chapter 7:- phonological features.

* phonological features < Alternation patterns

[t] → [t^h]
[+Release] → [-Release]

* Natural classes → class of sounds that shared features.
+Alveolar → it can't be interdental
* phonetic features → distinction.
↳ { 1) Major class features
2) Consonantal
3) vocalic }

→ Major class features ... features)

↳ 1) voicing < +V / -V [p, f, θ, t, s, ʃ, tʃ, k, ɸ]

2) Nasalization < +N → [m, n, ŋ] / -N

3) syllabic → sounds that occupies vowels

onset, N (vowel) centre, Coda.

-syllabic (consonant) +syllabic (vowels)

→ all consonants except Glides [w, j]

4) Consonantal < +cons → presents of obstruction
-cons → All vowels + Glides (NO obstruction)

[-syllabic, +V] → Consonant + Voiced → voiced consonant.

phonological features → to create Natural classes.

Ex: [+syllabic, -V] ✗ → it's not a natural classes
consonantal includes all consonant except [w, j].
* Vowel naturally → voiced.

5) sonorants → what makes sounds audi → passage way.
sonority (+son) → All vowels + approximants + Nasals (voiced)
non sonority (-son) → oral stop (plossives), fricatives, Affricates (voiceless)
higher voicing / vibration → more sonority
less voicing / vibration → less sonority
* bigger passage way → more sonority.
* Feature matrix →
Ex: [+son, -syll] = vowels ✗ + [w, j, l, ɹ, m, n, ŋ]
→ approximants and nasals

* Place of Articulation features :

1) Anterior [+/- Ant] → bilabial + Dental + Alveolar
   ↳ front of the vocal tract
2) Coronal [+/- Cor] → front of the tongue → Interdental, palatal, Alveolar
-Cor → labial + velar, Glottal
-Ant → palatal + velar, Glottal

$\begin{bmatrix} -Ant \\ +son \end{bmatrix}$ → [j, ɰ]

natural class
↓
classes features to actual sounds

$\begin{bmatrix} -son \\ +cons \\ +v \end{bmatrix}$ = [p, b, f, v, θ, ð, t, d, s, z, ʃ, ʒ, tʃ, dʒ, k, g, ɡ, h]

irrelevant

↓

[b, v, ð, d, z, ʒ, dʒ, g, ɡ]

$\begin{bmatrix} +Cor \\ +cons \end{bmatrix}$ = [θ, ð, ..., d, s, z, n, l, ɹ, ʃ, ʒ, tʃ, dʒ].

* Manner of articulation features : (consonants)

[1] Continuant → there is a continuous air flow inside the focal tract.

[-cont] = stops + Affricates
[+cont] = fricatives + Approximants.

[2] strident. when the muscle of the tongue has more than one constriction (multiple).
[s, z, ʃ, ʒ, tʃ, dʒ, f, v]
↳ except [θ, ð, h]
↳ Affricates + fricatives without [θ, ð, h]

[3] Lateral → [-l] All consonants except [l].
↓
[+l] → [l]

[4] Delayed release → we stop and realise sounds, continous released but there's a stop.

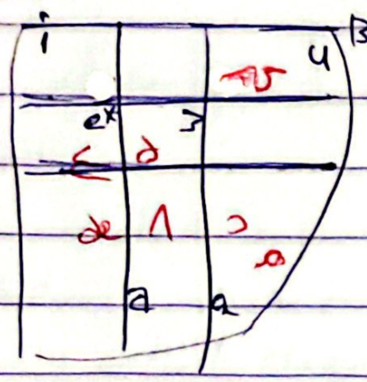
تأخير علاقة الصوت بإصدار
[+Del Rel] → Affricates [tʃ, dʒ] (delayed)
[-Del Rel] → All consonants except Affricates

All back tense vowel have roundness except [a] means all rounded vowel are back

[ɔ, ʌ] = [-Tense, -front, -back]

* Vocalic features (features of vowels):

Height → [-Hi -Lo]



Position → [-front -Back]

shape of the tongue (roundness) [+/-R]

Tension.

tense ⇄ Lax

tense → [+Tense] Lax → [-tense].

