

# Turkish vowel harmony: Underspecification, iteration, multiple rules

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# Data

- Turkish data on handout. [a] represents a low back unrounded vowel (more standardly [ɑ]).

# Morphological analysis and morpheme alternants

- Words in Turkish
  - root alone
  - root followed by one or two suffixes
- Suffixes
  - plural suffix,  $-[ler] \sim -[lar]$
  - genitive suffix,  $-[in] \sim -[un] \sim -[ün] \sim -[in]$
- Order of morphemes
  - root - plural - genitive

# Possible vowel features

	i	ɨ	u	ü	e	a	o	ö
high	+	+	+	+	-	-	-	-
low	-	-	-	-	-	+	-	-
back	-	+	+	-	-	+	+	-
front	+	-	-	+	+	-	-	+
round	-	-	+	+	-	-	+	+

# Distinctive features of vowels

	i	ɨ	u	ü	e	a	o	ö
high	+	+	+	+	-	-	-	-
back	-	+	+	-	-	+	+	-
round	-	-	+	+	-	-	+	+

([front] could be used instead of [back].)

Values of [low] are redundant:

V  
-high           →   [+low]  
+back  
-round

Otherwise:

V → [-low]

# Distribution of suffix alternants

- Plural suffix
  - -[ler] / front vowels C(C) \_\_\_\_\_
  - -[lar] / back vowels C(C) \_\_\_\_\_
- Genitive suffix
  - -[in] / front non-round vowels C(C) \_\_\_\_\_
  - -[ün] / front round vowels C(C) \_\_\_\_\_
  - -[ɨn] / back non-round vowels C(C) \_\_\_\_\_
  - -[un] / back round vowels C(C) \_\_\_\_\_

# Subscript and superscript convention

- $C_1$  = one or more consonants: C, CC, CCC, etc.
- $C_0$  = zero or more consonants: 0, C, CC, CCC, etc.
- $C^1$  = at most one consonant: 0, C
- $C_1^2$  = minimum one, maximum 2 C: C(C)

# Analysis of alternating morphemes

- Symmetrical distribution of suffix alternants
- No non-alternating suffixes
- No single suffix alternant can be elevated to UR



# URs

- UR = what all suffixes have in common
- genitive: -/ V n/

[+high]

(values of [back] and [round] will be added to match preceding vowel)

an underspecified vowel, or “archiphoneme”  
(Odden p. 239)

- plural:                    -/l    V   r/                    ([ler], [lar])  
                                   [ -high ]  
                                   [ -round ]

assimilates in backness (only) to a preceding vowel

([-round] in suffix UR, but possibly, all non-high suffixes are non-round---redundant [-round]?)



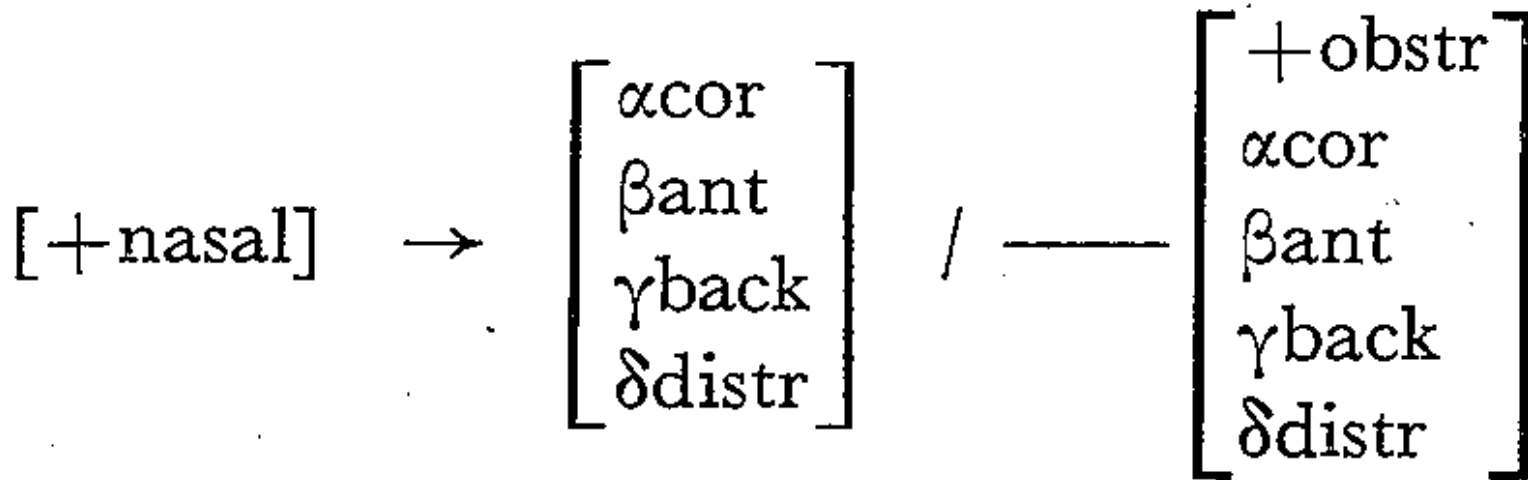
# Rules for use of $\alpha$ -notation in rules

