

Phonemic Analysis

1. PHONETICS AND PHONOLOGY

PHONETICS: The study of the inventory of all speech sounds which humans are capable of producing.

PHONOLOGY: The study of the sound systems of languages. Out of the very wide range of sounds the human vocal apparatus can produce (studied by PHONETICS) only a relatively small number is used *distinctively* in any one language. Phonology is concerned with the *function* of sounds.

The relationship between phonetics and phonology is a complex one:

Statement (a):

Phonetics is concerned with universal properties of speech, studied by scientific methods; it deals with physical or concrete reality while phonology is concerned with the linguistic organization of this reality.

Statement (b):

Reversing this argument, phonology may be said to tackle the true mental reality behind speech, while phonetics handles 'merely' the concrete manifestations of this reality.

Phonology deals with the systems and structures of speech, while phonetics focuses more narrowly on articulation and acoustics. But: the boundary should not be sharply drawn; speech is analyzed by breaking it down into its several aspects, but the true reality is one of *integration*.

Phonetics:

sounds vary with their context

Phonology:

hypothesize rules to characterize the variation;
identifies patterns of the sequencing and distribution of speech sounds;
relates sounds patterning with other components of grammar: interfaced with morphology and syntax.

SPEECH SOUND (=Segment): Any *discrete unit* that can be identified in the stream of speech.

c a n
(3 segments)

science
(6 segments)

Utterances can be represented as sequences of *discrete* units (=segments).

BUT:

Speech sounds are *not* produced as a series of discrete segments; rather, they merge and blend together.

The vocal apparatus does *not* work like

[k^h] *pause* [æ] *pause* [n]

BUT: [k^hæ̃n]

Speech is DYNAMIC rather than STATIC.

TARGET POSITIONS: Those positions of speech organs that are specified for a given sound. During speech, these target positions are most of the time only *approximations*.

A sound begins to be articulated *before* the completing of the articulation of the previous sound.

e.g. book [b^w] }
 queen [k^{hw}] } *labialization*

Although a speech signal is physically *continuous*, we seem to perceive it as a sequence of *discrete entities*.

BUT: Do we have the right to claim that speech is segmentable if the articulatory and acoustic aspects suggest the opposite?

SPEAKER:

Intention: "can"

The speaker intends to utter a sequence of discrete sounds, but the vocal apparatus instead functions continually in motion, moving from one sound to the next.

Assumption: The transitions from one sound to the next are *automatic features of the vocal mechanism* -- as such can remain outside the intention of the speaker.

LISTENER:

Perceives the continuous signals as *discontinuous*.

EVIDENCE FOR THE RECOGNIZING OF INDIVIDUAL SEGMENTS IN THE FLOW OF SPEECH:

a. Alphabetic writing

There is a correlation between a sequence of symbols and a sequence of speech sounds (the correlation may not always be ideal, but it is undeniable that *there is* a correlation).

can

in the written word there is a continuum, yet we perceive it as consisting of three letters just like in the printed form: **can**

Alphabetic writing teaches us:

- (i) that speech consists of linear sequences of unitary, discretely different sounds;
- (ii) that a sound occurring at a given place in one word can be identified with certain sounds occurring at different places in other words.

b. Slips of the tongue

e.g., *you have hissed my mystery lectures;*

with this wing I thee red

etc.

Slips of the tongue illustrate the treatment of speech sounds by speakers as discrete segments which can be shunted from one word to another.

c. Rhymes

e.g., *the fat cat in the hat*

Rhymes suggest the need for recognizing individual segments.

d. Adding or deleting segments

e.g., *r-addition (idear is for idea is)*
h-drop (at for hat)

Segments rather than syllables or words are added or deleted.

"Same" utterance:

can

different! { (i) speaker differences
(ii) the same person never says it in the same way

BUT: We perceive them as *identical* utterances even though they are physically *different*.

In language the *PERCEPTUAL*, the *SUBJECTIVE*, the *DISCRETE* take precedence over the *PHYSICAL*, the *OBJECTIVE*, the *CONTINUOUS*: A BASIC ASSUMPTION OF PHONOLOGY.

2. DISTINCTIVENESS AND CONTRAST

Examine the following words:

- a. *pin, bin, tin, din, kin, fin, sin*
- b. *beat, bait, bet, bat, boot, boat, bought*

In (a) the words differ only in their initial consonant segments.

In (b) the words differ only in their vowel segments.

Segments whose function is to contrast forms are PHONEMES.