If we dont have central, Mid.

Example: 1) [w, j, l, ɹ] = [+son {vowels, approximants, nasals}, +V, +cont] =

→ = [+son, -syll, -Nasal]

2) [ə, ɜ] = [-R, +syll, -cons, +Tense, -front, -Back]

chapter 8: phonological analysis.

phonological analysis → analysis of sounds change
Alternations.
phoneme → not actuall sounds (Abstract).
Allophone → actuall sound, can replace each other without change meaning → physical.
→ store sound on the brain
phoneme → contrastive (origional sound).
Allphone → Non - contrastive / different shapes

How we do identify allaphones of phoneme
[1] commutation Test
City → [sIti]
[sIdi]
[sIɾi].

→ replaces one allaphone with another allophone end with minimal pair/set
comparing the meaning between minimal pair/set
If I have a minimal pair, result free Variation - with no changing in the meaning / with same phoneme
Replacing one allophone to another → change the meaning → contrastive distribution.
↳ we have different meanings → (multipule phoneme)

same accent → different allophones.

[tʰ ʔ] → [-Realese]

[tæt]

[+Aspiration]

* 2 allophones that belong of the same phoneme /t/ occupy different Position.

↳ called (complementary Distribuation)

Allophones
- different accents.
- different Positions

* phonemic analysis.
- phonetic similatery.
- pattern structure (rules).

} → phonolgical rules. ↓ creates symbols.

Exercise 2 - [+son, +Tense, -Hi, -Lo] = [i, ɪ, 3, ɑ, u] = [3]

ɜ → only Long Lax vowel.

ə → shortest Lax vowel.

chapter8: phonemic analysis → How we select the underlying form

[w, j, l, r]

square [skweɪɹ] → /w/ or /ʍ/

were [wɚ]

[underlying form] الأصل phoneme → symbolizing /t/ ↳ the symbol of phoneme

3 different critira → the symbol based on these critira

phoneme → original state.

widest distribution → if a natural class of sound is common as a voiced sound then naturally the phoneme is voiced

distribution → phonetic area.

most common kind of environment -

[tʰ], [t], [ɾ], [t̚], [ʔ] → we select the underlying form from group of allophones based on which allophone is (the most common.

[t] → most common (phoneme)

pass → [pʰæs] [ju] → you → we replace /s/ with /ʃ/

alveolar → [+ant +cor], palatal → [-ant +cor], don't have the same phonolgical features ↳ the place of articulation is different.

preservative (coarticulation)

استيعاب
we have assimilation . حركة اللسان أسهل بكون
→ If we have an alveolar followed by a Palatal
it's much easier to Produce a Palatal followed by a Palatal

↳ Pass you [pæs] [ju] → [pæʃ] [ʃ j]
/s/

[ʃ] more similar to [j]
↳ have the same place of articulation
(phonetic similarity)
↓ (phonetic environment) → it's easier to Produce 2 sounds from the same feature

Palatal — Palatal
↓
(the same features)

If a sound is less similar, common → original Phoneme
↳ environment (what comes after and what comes before → underlying form
↓ (underlying form)

abstruents → (- son) → Natural class < -, +
[obstruent cluster voicing uniformality principle]

33 Ex: skt ✓ → all of them have to be voiced or voiceless.
-v sgt +v -v ✗
↓ we can't have an obstruent cluster that is both voiced and voiceless at the same time
✗ only obstruent have compsedy to be voicless

✓ [dɛpt] ✗ [dɛbt] → breaks → obstruent cluster uniformality principle
↳ change in single feature (Diacritic) used to make change in the features

(it doesn't breaks as allophone but breaks as phoneme)

It can't follow incorrect patteren in English

شو الأصوات اللي بتيجي ورا بعضها والأصوات اللي ما بترابط ألفاظ

3) Pattern congruity correctness / soundness
→ following the patterens of sounds.
→ phoneme can't break the patterens that are correct
→ Example of it → (obstruents cluster voicing uniformality principle.)

