Unit 3: Generative phonology- Linear model

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Carr (2013) – Chapter 2, 4
Lings_P5_M3-Rule Ordering (in Other Resources)
Jensen (2004) – Chapter 5
Gussenhoven & Jacobs (2017) – Chapters 6 (section 6.4 onwards), 7, 8 & 13 (upto page 222)

Textbooks and Resources

EPG Pathashala (Prof Pramod Pandey’s lecture)
https://www.youtube.com/watch?v=u0wVsomWQBw

Other Resources

Goals of phonological theory

"A list of facts is scientifically uninteresting. A basic goal of science is to have knowledge that goes beyond what has been observed, because we believe that the universe obeys general laws. A list might be helpful in building a theory, but we would not want to stop with a list, because it would give us no explanation why that particular list, as opposed to some other arbitrary list, should constitute the possible phonemes of language. The question "what is a possible phoneme" should thus be answered by reference to a general theory of what speech sounds are made of, just as a theory of "possible atoms" is based on a general theory of what makes up atoms and rules for putting those bits together. Science is not simply the accumulation and sorting of facts, but rather **the attempt to discover laws that regulate the universe**. Such laws make predictions about things that we have yet to observe: certain things should be found, other things should never be found." (Odden, p. 133)

- Phonology has a twofold task:

(a) to explore the nature of the substantial (phonic) realization or representation of the formal core of language, both in general and for specific languages; and

(b) to relate this substantial representation to the form itself, i.e. determine its place in and relation to other aspects of a total description.

"to understand the tacit system of rules that the speaker uses in apprehending and manipulating the sounds of her language i.e. "how the particular" follows from the general".

What is generative phonology

- The basic goal of generative grammar is to explore and understand the nature of linguistic knowledge. It seeks answers to questions like: what does knowing a language entail? How is linguistic knowledge acquired by infants? Are there any properties of language that are universal, i.e. is there such a thing as 'Universal Grammar'?
- Generative Phonology (GP) is a subdiscipline within Generative Grammar, an approach to linguistic theory whose aim is to characterize the unconscious knowledge which is said to constitute our knowing a language.
- It is the goal of Generative Phonology to characterize the nature of phonological knowledge and thus to state what it is that constitutes having a native accent.

What are the tenets of Generative phonology

- The rules should **produce grammatical utterances** and only those
- The language output must be the result of a series of **derivational steps**. Meaning

A→ B→ C→D

- If there is more than one rule, the **rules may be ordered**.
- Once the ordering of the rules is fixed, the rules can apply cyclically or non cyclically.

cyclic rule (stress rule): ‘nation → ‘national → natio‘nality

Levels of representation (Hayes, 2009, p. 29)

- There are two levels of representation of a segment if it undergoes change i.e. allophony:

- Underlying representation/phonemic representation/ underlying form/ base form: this is an abstract level of representation.

- Surface form- contains the actual phonetic forms

- The idea is that phonemes have an essential, characteristic form, which is altered in particular contexts by the rules of the phonology, applying in a derivation

- There may be more than one intermediate form between the underlying and the surface forms.

“Elsewhere” allophones

- it is rational to adopt as the underlying representation of the phoneme its “elsewhere” allophone. Recall (p. 24) that the elsewhere allophone is the allophone that is not affiliated with any particular context, but rather is the sound that appears when no other special context is met.
- The phonological derivation starts out with the underlying form, and rules apply to derive from it the various allophones in their appropriate contexts. If no rule is applicable, the underlying form emerges unaltered as the output of the phonology.

Examples of underlying forms undergoing derivations into surface forms

/l/ Devoicing

$$/l/ \rightarrow [\underset{\circ}{\widehat{l}}] \; / \begin{bmatrix} +\text{consonant} \\ -\text{voice} \end{bmatrix} \_\_$$

Partially devoice /l/ after a voiceless consonant.

/l/ Dentalization

$$/l/ \rightarrow [\underset{\sqcap}{l}] \; / \_\_\_ \; \theta$$

/l/ is rendered as velarized and dental before [θ].

/l/ Velarization

$$/l/ \rightarrow [ɫ] \; / \_\_\_ \;]_{\text{word}}$$

/l/ is velarized word-finally.

file	*slight*	*wealth*	*listen*	
/faɪl/	/slaɪt/	/wɛlθ/	/'lɪsən/	underlying forms
—	s͡l̥laɪt	—	—	/l/ Devoicing
—	—	wɛɬ̪θ	—	/l/ Dentalization
faɪɬ	—	—	—	/l/ Velarization
['faɪɬ]	[s͡l̥laɪt]	['wɛɬ̪θ]	['lɪsən]	surface forms

Some conventional symbols used in phonological rules:

= word boundary

+ = morpheme boundary

$ or . = syllable boundary

C = [–syll]

V = [+syll]

{} enclose alternatives (see §4.9.1)

() enclose optional elements (see §4.9.2)

