Phonology

The sound patterns of language

1.1What is phonology?

- It is the study of the *systems and patterns* of speech sounds in *a language*.

- Phonology is concerned with the *abstract mental aspect of sounds* (speaker's knowledge of the sound patterns of his language) rather than the *actual physical* articulation of speech sounds.

1.2.Why does such a field exist?

- First, speech sounds vary according to the context.

  e.g. The variation in /t/ in the following contexts:

  tar, star, writer, eighth.

- Second, the distribution of sounds is not arbitrary, but follows *complex, rule–governed patterns.*

1.3.What is phonology concerned with?

- It is concerned with:

a-the set sounds that allows us to distinguish meaning,

e.g. The differences between /t/, /k/, /f/ in:

tar, *car*, *far*.

b-the variations of any sound type in different contexts,

e.g. The variation in /t/ in :

tar, *star*, *writer*, *eighth*.

c-sound patterns.

1.4 Aspects of phonology:

Since phonology is the study of the sound system and patterns of a language and the set of rules that govern the way they function, two aspects can be identified:

- *Segmental phonology:* analyses speech into *discrete segments*, such as phonemes and studies the *phonological rules* that govern the way sounds function in a language.

(this area studies sounds (phonemes and allophones) and sound patterns (clusters and syllables))

- *Suprasegmental phonology* (non-segmental phonology): analyses features which extend over the segment, such as, stress and intonation

- What is phonology?
- What is the difference between phonology and phonetics?
- Why do we need phonology?
- What does phonology deal with?
- What is the difference between:

Segmental and suprasegmetal phonology

Segmental Phonology

2.1 Segment

- Speech is a production of a continuous stream of sounds.
  Consider: **“see you at three” /siː ju: æt θri:/**

- In studying speech, the stream is phonetically divided into smaller units called ***segments or sounds***.

- ***Segment:*** is the smallest unit in language. It can not be divided into smaller units.
  - E.g. “*fan*” **/f, æ, n/** →has the three segments
    “*van*” **/v, æ, n/** →has the three segments

- If one segment of a word is substituted with another, the meaning of the word will change. When two segments can be used to distinguish the meaning of words, they are said to be two different ***phonemes***.

2.2 Phoneme / /

•***Phoneme:*** is the meaning-distinguishing sound unit in a language.

•E.g. substituting one of the short vowels / ɪ, e, æ, ʌ, ɒ, ʊ/ for another in /p_t/ results in six different words.

/pɪt/ 'pit /pæt/ 'pat' /pɒt/ 'pot' /pet/ 'pet' /pʌt/ 'putt' /pʊt/ 'put'

/ɪ/, /e/, /æ/, /ʌ/, /ɒ/, /ʊ/ are meaning-distinguishing sounds in English. They are phonemes.

•E.g. substituting /b, t, k, f/ for another in /_ɑ:/ results in four different words.

/bɑ:/ 'bar' /tɑ:/ 'tar' /Kɑ:/ 'car' /fɑ:/ 'far'

/b/,/t/, /k/, /f/ are meaning-distinguishing sounds in English. They are phonemes.

•The complete set of phonemes in a language is called the *phonemic system* of this language. The phonemic system of RP consists of 44 phonemes.

2.3 Phonemes & Minimal pairs/ sets:

- Phonemes function *contrastively*. Look at the following:
  fan-van *big-pig* *site-side*

- /f/&/v/, /b/&/p/,and /t/&/d/ are phonemes in English because there is a contrast in meaning.

- This contrastive property enables us to ***test*** the phonemes that exist in a language using *minimal pairs/sets*.

- *Minimal pair/set:* two words (or more) are identical in form except for a contrast in one phoneme, in the same position in each word.

Minimal pairs: e.g. *fan-van* *big-pig* *site-side*
Minimal sets: e.g. *foot- fit- fat- feet- fate- fought.*
e.g. *big- rig- dig- wig- pig.*

2.4 Allophones [ ]

•A phoneme can be pronounced in different ways according to its context.

Compare:
The variation in /t/ in :
tea, eat, writer, eighth, two
The variation in /i:/ in:
see, seed, seat, seen

•Therefore, a phoneme may have more than one ***realization.***

• The different realizations of a phoneme are called ***allophones*** of that phoneme. ***The allophone*** is a variant of a phoneme.

2.4 Allophones [ ]

- Look at the different realizations of the phoneme /t/ and /i:/:

1-tea [tʰ] aspirated.
2- eat [t] unaspirated.
3-writer [D] flapped.
4-eighth [t̪] dentalized.
5-two [tʷ] labialized

→ Allophones of the phoneme /t/

1-seed [i:].
2-seen [ĩ:] nasalized.

