Class 4: Extrinsic rule ordering

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".

1. SPE reasoning from end of last handout

- 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 1979a)

- 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

New topic: 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...

3. Imagine simultaneous application

- Say we've got two rules:

labialization: [–labial] → [+round] / u __ V
harmony: u → i / i C_0 __

? 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?

/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/
labialization	*harmony*
harmony	*labialization*

5. Intrinsic vs. extrinsic rule ordering

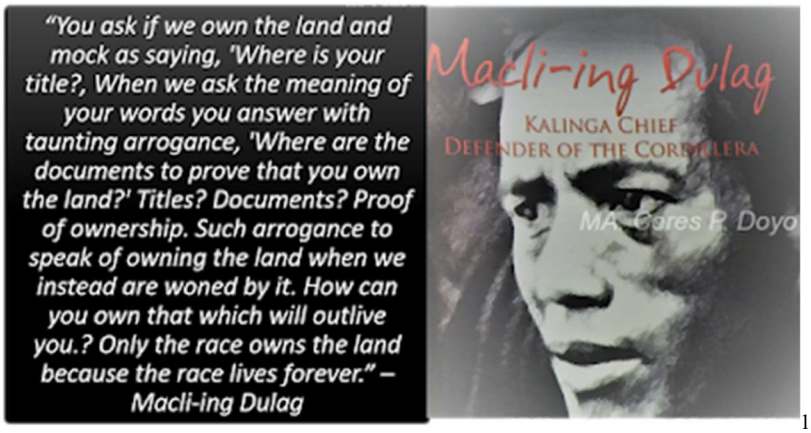
- Can we tell just from looking at a set of rules what order they should apply in?
  - There have been proposals to do just that—to impose an *intrinsic* rule ordering, determined by properties of the rules themselves, or properties of the rules and the underlying representations.
- But if each language 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:



[1]

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


[2]

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)	d**in**ábina	(hypothetical)
b) dopá	'fathom'	d**im**pána	'he measured by fathom'
c) gobá	'firing (pots)'	g**im**bána	'she fired'
d) ʔomós	'bath'	ʔ**im**mósna	'she bathed'
e) botáʔ	'broken piece'	b**in**táʔna	'she broke'
f) ʔodáw	'requesting'	ʔ**in**dáwna	'he requested'
g) bosát	'sudden break'	b**in**sátna	'she snapped'
h) ponú	'filling'	p**in**núna	'she filled'
i) toʔóp	'satisfaction'	t**in**ʔópna	'he satisfied'
j) sogób	'burning'	s**iŋ**góbna	'he burned'
k) doŋól	'report'	d**iŋ**ŋólna	'he heard'

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

[1] image from https://www.wowcordillera.com/2017/05/the-great-macli-ing-dulag-cordilleran.html
[2] photo by Renato S. Rastrollo/NCCA

- 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].)

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?

A = yes, B = no

7. Types of rule interaction—Counterfeeding

Palauan

- Primary language of the Republic of Palau (in Micronesia region, but not part of Federated States of Micronesia)
- 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 to hear crowd-sourced recordings of Palauan words

	X	*his/her/its X*			*X*	*his/her/its X*	
a)	rákt	rəkt-él	'sickness'	b)	ðéːl	ðɛl-él	'nail'
c)	sésəb	səsəb-él	'fire'	d)	ðəkóːl	ðəkol-él	'cigarette'
e)	bóðk	bəðk-él	'operation'	f)	ʔíːs	ʔis-él	'escape'
g)	ríŋəl	rəŋəl-él	'pain'	h)	búːʔ	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→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]

A = yes, B = no

❓ Repeated simultaneous application?

A = yes, B = no

8. Transparent vs. opaque interactions

- In simple cases,[3] 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"
"don't have unstressed long vowels" } rəkt-él—OK on both counts
ðɛl-él—whoops! first rule is not "satisfied"

[3] 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→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

pʰi-z	'peas'	dɑg-z	'dogs'	mɪt-s	'mitts'	glæs-ɨz	'glasses'
tʰoʊ-z	'toes'	læb-z	'labs'	bloʊk-s	'blokes'	fɪz-ɨz	'fizzes'
dɑl-z	'dolls'	sɑlɪd-z	'solids'	kʰɑf-s	'coughs'	bɹæn͡tʃ-ɨz	'branches'
pʰæn-z	'pans'	weɪv-z	'waves'			bæd͡ʒ-ɨz	'badges'
		saɪð-z	'scythes'			wɪʃ-ɨz	'wishes'
						gəɹɑʒ-ɨz	'garages'

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

- 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-ɨz].

A = yes, B = no

? Repeated simultaneous application?

