Don't panic at how long this handout is!
1. It's long partly because of ASL line drawings and many languages to introduce
2. Starting on page 12, it's a collection of phenomena in no particular order; if we skip some it's fine

Class 14 & 15: Process interaction

0. Preliminary business

- OTSoft
- Real-life constraint interaction
- Where are we?
  - The last two classes, we looked at different types of **process application**
    - Self-(counter-){f,bl}eeding
    - Global optionality, local optionality, iterative optionality, unique-target optionality
  - We saw that different ones were problematic for different theories
    - Self-counter-{f,bl}eeding problematic for OT
    - Self-{f,bl}eeding problematic for SPE
      - solvable if rules can be individually tagged as left-to-right iterative, right-to-left iterative, or non-iterative
      - increases burden on the learner
      - but there was never a well-developed field of learnability in rule-based phonology, so it's hard to say if the burden is problematic
    - Global optionality problematic for OT with variable constraint ranking
    - Local optionality problematic for OT with constraint weights
    - Co-existence of global and local optionality problematic for SPE
      - solvable if rules can be individually tagged as globally vs. locally optional
      - again, increases burden on the learner
    - Iterative optionality: same issues as with self-feeding
    - Unique-target optionality: bit of a mystery all around
  - So, we can get a big pay-off for theory comparison by finding more and better cases of these, or better understanding the known cases
    - Are the data correct?
    - Is the pattern productive?
    - Is there a different explanation: processing (for across-word processes), another constraint (like how adding VOICEHARMONY to Warao analysis turns it into potentially local optionality), …
    - Hence, the squib recipe
- Now we do something similar, but for interaction between two or more processes

Overview: Should processes be able to look forward into the derivation? How far? We'll contrast SPE, OT, and a major variant of classic OT, Harmonic Serialism. Then we'll revisit the typology of opaque process interaction and what each theory predicts.

1. Global power

- Can a rule "see" anything other than its immediate input? Can it look further ahead? Further back?
- In SPE, rules aren't supposed to have *global power* (term from Lakoff 1970).
- But global power follows naturally in OT: every candidate is the very end of a derivation, and "sees" the very beginning (through correspondence).
  - Now we have something that OT can handle easily but SPE can't.
  - So how robust are the claimed cases?

2. Case of global power in Walker 2010

- Basic metaphony rule again, as seen in many Romance languages/varieties:

  basic rule: {é,ó} → [+high] / __C_0+C_0[+syll, +high]

- Venetan version (inventory: [i,e,ɛ,a,u,o,ɔ])—more info than we saw before (don't try to incorporate this into your assignment revision!)

tense Vs raise	kals-ét-o	kals-**í**t-i	'sock (m. sg/pl)'
	móv-o	m**ú**v-i	'move (1 sg/2 sg)'
lax or low Vs don't	gát-o	g**á**t-i	'cat (m sg/pl)'
	prɛ́t-e	prɛ́t-i	'priest (m sg/pl)'
	bɛ́l-o	bɛ́l-i	'beautiful (m sg/pl)'
	mɔ́d-o	mɔ́d-i	'way (m sg/pl)'
[hi] spreads through unstr. V	órden-o	**ú**rd**i**n-i	'order (1 sg/2 sg)'
... unless that V is /a/	lavór-a-v-a	lav**ór**-**a**-v-i	'work (1 sg [3sg?] perf/2 sg impf)'
...and no spreading if [+hi] won't get all the way to the stressed V	ángol-o	**á**ng**o**l-i	'angel (m sg/pl)'
	pɛ́rseg-o	pɛ́rs**e**g-i	'peach (m sg/pl)'

- Spreading shows "look-ahead"—it sees all the way to the end of its iterative application (hypothetical *[**á**ng**u**l-i], *[pɛ́rs**i**g-i], where stressed V is still not high)
  - if the result doesn't solve the fundamental problem of the unraised stressed vowel, then no spreading is done at all (**"sour grapes"**)

❓ Let's sketch a rule analysis to see why this is problematic.

❓ Let's develop an OT analysis.

	/mov-i/				
a	móvi				
☞ *b*	múvi				

	/pɛ́rseg-i/				
☞ *c*	pɛ́rsegi				
d	pɛ́rsigi				
e	pírsigi				

- See Kaplan 2011 for a seemingly contrasting case of *non*-look-ahead or "**myopia**" in Chamorro.

3. Case of global power in the reverse direction (look-back)

- Analysis briefly entertained (and rejected) in your Piggott 1980 reading:

- Odawa final deletion of glides and lax vowels

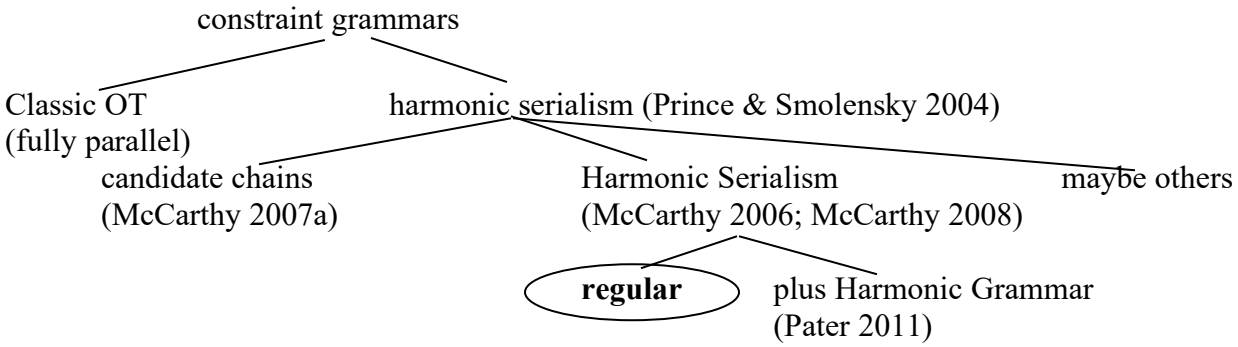
  - /aniššināpē**-wi-w**/ → [aniššināpē**wi**], but doesn't self-feed to *[niššināpē**w**] or *[niššināpē]
    - (later, stress rule applies, [aˈnišši ˈnāˈpēˈwi], and then unstressed vowels delete and stress deletes, yielding [niššnāpēwi])

  - One way to prevent self-feeding (if you want a theory that generally requires it) is to say that the deletion rule deletes only in the *underlying* environment __# ← look-back power
    - Piggott's solution: the rule is simply non-iterative

❓ Not related to look-back but related to this word: The general name for the Ojibwe language group in that language is Anishinaabemowin (anɪʃːnaːpeːmowɪn). The name for Odawa specifically is Nishnaabemwin. Explain this.