→ Allophones of the phoneme /i/

•The allophones of a phoneme:
(1) do not change the meaning of a word.
(2) are all very similar to one another.
(3) occur in phonetic contexts different from one another.

Define and provide examples of the following terms:

1-segment

2-Phoneme-Allophone

3-Minimal pairs/sets

4-Aspiration-Flapping-Dentalization-Nazalization-Labialization

What is the difference between:

1-Phoneme-Allophone

2-Minimal pairs-Minimal sets

Some allophonic rules for English consonants

- Voiceless [̥] : approximants /l, r, w, j/ are partially or fully voiceless when they occur after initial voiceless stops /p, t, k/.
  E.g. "*pride*, *clue*, *twin*, *cue*" → [p̥raɪd], [k̥lu:], [tw̥ɪn], [k̥ju:]
- Aspirated [^{h}] : Voiceless stops /p, t,k/ are aspirated when they are syllable initially.
  E.g. "*pie*, *ten*, *kick*" → [p^{h}aɪ], [t^{h}en], [k^{h}ɪk].
- Syllabic [̩] : Syllabic consonant is a consonant which either forms a syllable on its own, or is the nucleus of a syllable. Nasals and laterals are syllabic at the end of a word when come immediately after an obstruent (stops, fricatives, and affricates)
  E.g. "*button*" [bʌtn̩], "bottle" [bʌtl̩]

Some allophonic rules for English consonants

- Labialized [ʷ]: consonant sounds are labialized when their production involve lip rounding.
  E.g. “two” [tʷu:] “shoe” [ʃʷu:]
- Dentalized [̪]:Alveolar consonants are dentalized before dental consonants.
  E.g. “*eighth*” [eɪt̪θ], “*tenth*” [ten̪θ], “*wealth*” [wel̪θ]
- Velarized [ɬ]:The lateral /l/ is velarized after a vowel or before a consonant at the end of a word.
  E.g. “*file, kill, talc*” [faɪɬ, kɪɬ, tæɬk]
- Flapped [D]: /t/ is flapped when preceded and followed by vowels.

E.g. “*writer*” [raɪDə]

Some allophonic rules for English vowels

- Nazalized [˜]: vowels are nazalised when followed by a nasal consonant.
  E.g. as “can” [kæ̃n], “been” [bĩ:n].

Provide examples of the following:

- Voiceless approximant.
- Aspiration
- Syllabic /n/ and/l/
- Labialization
- Dentalization
- Velarized /l/
- Nazalization

2.4 Allophones [ ]

• It should be noticed that different allophones of a phoneme cannot be found in the same context.
E.g. nasalized vowel , as in seen, never occur in the same contexts of non-nasalized vowel, as in seed.

•This separation of places where particular realizations can occur is referred to as ***complementary distribution***.

•Allophones are in *complementary distribution*. E.g. seen & seed.

•Phonemes are in *parallel or overlapping distribution*. E.g, fan & van.

2.5 The Phonemic Principle:

- Two or more sounds are realizations of the same *phoneme* if:

(a) They are in complementary distribution.

(b) They are phonetically similar.

- Two or more sounds are realizations of *different phonemes* if:

(a) They are in Parallel (overlapping) distribution.

(b) They serve to signal semantic contrast.

2.6 Phoneme & Allophone:

- Substituting one phoneme for another results in a word with *a different meaning* as well as *different pronunciation.*
- Substituting one allophone for another results in *a different (unusual) pronunciation* of the same word.

Symbols & Transcription

- There are two kinds of symbols:

1. ***phonemic symbols:*** representing the phonemes of a language.
2. ***phonetic symbols (diacritics):*** representing precise phonetic values.

- Accordingly, there are two kinds of transcription:

1. ***Phonemic transcription:*** refers to transcribing an utterance in a way that shows none of the details of the pronunciation that are predictable by phonological rules. Only phonemic symbols are used, and are enclosed in slant brackets / /. E.g. 'fan' → /fæn/

2. ***Phonetic transcription:*** refers to transcribing an utterance in a way that indicates more phonetic details predictable by phonological rules (allophones) by using diacritics, and are enclosed in square brackets [ ]. E.g. 'fan' → [fæ̃n]

Transcribe the following words Phonetically:

price
clean
cream
queen
twice
pure

sudden
door
bean
dean
deal
fill

Define and provide examples of the following terms:

Aspiration-Flapping-Dentalization-Nazalization-

Labialization

The Phonemic principle.