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"
} *wɪʃ-ɨz*—OK, and no unnecessary changes as in **wɪʃ-ɨs*

? 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 langauge 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

Daniel Mark Pudi, actor

- Data from Kenstowicz & Kisseberth 1979, p. 72)

	sg.	*pl.*	
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→B / X__Y has been counterbled if there exist surface *B*s <u>derived by the rule</u> 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].

A = yes, B = no

? Repeated simultaneous application?

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→B / X__Y, but B is not in the surface environment X__Y, we have **overapplication opacity**.
    - So it's a little harder to detect than underapplication opacity, because it's not enough to look at the surface form
    - You also have to know which rules applied

11. If small amount of extra time:

- Imagine you're editing a word-processing document and need to do some search-and-replace operations
    - come up with one scenario that would be feeding
    - …and one that would be counterfeeding
    - …bleeding
    - …counterbleeding

12. If moderate amount of extra time (ha ha!): Is counterbleeding really more complicated than bleeding?

Third tone sandhi and real-time speech (I'll just write it on the board, if we get this far)

13. 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)
• Fall in love w/ Norwegian person (in January, say)	hi	• If dating a Norwegian, take special February-only Norwegian class	*not applicable*
• If dating a Norwegian, take special February-only Norwegian class	hei	• Fall in love w/ Norwegian person (in March)	hi
surface form	[hei]	surface form	[hi]
transparent: dating status and language status match		**opaque**: 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)
• Break up (January)	hi	• If dating a Norwegian, take Norwegian class (Feb.)	hei
• If dating a Norwegian, take Norwegian class (February)	*not applicable*	• Break up (March)	hei
surface form	[hi]	surface form	[he]
transparent: dating status and language status match		**opaque**: 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.

To do

- Work on Malagasy analysis, due Friday night
- Get started on next reading if you like

References

Baković, Eric. 2007. A revised typology of opaque generalisations. *Phonology* 24(02). 217–259. https://doi.org/10.1017/S0952675707001194.

Baković, Eric. 2011. Opacity deconstructed. In Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume & Keren Rice (eds.), *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. 1979a. *Generative Phonology: Description and Theory*. New York: Academic Press.

Kenstowicz, Michael & Charles Kisseberth. 1979b. *Generative Phonology: Description and Theory*. New York: Academic Press.

Padden, Carol & David Perlmutter. 1987. American Sign Language and the architecture of phonological theory. *Natural Language and Linguistic Theory* 5. 335–375.

rule ordering exercise (warm-up for next class)

14. 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:

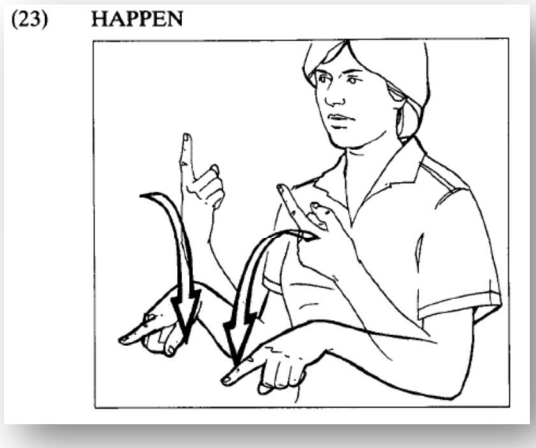
Marlee Matlin, actor

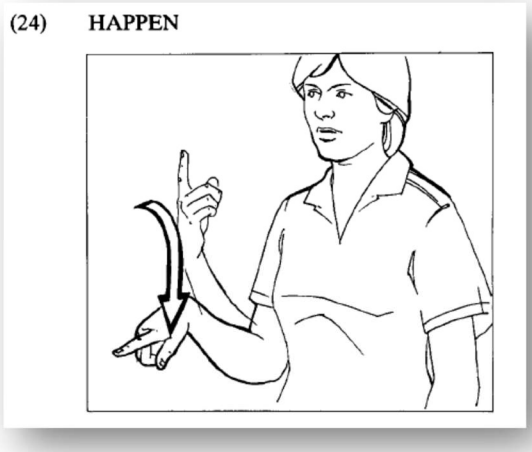
Christine Sun Kim, artist
performed at Superbowl 2020 [4]

Connie Briscoe, novelist
and L2 signer [5]

- 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*

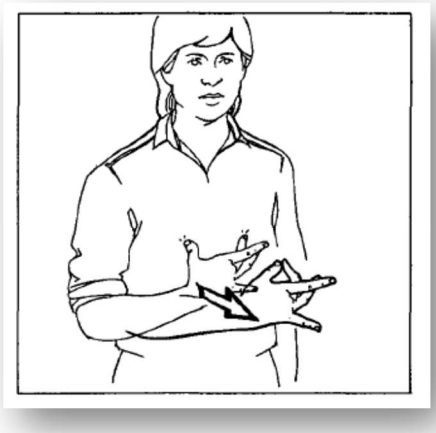




(p. 350)