4. A major variant of OT: Harmonic Serialism

- Distinction between small-*h*, small-*s* and capital-*H*, capital-*S*:



- **Difference #1: Gen( )**

Classic OT Gen(/input/) = {all results of applying any rules to input, in any order, repetition OK}
Gen(/ab/) = {ab, b, a, tab, abi, tabi, tabii, tabiii, Ø, ba, qo, ...} (infinite set)

Harmonic Ser. Gen(/input/) = {all results of applying just one minimal change to input}
Gen(/ab/) = {ab, b, a, tab, abi, eb, ɑb, ãb, ap, am, ... }(finite set)

  - A change is minimal iff it incurs just one faithfulness violation (so, constraint inventory matters—this might not be the best way to define "minimal change").

- **Difference #2: Overall architecture**
  - In Harmonic Serialism, keep applying grammar to its own output until the result stops changing.
    - Related to a Perusall comment last week: we'd better hope that the grammar can't get trapped in a cycle (with standard OT constraints, it won't)

5. Example of how Harmonic Serialism operates: Dakota

- Siouan language, prairies of U.S. and Canada
- Fluent speakers in the hundreds
- Some English words of Dakota origin: *tepee, Minnesota*

Dakota Language immersion program, South Dakota[1]

Ella Cara Deloria, linguist

Analysis adapted from Elfner 2016—*data orig.* Shaw 1985

/čap/	WordMust HaveStress	NoCoda	Don'tAdd Stress	StressIs Final[2]	Dep-V	Don'tDelete Stress	Max-V
a čap	*!	*					
☞ *b* čáp		*	*				
c ča.pa	*!				*		

? Why is [ča.pá] not a candidate?

feed *čáp* into grammar—again, [ča.pá] is not a candidate (why not?)

čáp	WordMust HaveStress	NoCoda	Don'tAdd Stress	StressIs Final	Dep-V	Don'tDelete Stress	Max-V
d čap	*!	*				*	
e čáp		*!					
☞ *f* čá.pa				*	*		

feed *čá.pa* into grammar:

čá.pa	WordMust HaveStress	NoCoda	Don'tAdd Stress	StressIs Final	Dep-V	Don'tDelete Stress	Max-V
g ča.pa	*!					*	
☞ *h* čá.pa				*			
i čá.pá			*!				
j čáp		*!					*

Input=output, so stop iterating.

[1] www.nativeshop.org/programs/language-and-culture/dakota-language-immersion.html
[2] Not the real constraint—see Elfner, who uses "feet".

? What does this grammar predict for input like /čite/?[3]

čite	WORDMUST HAVESTRESS	NOCODA	DON'TADD STRESS	STRESSIS FINAL	DEP-V	DON'TDELETE STRESS	MAX-V

	WORDMUST HAVESTRESS	NOCODA	DON'TADD STRESS	STRESSIS FINAL	DEP-V	DON'TDELETE STRESS	MAX-V

? Why can't we get *[ča.pá] in this Harmonic Serialism grammar?

? What happens if we switch the ranking of WORDMUSTHAVESTRESS and NOCODA?

/čap/	NOCODA	WORDMUST HAVESTRESS	DON'TADD STRESS	STRESSIS FINAL	DEP-V	DON'TDELETE STRESS	MAX-V
a čap	*	*					
b čáp	*		*				
c ča.pa		*			*		

	NOCODA	WORDMUST HAVESTRESS	DON'TADD STRESS	STRESSIS FINAL	DEP-V	DON'TDELETE STRESS	MAX-V

[3] hypothetical—real examples have consonant clusters that muddy the issue

- ? What happens if we try to analyze Veneto in Harmonic Serialism?

	/pɛ́rseg-i/				
a	pɛ́rsegi				
b	pɛ́rsigi				

6. Classic look-ahead: "peeking" rule in Cupeño (Hill 1970 and Hill 2005)

- Uto-Aztecan language from Southern California
- Cupeño people continue to lay claim to Cupa/Warner Springs, from which they were forcibly removed in 1903
  - This contributed to language attrition—forced to share territory with speakers of different language
  - along with forced residential school
- The language is not currently in daily use
- Hill, when a grad student at UCLA, worked with Roscinda Nolasquez, a survivor of the three-day forced march from Cupa to Pala, who worked to document and preserve the language

Cupa Cultural Center, near Temecula. If in the area, call to find out if exhibition hall is open to the public

Cupeño language courses are taught at the Pala Learning Center

Honoring Traditions Gathering 2021

[4] cupa.palatribe.com/ , all three pictures

- Read the derivations from left (underlying) to right (surface):

Figure 1. Application of Rules to Examples (1)–(13) of Section 1.1

	Underlying Forms	A Vowel Deletion	B *-ine, yaxe* Reduction	C *a*-Reduction	D HAB	E ʔ Insertion	Final Form	
(1)	cí, HAB	cí, HAB			cí	cíʔ	cíʔ	
(2)	hú, HAB	hú, HAB			hú	húʔ	húʔ	
(3)	yélice-ine, HAB	yélic-in, HAB	yélic-i, HAB		yélic-i		yélici	'can gather'
(4)	céle-ine, HAB	cél-in, HAB	cél-i, HAB		cél-i		céli	'can fart'
(5)	kʷáwe-yaxe, HAB	kʷáw-yax, HAB	kʷáw-ya, HAB	kʷáw-ye, HAB	kʷáw-ye		kʷáwye	'can clean'
(6)	qáʔaye-yaxe, HAB	qáʔay-yax, HAB	qáʔay-ya, HAB	qáʔay-ye, HAB	qáʔay-ye		qáʔaye	'can snip'
(7)	píneʔwexe, HAB	píneʔwex, HAB			píneʔwex		píneʔwex	'can holler'
(8)	cáspele, HAB	cáspel, HAB			cáspeʔel		cáspeʔel	'can speak Luiseño'
(9)	pácike, HAB	pácik, HAB			páciʔik		páciʔik	'can sing enemy songs'
(10)	qáwe, HAB	qáw, HAB			qáʔaʔaw		qáʔaʔaw	'can mend'
(11)	cále, HAB	cál, HAB			cáʔaʔal		cáʔaʔal	'can leach acorns'
(12)	tĕwĕ, HAB	téw, HAB*			téʔeʔew		téʔeʔew	'can be sick'
(13)	helʸépe, HAB	helʸép, HAB			helʸéʔeʔep		helʸéʔeʔep	'can husk'
	púy, HAB				púʔuʔuy			'can see'
	ísaxw, HAB				ísaʔaxw			'can hiccup'
	itú, HAB				itú	itúʔ		'can dine'
	kwá, HAB				kwá	kwáʔ		'can sing a man's song'
								'can steal'
								'can eat'

(Hill p. 536)

- Step D, Habilitative (habitual) Formation, adds glottal stop(s) and copied vowel(s) only if the word ends in a consonant at this point in the derivation.

