On the existence of counterfeeding from the past[*]

Matthew Wolf
Yale University
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•Wilson (2006) shows that OT with Candidate Chains (OT-CC: McCarthy 2007) can produce a hypothetical type of opaque interaction he dubs *counterfeeding from the past* (CFFTP); Wilson argues that such interactions are unattested.

•This talk is a report of work in progress on whether CFFTP examples do in fact exist in natural languages. Indeed, there are several reported cases of rule-ordering paradoxes which are of the CFFTP type.

1. Counterfeeding from the past

•Most versions of rule-based phonology (excluding primarily ones which permit local ordering of rules: Anderson 1969, 1974, *etc.*) hold that rule ordering is transitive. If rule A applies before rule B, and rule B applies before rule C, it follows that rule A applies before rule C.

•If A and B are in a feeding relationship (Kiparsky 1968), and B and C are also in a feeding relationship, it follows that:

(1) If rule C applies in environments created by prior application of rule B, then C will apply in *all* environments created by B-application, regardless of whether the conditions for B to apply were already present in the underlying form, or were set up by prior application of rule A.

•For example (Wilson 2006), if we have a language where raising of underlyingly word-final /e/ to [i] feeds pre-/i/ assibilation:

(2)	/pate/
Raising	pati
Assibilation	pasi
	[pasi]

•...and where deletion of word-final consonants feeds /e/-raising:

(3)	/mek/
C-deletion	me
Raising	mi
	[mi]

[*] Thanks to Bruce Hayes for first pointing me to Wilson (2006), and to John McCarthy for useful feedback. I hasten to claim responsibility for all mistakes.

•...it follows by transitivity that C-deletion precedes raising. This means that if assibiliation applies before [i]s derived from an /e/ which was underlyingly word-final, assibilation must also apply before [i]s which derived from an /e/ which became word-final through the prior application of C-deletion:

(4)		/patek/
	C-deletion	pate
	Raising	pati
	Assibilation	pasi
		[pasi]

•Wilson (2006) shows that OT with Candidate Chains (McCarthy 2007) is not constrained in this way: OT-CC permits languages where C-deletion feeds raising, and raising feeds assibilation, *except when raising was fed by C-deletion*:

(5)					
	a. /mek/	→	me	→	[mi]
	b. /pate/	→	pati	→	[pasi]
	c. /patek/	→	pate	→	[pati] (*→ [pasi])

•He dubs this hypothetical form of opacity *counterfeeding from the past*. (Odden [2008] shows that Sympathy theory [McCarthy 1999] can produce interactions of this same kind.)

2. OT-CC, and why it predicts CFFTP

•In classic OT (Prince & Smolensky 2004 [1993]), each candidate is a direct mapping from the input to a (potential) output.

•In OT-CC, candidates are gradual, one-step-at-a-time mappings from the input to a (potential) output.

> So each candidate contains a sequence of intermediate derivational steps.
>
> (This claim abstracts away from the effects of the device of chain merger, which is not relevant to anything that I'm discussing here.)

•There are assumed to be two universal, inviolable conditions which define what is and is not a well-formed candidate chain:[1]

(6) *Gradualness*: Each form in the chain differs from the preceding form via one application of a single basic operation.

[1] OT-CC is based on Harmonic Serialism, which was originally proposed by Prince & Smolensky (2004 [1993]: §5.2.3.3). An extensive bibliography of works in or about HS and OT-CC can be found at http://works.bepress.com/cgi/viewcontent.cgi?article=1101&context=john_j_mccarthy.

(7) *Harmonic improvement*: Each form in the chain must be more harmonic than the preceding form, given the ranking of markedness and faithfulness constraints in the language in question.

•The gradualness requirement of course requires explicit assumptions about what the 'basic operations' are. Except as may otherwise be required, I will assume (following McCarthy 2007) that these are: delete one segment; epenthesize one segment; change one feature-value of one segment; metathesize two adjacent segments.

•For /mek/ [mi] and /pate/ [pasi], the winning chains and their pertinent competitors are as follows (following standard OT-CC notational practice, operations are referred to by the 'basic faithfulness constraint' which they violate).