* Note: the underlying form has to be the one is phonetically (natural)
↓ means: if the sound most common and if the sound is the one less similar to the enviroment → it must be the widest distribution.

* The allophone that is the least similar to the enviroment → is going to be used as the symbol form of phoneme

* There are a clusters when they are pronounced in a sequence → A cluster is broken if we have a vowel.

* if we have any sequence of consonants and all of these consonants are obstruents → we have to have all of these consonants either as voiced or voiceless → [obstruents cluster voicing uniformaty principle].

Note: /h/ → is the only glottal fricative that doesn't have a voiced counterpart

مهم
* Voiced sounds are more sonorant than voiceless so the sound that have a high complexity of sonority can't be voiceless.

patterned congruity → Patterns that are allowed in English.
These patterns not only applies to allophones it also applies to phonemes.

* what to consider when choosing an underlying form:
phonetically natural (frequently found across language.
1) same symbol, Ex: /p/ for [pʰ] and [p⁼]
2) widest Distribution
* phonetic Naturalness, phonological Analysis and phonetic similarity
phonetic Analysis → uncovers what is natural.
phonetic similarity → insightful, feature based on similarity amongst allophones:
[p], [pʰ], [p⁼] → similar (related through minimal pairs test.
[ŋ] (syllable initially → -nasal, +obstruent, +continuant
[y] (syllable finally → +Nasal, +sonorant, -Continuants
only common feature is +consonant = not natural class.
Examples: This year [ðɪʃ jɪr] vs [ðɪs jɪr]
[ʃ] is derived from /s/ or [s] derived from /ʃ/
1) Immediate phonetic Environment: [s] appears in more environments.
2) Phonetic characteristics [s], [ʃ], [j] → Palatal → +cor, -ant
alveolar → +cor, +ant
palato-Alveolar → +cor, -ant

pattern congruity → the systematic organization of a set of phonemes and their distribution

* since aspiration is found on voiceless stops whic occur at the beginig of a stessed syllable except when stop is preceded by [s], would [p] or [b̥] be appropriate in apt?

/_ ft, -pt, -ps, -kst, -sp → Ex: daft, apt, apse, next, asp.

_bt, d2, 2d, v2 → Ex: robbed, adze, phased leaves.

*/- fd, bt, p2, ds.

* Phonemic Level → obstruent clusters have uniform voicing in English.

Based on the overall patterns found in the phonolgical system (Pattern congruity). not by phonemic similarity or the communcation test → the choice of voiceless phonemes for aspirated stops is made in terms of the overall patterns found in the phonolgical system of English: in term of pattern congruity, since [p] is naturally voiceless [dept] → would be appropriate choice, in contrast to [deb̥t].

تحويل الأصوات

*Linking levels: phonological rules → How we represent alternation
phonology → the concept of Alternation (how the sounds change without change in meaning)
* How represent Phonological Alternation using rules of alternation (phonological rules).
→ A phoneme represents an entire feature matrix, which is stored in the lexicon
* A rule represent:
1) The item (s) affected (Phoneme).
2) The change that taker place (allophone).
3) The environment in which the change occurs (context. or neighboring sounds).
Example instead of saying a vowel becomes a certain other vowel in a certain environment.
↳ ex: /æ/ → [æ̃] _ /n/ ([æn] → [æ̃n])
↳ we going to use symbol. so in the example.
we use symbols → [+syllabic] → [+Nasal] / _ + [+nasal]
↓ Generalization based on previous rule
when we talk about alteration of sound →
we look at 3 parts → 1) what is the original form?
2) How does change?
3) what causes that change to happen?

* phonetic environment (what comes after and before sound)
↓use the sound itself that changing.
↳ [+syllabic] → [+Nasal] / _ [+Nasal]
Perseverative coarticulation ↩
Anticipat Coarticulation ↓

✓ Rule: vowels become nasal before a nasal → vowels are phonemically oral but they become nasal if they are followed by a nasal sound.