- The key is that Habilitative copying applies as many times as needed to provide two syllables following the stressed syllable—including zero times.

  ? So what's the look-ahead issue? Let's step through the derivation for (13) and think about the first application of copying.

- Hill points out that of course we *can* write complicated rules that will do this without look-ahead, but they seem to miss the point about word shape.

7. Wrap up of look-ahead

- SPE, Classic OT, and Harmonic Serialism make different predictions about what kinds of look-ahead should exist
  - The typology of what *does* exist is controversial
- Index card fast pass: Why do OT and harmonic serialism make different predictions?
  - 2 minutes to write your answer
  - Stand up and swap cards twice
  - Find a nearby student and compare the cards you have

Process interaction

Overview: We revisit the typology of (counter)-{f,bl}eeding and what each theory predicts.

8. Theories roundup

theory	*language-specific grammar consists of*	*feeding?*	*counter-feeding?*	*bleeding?*	*counter-bleeding?*	*global power?*	*priority for more-specific rules?*
SPE	ordered list of rules	yes	yes	yes	yes	no	yes, using ( )
SPE + Elsewhere Condition	ordered list of rules—but adjacent pairs are subject to Elsewhere Condition						**yes**
Partially indeterminate ordering, prefer maximal application	list of rules that is mostly ordered, but with some left unordered	yes	**yes, but is not default**	**yes, but is not default**	yes	no	yes, using ( )
Partially indeterminate ordering, prefer transparent application		yes	**yes, but is not default**	yes	**yes, but is not default**		
one-shot simultaneous application	unordered set of rules	**no**	yes	**no**	yes	no	yes, using ( )
repeated simultaneous application		yes	**no**	**no**	yes	no	
repeated simultaneous application + Proper Inclusion Precedence		yes	**no**	**no**	yes	no	**yes**
OT	ranking on universal set of constraints	yes	**no, except when big jump is prohibited**	yes	**no, except fusion**	**yes**	no (but see below)
Harmonic Serialism							

- Harmonic Serialism can capture certain "countershifting" opacity (Rasin 2022), where it's not a question how *whether* a process applies, but *how* it applies—e.g. where does stress end up
- And of course, each theory also can have variants

9. Preferring specificity

- Proper Inclusion Precedence: If any two rules are in a specificity relation—as defined by lining up their structural descriptions, where longer is more specific—then apply the more-specific one first, possibly preempting the less-specific one
- Elsewhere Condition: If any two *adjacent* rules are in a specificity relation—as defined by the set of forms they could apply to—and both could apply to a form, then apply the more-specific one *instead of* the less-specific one.
- OT: both rankings are possible, but the more-specific constraint won't be noticeable unless it's ranked higher *(see tableau)*

Pāṇini's Theorem (so named by Prince & Smolensky)

Pāṇini: Sanskrit grammarian, lived around 2500 years ago

17th-century manuscript of his grammar treatise

- General >> specific: specific constraint doesn't do anything

	/akeʎ/	*ʎ	IDENT(lateral)	*ʎ#
a	akeʎ	*!		*
☞ *b*	akej		*	
	/akeʎos/	*ʎ	IDENT(lateral)	*ʎ#
c	akeʎos	*!		
☞ *d*	akejos		*	

- Specific >> general

	/akeʎ/	*ʎ#	IDENT(lateral)	*ʎ
a	akeʎ	*!		*
☞ *b*	akej		*	
	/akeʎos/	*ʎ#	IDENT(lateral)	*ʎ
☞ *c*	akeʎos			
d	akejos		*!	

10. The classic interaction typology, for reference

interaction	*definition*	*schematic derivation*	*result*
R1 feeds R2	R1 creates environment for R2 to apply to	/bind/ d → Ø / __# bin n → Ø / __# bi [bi]	transparent: • no [d#] on the surface • no [n#] on the surface
R1 counterfeeds R2	R1 applies too late to create environment for R2	/bind/ n → Ø / __# -- d → Ø / __# bin [bin]	opacity—*under-application*: • [n#] on surface, despite rule targeting *n#*
R1 bleeds R2	R1 destroys environment for R2 to apply to	/bind/ d → Ø / __# bin Ø → i/ C__C# -- [bin]	transparent: • no [d#] on the surface • no [i] inserted, because no surrounding *C__C#*
R1 counterbleeds R2	R1 applies too late to destroy environment for R2	/bind/ Ø → i/ C__C# binid d → Ø / __# bini [bini]	opacity—*over-application*: • [i] inserted, despite lack of surrounding *C__C#*

- A rule *under-applies* if there are surface instances of its structural description.
- A rule *over-applies* if there are instances in which it has applied, although the non-affected part of the structural description (the environment) is no longer present.

(The terms *under-application* and *over-application* come from Wilbur's (1973) discussion of reduplication. McCarthy 1999 adapts them for discussing opacity.)

11. Baković 2007, Baković 2011: dissociating opacity-vs-transparency from interaction type

Baković argues that the typology is **not** this, where the row labels and column labels are redundant...

	transparency	under-application opacity	over-application opacity
feeding	✓		
bleeding	✓		
counter-feeding		✓	
counter-bleeding			✓
non-interaction	✓		

...but rather (at least) this ...

	transparency	under-application opacity	over-application opacity
feeding	✓	✓	✓
bleeding	✓		
counter-feeding	✓	✓	
counter-bleeding	✓		✓
other	✓	✓	

...so process-interaction types actually don't account for opacity vs. transparency.

