

## Class 4: Extrinsic rule ordering + work session

**Overview:** 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”.

### 0. Business

- How did you find the annotation?
- Anything else?
- **Kie: start the recording!**

### 1. SPE reasoning we wrapped up with last time

- Should we allow the same Greek-letter variable to appear on two different features in a rule schema?
- Well, it allowed us to collapse two rules that seem similar in French
  - So if those two rules really are more likely to occur together in languages, compared to a random pair of rules, then a notation that lets them be collapsed is good
  - Because we assume that learners favor short grammars
  - So theoretical devices that let us shorten real grammars (and not fake, implausible grammars) are good

### 2. This is very different from what you read in Kenstowicz & Kisseberth 1979

- 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

### *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...

*We will see how far we get in the first hour, then switch to a work session on Malagasy where you’ll work in breakout rooms, shuffling groups every 15 minutes*

### 3. 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 then all structural changes are performed simultaneously? *I'll take some hands up and then you can annotate*

/dalbuge/

/dibumpo/

/griluda/

### 4. 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>			

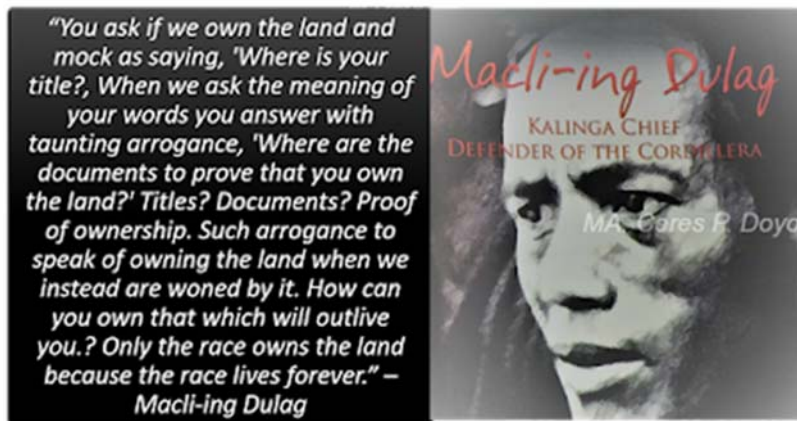
### 5. Intrinsic vs. extrinsic rule ordering <sup>d<sup>w</sup></sup>

- 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.

### 6. Types of rule interaction—Feeding

#### Guinaang Kalinga

- Part of the Kalinga dialect continuum, spoken by the Kalinga people of the northern Philippines
  - Many (most?) Kalinga people also speak Ilocano (one of the biggest languages of the Philippines), plus often Filipino and English
- Austronesian
- Guinaang variety belongs to Lubuagan Kalinga group, which has 17,000-30,000 speakers
- Some notable Kalinga people:



Macli-ing Dulag, martyred trying to stop the Chico Dam Project

Alonzo Saclag, musician and promoter of Kalinga culture

- Data here from 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’	biná?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’	diŋŋólna	‘he heard’

<sup>1</sup> image from <https://www.wowcordillera.com/2017/05/the-great-macli-ing-dulag-cordillera.html>

<sup>2</sup> photo by Renato S. Rastrollo/NCCA

*& o deletion*

? Write a rule to account for the allomorphs of the infix /-in-/. Give a derivation for [dimpána].

- 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 we get a feeding interaction with simultaneous application? (Try it on [dimpána].)

Zoom  
poll

? 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?

Zoom  
poll

## 7. Types of rule interaction—Counterfeeding

### Palauan

- Primary language of the Republic of Palau (in Micronesia region)
- Austronesian, ~15,000 speakers
- Some notable Palauan speakers:



Prince Lebuu, sent by his father to London in the 1780s to learn useful technology (died there of smallpox)



Gabriela Ngirmang, anti-nuclear activist, key force behind world's first anti-nuclear constitution

- Data here from Josephs 1990
  - these are quite broad transcriptions and there's a lot more to it
  - check out [tekinged.com](http://tekinged.com) to hear crowd-sourced recordings of Palauan words

<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]

Zoom  
poll

? Repeated simultaneous application?