C_0 = zero or more [–syllabic] segments

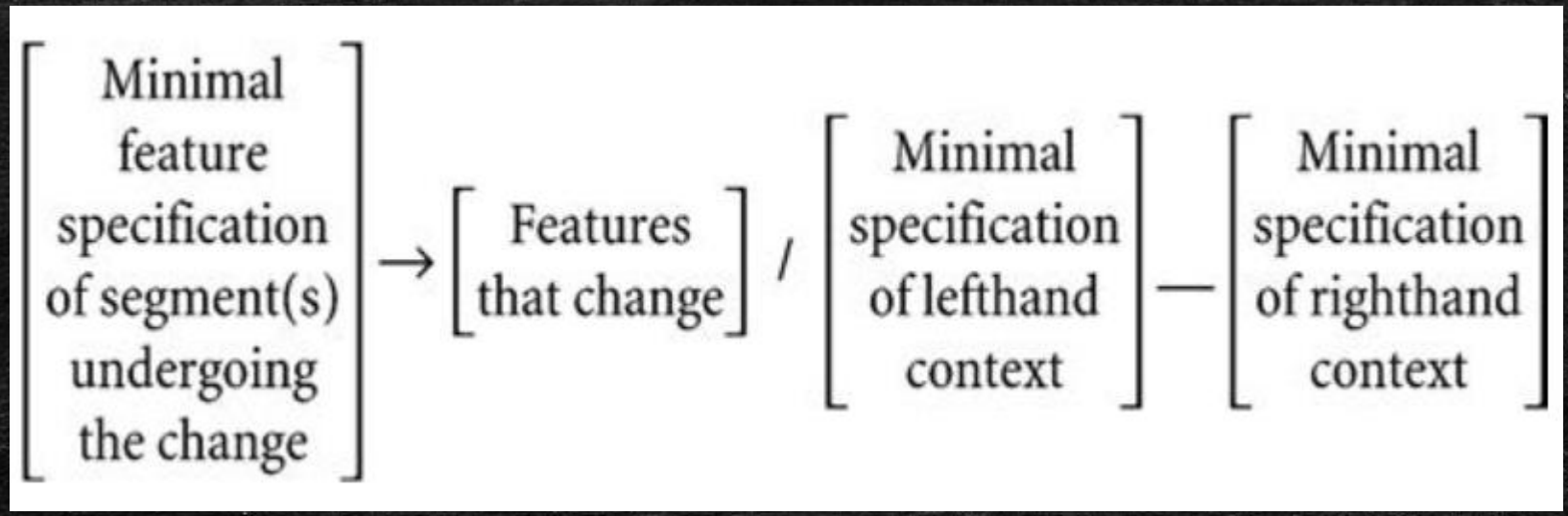
C_0^1 = zero or one consonant

C_a^b = a string of consonants of at least *a* but no more than *b* (rarely used)

Jensen (2004), p. 120

Rule writing

The structural description (SD) of a rule is the Focus and Environment. The structural change (SC) of the rule is the Focus and Change

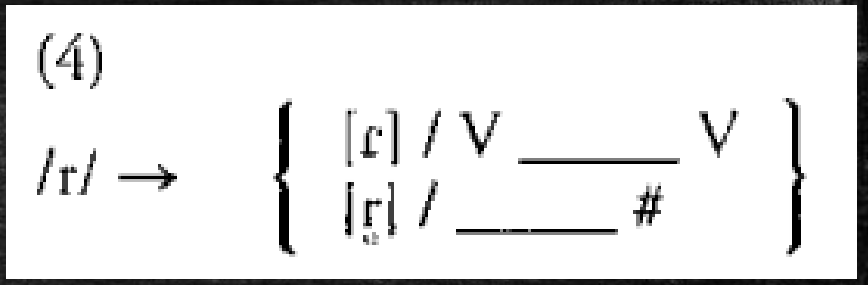


Focus

Change

Trigger or Environment

Rule formalism (Farsi example)



- On the left of the arrow, we have the representation for the phoneme /r/ in Farsi; the arrow means 'is realized as'; the slash (I) means 'in the environment of' or 'in the context of'.
- The horizontal bars indicate structural slots, with information preceding and/or following them. In this case, on the uppermost line, the bar shows a vowel (V) preceding and following the segment; on the second line, a word boundary (#) follows the segment (i.e. the phoneme occurs at the end of a word).
- Thus, the right-hand side indicates the devoiced and tapped allophones and the contexts in which they occur.

- The curly brackets (or brace notation) indicate a choice between the realisations enclosed within the brackets: we must choose one of the realisations enclosed within the brackets, but we may not choose more than one.
- The entire statement expresses a general rule about the occurrence of the allophones, which in prose would be:
- ‘the phoneme / r/ is realised as [ɾ] voiced alveolar tap between vowels, a voiceless alveolar trill word-finally, and a voiced alveolar trill elsewhere’.
- That is, we are assuming here that the representation /r/ indicates that the phoneme is ‘fundamentally’ a voiced trill and that it emerges as a voiceless trill or a voiced tap only in the word-final and intervocalic environments, respectively.
- The [rl is the ‘default’ (‘elsewhere’) realisation of the phoneme, and this is encoded in the representation we give for the phoneme: / r/.

[7.1]	[p^hɪt]	pit	[p^{wh}ul]	pool
	[t^hɪk]	tick	[t^{wh}ʊk]	took
	[k^hil]	keel	[k^{wh}ul]	cool
	[ət^hend]	attend	[ək^{wh}ʊstɪk]	acoustic

The rules we needed to account for [7.1] are listed informally in [7.2]

[7.2] (a) voiceless stops are aspirated at the beginning of a stressed syllable;
(b) consonants are labialised (rounded) before rounded vowels;
(c) velar consonants are fronted (palatalised) before high front vowels.

