

### Class 3: Extrinsic rule ordering

#### To do for next time

- Study questions for Tuesday: K&K ch. 5 excerpt (pp. 154-165), K&K ch. 10 excerpt (pp. 424-436), Kisseberth 1970 (it's short)
- Assignment on this week's material will be posted tonight; due at end of next week (Friday, Oct. 7) to my mailbox (Campbell 3125, office closes 5 PM)

**Overview:** We continue our big-picture discussion of the K&K reading. Then, back to the small picture—now that we've reviewed the rule notation, we turn to the interaction of rules, using **extrinsic rule ordering**, which you may have encountered before under the name “rule ordering”.

#### 1. Argumentation in Kenstowicz & Kisseberth 1979

K&K are doing something very interesting in your reading for this week.

- Rather than taking it for granted that short, general grammars are good and then striving for them...
- ...they argue for one case study (Russian final devoicing) that:
  - the grammar fragment that is descriptively adequate, based on external evidence, happens to be the one that is concise and general
  - therefore, if this case is representative, an explanatorily adequate theory should favor concise, general grammars

The grammar fragment they argue for:

- $[-\text{son}] \rightarrow [-\text{voice}] / \_ \#$

Alternatives they consider—let's discuss the evidence against each one:

- null hypothesis: Russian speakers just memorize all the whole words
- rule: choose the voiceless-final allomorph of a stem, if there is one listed /  $\_ \#$
- rule:  $[-\text{son}] \rightarrow [-\text{voice}] / \_ \_ ]_{\{\text{masc. nom. sg., fem. gen. pl., etc.}\}}$
- 6 rules :  $b \rightarrow p / \_ \#$ ,  $d \rightarrow t / \_ \#$ ,  $g \rightarrow k / \_ \#$ ,  $v \rightarrow f / \_ \#$ ,  $z \rightarrow s / \_ \#$ ,  $\text{ʒ} \rightarrow \text{ʃ} / \_ \#$

**Extrinsic rule ordering**

- If a language has more than one rule (and they all do), the rules have to find a way to get along.
- It's usually assumed that they apply one by one in an order, but we can imagine other scenarios...

**2. Imagine simultaneous application**

- Say we've got two rules:

*labialization*: [-labial] → [+round] / u \_\_ V

*harmony*: u → i / i C<sub>0</sub> \_\_

- What happens to the underlying forms below if each rule just finds any segments in the underlying form to which it can apply and performs the structural change?

/dalbuge/    /dibumpo/    /griluda/

**3. Ordered rules**

- If rules apply instead one by one (in *ordered* fashion), so that one rule's output is the next rule's input, there are two possible outcomes with the same two rules.

- Fill in the derivations:

	/dalbuge/	/dibumpo/	/griluda/		/dalbuge/	/dibumpo/	/griluda/
<i>labialization</i>				<i>harmony</i>			
<i>harmony</i>				<i>labialization</i>			

**4. Intrinsic vs. extrinsic rule ordering**

- Can we tell just from looking at a set of rule what order they should apply in?
  - There have been proposals to do just that—to impose an *intrinsic* rule ordering, determined by properties of the rules themselves, or properties of the rules and the underlying representations.
- But if each language can order the rules the way it likes, rule ordering is *extrinsic* (our focus today).
  - This means the child needs to learn the ordering based on data.

### 5. Evidence for extrinsic rule ordering?

- We need languages or dialects that form a (near-)minimal pair for the ordering of two rules. Let's try an example from SPE (iffy, since one of the "rules" is outside the normal grammar).
- *Canadian raising* in some English dialects: /aɪ/, /æʊ/ → [ʌɪ], [ɛʊ] before voiceless consonants.
 

[ʌaɪd] vs.	[ʌʌɪt]	[gæʊd͡ʒ] vs.	[k <sup>h</sup> ɛʊtʃ]
'ride'	'right'	'gouge'	'couch'
- Do any English speakers in the class (besides me) have this rule in their everyday speech?
- *Pig Latin* rule of children's English language game: Initial consonant(s), if any, are moved to the end of the word, and [ɛɪ] is added to the end: [p<sup>h</sup>ɪg læʔŋ] becomes [ɪgp<sup>h</sup>ɛɪ æʔŋɛɪ]
- Notation practice: write the Pig Latin rule using transformational notation.
- If you have Canadian raising, transform the following words into Pig Latin and have your neighbors carefully transcribe them:
 

<i>ice</i>	<i>might</i>	<i>try</i>	<i>sigh</i>
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- Let's compare notes—which orderings of "Pig Latin movement" and raising did we find? *plickers*: A—my group found Canadian Raising ordered first, then Pig Latin; B—my group found Pig Latin first, then Canadian Raising

## 6. Types of rule interaction—Feeding

Guinaang Kalinga (*Ethnologue*: dialect of Lubuagan Kalinga, Austronesian language from the Philippines with 12,000-15,000 speakers; (Gieser 1970))

Assume there are lots of examples like (a), where the first stem vowel is not unstressed [o].