What is the difference between:

Complementray distribution and parallel (overlapping) distribution

Phonemic and phonetic transcription

3.1. Syllable

- Consider the following examples:
  - "*card*" /kɑ:d/ includes one syllable composed of a vowel /ɑ:/ and preceding and following consonants /k, d/.
  - "*car*" /kɑ:/ includes one syllable composed of a vowel /ɑ:/ and a preceding consonant /k/.
  - "*is*" /ɪz/ includes one syllable composed of a vowel /ɪ/ and a following consonant / z/.
  - "*are*" /ɑ:/ includes one syllable (a minimum syllable) composed of the vowel /ɑ:/.

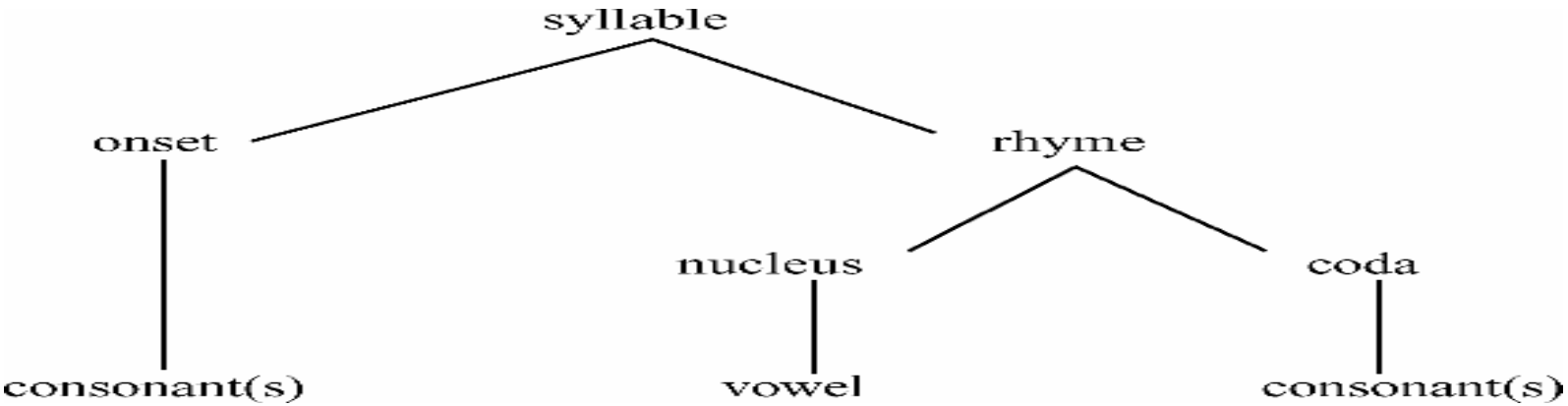
card	/kɑ:d/	**CVC**
car	/kɑ:/	**CV**
is	/ɪz/	**VC**
are	/ɑ:	**V**

