trʊp ⁻]
Happy	[hæpi]	----	*[hæp ⁻ i]

It should be clear that these sounds are also in overlapping distribution because they share some of the same environments: they can both appear at the ends of words. Unlike the [b] vs. [d] examples, however, there are no minimal pairs in these data. Although there are pairs of words containing the same sounds but one, these words do not contrast in meaning. To a native speaker, sounds like [p] and [p⁻] that are in free variation are perceived as being the “same” sound, and so we conclude that they are allophones of the same phoneme.

XIII. Pronunciation of Morphemes:

English plurals: The Data

A	B	C	D
Cab	cap	bus	child
Cad	cat	bush	ox
Bag	back	buzz	mouse
Love	cuff	garage	criterion
Lathe	faith	match	sheep
Cam		badge	
Can			
Bang			
Call			
Bar			
Spa			
Boy			

What generalizations can you generate for the formation of the plurals in each of the above columns for English? That is, what are the environments for the plural allomorphs in English?

-Start with simple lists then extract the generalization from the members.

Allomorph Environment

[z] After: [k^hæb],

VIII. **Phonological Rules:** (similar to rules of syntax and morphology)

-A more concise way of stating the same information that we just noted above, is in terms of phonological rules.

- i. We will assume that the regular, productive plural morpheme has the phonological form /z/. This is the form of the plural that is pronounced if no phonological rules apply to it.
- ii. Given this basic form, the variation in pronunciation of the regular plural morpheme follows two rules:
 1. Insert a [ə] before the plural morpheme when a regular noun ends in a sibilant /s, ʃ, z, ʒ, tʃ, dʒ / giving [əz]
 2. Change the plural morpheme to a voiceless [s] when a voiceless sound precedes it.

IX. Lots more to say about **Phonological Rules:**

An underlying assumption we are making:

▪ **I. Derivations and underlying representations:**

- a. A systematic modification of stored representations assembled into larger constituents undergoes systematic modification via a class of mental operations
- b. An underlying or phonological representation will contain all and only the unpredictable (distinctive feature) information for each lexical item.
- c. Predictable features of pronunciation are added to the underlying phonological representation by grammatical rules and principles.
- d. These rules operate on the basis of the information in the lexical item's phonological representation on an underlying form and the context in which it is located.

▪ **II. Phonological Rules are of two types:**

Allophonic rules: fill in qualities of pronunciation that are absent in the lexical forms of morphemes but are required by their circumstances in speech, like the aspiration of word-initial /k/ in *coats* and the rounding of the word-initial /r/ of *rules*.

-English stop aspiration:

Rule 1: Voiceless stops are aspirated when in initial stressed syllables

Rule 2: Nouns, main verbs, adjectives and adverbs have at least one stressed vowel.

Morphemic rules: also known as morphonemic rules and morphophonological rules change or choose between meaningful qualities given as part of the lexical entries of morphemes, as where voicing of the /z/ of the plural suffix is replaced by voicelessness, giving /s/, in words like /kots/ *coats* and /saks/ *socks*.
-English plural rule above .