(8)	a. <mek>	(do nothing)	
	b. <mek, me>	<Max-C>	
	c. <mek, me, mi>	<Max-C, Ident(high)>	[winner]

(9)	a. <pate>	(do nothing)	
	b. <pate, pati>	<Ident(high)>	
	c. <pate, pati, pasi>	<Ident(high), Ident(contin)>	[winner]

•The following rankings are needed [h.i. = 'harmonically-improving']:

(10)	a. *Mid# » Ident(high)	(h.i. to raise word-final vowels)
	b. *C# » Max-C	(h.i. to delete word-final consonants)
	c. *ti » Ident(contin)	(h.i. to change /t/ to [s] before [i])
	d. *Mid# » *ti	(raising can create new /ti/ sequences)
	e. *C# » *Mid#	(C-deletion can render mid vowels word-final)

•Overall ranking:

(11)

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            *C#
           /   \
      *Mid#     Max-C
       /   \
   *ti      Ident(high)
    |
   Ident(contin)
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•In modified comparative tableau (Prince 2003) form[2]:

(12)

W~L	*C#	*Mid#	Max-C	*ti	Ident(high)	Ident(contin)
<mek, me, mi>		W			L	
~ <mek, me>	(0~0)	(0~1)	(1~1)	(0~0)	(1~0)	(0~0)
<mek, me, mi>	W		L		L	
~ <mek>	(0~1)	(0~0)	(1~0)	(0~0)	(1~0)	(0~0)
<pate, pati, pasi>				W		L
~ <pate, pati>	(0~0)	(0~0)	(0~0)	(0~1)	(1~1)	(0~1)
<pate, pati, pasi>		W			L	L
~ <pate>	(0~0)	(0~1)	(0~0)	(0~0)	(1~0)	(1~0)

•For input /patek/, the following chains will be harmonically improving under the rankings just presented:

(13)
a. <patek> (do nothing)
b. <patek, pate> <Max-C>
c. <patek, pate, pati> <Max-C, Ident(high)> [winner]
d. <patek, pate, pati, pasi> <Max-C, Ident(high), Ident(contin)>

•The constraint *ti will prefer <patek, pate, pati, pasi> over the intended winner <patek, pate, pati>. So for that winner to win, *ti must be dominated by some other constraint with the opposite preference.

•In OT-CC, we can call this Prec constraint for that purpose:

(14) Prec(Ident(contin), Max-C)
Assign a violation-mark for every time that:

(a) A Max-C-violating LUM occurs and is not preceded by an Ident(contin)-violating LUM.
(b) An Max-C-violating LUM occurs and is followed by an Ident(contin)-violating LUM.

[LUM = ‘localized unfaithful mapping’, i.e. a single operational step performed in chain-construction.]

[2] Each row contains a winner ~ loser pair. A W indicates that a constraint prefers the winner over the loser; an L indicates that it prefers the loser over the winner. Integer pairs indicate the number of violations incurred by each candidate: 1~0 for example means that the constraint assigns one mark to the winner and zero marks to the loser.

(15)

W~L	*C#	*Mid#	Max-C	Prec (Id(cont), Max-C)	*ti	Id (hi)	Id (cont)
<patek, pate, pati> ~ <patek, pate, pati, pasi>	(0~0)	(0~0)	(1~1)	W (1~1)/(0~1)	L (1~0)	(1~1)	W (0~1)
<patek, pate, pati> ~ <patek, pate>	(0~0)	W (0~1)	(1~1)	(1~1)/(0~0)	L (1~0)	L (1~0)	(0~0)
<patek, pate, pati> ~ <patek>	W (0~1)	(0~0)	L (1~0)	L (1~0)/(0~0)	L (1~0)	L (1~0)	(0~0)
<mek, me, mi> ~ <mek, me>	(0~0)	W (0~1)	(1~1)	(1~1)/(0~0)	(0~0)	L (1~0)	(0~0)
<mek, me, mi> ~ <mek>	W (0~1)	(0~0)	L (1~0)	L (1~0)/(0~0)	(0~0)	L (1~0)	(0~0)
<pate, pati, pasi> ~ <pate, pati>	(0~0)	(0~0)	(0~0)	(0~0)/(0~0)	W (0~1)	(1~1)	L (0~1)
<pate, pati, pasi> ~ <pate>	(0~0)	W (0~1)	(0~0)	(0~0)/(0~0)	(0~0)	L (1~0)	L (1~0)

•Note that every L is outranked by a W, so this is a consistent set of winner/loser pairs, relative to the constraints depicted.