Let's go through Baković's typology:

12. Counterfeeding-on-environment[5] → under-application

Bedouin Arabic

- Arabic has huge regional variation
- Cross-cutting that, both linguists and the Arabic-speaking public recognize a major division of varieties of Arabic into Bedouin/nomadic versus sedentary
  - "Bedouin" varieties can be spoken by people who are actually nomadic, or who have nomadic heritage, or whose language is very influenced by nomadic varieties
- So I'm assuming McCarthy means that the following process interactions are typical of Bedouin varieties of Arabic across a geographic range (though not necessarily true of every single Bedouin variety)

underlying	/badw/	(Baković 2007, p. 222; from McCarthy 1999)
syllabify	badw	
a → i / __]$_{\text{syllable}}$	---	
[+high] → [+syllabic] / C__#	badu	'Bedouin'

? What would be the transparent outcome?

13. Counterfeeding-on-focus → under-application

Bedouin Arabic again, same source

underlying	/katab/	(Baković 2007, p. 222; from McCarthy 1999)
syllabify	ka.tab	
i → Ø / __]$_{\text{syllable}}$	---	
a → i / __]$_{\text{syllable}}$	ki.tab	'he wrote'

? What would be the transparent outcome?

- This is the one that's easier in OT, because we just need to invent a faithfulness constraint that prohibits the big change (in this case, from a to Ø)

[5] Term from McCarthy 1999.

14. "Surface-true counterfeeding" → transparency!

Singapore English: Baković 2011, p. 16;[6] from Mohanan 1992, Anttila et al. 2008

- Singapore English is often misunderstood outside Singapore as being a second-language variety
  - But in fact it is the native or dominant language of a large percentage of Singaporeans
  - Has influences from Malay, Mandarin Chinese, Hokkien, Tamil
- Singapore English shows huge variation depending on the speaker and the social context
  - The data here are meant to represent speakers with higher education, in a somewhat formal social context

Epenthesis: /reɪz+z/ → [reɪz+əz] (and, I infer, /reɪs/ → [reɪs+əz])
Deletion: /test/ → [tes] cf. /tɛst+ɪŋ/ → [tɛst+ɪŋ]
no data, but Degemination "deletes one of two tautosyllabic near-identical consonants" (p. 16)
/lɪst+z/ → [lɪs]

? In an SPE analysis, what rule order do we need to get [lɪs]? Why does B. call this result "transparent"?

15. Under-application without counterfeeding (Baković 2011 p. 8ff.)

"Disjunctive blocking" (p. 8)

? How would this rule schema apply to these words: V → [+stress] / __ $(C_2V)C_0$ # ?

/badupil/ /pikomsak/

Remember how expansion conventions work—abbreviates two rules, disjunctively ordered.

? In what sense do you think Baković means that under-application results?

[6] Page numbers for manuscript version

Non-derived-environment blocking—we'll save that till Lexical Phonology, but essentially it's when an additional mechanism in some rule theories, saying that a rule can't apply if its structural description was already met in the monomorphemic underlying form:

e.g. a → i / __ C# /likat/ *fails to apply* /noka+l/ → [nokil]

Blocking by phonotactic constraint (p. 12)

- Think of V → Ø, blocked by *CCC. Strictly speaking, the rule V → Ø under-applies in forms like _____

(Non-)triggering by phonotactic constraint (p. 13)

- Think of C → Ø, triggered by *CCC. Strictly speaking, the rule C → Ø under-applies in forms like _____

Restriction to certain morphological classes (Estonian V deletion in nominative singular only)

Optionality (French schwas may or may not delete)

Lexical exceptions (English *obesity* fails to undergo 'trisyllabic shortening')

16. Fed counterfeeding[7] on environment→ under-application

Lardil, as you've seen before (Baković 2011, p. 6; from Hale 1973)

	/dibirdibi/	/yilihili/	/wangalk/
Apocope: V → Ø / syllable syllable __ #	dibirdib	yilihil	--
Deletion: [–apical] → Ø / __ #	dibirdi	--	wangal
	[dibirdi]	[yilihil]	[wangal]
"apical" means made with the tongue tip ("apex")	'rock cod'	'oyster sp.'	'boomerang'

- Any guesses as to why it's called "fed counterfeeding"?

[7] Baković gets the term from Kavitskaya & Staroverov 2009

17. Fed counterfeeding on focus = "Duke of York" derivations[8]→ under-application

Nuu-chah-nulth [nuːt͡ʃaːnˀuɬ])

- Wakashan language of Vancouver Island
- Formerly and erroneously known as Nootka

Literacy kit and app,
ready for library checkout [9]

ṅaasṅaasʔaqsa by Hesquiaht carver Tim Paul
in honor of Nuu-chah-nulth language revitalization [10]

Labialization: [+dorsal] → [+round] / [+round] __
Delabialization: [+dorsal] → [–round] / __]$_{syllable}$

/muːq/	/ħaju+qi/	/ɬaːkʷ+ʃit͡ɬ/
muːqʷ	ħa.ju.qʷi	--
muːq	--	ɬaːk.ʃit͡ɬ
'throwing off sparks'	'ten on top'	'to take pity on'

(Baković 2011, p. 7; from Sapir & Swadesh 1978, McCarthy 1999, 2003, 2007a, 2007b)

? OT thoughts on this interaction?

	/muːq/			
☞ *a*	muːq			
b	muːqʷ			

[8] Term from Pullum 1976
[9] https://www.hashilthsa.com/news/2017-11-10/traditional-nuu-chah-nulth-language-taught-through-new-mobile-technology
[10] https://hashilthsa.com/news/2021-09-23/its-alive-now-and-we-can-talk-it-poles-name-references-first-woman

18. Counterbleeding → over-application

Yowlumne Yokuts (also spelled Yawelmani)

- Variety of Yokuts, language of California's Central Valley
- California statehood brought epidemics and war that greatly reduced the number of Yokuts people, and forced survivors to share territory with speakers of other languages

Nicola Larsen, teaches Yowlumne language and culture classes at Tule River Reservation[11]

Mary Santiago (center) ca. 1948, language teacher and survivor of forced removal from Madden Farm (Frank & Goldberg 2010 p. 55)

		/ʔili:+l/
long lowering	[+long] → [–high] /	ʔile:l
shortening	V → [–long] / ___ C#	ʔilel
		[ʔilel] 'might fan'

(Baković 2007, p. 223; from McCarthy 1999)

? What would be the transparent outcome?