a) dábi	(hypothetical)	dinábina	(hypothetical)
b) dopá	‘fathom’	dimpána	‘he measured by fathom’
c) gobá	‘firing (pots)’	gimbána	‘she fired’
d) ?omós	‘bath’	?immósna	‘she bathed’
e) botá?	‘broken piece’	binotá?na	‘she broke’
f) ?odáw	‘requesting’	?indáwna	‘he requested’
g) bosát	‘sudden break’	binsátna	‘he snapped’
h) ponú	‘filling’	pinnúna	‘she filled’
i) to?óp	‘satisfaction’	tin?ópna	‘he satisfied’
j) sogób	‘burning’	siŋgóbna	‘he burned’
k) doŋól	‘report’	diŋólna	‘he heard’
l) ?olót	‘tightening’	?illótna	‘he made tight’
m)?owá	‘doing, making’	?iŋwána	‘he made, did’

- Write a rule to account for the allomorphs of the infix /-in-/. Give a derivation for [dimpána]. (Getting the **features** right in items (l) and (m) is tricky—don’t worry much about it.)
  
- This is an example of **feeding**: Rule1 **feeds** Rule2 if R2 is applicable to some form only because the form has undergone R1. (Informally, Rule1 creates a suitable input for Rule2.)
- Can you remember an example from the Russian data discussed in K&K?
- Can we get a feeding interaction with simultaneous application? (Try it on [dimpána].) *plickers: A yes, B no*
  
- A variant on simultaneous application: apply all possible rules simultaneously; then do that *again* to the result; and so on until no more rules are applicable. Try it for [dimpána]. Do you get feeding? *plickers: A yes, B no*

## 7. Types of rule interaction—Counterfeeding

Palauan (Austronesian language from the Republic of Palau, ~15,000 speakers; (Josephs 1990)—these are quite broad transcriptions and there's a lot more to it)

<i>X</i>	<i>his/her/its X</i>		<i>X</i>	<i>his/her/its X</i>	
a) rákt	rəkt-él	'sickness'	b) ðé:l	ðel-él	'nail'
c) sésəb	səsəb-él	'fire'	d) ðəkó:l	ðəkol-él	'cigarette'
e) bóðk	bəðk-él	'operation'	f) ʔís	ʔis-él	'escape'
g) ríŋəl	rəŋəl-él	'pain'	h) bú:ʔ	buʔ-él	'betel nut'
i) ðúbs	ðəbs-él	'tree stump'			

- Account for length and quality alternations (you'll need 2 rules).

- Rule2 **counterfeeds** Rule1 if R2 could feed R1, but R1 is ordered first, so R1 doesn't get to apply.
- In the simplest cases,  $A \rightarrow B / X\_Y$  has been counterfed if there exist surface  $XAY$ s.

- Can we capture this case with simultaneous rule application? Try it for [ʔis-él] *plickers*: *A yes, B no*

- Repeated simultaneous application? *plickers*: *A yes, B no*

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We got this far

### 8. Transparent vs. opaque interactions

- In simple cases,<sup>1</sup> feeding interactions are called *transparent*, because, if we think of the two rules in declarative rather than procedural terms...
  - they are both “satisfied” in the resulting form
  - this is achieved without superfluous changes

“don’t have unstressed [o] in the environment VC\_\_CV” }  
 “nasal must match following consonant in certain features” } *dimpána*—OK on both counts

- Counterfeeding is said to be *opaque*, because at least one of the rules is not “satisfied”

“don’t have unstressed non-[ə] vowels” } rəkt-él—OK on both counts  
 “don’t have unstressed long vowels” } ðɛl-él—whoops! first rule is not “satisfied”

- More precisely, if there’s a rule A→B / X\_\_Y, and yet we find instances of XAY on the surface, we’ve got **underapplication opacity** (characteristic of counterfeeding).

### 9. Types of rule interaction—Bleeding

English regular plural

p <sup>h</sup> i-z	‘peas’	dəg-z	‘dogs’	mit-s	‘mitts’	glæs-iz	‘glasses’
t <sup>h</sup> ou-z	‘toes’	læb-z	‘labs’	blouk-s	‘blokes’	fiz-iz	‘fizzes’
dəl-z	‘dolls’	səlɪd-z	‘solids’	k <sup>h</sup> af-s	‘coughs’	bɪæntʃ-iz	‘branches’
p <sup>h</sup> æn-z	‘pans’	weɪv-z	‘waves’			bædʒ-iz	‘badges’
		saið-z	‘scythes’			wɪʃ-iz	‘wishes’
						gəɹɑʒ-iz	‘garages’

- Account for the three suffix allomorphs. Give a derivation for [wɪʃ-iz].

- Rule1 **bleeds** Rule2 if R2 is *not* applicable to some form because the form has undergone R1. (Informally, Rule 1 destroys a suitable input for Rule 2.)

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<sup>1</sup> In week 5 we’ll discuss papers by Eric Baković (Baković 2007; Baković 2011) showing that counterfeeding doesn’t always cause opacity, and “counterfeeding opacity” isn’t always caused by counterfeeding; and similarly for counterbleeding.