•OT-CC thus predicts that the "counterfeeding from the past" language is possible.

•As Wilson (2006) notes, this prediction is just one way in which OT-CC admits the existence of certain kinds of global rules (Lakoff 1969, 1970; subsequently argued for in phonology by Dressler 1972, Lakoff 1972, Pyle 1972, McCawley 1973, Miller 1975, among others), i.e. ordering requirements imposed between non-consecutive steps of the derivation. This is because Prec constraints inspect whole derivations at once, not just consecutive pairs of steps.

3. Reported examples of CFFTP

3.1 Samothraki Greek (Kaisse 1975)

•Three rules:

(16) a. Intervocalic /r/-deletion: r → Ø / V_V
b. Glide Formation: [+voc, +hi] → [-voc] / _%V
c. Height Dissimilation: [+voc, -hi, -low] → [+hi] / _%a
(also: /e/ → [+hi] / _%o)

• Intervocalic /r/ deletion feeds, therefore precedes height dissimilation:

(17)	/fér-a-me/		√CARRY-PAST.THEME-1.PL.
	féame	intervocalic /r/ deletion	
	fíami	raising	

cf. /fér-i/ → [fér] 'he (will) carry' for evidence of underlying /e/ and /r/

•Height dissimilation feeds, therefore precedes, (sometimes optional) glide formation:

(18)	/romé-os/		'Greek, a modern Greek'
	romíos	raising	
	romjós	glide formation	

(19)	/palé-os/		'old'
	palíos	raising	
	paljós	glide formation	

cf. deadjectival derivative [pale-ikós] and compound [palé-maxs] 'veteran, old soldier' for evidence of underlying /e/.

•But! We just saw that /fér-a-me/ surfaces as [fíami] and not *[fjámi].

•Similarly *méra 'day' can only be pronounced [mía], while *mía 'one' varies between [mía] and [mjá]. (p. 335).

Kaisse (1975: 335): "...the only time that the output of height dissimilation is not subject to glide formation is when the input to height dissimilation was derived from r-loss."

•In other words, r-deletion counterfeeds glide formation "from the past" across the intervening process of height dissimilation.

3.2 *Several SE Greek dialects—Ikaria, Kalimnos, Kos, Karpathos, parts of Rhodes (Kaisse 1976)*

•Same rules of height dissimilation and glide formation as in Samothraki, but interacting with deletion of intevocalic voiced fricatives instead of intervocalic /r/.

•Voiced fricative deletion feeds, and therefore precedes, height dissimilation adjacent to /a/:

(20)	/tuto#ða/		'this'#INTENSIFIER
	tutoa	voiced fricative deletion	
	tutua	height dissimilation	

•Same for height dissimilation adjacent to /o/:

(21) /latrev-o/ ‘adore’
latreo voiced fricative deletion
latrio height dissimilation

cf. past passive [latréftika], giving evidence for underling presence of both /e/ and the labiodental fricative.

•Height dissimilation feeds, and therefore precedes, glide formation (same argument as for Samothraki):

(22) /romé-os/
romíos height dissimilation
romjós glide formation

•But height dissimilation fails to feed glide formation when it has been fed by voiced fricative deletion (pp. 328-329):

(23) /fleva/ ‘vein’
flea voiced fricative deletion
flia height dissimilation
(*flja glide formation)

•Voiced fricative deletion also fails to directly feed glide formation (i.e., in cases where height dissimilation is inapplicable):

(24) /píɣa/ ‘I went’
pía voiced fricative deletion
(*pjá glide formation)

3.3 Bedouin Hijazi Arabic

•This is a more complicated example, since among the three rules involved are not one but two counterfeeding interactions.

•Data originally in Al-Mozainy (1981); subsequent theoretical discussion by McCarthy (2007), among others.