Since counterbleeding is so problematic in OT, here are some other famous cases:

- Canadian Raising vs. tapping in English ("Output-output Correspondence" helps)
- Serbo-Croatian *l*-vocalization (see Kenstowicz & Kisseberth 1979 ch. 3 exercise)

[11] facebook

19. Counterbleeding on focus vs. on environment: (Itô & Mester 2001) on German

- German is an Indo-European language from Germany, Austria, Liechtenstein, and adjacent areas of Switzerland, Italy, France, Poland, Czech Republic, Slovakia, Hungary.
  - Same sub-family as English
  - There are substantial German-speaking communities, of descendants of German colonists and religious communities, in Namibia, the U.S., Mexico and Brazil, often speaking varieties not found in Europe
- About 90 million first-language speakers, many second-language speakers and learners
  - Most common native language in European Union
- Uses the Roman alphabet, plus letter *ß*, which is how [s] is written after a long vowel or diphthong[12]
- Source of many loanwords in English
  - To list just a few: kindergarten, angst, kaput, zeitgeist, kitsch, gestalt, hinterland


13
Hannah Arendt
philosopher & historian


14
Nina Hagen
Godmother of German Punk


15
Elfriede Jelinek
Nobel Prize in Literature 2004

- Keep in mind, Itô & Mester are pursuing an OT analysis; this is just their sketch of why it would counterbleeding-on-focus in a rule analysis

	/bɛʀg/ ‘castle’
G-Spirantization: g → ɣ / __]$_\sigma$	**bɛʀɣ**
Coda Devoicing: [–sonorant] → [–voice] / __]$_\sigma$	**bɛʀx**
Dorsal Fricative Allophony: voiceless dorsal fricatives become…	
[+back] if preceded by [+back] V or glide	
otherwise [–back]	bɛʀç
R-Vocalization: ʀ → ʁ̞ / __]$_\sigma$	bɛʁ̞ç

- Coda devoicing counterbleeds G-spirantization
  - Because it’s the *focus*, or target, of the rule that changes-but-too-late-to-bleed—that is, the g--this is counterbleeding on focus
- Itô & Mester treat [ʁ̞] as [+back], so R-Vocalization also counterbleeds Dorsal Fricative Allophony
  - That’s counterbleeding on environment

[12] because single *s* means [z], and double consonant letters mean preceding vowel is short
[13] commons.wikimedia.org/wiki/File:Hannah_Arendt_1933.jpg
[14] commons.wikimedia.org/wiki/File:NinaHagenPremiereDerSiebteZwerg2014-4_(cropped).jpg
[15] commons.wikimedia.org/wiki/File:Elfriede_jelinek_2004_small.jpg

20. Counterbleeding by mutual bleeding → transparent!

Lardil, again

		a. /papi+ uɻ/	b. /tʲæmpæ+uɻ/
Epenthesis:	∅ ⟶ w / i __ u	w	
Elision:	V ⟶ ∅ / V __		∅
		[papi+wuɻ]	[tʲæmpæ+ɻ]

Glosses: (25a) 'father's mother (acc. fut.)', (25b) 'mother's father (acc. fut.)'

(Baković 2011, p. 22 of ms.; from Hale 1973)

- In what sense is this mutual bleeding?

- OT analysis?

21. "Self-destructive feeding"→ over-application!

Turkish

- Turkic language from Turkey, Northern Cyprus, and adjacent areas of neighboring countries, with many speaker abroad also
  - 90-100 million speakers
- "Ottoman Turkish" refers to the variety used throughout the Ottoman Empire for administration and literature
- Old Turkic had its own script, with each letter representing a consonant plus whether the following vowel is front or back
  - Around 1000 years ago, switched to a version of the Perso-Arabic alphabet that writes out all the vowels
  - That was then replaced about 100 years ago by Roman alphabet

Old Turkic

Calendar from 1895 in Turkish, Armenian, Ladino, Greek, Bulgarian, and French

Elif Shafak
novelist in Turkish & English

Orhan Pamuk
2006 Nobel Prize in Literature

UR	bebek+n		
∅ → i / C__C#	bebekin	= ℙ	cf. /ip+n/ → [ipin] 'your rope'
k → ∅ / V__+V	bebein	= ℚ	cf. /bebek+i/ → [bebei] 'baby (ACC)'
SR	bebein	'your baby'	

(Baković 2007, p. 226; from Sprouse 1997)

? What would be the transparent outcome?

? Why "self-destructive"?

[16] commons.wikimedia.org/wiki/File:ToyokAndRjukokuAlphabets.gif
[17] commons.wikimedia.org/wiki/File:Calendar_Thessaloniki_1896.jpg

- Here's another from Turkish

UR	ajak+sɯ		
[+cont] → ∅/ C__	ajakɯ	= ℙ	cf. /arɯ+sɯ/ → [arɯsɯ] 'his bee'
k → ∅ / V__+V	ajaɯ	= ℚ	cf. /ajak+ɯ/ → [ajaɯ] 'foot (ACC)'
SR	ajaɯ	'his foot'	

(Baković 2007, p. 227; from Kenstowicz & Kisseberth 1979)

22. More self-destructive feeding from Lee 2007

Javanese

- Austronesian from Indonesia
- about 84 million speakers;
- data originally from Dudas 1976; Lee 1999
- Now written in Roman letters, formerly used an Abugida

[18]

cover, Kajawen magazine, 1933

Kartini, Indonesian national hero

Pramoedya Ananta Toer, novelist

	'skin'	'school'	'house'
	/kulit+ne/	/sekolah+an/	/omah+ne/
n → Ø / C__	kulit+e	--	omah+e
h → Ø / V__V	--	sekola+an	oma+e
	[kulite]	[sekolaan]	[omae]

[18] https://en.wikipedia.org/wiki/Javanese_script#/media/File:Kajawen_1933-08-16-1_sampul.jpg

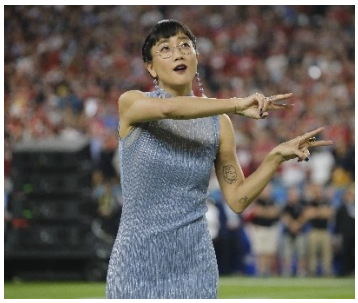
- ? Could this work in Harmonic Serialism?