- Minimum of two instances of  $[\alpha F]$ 
  - one feature varies according to values of another
- $\alpha \dots -\alpha$  is okay
  - e.g. for dissimilation
- Features don't have to be the same.  
Chamorro vowels:

$$\begin{bmatrix} +\text{syll} \\ -\text{low} \\ \alpha\text{back} \end{bmatrix} \longrightarrow [\alpha\text{round}]$$

# Nasal assimilation in Spanish

- If additional features independently co-vary, additional greek letter variables are used ( $\beta$ ,  $\gamma$  etc.):



Each feature assimilates independent of the other.

(Hayes' "[place]" (ch. 4) is essentially an abbreviation for sets of place features like these.)

# Rule types

focus

- Assimilation: Focus of rule takes on an element of the context

$V \rightarrow [\alpha \text{ back}] / \boxed{\begin{array}{l} V \quad C_0 \text{ —} \\ [\alpha \text{ back}] \end{array}}$

context

# Harmony

- Type of assimilation rule (see Odden 8.2.1)
  - Phonetic origins of assimilation are coarticulation
- Focus of rule takes on an element of the context and (usually)
  - element of context need not be adjacent to the focus
  - the rule can apply more than once per word

# Round Harmony

does not apply to non-high vowels

V --> [+round] / V C<sub>0</sub> \_\_\_\_\_  
[+high] [+round]

V --> [-round] / V C<sub>0</sub> \_\_\_\_\_  
[+high] [-round]

collapsed:

V --> [αround] / V C<sub>0</sub> \_\_\_\_\_  
[+high] [αround]



# Derivations

- Illustrate the analysis, usually only included in more complex problems

- General schema

/UR/ (possibly morphologically complex)

rule 1 (result of applying rule 1)

rule 2 (result of applying rule 2)

...

[PR] (=phonetic representation)

- Note: rule 2 applies to output of rule 1, not directly to the UR

# Derivations

- A non-alternating root

UR	/ip - V/	/ip/
	[+high]	
Final Devoicing	- <sup>1</sup>	p <sup>2</sup>
Backness Harmony	[-back]	
Roundness Harmony	[-round]	
PR	[ipi]	[ip]

<sup>1</sup>“-” can be included in a derivation to show that a rule does not apply to a form

<sup>2</sup>vacuous application—rule applies to form but no change occurs

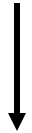
# Derivations

- An alternating root

UR	/sebeb -	V/	/sebeb/
		[+high]	
Final Devoicing	-		p
Backness Harmony		[-back]	
Roundness Harmony		[-round]	
PR	[sebebi]		[sebep]

# Caution: not a phonological derivation

/sebeb/



/sebeb-V/

[+high]

'reason'

'reason' (psd.)

# Rule stages

- “/sebeb/ meets the structural description of Final Devoicing.”
- Final Devoicing  
C --> [-voiced] / \_\_\_\_ #

structural description of rule:

C #

structural change of rule:

C #

[-voiced]

form meets s.d. of rule:

sebe b #

(FD applies to word-final consonants. /sebeb/ contains a word-final consonant.)

# Iterative rules

- Rules can apply more than once per word
  - Hayes 4.2.2: “If a rule matches up to more than one location in a form, it applies to all such locations...”
- A rule can apply to its own output
- A direction may be specified for rule application (L-R or R-L across word)
- In case of Turkish, L-R dictated by feature specification in UR < root/affix asymmetry
- (Another example: Choctaw, 6.1.4)



# Summary of Turkish vowel harmony

- Turkish root vs. affix vowels
  - asymmetrical level of specification in UR
- Backness Harmony
- Roundness Harmony
  - interacts with [high]
- Both rules iterate



# Practice

- Yakut vowel harmony

# Typological perspective on Rounding Harmony

- Turkish
  - only high vowels undergo, all round vowels trigger
- Kirghiz
  - all vowels assimilate in rounding to preceding vowels except that [a] does not assimilate to [u]
- Sakha (Yakut)
  - high vowels undergo, round vowels trigger; nonhigh vowels are round if same height as trigger
- Mongolian
  - only nonhigh vowels undergo, only nonhigh vowels trigger
- Yawelmani
  - vowels undergo if same height as trigger

# Harmony and assimilation

- Vowel assimilation
  - Vowels undergo, vowels or consonants may trigger
    - Triggering vowels and undergoing vowels need not be adjacent
- Consonant assimilation
  - Consonants undergo, consonants or vowels may trigger
    - Triggering segment typically adjacent to undergoing consonant