•Short high vowels in nonfinal open syllables are syncopated:

(25) a. /k**i**tib-t/ [ktibt] ‘you.MASC.SG. were written’
b. /ti-rs**i**l-u:n/ [tirslu:n] ‘you.MASC.SG. send’

•Short low vowels are raised to high in nonfinal open syllables:

(26) a. [ki.táb] 'he wrote'
b. [ki.tábt] 'you.MASC.SG. wrote'
c. [ki.táb.tum] 'you.MASC.PL. wrote'
d. [ki.táb.na] 'we wrote'
e. [k.tí.bat] 'she wrote'

•Raising counterfeeds syncope: as can be seen in (26), open-syllable high vowels resulting from raising are not deleted, even though these vowels should be of exactly the right kind to get deleted.

•The transitivity paradox comes from the interaction of both processes with phrasal resyllabification. Low vowels in syllables that become open through resylabification do not raise...:

(27) [ʕa.ba.d#alˁ.lˁah] 'he worshipped Allah'

...which suggests that raising is ordered before resyllabification.

•But high vowels in syllables which are opened by phrasal resyllabification, on the other hand, do undergo syncope...:

(28) /ka:tib al-ʒuwa:b/ [ka:t.bal.ʒu.wa:b] 'writing the letter'
*[ka:.ti.bal.ʒu.wa:b]

(29) /tiʕtˁu:nih al-muse:ʕi:di/ [tiʕ.tˁu:n.hal.mu.se:.ʕi:.di]
*[tiʕ.tˁu:.ni.hal.mu.se:.ʕi:.di]
'you gave it to the one from the clan of Musai`īd'

...which suggests that syncope is ordered after resyllabification.

•But then by transitivity the order is

(30) raising
resyllabification
syncope

...which means that we would expect high vowels created by raising to undergo syncope—and that, as we saw, is not what happens.

•Indeed, what seems to be necessary is to independently specify that raising cannot apply to the output of resyllabification, and that syncope cannot apply to the output of raising—the latter of which, in rule-based terms, would be a CFFTP requirement.

•Analysis in McCarthy (2007):

(31) WEAK<i
One violation-mark for every weak-syllable nucleus as sonorous as, or more sonorous than, a high vowel. [Encourages syncope.]

(32) WEAK<a
One violation-mark for every weak-syllable nucleus as sonorous as, or more sonorous than, a low vowel. [Encourages raising.]

[For present purposes 'weak syllable' = nonfinal open syllable.]

(33) MAX-A
One violation-mark for every underlyingly low vowel which lacks an output correspondent.

(•As this is a zero-terminating chain shift, MAX-A is needed to prevent direct mappings from /a/ to zero, without passing through intermediate /i/, from being harmonically improving.)

•Additional assumptions for handling special treatment of junctural environments:

Separate words in an utterance are initially without a linear-order relation to one another; linearization of words occurs as a step of the chains (Wolf 2008)

Linearization can create new markedness violations, so there needs to be some high-ranked constraint that encourages linearization: call it *UNLIN

Syllabification reapplies for free at every step of the chain (McCarthy 2007, though cf. Elfner 2009 on gradual syllabification in Harmonic Serialism)

(34)

Generalization	*Required harmony relation*	Weak<i	Weak<a	Max-A	Max-V	Id(lo)	*Unlin
Raising is h.i. (input /CaCV/)	Ci.CV > Ca.CV	(1~1)	W (0~1)	(0~0)	(0~0)	L (1~0)	(0~0)
Syncope is h.i. (input /CiCV/)	CCV > Ci.CV	W (0~1)	(0~0)	(0~0)	L (1~0)	(0~0)	(0~0)
Syncope of /a/ is not h.i. (input /CaCV/)	Ca.CV > CCV	L (1~0)	L (1~0)	W (0~1)	W (0~1)	(0~0)	(0~0)
Linearization is h.i. (1) (input {CaC. VC})	Ca.CVC > {CaC, VC}	L (1~0)	L (1~0)	(0~0)	(0~0)	(0~0)	W (1~0)
Linearization is h.i. (2) (input {CiC, VC})	Ci.CVC > {CiC, CV}	L (1~0)	(0~0)	(0~0)	(0~0)	(0~0)	W (1~0)