Rules [7.2b] and [7.2c] do not affect each other. There is no interaction problem since they do not have the same *structural description*, i.e. the phonetic properties of their inputs are different. Rule [7.2b] requires the presence of a rounded vowel, and all such vowels are back in English while rule [7.2c] stipulates that there must be a high front vowel. The two rules are like traffic on different highways. There is no possibility of their interfering with each other.

Determine whether rule [7.2a] interferes with either of the other two rules.

FINAL CONSONANT DELETION

Masculine			Feminine			
/bɑs/	[bɑ]	bas	/bɑsə/	[bɑs]	basse	'low'
/ʃat/	[ʃa]	chat	/ʃatə/	[ʃat]	chatte	'cat'
/ʃod/	[ʃo]	chaud	/ʃodə/	[ʃod]	chaude	'hot'

- In the feminine form, the underlying representation ends in a [ə]
- Phonetically the final [ə] is deleted in contemporary French
- Formalise the rule of final consonant deletion?

$$[+\text{cons}] \longrightarrow \emptyset / \_\_ \begin{Bmatrix} C \\ \# \end{Bmatrix}$$

Next consider VOWEL NASALISATION, another phonological process which occurs in French:

[7.6]	[fɛ̃]	fin	'end'
	[dɑ̃]	dans	'in'
	[rɔbɛ̃]	robin	'lawyer (pejorative)'
	[fɛ̃]	faim	'hunger'
	[sɑ̃]	sans	'without
	[ɔ̃]	on	idef. pron. 'one'
	[ɑ̃]	en	'in'
	[tɑ̃]	tant	'so much'
	[mulɛ̃]	moulin	'mill'

$$[7.7]\quad V \longrightarrow [+\text{nasal}] \;/\; \underline{\qquad} \; [+\text{nasal}] \begin{Bmatrix} C \\ \# \end{Bmatrix}$$

Lumasaaba plurals

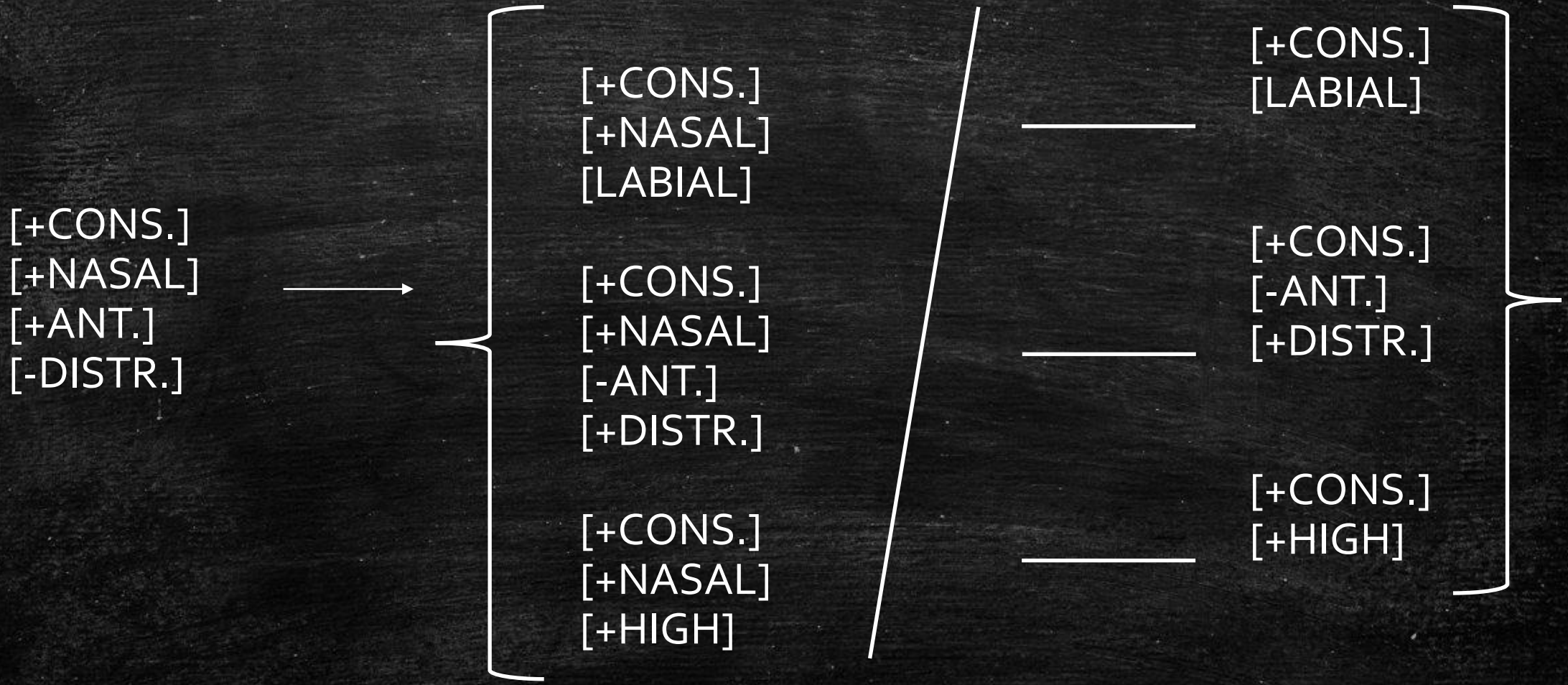
To exemplify further this new set of terms, let us examine a case in Lumasaaba which is similar to our English example. In this language, [b], [β̞], [d], [l], [ɟ] and [j] function contrastively. That is, Lumasaaba has the phonemes /b/, /β̞/, /d/, /l/, /ɟ/ and /j/. In the following data, all the words are morphologically complex; like our two examples from English, they are composed of prefixes followed by a root.