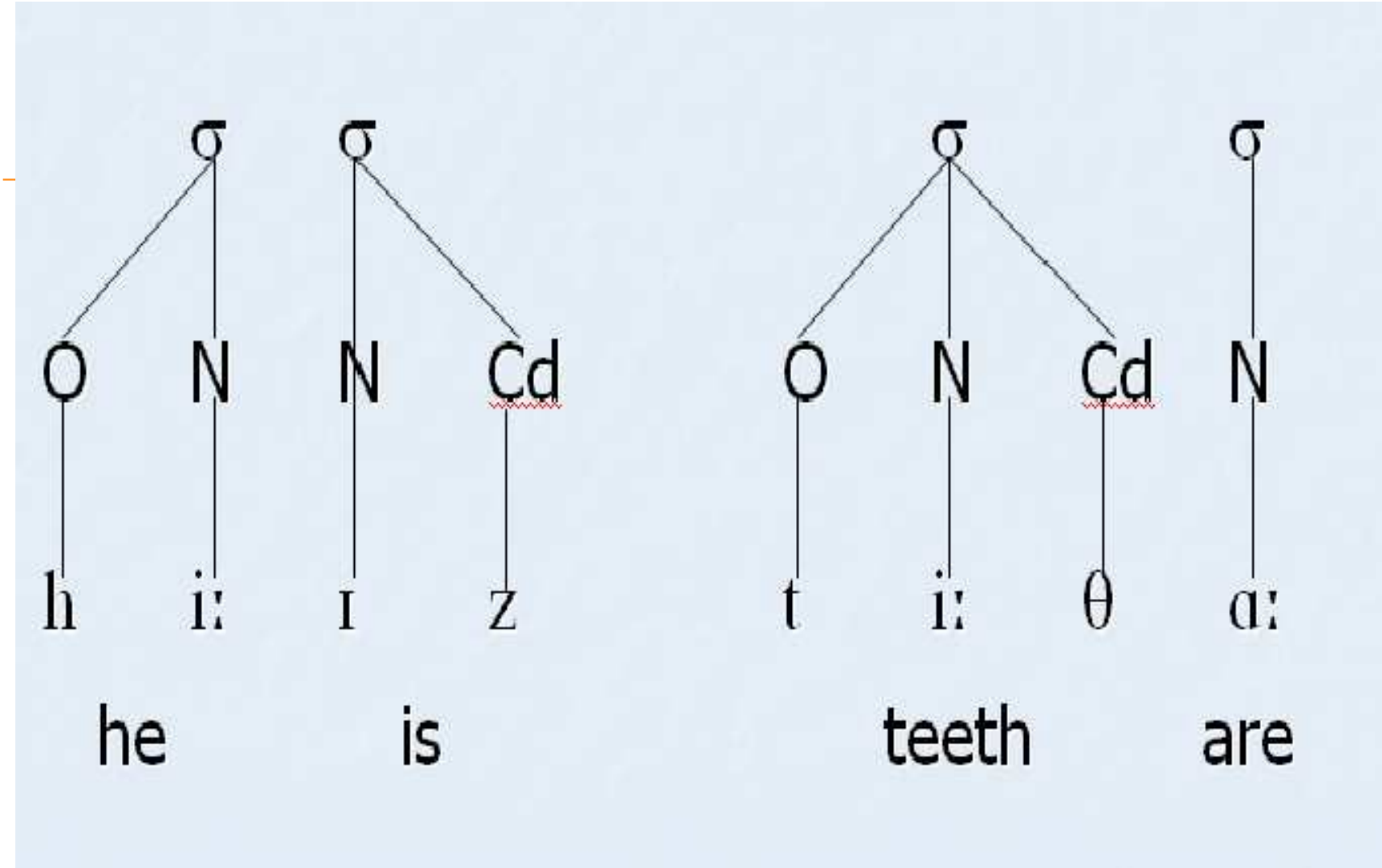
- *Syllable:* a unit of sound consisting of a basic vowel and optional consonants before or after the vowel.
- The different possibilities of the structure of a syllable can be represented as follows: (C) V (C)

3.2.Syllable Structure:

Technically, syllable:

- must have a centre (called peak or nucleus) which is a vowel
- could have an onset (which is the initial part of the syllable) that consists of either one or more consonants.
- could have a coda (which is the final part of the syllable) that consists of either one or more consonants.
- the nucleus and the coda form the rhyme/ rime.




σ σ σ σ
O N N Cd O N Cd N
h i: ɪ z t i: θ ɑ:
he is teeth are

Draw a tree diagram for each of the following words to show their syllabic structures.

- Dream
- Cream
- Car
- Card
- It
- Or
- Bright

3.3. Syllable:

- *Open syllable:* (CV) syllable that has an onset and nucleus, but no coda.

e.g. he, do, me, no, to. (CV)

- *Closed Syllable*: syllable has a coda.

e.g. 1- is, am (VC), and , eggs (VCC).

2- green (CCVC), teeth, ham, not , like , them, Sam (CVC).

- Both the onset and the coda can consist of more than one consonant, or *consonant cluster*.

3.4 Sound Patterns:

- There are three possibilities of sound patterns :

a- permitted patterns: train

b- impossible patterns: rtain

c- possible/non-existant: tream

- The distribution of sounds in sound patterns is *not arbitrary*, but follows some constraints called *phonotactics*.
- ***Phonotactics:*** the set of constraints on the permissible combination of sounds in a language, which is part of speaker's phonological knowledge.

3.5. Phonotactics:

In a syllable-initial position:

- it is allowed to begin with a vowel, or with one, two or three consonants.
- no syllable begins with more than three consonants.

In a syllable-final position:

- a syllable can end with a vowel, or with one, two, three or four consonants.
-no syllable ends with more than four consonants.

Phonotactics:

The syllable onset:

- If the syllable begins with a vowel, it has a **zero onset** as in '*am*' /æm/; '*ease*' /iːz/.