•Running Recursive Constraint Demotion (Tesar 1995, Tesar & Smolensky 1998, 2000, Prince 2002, 2003) on the above yields

(35) *Unlin, Max-A » Weak<a, Weak<i » Max-V, Ident(low)

•To ensure consistency of the CFFTP analysis, we need to be sure we can get the desired winners for each of the following four scenarios, the chains for each of which I now give:

(36) Word-internal /CaCV/:

a. <Ca.CV> (do nothing)
b. <Ca.CV, Ci.CV> <Ident(low)> [winner]
c. <Ca.CV, Ci.CV, CCV> <Ident(low), Max-V>

(37) Word-internal /CiCV/:

a. <Ci.CV> (do nothing)
b. <Ci.CV, CCV> <Max-V> [winner]

(38) /CaC#V/ juncture:

a. <{CaC, V}> (do nothing)
b. <{CaC, V}, Ca.CV> <linearize> [winner]
c. <{CaC, V}, Ca.CV, Ci.CV> <linearize, Ident(low)>
d. <{CaC, V}, Ca.CV, Ci.CV, CCV> <linearize, Ident(low), Max-V>

(39) /CiC#V/ juncture:

a. <{CiC, V}> (do nothing)
b. <{CiC, V}, Ci.CV> <linearize>
c. <{CiC, V}, Ci.CV, CCV> <linearize, Max-V> [winner]

•The chief cases of interest are (36) and (38), where the desired winners are opaque.

In (38), Weak<a prefers both <{CaC, V}, Ca.CV, Ci.CV> and <{CaC, V}, Ca.CV, Ci.CV, CCV> over <{CaC, V}, Ca.CV>

•To override this preference, Weak<a must be outranked by something with the opposite preference—such as the following Prec constraint:

(40) Prec(Ident(low), linearize)
Assign a violation-mark for every time that:
(a) A linearization LUM occurs and is not preceded by an Ident(low)-violating LUM.

(b) A linearization LUM occurs and is followed by an Ident(low)-violating LUM.

In (c) Weak<i prefers <{CaC, V}, Ca.CV, Ci.CV> over <{CaC, V}, Ca.CV>, and in (a), it prefers <Ca.CV, Ci.CV, CCV> over <Ca.CV, Ci.CV>.

As this is a zero-terminating chain shift, the duty of preferring the counterfeeding of syncope by raising has to be left up not to a Prec constraint but to the positional faithfulness constraint Max-A, which forbids deleting the underlyingly low vowel, even if it has been raised subsequently in the chain.[3]

[3] Jesney (to appear) argues that in Harmonic Serialism, positional faithfulness constraints (Beckman 1998) should be interpreted relative to positions in the immediate input to the current step. If carried over into OT-CC, this idea might foreclose the use of Max-A in the fashion required here. An ongoing topic of research for me involves the implications of this proposal about positional faithfulness for OT-CC, both for the analysis of zero-terminating chain shifts and for the possibility of positional differences in whether processes interact transparently or opaquely.

(41)

	*Unl	Max-A	Wk<i	Prec (Id(lo), lin)	Wk<a	Max-V	Id(lo)
<Ca.CV, Ci.CV> ~ <Ca.CV>	(0~0)	(0~0)	(1~1)	(0~0)	W (0~1)	(0~0)	L (1~0)
<Ca.CV, Ci.CV> ~ <Ca.CV, Ci.CV, CCV>	(0~0)	W (0~1)	L (1~0)	(0~0)	(0~0)	W (0~1)	(1~1)
<Ci.CV, CCV> ~ <Ci.CV>	(0~0)	(0~0)	W (0~1)	(0~0)	(0~0)	L (1~0)	(0~0)
<{CaC, V}, Ca.CV> ~ <{CaC, V}>	W (0~1)	(0~0)	L (1~0)	L (1~0)	L (1~0)	(0~0)	(0~0)
<{CaC, V}, Ca.CV> ~ <{CaC, V}, Ca.CV, Ci.CV>	(0~0)	(0~0)	(1~1)	W (1~2)	L (1~0)	(0~0)	W (1~0)
<{CaC, V}, Ca.CV> ~ <{CaC, V}, Ca.CV, Ci.CV, CCV>	(0~0)	W (0~1)	L (1~0)	W (1~2)	L (1~0)	W (0~1)	W (0~1)
<{CiC, V}, Ci.CV, CCV> ~ <{CiC, V}>	W (0~1)	(0~0)	(0~0)	L (1~0)	(0~0)	L (1~0)	(0~0)
<{CiC, V}, Ci.CV, CCV> ~ <{CiC, V}, Ci.CV>	(0~0)	(0~0)	W (0~1)	L (1~0)	(0~0)	L (1~0)	(0~0)