1.	(a)	[cibati]	'a knife'	(b)	[zimbati]	'knives'
2.	(a)	[kaβ̞ua]	'a small dog'	(b)	[zimbua]	'dogs'
3.	(a)	[ludaha]	'a wing'	(b)	[zindaha]	'wings'
4.	(a)	[luli]	'a root'	(b)	[zindi]	'roots'
5.	(a)	[luɟeɟele]	'a chain'	(b)	[ziɲɟeɟele]	'chains'
6.	(a)	[lujo:jo]	'a bud'	(b)	[ziɲɟo:jo]	'buds'
7.	(a)	[kagunija]	'a small bag'	(b)	[ziŋgunija]	'bags'

Write the rule that captures the distribution of the morpheme /n/

$$/n/ \rightarrow \begin{Bmatrix} [m] \,/\, \_\_\_\, b \\ [ɲ] \,/\, \_\_\_\, ɟ \\ [ŋ] \,/\, \_\_\_\, g \end{Bmatrix}$$

Now write this rule using distinctive features


[+CONS.]
[+NASAL]
[+ANT.]
[-DISTR.]
[+CONS.]
[+NASAL]
[LABIAL]
[+CONS.]
[+NASAL]
[-ANT.]
[+DISTR.]
[+CONS.]
[+NASAL]
[+HIGH]
[+CONS.]
[LABIAL]
[+CONS.]
[-ANT.]
[+DISTR.]
[+CONS.]
[+HIGH]

1.	(a) [cibati]	'a knife'	(b)	[zimbati]	'knives'
2.	(a) [kaβua]	'a small dog'	(b)	[zimbua]	'dogs'
3.	(a) [ludaha]	'a wing'	(b)	[zindaha]	'wings'
4.	(a) [luli]	'a root'	(b)	[zindi]	'roots'
5.	(a) [luɟeɟele]	'a chain'	(b)	[ziɲɟeɟele]	'chains'
6.	(a) [lujo:jo]	'a bud'	(b)	[ziɲjo:jo]	'buds'
7.	(a) [kagunija]	'a small bag'	(b)	[ziŋgunija]	'bags'

Lumasaaba
Root alternation

HYPOTHESIS I

Approx becomes Stop.

/bati/ - [bati]

/βua/ - [bua]

/daha/ - [daha]

/li/ - [di]

/ɟeɟele/ - [ɟeɟele]

/jojo/ - /ɟo:jo/

/gunija/ - /gunija/

OR

HYPOTHESIS II

Stop. becomes Approx

/bati/ - [bati]

/bua/ - [βua]

/daha/ - [daha]

/di/ - [li]

/ɟeɟele/ - [ɟeɟele]

/ɟo:jo/ - /jojo/

/gunija/ - /gunija/

/β/	→	[b]	/ m —
/l/	→	[d]	/ n —
/j/	→	[ɟ]	/ ɲ —

/b/	→	[β]	/ V (+) — V
/d/	→	[l]	/ V (+) — V
/ɟ/	→	[j]	/ V (+) — V

A. Hungarian (data from Vago 1980a)

1.	[kalap]	'hat'	[kalabban]
2.	[rab]	'prisoner'	[rabban]
3.	[kut]	'well'	[kudban]
4.	[kad]	'tub'	[kadban]
5.	[zak]	'sack'	[zagban]
6.	[meleg]	'warm'	[melegben]
7.	[res]	'part'	[rezben]
8.	[viz]	'water'	[vizben]
9.	[lakaʃ]	'apartment'	[lakaʒban]
10.	[varaʒ]	'magic'	[varaʒban]

Morphological note
The words in the right-hand column all have a suffix morpheme meaning 'in'. There are two allomorphs for this morpheme: [ben] and [ban]. You may ignore this fact for the purposes of this exercise.

(a) In some of the nouns, the root morpheme has two allomorphs. What are these, and what property of which segment in the root alternates?
(b) There are two obvious possibilities for the phonological representation of such morphemes. What are they?
(c) Write the rule which must accompany each representation in order to yield the phonetic representations.
(d) You now have two general hypotheses about the nature of these alternations. Test them against the entire body of data. Which is falsified?