23. Another type of feeding: American Sign Language (Padden & Perlmutter 1987)

- aka ASL, Sign language from the U.S., maybe 500,000 users
- Originated in early 1800s at American School for the Deaf in Connecticut
  - Result of contact among French Sign Language (brought by teachers), Martha's Vineyard Sign Language (brought by many students), and other "village" sign languages [= languages that develop in communities where hereditary deafness is common] and homesign systems [that deaf children develop with their hearing families].
- Influential on sign languages in West Africa (and elsewhere), because of American educators involved with Deaf Schools there
- Many Deaf people around the world know some ASL in addition to their primary sign language
- Most deaf children are raised by hearing parents, so the term "native signer" can be even more problematic than "native speaker"! (Cheng et al. 2021)

Marlee Matlin
actor

Andrew Jackson Foster, Deaf American educator, established Deaf Schools across West Africa



artist Christine Sun Kim performing national anthem at Super Bowl in 2020

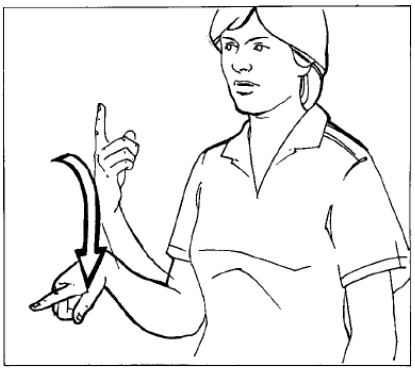
[19] en.wikipedia.org/wiki/Marlee_Matlin#/media/File:MarleeMatlinMay09crop.JPG
[20] en.wikipedia.org/wiki/Andrew_Foster_(educator)#/media/File:AndrewJacksonFoster.png
[21] Olivia Locher

- 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*

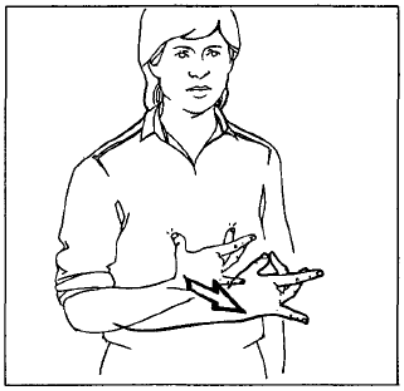
(23) HAPPEN

(24) HAPPEN



(p. 350)

(26) INTERESTING



(p. 351)

(29) **ANALYZE**

(28) **ANALYZE (Weak Drop)**

(p. 352)

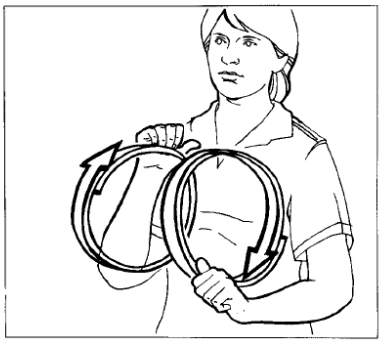
(31) **READ**

(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

(4) ACT



(49) RAP

(p. 339)

(p. 363)

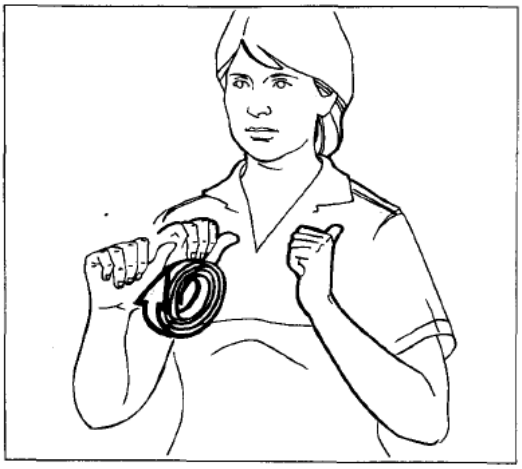
- There's a morphological rule that forms nouns from verbs, like ACTING from ACT
  - Adds "trilled" movement ("small, quick, stiff movements", p. 343)

(9) ACTING

(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)

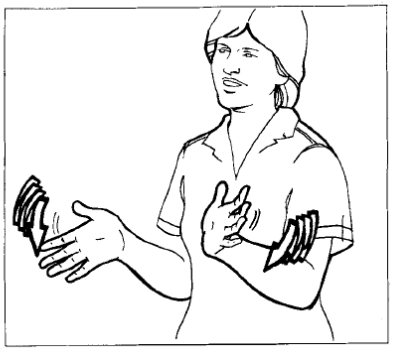


(p. 356)

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

- As it turns out, ACTING does have a version with Weak Drop (sorry, no drawing)
- 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?

- In one sense this is straightforward feeding: A → B, and B → C (two context-free rules)
  - But the only reason we can observe A → B is that B → C is optional
  - If both rules were obligatory, it would look like {A, B} → C
    - I think this is an example of what Baković calls a **concealed free ride**: feeding-on-focus, which is technically transparent, but part of the derivation is obscured by another
  - So it's something like "concealed-free-ride feeding that can be exposed by early stopping of the derivation"

24. "Non-gratuitous feeding" → over-application

Classical Arabic

UR	ktub		
$\emptyset \rightarrow V_i / \#\_\_CCV_i$	uktub	$= \mathbb{P}$	
$\emptyset \rightarrow ʔ / \#\_\_V$	ʔuktub	$= \mathbb{Q}$	cf. /al-walad-u/ → [ʔalwaladu]
SR	ʔuktub	'write (MASC SG)!'	'the boy (NOM)'

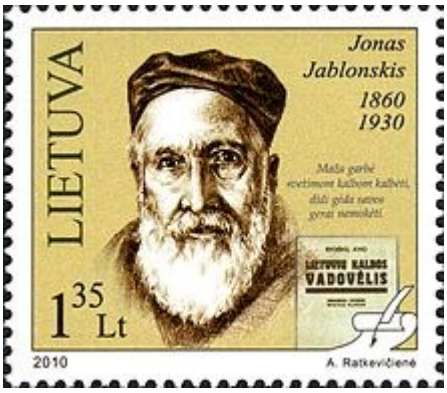
(Baković 2007, p. 231; from McCarthy 2007b)

❓ What would be the transparent outcome?