[4] Olivia Locher
[5] ashleybingphotography.com

(26) INTERESTING



(p. 351)

(29) ANALYZE

(28) ANALYZE (Weak Drop)

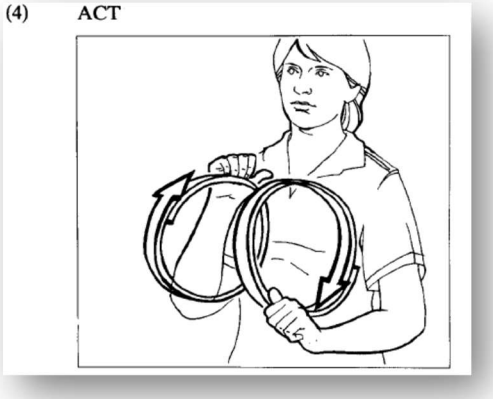
(p. 352)

(31) READ

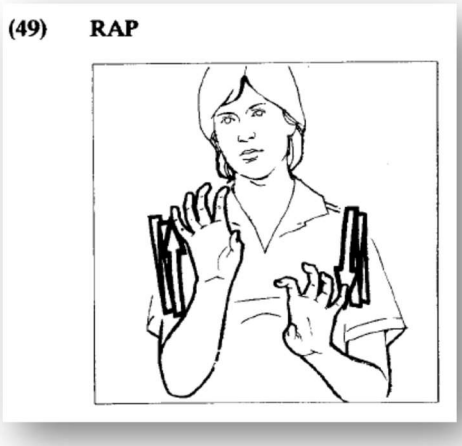
(30) READ (Weak Drop)

(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

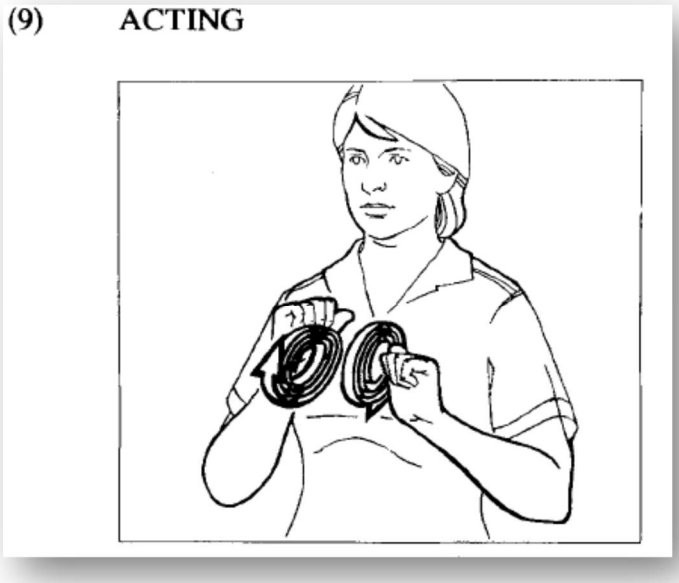


(p. 339)



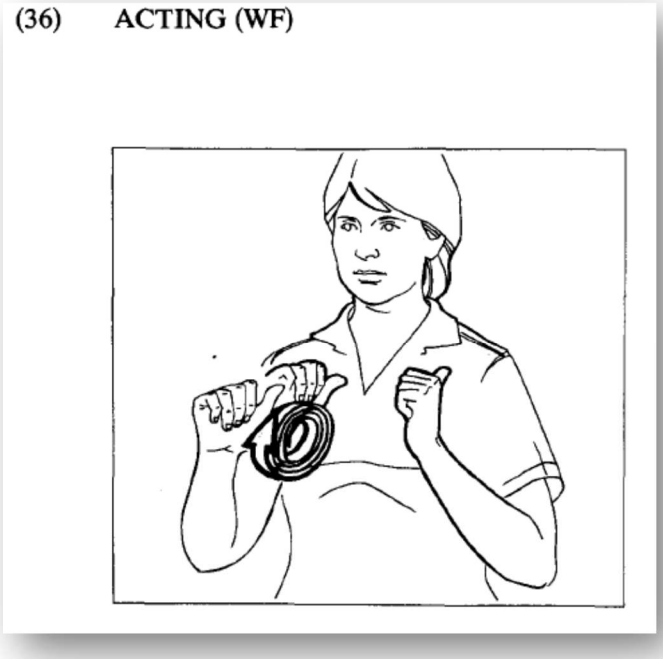
(p. 363)

- 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)



(p. 356)

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

- As it turns out, ACTING does have a version with Weak Drop (sorry, no drawing, but I will try to produce it)
- More examples of signs that can undergo both rules (pp. 364-365)
  - unforntunately, 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.)