Voiceless becomes voiced

/kalap/ – [kalab]

/rab/ – [rab]

/kuʈ/ – [kuɖ]

/kaɖ/ - [kaɖ]

/zak/ – [zag]

/meleg/ – [meleg]

/res/ – [rez]

/viz/ – [viz]

/lakaʃ/ - [lakaʒ]

/varaʒ/ – [varaʒ]

[-VOICE] → [+VOICE] / ____ [+VOICE]

Voiced becomes voiceless

/kalab/ – [kalap]

/rab/ – [rab]

/kuɖ/ – [kuʈ]

/kaɖ/ - [kaɖ]

/zag/ – [zak]

/meleg/ – [meleg]

/rez/ – [res]

/viz/ – [viz]

/lakaʒ/ - [lakaʃ]

/varaʒ/ – [varaʒ]

[+VOICE] → [-VOICE] / ____ #

Phonetic plausibility

(5) *Polish nouns* (data from Rubach 1984)

	Nominative		Diminutive	Augmentative
1.	[kɐpeluš]	'hat'	[kɐpelušik]	[kɐpelušisko]
2.	[ɐrkuš]	'sheet'	[ɐrkušik]	[ɐrkušisko]
3.	[kontuš]	'nobleman's overcoat'	[kontušik]	[kontušisko]
4.	[groš]	'monetary unit'	[grošik]	[grošivo]

(6)

/ś/ → [š] / ____#

(7)

/š/ → [ś] / ____i

- None of the hypotheses is falsified.
- But which one is "phonetically more plausible"?

- Pre-palatal fricative becoming a post alveolar in the environment of a word boundary - NO

- Post alveolar fricative becoming pre-palatal in the environment of a high front vowel - YES

When a derivation needs more than one rule

- Urdu has the variant forms [ɟəhã:n] and [ɟəhã:] derived from the underlying form /ɟəha:n/ (Pandey, nd)

(1) Vowel nasalization

(2) Nasal consonant deletion

How should we order them?

So,
(1) followed by (2)
OR
(2) followed by (1)

Tip: The output of the first rule will be the input to the second rule.

Xhosa nouns

	Nominative			Partitive
1.	[udaka]	'mud'	2.	[kudaka]
3.	[ubuso]	'face'	4.	[kubuso]
5.	[ukutja]	'food'	6.	[kukutja]
7.	[ihashe]	'horse'	8.	[kwihashe]
9.	[iŋkosi]	'chief'	10.	[kwiŋkosi]
11.	[izitja]	'basket'	12.	[kwizitja]
13.	[abantu]	'people'	14.	[kubantu]
15.	[amadoda]	'men'	16.	[kumadoda]

- [u], [i], [a] are noun class prefixes here
- So you get:

[u + daka] [i + hashe] [a + bantu]

The partitive affixes are [ku] and [kw].

So we get

2. [ku + daka]
4. [ku + buso]
6. [ku + kutja]
8. [kw + i + hashe]
10. [kw + i + ŋkosi]
12. [kw + i + zitja]
14. [ku + bantu]
15. [ku + madoda]

	Nominative			Partitive
1.	[udaka]	'mud'	2.	[kudaka]
3.	[ubuso]	'face'	4.	[kubuso]
5.	[ukutja]	'food'	6.	[kukutja]
7.	[ihashe]	'horse'	8.	[kwihashe]
9.	[iŋkosi]	'chief'	10.	[kwiŋkosi]
11.	[izitja]	'basket'	12.	[kwizitja]
13.	[abantu]	'people'	14.	[kubantu]
15.	[amadoda]	'men'	16.	[kumadoda]

2. [ku + daka]
4. [ku + buso]
6. [ku + kutja]
8. [kw + i + hashe]
10. [kw + i + ŋkosi]
12. [kw + i + zitja]
14. [ku + bantu]
15. [ku + madoda]

We have to account for two things:
(1) [ku] [kw] alternation
(2) elision of the noun class affix in 2, 4, 6, 14 and 15

[ku] [kw] alternation

2. [ku + daka]
4. [ku + buso]
6. [ku + kutja]
8. [kw + i + hashe]
10. [kw + i + ŋkosi]
12. [kw + i + zitja]
14. [ku + bantu]
15. [ku + madoda]

	Nominative			Partitive
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7.	[ihashe]	'horse'	8.	[kwihashe]
9.	[iŋkosi]	'chief'	10.	[kwiŋkosi]
11.	[izitja]	'basket'	12.	[kwizitja]
13.	[abantu]	'people'	14.	[kubantu]
15.	[amadoda]	'men'	16.	[kumadoda]

$/u/ \rightarrow [w] \; / \_\_\_ i$

OR

$/w/ \rightarrow [u] \; / \_\_\_ C$

Phonetically more plausible

Elision of the noun class affix

2. [ku + daka]
4. [ku + buso]
6. [ku + kutja]
8. [kw + i + hashe]
10. [kw + i + ŋkosi]
12. [kw + i + zitja]
14. [ku + bantu]
15. [ku + madoda]

	Nominative			Partitive
1.	[udaka]	'mud'	2.	[kudaka]
3.	[ubuso]	'face'	4.	[kubuso]
5.	[ukutja]	'food'	6.	[kukutja]
7.	[ihashe]	'horse'	8.	[kwihashe]
9.	[iŋkosi]	'chief'	10.	[kwiŋkosi]
11.	[izitja]	'basket'	12.	[kwizitja]
13.	[abantu]	'people'	14.	[kubantu]
15.	[amadoda]	'men'	16.	[kumadoda]