Phonetic differences that are linguistically significant are PHONEMIC.

moon

Different meanings: /m/ and /n/ are PHONEMES

noon

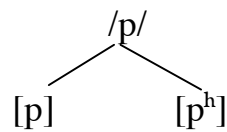
A phoneme is not necessarily phonetically invariant:

pin /p/ phonetically: [p^h]

bin /b/

spin /p/ phonetically: [p]

PHONEME: A contrastive segmental unit that may have predictable phonetic variants.



Phoneme: contrastive

Allophones: non-contrastive

pin *p^hin* Same meaning: [p] and [p^h] are *non-contrastive* segments (in English).

3. SOUNDS THAT DO NOT CONTRAST: ALLOPHONES

ALLOPHONES are phonetically conditioned predictable variants of the phoneme.



On the basis of:

(a) *The phonetic quality of neighbouring sounds:*

/d/



[d̪]

e.g., *drain*

(b) *Position:*

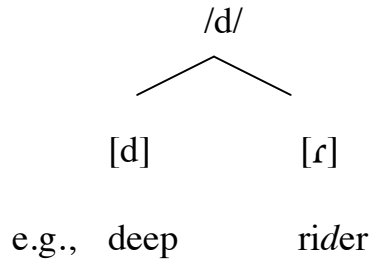
/b/



[b̚]

e.g., *tab*

(c) *Influence of prosodic elements:*



Additional examples for allophones:

/t/

(fill in!)

ELSEWHERE ALLOPHONES:

Abstract level:

/g/

phoneme

Concrete level:

$$|g|$$
 $|g|$

allophones

used before a
front vowel

used
elsewhere

environments for allophones

4. PHONEMES AS CATEGORIES

Allophones, such as [d] and [ɾ] form an abstract phonological category, the phoneme /d/.

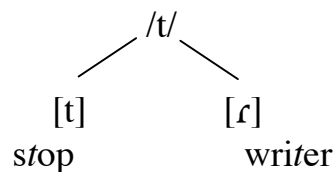
Phonological categories – the phoneme – used to distinguish between words, but allophones cannot.

5. PHONOLOGICAL RULES

Example: Alveolars become dentals before a dental consonant.

Phonological rules are *language specific*! They are *productive*, conform to the *well-formedness condition*, and reflect *unconscious knowledge* – Study these concept on pp. 26-27!

6. COMPLEMENTARY DISTRIBUTION: The distribution of allophones, in their respective phonetic environments, is such that one never appears in the same phonetic context as the other.



The distribution of /h/ and /ɣ / in English:

head, heart, perhaps, enhance

sing, coming, wing [ɣ]

There are no English syllables ending in [h], and there are no English syllables beginning with [ɣ]. Thus, it would appear that [h] and [ɣ] are in complementary distribution, and should be assigned as allophones of the same phoneme -- wrong!

[h] and [ɣ] have very little in common (they are both consonants).

PHONETIC SIMILARITY:

Sounds which represent different pronunciations of the same phoneme must be *phonetically similar*. We consider two sounds to be phonetically similar when they share the *same place* or *manner* of articulation.

7. FREE VARIATION: When two phonemes appear in the same context *without* causing a change in meaning.

economics /i/ or /ɛ/

either /i/ or /aj/

FREE VARIATION AMONG ALLOPHONES:

<i>map</i>	[p] or [p ^h] or [b [̞]]
<i>mat</i>	[t] or [t ^h] or [t [̞]]

8. MINIMAL PAIRS:

<i>beet</i>	<i>rip</i>	<i>feel</i>
<i>bit</i>	<i>rib</i>	<i>seal</i>

A minimal pair consists of two forms with distinct meanings that differ by only *one* segment found in the *same* position of the word.

The contrastive function of speech sounds is *language specific*.

Thai: pàa	‘forest’	/p/
p ^h àa	‘to split’	/p ^h /

English: *pit* [p^h]
 pit [p] Same meaning (see above)!

Malayalam:

kutti	‘peg’	/t/
kut̪ti	‘child’	/t̪/

English:

<i>train</i>	[t ^h]	Same meaning!
<i>train</i>	[t̪ ^h]	

English:

<i>Ben</i>	/ɛ/
<i>ban</i>	/æ/

Turkish:

ben [ɛ] or [æ] Sg1.

Minimal triplets: *time, dime, lime*

Phonemes, minimal pairs and minimal triplets: Study Tables 2.1 and 2.2
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NEAR MINIMAL PAIRS: Segments in nearly identical environments.

e.g., *author*[θ]
 either [ð]

Near minimal pairs occur more frequently in languages with large phonemic inventory and long words.