Introduction to Phonological Analysis   **Handout 11 (Oct. 28)**
LING 232A/632A, Fall 2013
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Topic: More on rule ordering   **Reading:** *Kenstowicz*, Chapter 5.

1. Strategies of rule application

Rules can be applied obligatorily or optionally whenever their environments apply. Yet, what happens when more substrings of an input match the same rule? Here is a case of potential "self-bleeding":

Input:	*aaaa*	
Rule:	a → b / a __ a	
Output	of *simultaneous rule application*:	*abba*
	of *left-to-right rule application:*	*abaa*
	of *right-to-left rule application:*	*aaba*
	(NB: Different languages seem to require different strategies.)	

Recursive rule: the output of the rule can serve as its own input. **Cyclicity** (cf. Lexical Phonology).

2. Opacity

<u>Spirantization in Modern Hebrew</u>:   {p, b, k} → [+ continuant] / [+syllabic] __

Summary of the argument:
1. [p] and [f] have complementary distribution (with marginal exceptions and minimal pairs).
2. Usually [b] alternate with [v]. But in some words [v] is unchanged. Hence: /b/ → [v] / V __.
3. In some words, [k] alternates with [x]. In other words, [k] unchanged. In other words again, [x] unchanged. Suggestion, /k_1/ → [x] / V__. Non-alternating [x] words have underlying /x/. Non-alternating [k] words have underlying /k_2/ (for instance, uvular /q/).
4. NB: Is {p, b, k} a natural class? In Tiberian Hebrew (a.k.a. Biblical Hebrew), the class of phonemes undergoing spirantization was {b, p, d, t, g, k}, the non-pharyngealized stops.

But, let us look at further data:

	'to be careful'	'to fight'	'to enter'	'to be written'
Infinitive	*lehizaher*	*lehilaxem*	*lehi<u>k</u>anes*	*lehi<u>k</u>atev*
Past. Sg. 3 masc.	*nizhar*	*nilxam*	*ni<u>x</u>nas*	*ni<u>x</u>tav*
Future Sg. 3. mas.	*yizaher*	*yilaxem*	*yi<u>k</u>anes*	*yi<u>k</u>atev*
			<u>k</u>*nisa* 'entrance'	

	'to exempt' (qal)	'to get rid of' (niphal)	'to resign' (hitpael)
Infinitive	*li<u>f</u>tor*	*lehi<u>p</u>ater*	*lehit<u>p</u>ater*
Past. Sg. 3 masc.	<u>p</u>*atar*	*ni<u>f</u>tar*	*hit<u>p</u>ater*
Future Sg. 3. mas.	*yi<u>f</u>tor*	*yi<u>p</u>ater*	*yit<u>p</u>ater*

"Famous" words contradicting the spirantization rule: Ka<u>bb</u>alah, Yom Ki<u>pp</u>ur, Su<u>kk</u>oth, Hanu<u>kk</u>ah…

Suggestion 1: morpheme 'to enter' has two allophones [k_1.n.s] and [k_2.n.s].
Suggestion 2: the pattern of the niphal infinitive is /lehi = a __ e __/; niphal future Sg 3 m is /yi = a __ e __/.
    Here, the *ad hoc* notation = means that the root consonant inserted does not undergo spirantization.

Historical-comparative data, orthography and further pseudo-arguments suggest: = means germination.

Lexical items:	'to enter' Niphal Past	Niphal Inf.	'to atone'	Piel nomen actionis
	/k.n.s/ /ni_ _ a _/	/lehi = a _ e _/	/k.p.r/	/_ i = u _/

Morphology:	/niknas/	/lehikkanes/	#/lehikkaper/	/kippur/
Phonology:				
Spirantization:	[nixnas]	- - -	[lehikkafer]	- - -
De-gemination:	- - -	[lehikanes]	[lehikafer]	[kipur]

Alternative suggestion: [=] stands for [n_], and *n*-deletion rule in coda position after sprirantization:

Lexical items:	'to enter' Niphal Past	Niphal Inf.	'to atone'	Piel nomen actionis
	/k.n.s/ /ni_ _ a _/	/lehi n_ a _ e _/	/k.p.r/	/_ i n_ u _/

Morphology:	/niknas/	/lehinkanes/	#/lehinkaper/	/kinpur/
Phonology:				
Spirantization:	[nixnas]	- - -	[lehinkafer]	- - -
n-deletion:	- - -	[lehikanes]	[lehikafer]	[kipur]

Problem: neither the child-learner, nor the synchronic linguist has evidence for underlying geminates or [n] in coda position. The analysis crucially relies on something that is <u>not observable on the surface</u>.

Opacity (Kiparsky 1973): A phonological rule *P* of the form A → B / C_D is *opaque* iff there are surface structures with either of the following characteristics:
    a.   instances of A in the environment C_D
    b.   instances of B derived by P that occur in environments other than C_D.