↳ Ex: /dɛ/ → becomes nasal /dɛ̃/ in a certain enviroment (if it followed by nasal) → [dɛn] → [dɛ̃n]

↓ so instead of saying /dɛ/ → /n/ → I would use [+syllabic]

↓ All vowels

[+Syll] → (becomes) [+Nasal] / __ [+Nasal]

[+Nasal] ↓ Alternation

عملية التغير (process) ↓ (Alternation)

[+Nasal] ↓ (Nasal) هو التي سببت التغير → when does it happen?
↳ the reason for alteration

__ : instead of write [+syllabic] → we leave a blank (this blank indicate [+syllabic])

المراد هو الصوت الي تغير كان قبله او بعده اي.

↳ I would read this rule → A vowels becomes nasal before a nasal or when it follows by a nasal → this is a phonolgical rule → it contain 3 aspects → 1) the phoneme
2) the Allophonic variation.
3) the enviroment.

→ : indicates a change
/ : seprates the enviroment to the right.
__ : this blank is the phoneme
and what comes after or before the blank → enviroment.

✓ so the previous example is a format of phonolgical rule

chapter 9 : phonological Alternation, processes and rules.

Alternation → alternation from one Phone to another caused by phonological processes.

Generative phonology → formalizing most appropriate rules to capture sound alternation and processes behind them - formal representation of such knowledge.

* we look at the kinds of enviroments that caused alternation

Ex: $\begin{bmatrix} -\text{cont} \\ -\text{voice} \\ -\text{del rel} \end{bmatrix}$ becomes $+\begin{bmatrix} \text{spread glottis} \end{bmatrix} / \# - \begin{bmatrix} +\text{syll} \\ +\text{stress} \end{bmatrix}$

↓ Voiceless stops → [+spread glottis] (+Aspirated) in the following enviroment (becomes) at the beginning of the word (stressed Vowel) and when it followed by a stressed vowel.

* we can discuss what causes alternation in the form of a phonetic cause.

→ if the phonetic enviroment causes a phonological change/alternation, we say this alternation is phonetically conditioning.

↳ means the cause of the alternation.

* phonetic conditioning → it has to be a phonetic reason that causes the Alternation.

* phonetically and morphologically conditioned Alternation.
There are a few certain irregularities.
↳ Examples:- rat [s] vs wartho [z] → the [s] becomes [z].
hors [iz]
fence [fens] & base [bets]
why [s] changes ?

rat [s] } → After [t] and [k] it was a [s] and
yak [s] } this [s] is a plural

bee [z] } → plural.
hors [Iz] }

base → [bers]
↳ voiced diphthong followed by [s]

* why base is different than bee [z] ?
↳ the letter [s] in bee [z] is actually plural but [s] in base is actually part of the original form of the word [base]

* plural, singular.
↳ Affixes & morphomes.

* Note:- the letter [s] or the phoneme [s] behaviors differently if the plural s than it is a part of the original form of the word.
means in order for [s] to becomes [s], [z], [Iz] if has to be a plural (s).

* we have a natural class called (sibilant) → [s], [z]
[ʃ], [ʒ], [tʃ], [dʒ]
(sibilant sounds).

rule: if the plural [s] is attached to a word that ends with sibilant → plural [s] becomes → [ɪz]
if plural [s] attached to a sound that is not sibilant (non-sibilant) → any other sound other than sibilant and it's voiceless → plural [s] becomes → [s].
if it attaches to a word that ends with non-sibilant and it's voiced becomes [z]

Examples: rat
↳ non sibilant - and voiceless → so plural [s] became [s].

bee
↳ non-sibilant and voiced → which makes plural s [z].

horse
↳ sibilant - voiceless → so we get the form [ɪz]

* base → we dont have [z] because [s] is not a plural [s] it's original.
* rule: we only change [s] into [z] or [ɪz] if it's voiced non-sibilant or if it's sibilant sound.
that's only happened in plural [s].
↳ this phonetic environment (morphology) only works if this a plural [s] → we have a (morphological environment).