$/a/ \rightarrow \emptyset \; / \; V \_\_\_$

$/u/ \rightarrow \emptyset \; / \; V \_\_\_$

$V \rightarrow \emptyset \; / \; V \_\_\_$

General rule

Ordering our rules

$$V \rightarrow \emptyset \,/\, V \_\_\_$$

$$/u/ \rightarrow [w] \,/\, \_\_\_i$$

	Nominative			Partitive
1.	[udaka]	'mud'	2.	[kudaka]
3.	[ubuso]	'face'	4.	[kubuso]
5.	[ukutja]	'food'	6.	[kukutja]
7.	[ihashe]	'horse'	8.	[kwihashe]
9.	[iŋkosi]	'chief'	10.	[kwiŋkosi]
11.	[izitja]	'basket'	12.	[kwizitja]
13.	[abantu]	'people'	14.	[kubantu]
15.	[amadoda]	'men'	16.	[kumadoda]

- If $V \rightarrow \emptyset \,/\, V \_\_\_$ followed by $/u/ \rightarrow [w] \,/\, \_\_\_i$

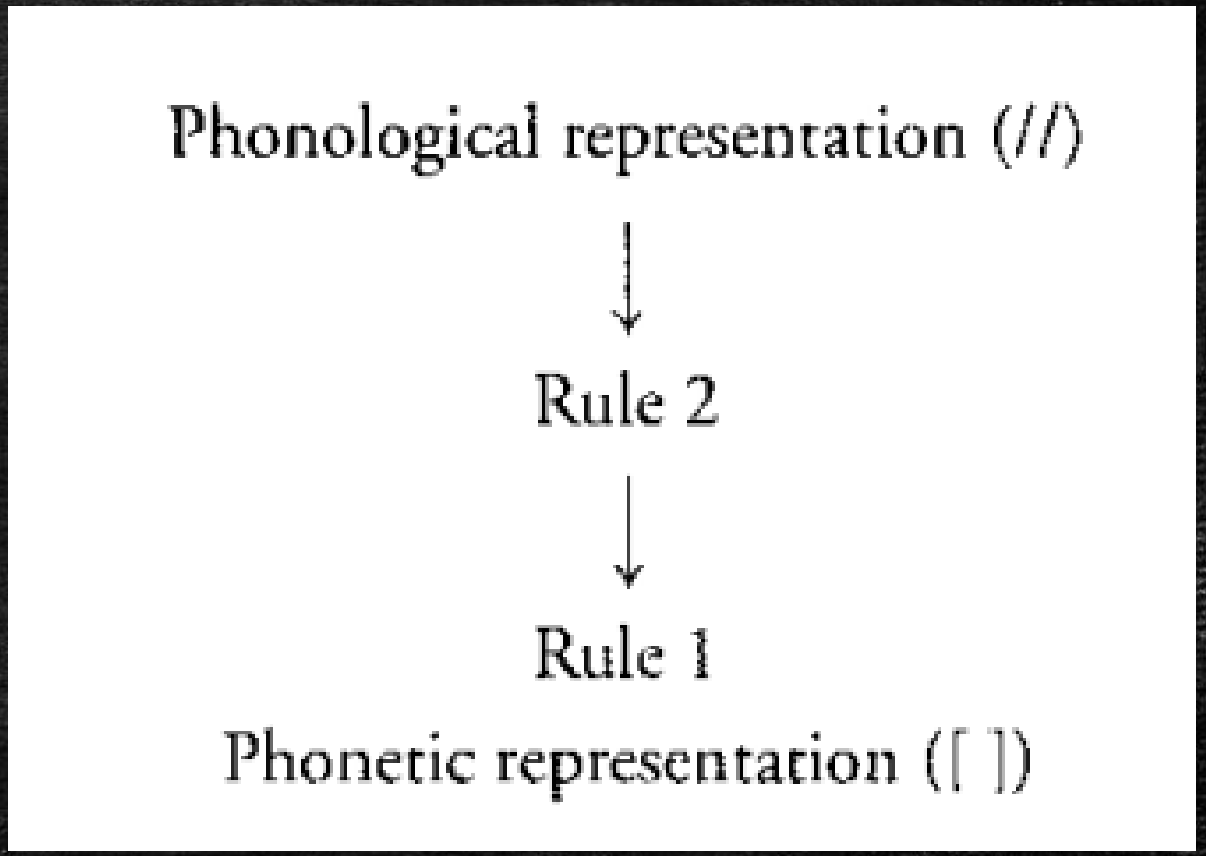
[ku + ihashe] → [kihashe], not the output we want. Also cannot be an input to $/u/ \rightarrow [w] \,/\, \_\_\_i$

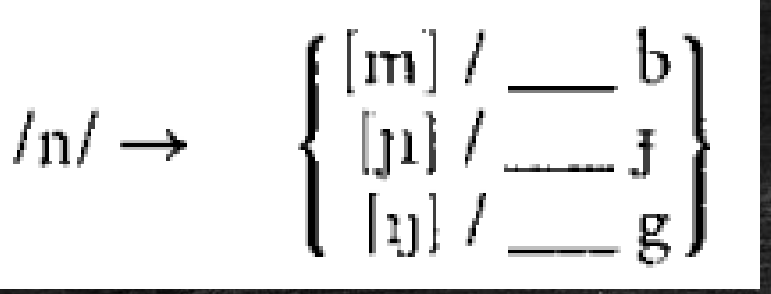
- But, if $/u/ \rightarrow [w] \,/\, \_\_\_i$ followed by $V \rightarrow \emptyset \,/\, V \_\_\_$