Counterfeeding order creates opacity:

	/CED/			/EAD/
A → B / C_D :	---		A → B / C_D :	---
E → A / C_D :	[CAD]		E → C / _A :	[CAD]

Counterbleeding order creates opacity:

	/CAD/			/CAD/
A → B / C_D :	[CBD]		A → B / C_D :	[CBD]
C → E:	[EBD]		D → E:	[CBE]

Displaced contrast in minimal pairs (Hayes, p. 146):   *writing* [ˈɹʌɪɾɪŋ] vs. *riding* [ˈɹaɪɾɪŋ]

        Structuralist approach: argument for [ʌɪ] and [aɪ] being different allophones.

        Underlying *write* /ɹʌɪɾ/ vs. *ride* /ɹaɪɾ/? But this contrast only appears before tap.

        Alternative analysis: Underlying *write* /ɹaɪt/ vs. *ride* /ɹaɪd/ (as hinted by orthography).

        No need for underlying /ɾ/ segment in the "alphabet employed to encode the lexical items".

3. Extrinsic and intrinsic rule orders

Extrinsic rule order: order must be specified explicitly (e.g. tapping and Canadian raising: both attested).
Intrinsic rule order: general principles define order. (Easier for linguist and learner; less memory needed.)

Elsewhere condition (Kiparsky 1973): if rule A is applicable to a subset of the forms to which rule B is applicable, then the more specific A is applied first, blocking the application of the more general rule B.

Example: Finnish deletes word final [k], unless C follows word boundary, to which [k] totally assimilates.

    (1) [k] → Ø / _ #   (2) [k] → C / _ # C

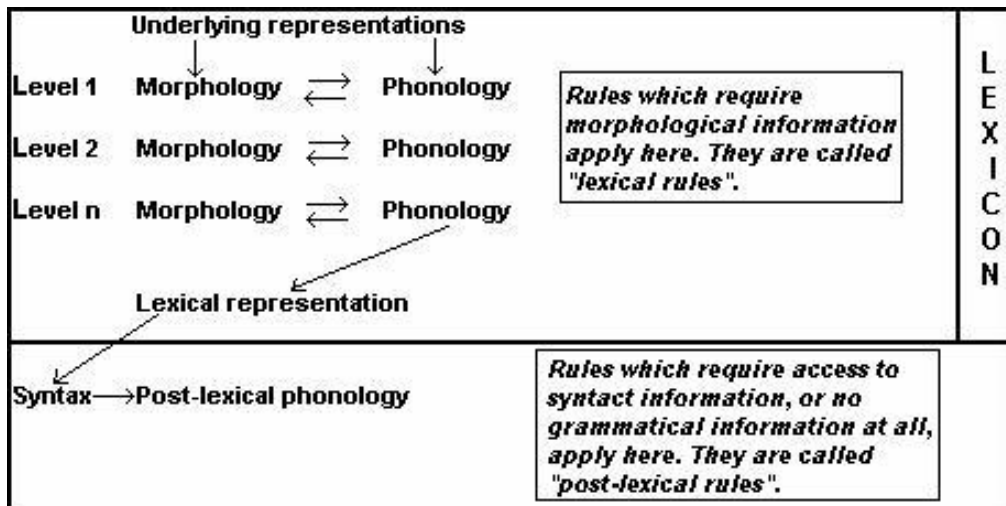   Elsewhere condition: (2) must be applied before (1). Therefore:

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

4. Contrastive Underspecification, extending *unspecification* to all predictable features:

- Predictable (redundant) features in each language are absent from underlying representations.
  - For example, sonorants would be unspecified for voicing.
- Only contrastive, distinctive features are stored in underlying representations.
  - For example, obstruents would be specified for [±voice].
- **Redundancy rules** apply <u>late</u> in the derivation to fill in predictable features:
  - For example, [+son] →   [+voice]
  - Prediction: only obstruents trigger and undergo voice assimilation (e.g. Russian).

5. Lexical Phonology (Kiparsky 1982; Mohanan 1982)
(http://www-01.sil.org/linguistics/GlossaryOflinguisticTerms/lexphon.jpg)

Lexical rules

  a. apply before all post-lexical rules
  b. apply before syntax
  c. apply only within words
  d. may require morphological information
  e. can have exceptions
  f. may not be phonetically natural
  g. must be structure preserving
  h. Cyclic
  i. only in derived context (Strict Cycle Condition)

Post-lexical rules

a. apply after all lexical rules
b. apply after syntax
c. apply within <u>and across</u> word boundaries
d. does not access morphological information
e. do not have exceptions
f. phonetic motivation apparent
g. need not be structure preserving
h. Not cyclic
i. not subject to the Strict Cycle Condition (SCC)