Zoom  
poll

## 8. Transparent vs. opaque interactions

- In simple cases,<sup>3</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” } *ðel-él*—whoops! first rule is not “satisfied”

<sup>3</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.

- More precisely, if there's a rule  $A \rightarrow B / X\_Y$ , 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'	dɑg-z	'dogs'	mit-s	'mitts'	glæs-iz	'glasses'
t <sup>h</sup> ou-z	'toes'	læb-z	'labs'	blouk-s	'blokes'	fiz-iz	'fizzes'
dɑl-z	'dolls'	sɑlɪd-z	'solids'	k <sup>h</sup> ɑf-s	'coughs'	bɪæntʃ-iz	'branches'
p <sup>h</sup> æn-z	'pans'	weɪv-z	'waves'			bædʒ-iz	'badges'
		sɑɪð-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.)

? Can we get a bleeding interaction with simultaneous application? Try it for [wɪʃ-iz].

Zoom  
poll

? Repeated simultaneous application?

Zoom  
poll

- Bleeding is generally transparent: both rules are “satisfied”, with no surface-unmotivated changes

“adjacent obstruents must agree in voice” } *wɪf-ɪz*—OK, and no unnecessary  
 “don’t have adjacent sibilants” } 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, about 43 million speakers
- Some Polish words (or maybe other Slavic—not always easy to tell which Slavic language a word came from) borrowed into English: *intelligentsia*, *spruce*, plus many foods and beverages (*babka*, *kasha*, *kielbasa*, *pierogi*)
- Some notable Polish speakers:



Marie Curie, only person to win Nobel Prizes in two sciences



Frédéric Chopin, pianist and composer

Tips for breakout rooms:

- one person can share screen and let others annotate
- if you have a heavier marker, you can write on paper and hold it up to webcam



- Data from 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)	žwup	žwobi	'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].

Zoom  
poll

? Repeated simultaneous application?













Zoom  
poll











*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	[  he ]
<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 [*though I doubt we got to all four today!*].
- 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:** After we finish the four rule ordering types, 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.

**To do**

- Work on Malagasy analysis, due Friday night
- Get started on next reading if you like (Shibatani, annotations due Monday night)

**12. Final business**

- **"Muddiest point" exercise:** Let's end today by having everyone briefly type in the chat the issue or topic that was most unclear/puzzling/etc. to them today
- **Kie: stop the recording!**

**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.

rule ordering exercise (warm-up for next class)

13. Rule ordering warm-up: American Sign Language (Padden & Perlmutter 1987)

- American Sign Language (ASL)
- Sign language from the U.S., maybe 500,000 users
- Some notable ASL signers:



Marlee Matlin, actor



Christine Sun Kim, artist performed at Superbowl 2020

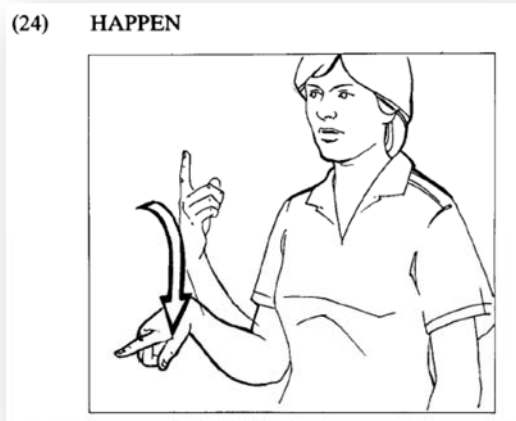
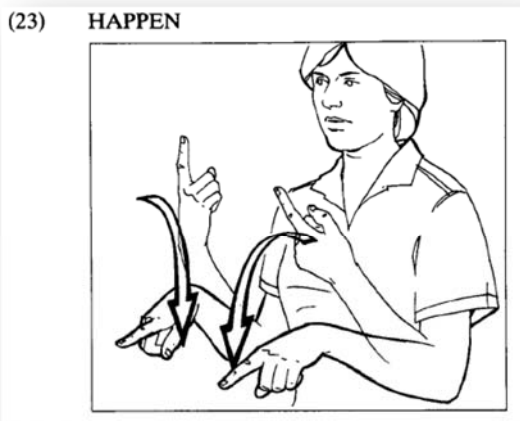