[ku + ihashe] → [kwihashe] , [ku + abantu] → kubantu, [ku + udaka] → kudaka

Rule 2 /u/ → [w] / ___i

Rule 1 V → Ø / V ___





α notation

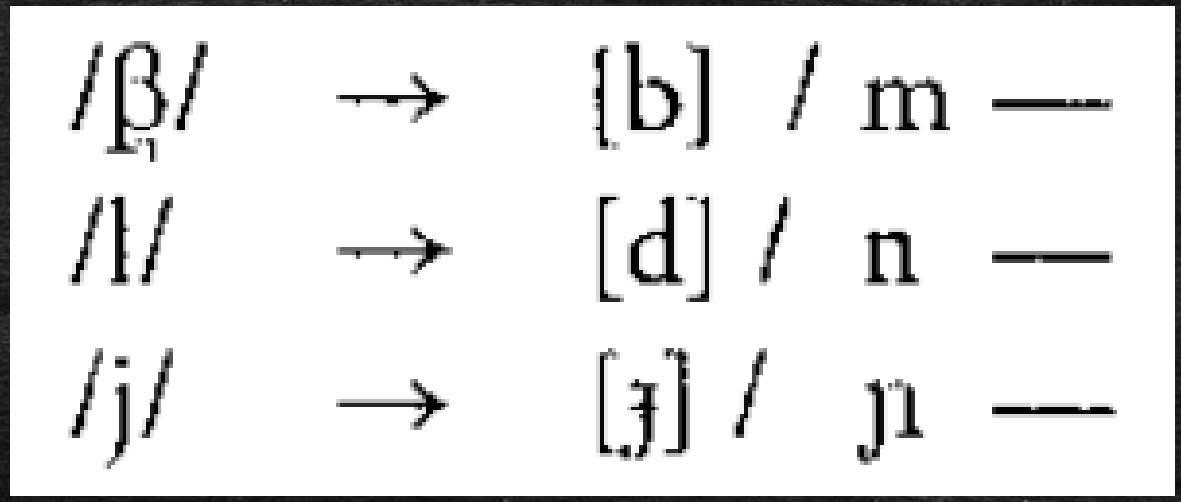
[+CONS.]
[+NASAL]
[+ANT.]
[-DISTR.]

→

[+CONS.]
[+NASAL]
[α PLACE]

/ ____

[+CONS.]
[α PLACE]



Approximants change into plosives after a homorganic nasal

[+CONS, +SON, +APPROX] → [+CONS, +SON, **αPLACE**] / [+NASAL, **αPLACE**] _____

TRY THIS YOURSELVES!

Exercise-2:

Look at the data on Luganda liquids. Write the formal rule using distinctive features, state the SD and SC parts of the rule and show how the rule applies to the data:

Words	Gloss	Words	Gloss
lja	'eat'	lwana	'fight'
lu:la	'sit'	bulira	'tell'
dira	'sound'	mmere	'food'
ŋgalo	'finger'	kwera	'to sweep'

Source: Pandey, e-pg-pathashala, P5_M2

No rule ordering

Essentially the idea that we do not need to order rules since they will only apply if the Structural Description (SD) is met. Therefore, rules will automatically ``get'' ordered and we do not need to specify ordering.

- Standard British English /r/ deletion

/r/ → Ø ___ { (#) C, # }

(1) [tʃətʃ] 'church'

(2) [kʰa pʰakɪŋ] 'car parking'

(3) [kʰa] 'car'

DOES NOT APPLY TO
(4) [wiəri] weary
(5) [fajəriŋ] firing
(6) [kʰaraʃ] car ash

Intervocalic /r/

Standard British English r-intrusion rule Ø → /r/ / V# ___ #V

/r/ is inserted between two words that end and begin with vowels respectively, like:

(1) lɔrənɔdə 'law and order'
(2) ðəsi:rɪz 'the sea is'

Intrinsic vs Extrinsic rule ordering

- Intrinsic rule ordering : the grammar does not specify the ordering of rules.
- Extrinsic rule ordering: the grammar specifies the ordering of rules.
- The Urdu nasalization and nasal deletion example and the Standard British English r-elision and r-intrusion rules can be argued to be Intrrinsic.

Why?

Iterative rules

- Rules that apply more than once to their output.
- Commonly found to apply for prosodic phenomenon, like vowel harmony and stress.
- For example V→ Ø / __ (+) V, says that a vowel is deleted if followed by a vowel with an optional morpheme boundary. Therefore a sequence of three vowels VVV, the rule will apply twice to yield a single vowel.
- Iterative vowels need to be stated as iterative in the grammar.

Most of the content from this slide onwards is taken from the e-pg pathashala Paper 5 of Module 3

Pulaar vowel harmony (Jensen 2004)

- In Pulaar, a vowel changes to an ATR vowel when preceded by an ATR (Advanced Tongue Root) vowel in the following syllable. Note that non-ATR vowels are represented with the symbols of lower vowels (e.g. ɪ ʊ ɔ) than their ATR counterparts (e.g. i u o). Thus in a word of the underlying representation ##dɔg-ɔ:-ru##, with the final ATR vowel, the preceding vowels change to ATR vowels: ##dog-o:-ru##. The Pulaar Vowel Harmony rule is stated as follows:

$$\begin{bmatrix} +\text{syll} \\ -\text{ATR} \end{bmatrix} \rightarrow [+\text{ATR}] \,/\, \_\_\, C_0 \begin{bmatrix} +\text{syll} \\ +\text{ATR} \end{bmatrix}$$

/#dɔg-ɔ:-ru#/	underlying representation
o:	ATR Harmony (first iteration)
o	ATR Harmony (second iteration)
[#dog-o:-ru#]	phonetic representation

- This rule applies iteratively to yield an output with two non-ATR vowels changing into their ATR counterparts. The rule applies **right to left**, and does not yield the right result when applied **left to right**.