So the alternation of plural [s] → [s], [z], [ɪz]
is not only phonetically condition but also
morphologically condition.
↳ phonetic enviroment which include 3 different
enviroments resulting in 3 different alternations.

we cant represents morphological enviroment /
conditioning → because in phonology we only discuss
phonetic reason / conditioning. but we don't
discuss morphological reason / conditioning.

we can have alteration that caused only
by phonetic enviroment such as; the
nasalization of vowels.
or dentalization of Alveolar → an alveolar
becomes dental when it's followed by Alveolar
↳ it doesn't matter if this is plural or
singular or past tense (morphology doesn't matter
in this case).
the same can apply in past tense → [ed]
↳ can be [d], [t], [ed] depending on
previous enviroment
the forms of [ed] → past tense verbs is
phonetically and morphologically condition.

Morphene Boundary → the final fricative represents plural marker, → final fricative agrees in voice with preceding segments.

↳ productive: automatically applied in predictable ways even to new words.

* phonetically, morphologically and lexically conditioned Alternation

* fricatives are voiced between voiced segments.

* velar stop [k] is fronted and fricativised into [s] before a high front (palatal) vowel segment (velar softening).

Example: leaf vs lea[v]es

↳ original form (voiceless sibilant) → plural form. ↓ not only with plural es, but also replaces [f] with [v]

house vs hou[z]es → irregular morphological condition

↓ original form ↓ plural form

* plural [s] normally we don't have the last sound in the original form

if the last sound is changed → the rule is going to change

irregularity → something that doesn't happen normally but only happen in the case on irregular words

↳ called lexical conditioning

↳ Ex: wife → wive[s] → morphological condition

we replace [f] to [v]

[v] → voiced_non sibliant → phonetically condition

* when we have plural form, and we change the last sound in the original sound → this doesn't only include phonetic and morphological conditioning but also include lexical conditioning
↳ (irregular).

* Non-Phonological Alternation → we can't find a phonetic environment that explains the change.
↳ No phonetic conditioning + morphological conditioning (plural, past tense) + specific lexical items = Suppletion: the introduction into a set of alternations (a paradigm) of form that is not obviously related, which is not part of our phonological knowledge (No phonological basis).

Ex: go vs went مافي قاعدة أو بيئة اعتمد عليها

↳ we see a change in sound (we have a consonant followed by vowel, then consonant followed by a vowel and 2 consonants.

↳ we can't explain the environment (change)
so we don't have phonetic conditioning.
but we have (morphological condition)
↳ change from present tense to past (go → went). الصرف تغير
it is not regular because we add (ed) normally
↳ so this lexical condition

Note (rule): when we have something that only morphologically and lexically conditioned a change
↳ this change called suppletion.

Suppletion → when we have an alternation that's not phonetically condition but morphologically and lexically condition.

Ex: mouse vs mice → irregular (lexically condition)
↓ but I can't explain why [aʊs] becomes → [ɪ] in mice phonetically (there's no condition).

(we don't ↓ have a phonetic environment that causes the change) → (So this is a non-phonetic alternation which called suppletion).

* Alternation types: one or more allophones involved in alternation restricted set of environments:
→ Allophones involved alternation Environment
(nasalized vowels only before nasal) consonants)

1) Alternation may occur in a certain phonetic environment.
2) Alternation may only be in the presence of certain suffixes.
3) Alternation may only be in the presence of certain lexical items.
4) Alternation maybe optional, or determined by factors other than immediate phonetic environment.
↳ in most cases the alternation only covered by phonetic.

Example: when aspiration happens at the begining of the word (that's phonetic environment).
or naslalization happens before a nasal (Phonetic environment)
↳ we can't have lexical conditioning by itself.

Suppletion → removing one form and adding another form without an explanation of phonetic environment conditioning الشروط المترتبة للتحول العرضي (Lexical) بتاع شاذة , حرفية , صوتية ← حادث.

* Formal rules : How to write formula for alternation

Ex: oral stops are devoiced before a vowel, word initially
(devoiced → voiceless)

→ we start with the phoneme, → then we indicate how the phoneme change in a certain features
→ then we create an allophones that indicate when that's happen (in which environment).
→ Translate it into formal rule using symbols.

oral stops → [−Nasal, −cont, −del Rel]
[p, b, t, d, k, g]

↓

[−V] / # [+syll]

↓ Alternation

= position → indicate absence before or after → initial position.