25. "Cross-derivational feeding" → over-application, in a sense

Lithuanian

- Indo-European language from Lithuania, 3 million speakers



Jonas Jablonskis, linguist

Jurgita Štreimikytė, retired WNBA player

- data from Baković 2007, p. 234ff.; see there for references
  prefix obstruents assimilate in voicing and palatalization :

at-koːpʲtʲi	'to climb up'	ap-kalʲbʲetʲi	'to slander'
ad-gautʲi	'to get back'	ab-gautʲi	'to deceive'
atʲ-pjʲautʲi	'to cut off'	apʲ-tʲemʲdʲiːtʲi	'to obscure'
adʲ-bʲekʲtʲi	'to run up'	abʲ-gʲiːdʲiːtʲi	'to cure (to some extent)'

(p. 234)
epenthesis between stops of the same place (also palatalization before [i]):

atʲi-taikʲiːtʲi	'to make fit well'	apʲi-putʲi	'to grow rotten'
atʲi-tʲeisʲtʲi	'to adjudicate'	apʲi-pʲiːlʲtʲi	'to spill something on'
atʲi-duotʲi	'to give back'	apʲi-barʲtʲi	'to scold a little bit'
atʲi-dʲetʲi	'to delay'	apʲi-bʲerʲtʲi	'to strew all over'

(234)
- Baković 2005 argues that the right analysis here (and in English epenthesis before /-d/ and /-z/) should capture the idea that epenthesis occurs where a geminate *would have occurred* (because of assimilation).
  - Assimilation would have fed epenthesis (which in Baković's analysis is only triggered between identical segments), but assimilation doesn't end up needing to apply (bleeding

  ? This is easy for OT—the "geminate would have occurred" outcome is one of the candidates. Why is it hard for SPE?

That completes our tour of Baković's typology. But here are a couple more types:

26. Wolf 2011: "mutual counterfeeding" in Hindi-Urdu

- Indo-European language from India and Pakistan w/ about 240 million speakers [Lewis 2009]
- One language or two languages?
  - Colloquial spoken Hindi and Urdu are very similar
  - But formal Hindi has strong Sanskrit influence and formal Urdu has strong Arabic and Persian influence (vocabulary, turns of phrase)
  - Hindi is written with Devanagari, an abugida; Urdu is written in an adapted version of Perso-Arabic script (has extra letters compared to Arabic script)

[22]

Sign with both Hindi and Urdu (plus English)


[23]

Gurzal, Urdu poet and lyricist

Mannu Bhandari, Hindi writer

Data and analyses originally from Narang & Becker 1971, Bhatia & Kenstowicz 1972

? Fill in the SPE-style derivation, including predicted surface form for 'mind':

	/nikəl-na:/	/nikəl-a:/	/angən-on/	/ma:nəsi/
schwa deletion: ə →Ø / VC__CV				
V nasaliz't'n: $\begin{matrix} V \\ 1 \end{matrix}$ $\begin{matrix} C \\ [+nas] \\ 2 \end{matrix}$ $\begin{matrix} \{C, \#\} \\ 3 \end{matrix}$ → $\begin{matrix} 1 \\ [+long] \\ [+nas] \end{matrix}$				
	[nikəlna:] 'to come out'	[nikl-a:] 'came out'	[ã:gən-õ:] 'courtyard-*obl.pl.*'	? 'mind-*adj.*'

- Problem: surface form is actually [ma:nsi].
  - ? What rule ordering does this require? What's the problem?

  - ? What outcome do we get if both rules apply simultaneously to the input (no iteration)?

- See Bhatia & Kenstowicz (or Wolf) for arguments that the V nasalization rule doesn't actually exist in this language—nasal vowels are just underlying, so the problem goes away.

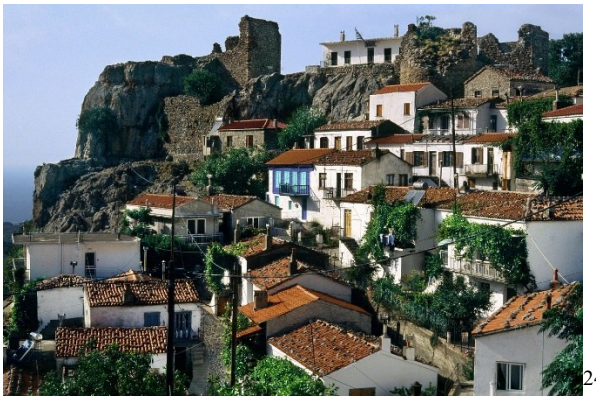
[22] https://en.wikipedia.org/wiki/Urdu#/media/File:Trilingual_road_sign_in_India.png
[23] https://en.wikipedia.org/wiki/Gulzar#/media/File:Gulzar_2008_-_still_38227.jpg

27. Wolf 2010: counterfeeding from the past

- The term comes from Wilson 2006.
- See the Wolf paper for more cases.

Samothraki Greek

- Variety of Greek, an Indo-European language from Greece with about 13.5 million speakers
- Samothraki is a Greek island close to Turkey



Samothraki[24]

Road sign with Greek script[25]

	Kaisse 1975:	‘carry-past.theme-1.pl’ /fér+a+me/	‘day’ /mér+a/
feeding:	r → Ø / V__V	fé+a+me	mé+a
	{a,e}→ i / __+{a,o}	fí+a+me	mí+a
		[fíami] (other rules apply to last V, I guess)	[mía]

feeding:		‘Greek’ /romé+os/	‘old’ /palé+os/	‘one’ /mía/
	{a,e}→ i / __+{a,o}	romí+os	palí+os	--
	V → [-syll] / __+V	romj+ós	palj+ós	mjá
		[romjós]	[paljós]	[mjá]

? What’s the problem here for putting all three rules in an order? (Hint: *[fjámi])

- Gliding somehow doesn’t get to apply if it was originally fed by *r*-deletion. None of our theories predict this (I think), but OT with "candidate chains” does.

[24] https://en.wikipedia.org/wiki/Samothrace#/media/File:20020800_Chora_Samothrace_island_Thrace_Greece.jpg
[25] https://depositphotos.com/editorial/city-entrance-sign-chora-samothraki-island-thrakia-greece-europe-587879598.html

28. Whew! Where does this leave us?

- Terms like "opacity" or "feeding" are useful but too broad when it comes to figuring out what a theory predicts
- We need to dig into all these different process-interaction types to find out…
    - how robust the purported cases are—what types of process interactions really exist?
    - which theories can handle which process-interaction types?

Next: We've been assuming a theory where you put all the morphemes together and then apply the phonology. What if that's nott adequate?

References

Anttila, Arto, Vivienne Fong, Štefan Beňuš & Jennifer Nycz. 2008. Variation and opacity in Singapore English consonant clusters. *Phonology* 25(02). 181–216. https://doi.org/10.1017/S0952675708001462.