- If a syllable begins with one consonant, the initial consonant can be any consonant phoneme except /ŋ/. Examples: '*key*' /kiː/; '*kick*' /kɪk/.

- If a syllable begins with two or three consonants, such a sequence of consonants is called a **consonant cluster.** Examples: *'play, stay, street, split, etc'.*

3.5.1. Onset Consonant Clusters:

- Onset two-consonant clusters:

1- stop 2- liquids

fricative glides

e.g. *please, proud, pure, trade, twin, clean, clear ,queen*

flat, throw

3.5.2 Onset Consonant Clusters:

- Onset three-consonant clusters:

1-	2-	3-
s	p	l
	t	r
	k	w
		j

e.g. splash, spring, spw-, spew

stl- , street , stw- ,stew

sclerosis, scrap, squeak, skewer

Phonotactics:

The syllable coda:

- If the syllable ends with a vowel, it has a **zero coda** as in '*car*' /kɑ/; '*see*' /siː/.
- If a syllable ends with one consonant, the final consonant can be any consonant phoneme except /h, r, w, j/. Examples: '*at*' /æt/; '*kick*' /kɪk/, 'catch' /kætʃ/, 'seen' /siːn/.
- If a syllable ends with two, three or four consonants, such a sequence of consonants is called a **consonant cluster.** There is a possibility of up to four consonants at the end of the word. Examples: '*books*, *six*, *bank*, *banks*, *prompts*, *etc*'.

4. Phonotactics:

Consonant clusters in the coda:

- **Final two-consonant clusters**:

  Examples: *'he**lp**, ban**k**, e**dge**, be**lt**,* bli**nd**, boo**ks**, si**x** etc'.*

- **Final three-consonant clusters**:

  Examples: *'he**lped**, seco**nds**, **fifths**, etc'.*

		Pre-final	Final	Post-final
'helped'	he	l	p	t
'banks'	bæ	ŋ	k	s
'bonds'	bɒ	n	d	z
'twelfth'	twe	l	f	θ

		Pre-final	Final	Post-final 1	Post-final 2
'fifths'	fɪ	–	f	θ	s
'next'	ne	–	k	s	t
'lapsed'	læ	–	p	s	t

4. Phonotactics:

Consonant clusters in the coda:

- **Final four-consonant clusters**:

  Examples: *'pro**mpts**, si**xths**, etc'*.

		Pre-final	Final	Post-final 1	Post-final 2
'twelfths'	twe	l	f	θ	s
'prompts'	prɒ	m	p	t	s

		Pre-final	Final	Post-final 1	Post-final 2	Post-final 3
'sixths'	sɪ	–	k	s	θ	s
'texts'	te	–	k	s	t	s

Thus, the English syllable has the maximum phonological structure:

pre-initial	initial	post-initial	VOWEL	pre-final	final	post-final 1	post-final 2	post-final 3
Onset				Coda				

- It is quite unusual for languages to have consonants clusters of that type.
- The syllable structure of many languages is predominantly CV, which is known as the *core syllable.*
- Large consonant clusters are often reduced in casual conversation as a result of the co-articulation effect.

Decide if the following transcriptions refer to possible English words or not. If not, explain, in terms of phonotactics, why they are impossible.

- **/briː/**
- **/spmæt/**
- **/kr/**
- **/fbuː/**
- **/strkiː/**
- **/bɪkstrs/**
- **/ŋuː/**
- **/ɑn/**
- **/bæh/**
- **/sgrem/**

Define and provide examples of the following terms:

1- Syllable.

2-Open & closed syllable.

3- Consonant cluster.

4-Core syllable.

5-Onset-nuecleus –coda

6-Phonotactics

7-zero onset- zero coda.

4.1.Co-Articulation:

- *Co-articulation:* is the process of making one sound almost at the same time as the next sound.
- There are two well-known articulation effects:

a- assimilation b- elision.

4.2.Co-Articulation Effects:

- *Assimilation:* the process whereby a feature of one sound becomes part of the preceding or following sound during speech production.
- e.g. a- word internally: seen [ĩ] nasalization.

  full [f^{w}ul] labialaized.

  b- cross word-boundary: I can go [n] → [ŋ] .

4.2.Co-Articulation Effects:

- *Elision:* the process of leaving out a sound segment in the pronunciation of a word.
- e.g. * Consonants:

a- word internally: friendship.

b- cross word-boundary: you and me, he must be

* Vowels:

a- word internally: every, interest, suppose.

Define and provide examples of the following terms:

1- Co-articulation.

2-Assimilation.

3-Elision.

Read

Ch.6

Word and word formation processes