Note: if we add # (position) next to natural class or sound → it's describe this sound.
→ but if it's next to blank → (phoneme itself)

[+syll] # → final vowel

[syll] → initial vowel → it's preceded by position مش الوضع مقدمة

oral stops are devoiced that preceded by an initial vowel. → [ʌb̥] [b̥ə]

Feature matrix → مصفوفة ...

oral stops are devoiced before a final consonant

$[-V]$ ___ $[-syll]$ #

$\rightarrow$ oral stops are devoiced before a consonant $[-syll]$ or a vowel $[+syll]$ and after an initial consonant or initially

{ [-syll] / [+syll] } → ما نربط الها مع بعض → Either, or → we use a (notation devices) (like if I want to create options → I use braces الأقواس (either, or))

we select one and only one

([-syll]) { [-syll] / [+syll] } → simpler way, it's more economical مختصرة أكثر

→ initial

الاختياري / الأقواس / نفس / optional

* Notation devices → they are devices that allows to compine different environments either by providing options with braces (either, or) { } or circular brackets ( )

* oral stops are devoiced before 1, 2, 3 or 4 consonants.

C (C)(C)(C) → C_1^4 (4 → maximum, 1 → minimum)

$[-V] \rightarrow$ ___ C_1^4

(c) = C_0^1 → we don't have a consonant if it's zero.
↳ optional

Rule: voiceless obstruents nasal before a nasal (1) or word (2) finally and after (3) 2 to 4 consonants
→ means either it's followed by a nasal or it's at the end of the word

phoneme ——→ Allophone

[−son −v] → [+Nasal]

C_2^4 ___ { [+Nasal] / # }

↑ Blank means phoneme

* Alpha Notation → Alpha (α): Replaces the (+ or −) value of feature

✓ Matching features → This specific sound is going to copy the place features of the following sound

Ex: Im possible (followed)
[m p] → Bilabial → [+Ant +cor]

Incomplete
[ŋ k] → velar → [−ant −cor]

unreleased
[n t] Alveolar → [+Ant +cor]

→ [m, n, ŋ] ↓ one phoneme that is change into 3 different Allophones

/n/ → [α ant / β cor]

a similar alternation to environment.

α = +/− → means the verbals that used to indicate] selecting options but these options are depending on environment (the environment is copied into allophone) of alternation.

the feature copy the feature that followed → we use Alpha notation). (+/− ...)

[+syll] → [α Nasal]

phonological process/operations and rules:-

[1] Assimilation → one allophone become more similar to another allophone that follows it or preceed it

Example [dẽnd] → de becomes nasal → it becomes more similar to environment.

another Ex: [s k.w̥ e ɪ s] → /w/ becomes devoiced and because it's preceeded by a voiceless oral stops

جاي قبله او بعده

[2] Dissimilation → it's not very common

Ex: chimney [tʃɪm.li]

+N → −N → it's less similar to the environment.

↳ phonetic environment.

↳ what follows and what comes before

/n/ become less similar to /m/ this make it dissimilation.

[3] Addition → when it's difficult for someone to pronounce something, if we add some sounds are not existing.

[pɛ ɹh de ps] → [pɛ rh de ps i]

additional vowel

[4] Deletion (Elision) → if we remove a sound

Ex: [p ɹ ɪ 2 d n d ɹ] → [p ɹ ɪ 2 n d ɹ]

remove vowel.

[5] Metathesis → observing change beyond the sound.

something beyond the sound — observing change

Bird → [b ɹ ɜ d] → [b ɜ ɹ d]

this movement of sounds called Metathesis.

→ reversal of a sequence of elements, segments in a word.

[6] Reduplication: copying part of a word and attaching it to the original word.

Ex: bon = sweet (French) (adj) → bonbon (n).

[b ɔ̃ n] [b ɔ̃ n b ɔ̃ n]

if we copy the 3 sounds and repeat them → we create a new word.