What is this wrong result?

Paul Kiparsky's Elsewhere Condition

Rules A, B in the same component apply disjunctively to a form Ø if and only if

(i) The structural description of A (the special rule) properly includes the structural description of B (the general rule)

(ii) The result of applying A to Ø is distinct from the result of applying B to Ø. In that case, A is applied first, and if it takes effect, then B is not applied.

Elsewhere condition exemplified using Finnish data

- Two processes that affect word-final /k/ are k-deletion and k-assimilation.
- k-assimilation takes place before a word initial consonant
- k-deletion involves the deletion of /k/ before vowels and word boundaries

menek#	'go'
menek# pois → menep pois	'go away'
menek#kotiin → menek kotiin	'go home'
menek#alas → mene alas	'go down'

- The structural description of both rules is identical: word final /k/.
- k-deletion is more general than k-assimilation. So k-deletion applies AFTER k-assimilation.
- The Elsewhere condition ensures that given the universal nature of the application of these two rules, there is no need to order them.

Types of rule ordering (Study this from Jensen 2004, p.190 onwards)

- Feeding Rules
- Counter-Feeding Rules
- Bleeding Rules
- Counter-Bleeding Rules

Feeding rules

If rule A creates a representation to which rule B can apply that was not present before the application of rule A, then rule A is said to feed B.

Data from Russian:

(1)

	Phonological form	Phonetic representation	
1.	#gorod + k + a#	[gorotka]	'little town'
2.	#mʦɛnsk#bi#	[mʦɛnzgbi]	'if Mcensk'
3.	#mʦɛnsk##bil#	[mʦɛnzgbil]	'it was Mcensk'

(2) *Word-Final Devoicing*

[+obs] → [−voice]/___#

(3) *Voicing Assimilation*

[+obs] → [αvoice] /___(#(#)) [+obs, αvoice]

	# mozg#
W-FD	mozk
VA	mosk
Phonetic representation	[mosk]

Bleeding Rules

- Consider rules A and B, and A is ordered before B. In a derivation in which rule A destroys a representation to which B would have applied, we say that rule A bleeds rule B.
- The English plural form exemplifies this. It involves two rules:

(A) ɪ-insertion

(B) Devoicing rule

When (A) applies before (B), insertion of /ɪ/ prevents devoicing, as it does in a form like [bʌs-z] by separating the final [z] from the stem final-obstruent.

	bæk-z	kɪs-z	aɪ-z
ɪ-INSERTION	(*n.a.*)	ɪ	(*n.a.*)
DEVOICING	s	(*n.a.*)	(*n.a.*)
	bæks	kɪsɪz	aɪz

Counterfeeding rules

- Assume a pair of rules A and B, with A ordered before B. If B creates a representation to which A could have applied, B is said to counterfeed A and the order is counterfeeding.

French for example has the following two rules

(A) Word-final ə-deletion rule

(B) Final consonant deletion rule – certain word-final consonants delete in contexts other than before a vowel or glide

ə-DELETION	ə → Ø / __ #
FINAL CONSONANT DELETION	C → Ø / __ # # [+cons]

(B) Applies before (A)

pətit nəvø	pətit-ə njɛs
Ø	(*n.a.*)
(*n.a.*)	Ø
pəti nəvø	pətit njɛs

If (A) were to apply before (B) i.e. in the feeding order, (A) would cause the feminine alternant of 'little' ([pətit]) to become homophonous with the masculine form i.e. it would become [pəti]

Counterbleeding rules

- A pair of rules A and B, with A ordered before B, is a counterbleeding relation if B destroys a representation that A applies to, and in fact has already applied. B ordered after A, has missed its chance to bleed A.
- In Russian there we look at two rules that are in counterbleeding order:

(A) Dental stop deletion

(B) L-Deletion

L-Deletion can destroy the context for Dental stop deletion. But this does not happen as Dental stop deletion, being ordered earlier, has already applied.

Dental Stop Deletion (Russian)

$$\begin{bmatrix} -\text{son} \\ -\text{cont} \\ +\text{ant} \\ +\text{cor} \end{bmatrix} \rightarrow \emptyset \; / \; \_\_\_\_ \; l$$

l-Deletion (Russian)

$l \rightarrow \emptyset \; / \; C \; \_\_\_\_ \; \#$

/#meʈ+l#/	/#meʈ+l+a#/	/#roʂ+u#/	/#roʂ+l#/	/roʂ+l+a/	underlying representation
Ø	Ø	———	Ø	Ø	Dental Stop Deletion
———	———	———	Ø	———	*l*-Deletion
———	———	———	———	———	Final Devoicing
[#mel#]	[#mela#]	[#roʂu#]	[#ros#]	[#rosla#]	phonetic representation