Baković, Eric. 2005. Antigemination, assimilation and the determination of identity. *Phonology* 22. 279–315.

Baković, Eric. 2011. Opacity deconstructed. In Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume & Keren Rice (eds.), *The Blackwell companion to phonology*. Blackwell.

Bhatia, Tej K & Michael J Kenstowicz. 1972. Nasalization in Hindi: a reconsideration. *Papers in Linguistics* 5. 202–212.

Dudas, Karen. 1976. *The phonology and morphology of Modern Javanese*. University of Illinois, Urbana-Champaign.

Elfner, Emily. 2016. Stress-epenthesis interactions in Harmonic Serialism. In John J McCarthy & Joe Pater (eds.), *Harmonic Grammar and Harmonic Serialism*, 261–300. Sheffield: Equinox Press.

Frank, Gelya & Carole E. Goldberg. 2010. *Defying the Odds: The Tule River Tribe's Struggle for Sovereignty in Three Centuries*. Yale University Press.

Hale, Kenneth. 1973. Deep-surface canonical disparities in relation to analysis and change: An Australian example. In Thomas Sebeok (ed.), *Current Trends in Linguistics*, vol. 9: Diachronic, Areal and Typological Linguistics, 401–458. The Hague: Mouton.

Hill, Jane. 1970. A peeking rule in Cupeño. *Linguistic Inquiry* 1. 534–539.

Hill, Jane H. 2005. *A Grammar of Cupeño*. University of California Press.

Itô, Junko & Armin Mester. 2001. Structure preservation and stratal opacity in German. In Linda Lombardi (ed.), *Segmental phonology in Optimality Theory: constraints and representations*. Cambridge University Press.

Kaisse, Ellen. 1975. A violation of transitivity in Modern Greek. In Robin E Grossman, L. James San & Timothy J Vance (eds.), *Papers from the 11th Regional Meeting, Chicago Linguistic Society*, 329–339. Chicago: Chicago Linguistic Society.

Kaplan, Aaron F. 2011. Harmonic Improvement without Candidate Chains in Chamorro. *Linguistic Inquiry* 42(4). 631–650. https://doi.org/10.1162/LING_a_00063.

Kavitskaya, Darya & Peter Staroverov. 2009. Fed counterfeeding and positional reference: re-solving opacity. manuscript.

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

Lakoff, George. 1970. Global Rules. *Language* 46(3). 627–639.

Lee, Minkyung. 1999. A case of sympathy in Javanese affixation. In Karen Baertsch, Daniel A Dinnsen, Karen Baertsch & Daniel A Dinnsen (eds.), *Indiana University Working Papers in Linguistics I*, 31–36. Bloomington, IN: IULC Publications.

Lee, Minkyung. 2007. OT-CC and feeding opacity in Javanese. *Studies in Phonetics, Phonology and Morphology* 13(2). 333–350.

Lewis, M. Paul (ed.). 2009. *Ethnologue: languages of the world*. 16th edn. Dallas, TX: SIL International.

McCarthy, John J. 1999. Sympathy and phonological opacity. *Phonology* 16. 331–399.

McCarthy, John J. 2003. Sympathy, cumulativity, and the Duke-of-York gambit. In Caroline Féry & Ruben van de Vijver (eds.), *The Syllable in Optimality Theory*, 23–76. Cambridge: Cambridge University Press.

McCarthy, John J. 2006. Restraint of Analysis. In *Wondering at the Natural Fecundity of Things: Essays in Honor of Alan Prince*. Linguistics Research Center. http://repositories.cdlib.org/lrc/prince/10.

McCarthy, John J. 2007a. *Hidden generalizations: phonological opacity in Optimality Theory*. London: Equinox.

McCarthy, John J. 2007b. Derivations and levels of representation. In Paul de Lacy (ed.), *The Cambridge handbook of phonology*. Cambridge: Cambridge University Press.

McCarthy, John J. 2007c. *Hidden Generalizations: Phonological Opacity in Optimality Theory*. London: Equinox.

McCarthy, John J. 2008. The Gradual Path to Cluster Simplification. *Phonology* 25(02). 271–319. https://doi.org/10.1017/S0952675708001486.
Mohanan, K.P. 1992. Describing the phonology of non-native varieties of a language. *World Englishes* 111–128.
Narang, G. C & Donald A Becker. 1971. Aspiration and Nasalization in the Generative Phonology of Hindi-Urdu. *Language* 47(3). 646–667.
Padden, Carol & David Perlmutter. 1987. American Sign Language and the architecture of phonological theory. *Natural Language and Linguistic Theory* 5. 335–375.
Pater, Joe. 2011. Serial Harmonic Grammar and Berber syllabification. In *Prosody matters: essays in honor of Elisabeth O. Selkirk*. London: Equinox Press.
Piggott, Glyne L. 1980. *Aspects of Odawa Morphophonemics*. Routledge.
Prince, Alan & Paul Smolensky. 2004. *Optimality Theory: Constraint interaction in generative grammar*. Malden, Mass., and Oxford, UK: Blackwell.
Pullum, Geoffrey. 1976. The Duke of York gambit. *Journal of Linguistics* 12. 83–102.
Rasin, Ezer. 2022. Shifting Interactions and Countershifting Opacity: A Note on Opacity in Harmonic Serialism. *Linguistic Inquiry*. The MIT Press 53(4). 836–851.
Sapir, Edward & Morris Swadesh. 1978. *Nootka texts: Tales and ethnological narratives, with grammatical notes and lexical material*. New York: AMS Press.
Shaw, Patricia. 1985. Modularism and substantive constraints in Dakota lexical phonology. In *Phonology yearbook 2*, 173–202.
Sprouse, Ronald. 1997. A case for enriched inputs. In. Berkeley, CA.
Walker, Rachel. 2010. Nonmyopic Harmony and the Nature of Derivations. *Linguistic Inquiry* 41(1). 169–179. https://doi.org/10.1162/ling.2010.41.1.169.
Wilbur, Ronnie Bring. 1973. *The phonology of reduplication*. Indiana University Linguistics Club.
Wilson, Colin. 2006. Counterfeeding from the past. Manuscript. UCLA, ms.
Wolf, Matthew. 2010. On the existence of counterfeeding from the past. In. Baltimore.
Wolf, Matthew. 2011. Limits on global rules in Optimality Theory with Candidate Chains. *Phonology* 28(01). 87–128.