Connie Briscoe, novelist and L2 signer

- Rule of Weak Drop
  - Optionally, the non-dominant hand can be eliminated from a sign
  - Happens especially in fast or casual signing

*full pronunciation*

*pronunciation with Weak Drop*



(p. 350)

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<sup>4</sup> Olivia Locher  
<sup>5</sup> ashleybingphotography.com

(26) INTERESTING



(p. 351)

(29) ANALYZE



(28) ANALYZE (Weak Drop)



(p. 352)

(31) READ

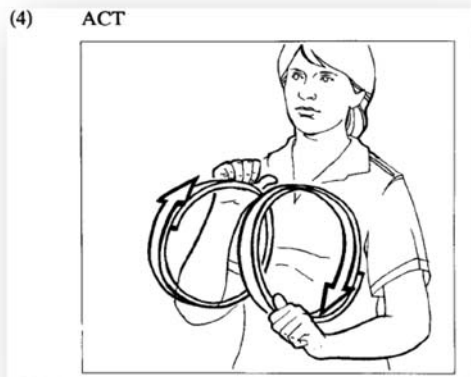


(30) READ (Weak Drop)

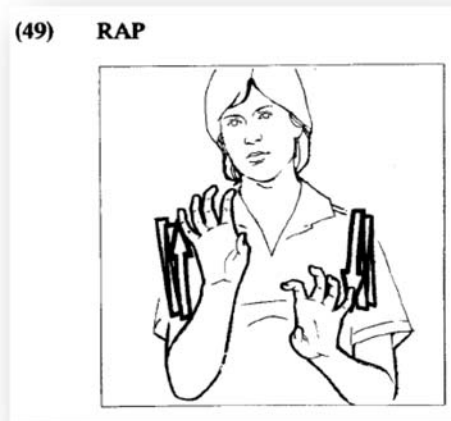


(p. 353)

- But Weak Drop is possible only if the movement in the underlying form of the sign is not “alternating”
  - nothing to do with when we say a morpheme or phoneme alternates!
  - “alternating” here = the hands move in opposition, not in synchrony
  - Examples of “alternating” signs—these have no Weak Drop version



(p. 339)



(p. 363)

- There’s a morphological rule that forms nouns from verbs, like ACTING from ACT
  - Adds “trilled” movement (“small, quick, stiff movements”, p. 343)



(p. 343) Note: ACTING is “alternating”

- Another rule: Weak Freeze
  - Like Weak Drop, it optionally applies to two-handed signs
  - Keeps the non-dominant hand, but removes its movement
  - Can only apply to signs with “tense” movement (including trill)

(36) ACTING (WF)



(p. 356)

- Let's figure out the order of Weak Drop and Weak Freeze
  - ? Try applying both orders to ACTING, then see next page



- o As it turns out, ACTING does have a version with Weak Drop (sorry, no drawing, but I will try to produce it)
- o More examples of signs that can undergo both rules (pp. 364-365)
  - unfortunately, again no drawing for the Weak Drop version but it exists in each case

(50) CHATTING



(52) CHATTING (WF)



this one doesn't tell us anything about ordering—can you see why?

(51) RAPPING



(53) RAPPING (WF)



this one supports the same ordering as ACTING does

- ? What does this tell us about the order?
- ? What kind of order is it? (feeding, bleeding, etc.)