- Can we get a bleeding interaction with simultaneous application? Try it for [wɪf-iz]. *pickers*:  
A yes, B no
  
  - Repeated simultaneous application? *pickers*: A yes, B no
  
  - Bleeding is generally transparent: both rules are “satisfied”, with no surface-unmotivated changes
- “adjacent obstruents must agree in voice” }  
“don’t have adjacent sibilants” } *wɪf-iz*—OK, and no unnecessary changes as in \**wɪf-ɪs*
- How is this similar to counterfeeding? How is it different from counterfeeding?

### 10. Counterbleeding opacity

Polish (Indo-European language from Poland with about 43 million speakers—(Kenstowicz & Kisseberth 1979), p. 72)

	<i>sg.</i>	<i>pl.</i>	
a)	trup	trupi	‘horse’
b)	wuk	wuki	‘bow’
c)	snop	snopi	‘sheaf’
d)	kot	koti	‘cat’
e)	nos	nosi	‘nose’
f)	sok	soki	‘juice’
g)	klup	klubi	‘club’
h)	trut	trudi	‘labor’
i)	grus	gruzi	‘rubble’
j)	wuk	wugi	‘lye’
k)	żwup	żwobi	‘crib’
l)	lut	lodi	‘ice’
m)	vus	vozi	‘cart’
n)	ruk	rogi	‘horn’

- Account for the voicing and vowel-height alternations (you’ll need 2 rules).

- Rule2 **counterbleeds** Rule1 if R2 could have bled R1, but R1 is ordered first, so it gets to apply.
- In the simplest cases,  $A \rightarrow B / X\_Y$  has been counterbled if there exist surface Bs derived by the rule that aren't in the environment  $X\_Y$ .
- Can you remember an example from the Russian data discussed in K&K?
- How is this similar to feeding? How is it different from feeding?
- Can we capture this case with simultaneous rule application? Try it for [ruk]. *plickers: A yes, B no*
- Repeated simultaneous application? *plickers: A yes, B no*

### **Opacity**

- Intuitively, [lut] is opaque because it underwent vowel raising, but the motivating context for vowel raising is no longer present.
- More precisely, if there is an instance of B derived from A by the rule  $A \rightarrow B / X\_Y$ , but B is not in the surface environment  $X\_Y$ , we have **overapplication opacity**.

### 11. Summary of interaction types

(Those who took 120A/165A with me have seen this already)

feeding		counterfeeding	
underlying form	/  hi / (single, speaks no Norwegian)	underlying form	/  hi / (single, speaks no Norwegian)
<ul style="list-style-type: none"> <li>Fall in love w/ Norwegian person (in January, say)</li> </ul>	  hi	<ul style="list-style-type: none"> <li>If dating a Norwegian, take special February-only Norwegian class</li> </ul>	<i>not applicable</i>
<ul style="list-style-type: none"> <li>If dating a Norwegian, take special February-only Norwegian class</li> </ul>	  hei	<ul style="list-style-type: none"> <li>Fall in love w/ Norwegian person (in March)</li> </ul>	  hi
surface form	[   hei ]	surface form	[   hi ]
<b>transparent:</b> dating status and language status match		<b>opaque:</b> dating a Norwegian, but can't speak Norwegian (even though a class was available)	

bleeding		counterbleeding	
underlying form	/   hi / (speaks no Norwegian, dating Norwegian)	underlying form	/   hi / (speaks no Norwegian, dating a Norwegian)
<ul style="list-style-type: none"> <li>Break up (January)</li> </ul>	 hi	<ul style="list-style-type: none"> <li>If dating a Norwegian, take Norwegian class (Feb.)</li> </ul>	  hei
<ul style="list-style-type: none"> <li>If dating a Norwegian, take Norwegian class (February)</li> </ul>	<i>not applicable</i>	<ul style="list-style-type: none"> <li>Break up (March)</li> </ul>	 hei
surface form	[  hi ]	surface form	[  hei ]
<b>transparent:</b> dating status and language status match		<b>opaque:</b> speaks Norwegian (because took a class), but needlessly, because not dating a Norwegian	

**Summing up**

- If rule ordering is *extrinsic*, meaning settable independently for each language, then we see four basic types of rule interaction.
- Theories with no rule ordering (simultaneous application, repeated simultaneous application) predict only a subset of these four.
- So, if all four types of rule interaction really exist, the theories without ordering must be wrong.

**Next time:** We'll start to motivate the other major theory that we're going to study (OT) by seeing why "constraints" might be a good idea—and how tricky it is to integrate them into a rule theory.

**References**

- Baković, Eric. 2007. A revised typology of opaque generalisations. *Phonology* 24(2). 217–259.  
doi:10.1017/S0952675707001194.
- Baković, Eric. 2011. Opacity deconstructed. *The Blackwell companion to phonology*. Blackwell.
- Gieser, C.R. 1970. The morphophonemic system of Guininaang (Kalinga). *Philippine Journal of Linguistics* 1/2. 52–68 plus insert.
- Josephs, Lewis S. 1990. *New Palauan-English dictionary*. Honolulu: University of Hawaii Press.
- Kenstowicz, Michael & Charles Kisseberth. 1979. *Generative Phonology: Description and Theory*. New York: Academic Press.