•One last remark: McCarthy (2007) analyzes the underapplication of raising in junctural environments to output-output faithfulness (Burzio 1994, Benua 1997) of words in juncture to their citation forms. Here though, as with cyclic effects (Wolf 2008: ch. 5), base-identity effects can be modeled using OT-CC itself if linearization of words/morphemes is part of the chains.

3.4 Other possible examples of CFFTP

•Several ordering paradoxes of the CFFTP variety are reported in other modern Greek dialects by Newton (1971, 1972a,b). However, as Kaisse (1975) notes, for many of these it is unclear whether all of the processes are still active synchronically.

•Adams (1972) argues for the existence of a CFFTP-type interaction in Ancient (Attic-Ionic) Greek.

This example involves four rules, with counterfeeding occurring "from the past" across two intervening rules.

•Underhill (1976) argues for an example in Yup'ik.

•Munro & Benson (1973) present an ordering paradox involving reduplication in Luiseño which seems to have the CFFTP character.

Post-conference addendum:

Thanks to Stephen R. Anderson for reminding me that the Faroese example discussed in Anderson (1974: 167-174) is also of the CFFTP form.

4. Conclusion

•Ordering relations between phonological processes in OT-CC are not necessarily transitive. This distinguishes OT-CC from the standard theory of rule-based phonology, and is a potential source of overgeneration (Wilson 2006).

•A number of possible examples of one type of transitivity paradox, namely CFFTP, are in fact reported, so this may turn out to be a virtue rather than a liability of the theory.

•In either case, resolving the empirical status of CFFTP is but one part of establishing what kinds of 'global rules' OT-CC does and does not permit, and how these predictions match up to language typology.

References

Adams, Douglas Q. (1972). Sonorant clusters in Ionic and the ordering of rules. In Paul M. Peranteau, Judith N. Levi, and Gloria C. Phares (eds), *Papers from the Eighth Regional Meeting of the Chicago Linguistic Society*. Chicago: CLS, pp. 405-415.

Al-Mozainy, Hamza Q. (1981). *Vowel Alternations in a Bedouin Hijazi Arabic Dialect: Abstractness and Stress.* Ph.D. dissertation, University of Texas, Austin.

Anderson, Stephen R. (1969). *West Scandinavian Vowel Systems and the Ordering of Phonological Rules*. Ph.D. dissertation, MIT, Cambridge, MA.

Anderson, Stephen R. (1974). *The Organization of Phonology*. San Diego: Academic Press.

Beckman, Jill N. (1998). *Positional Faithfulness.* Ph.D. dissertation, University of Massachusetts, Amherst. [ROA-234]

Benua, Laura (1997). *Transderivational Identity: Phonological Relations Between Words*. Ph.D. dissertation, University of Massachusetts, Amherst. [ROA-259]

Burzio, Luigi (1994). *Principles of English Stress.* Cambridge: Cambridge University Press.

Dressler, Wolfgang U. (1972). *Allegroregeln rechtfertigen Lentoregeln: Sekundäre Phoneme des Bretonishchen*. Innsbruck: Kowatsch.

Elfner, Emily (2009). Syllabification and stress-epenthesis interactions in Harmonic Serialism. Ms., University of Massachusetts Amherst. [ROA-1047]

Jesney, Karen (to appear). Positional faithfulness, non-locality, and the Harmonic Serialism solution. In Suzi Lima, Kevin Mullin, and Brian Smith (eds.), *Proceedings of NELS 39*. Amherst: GLSA. [ROA-1018]

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

Kaisse, Ellen (1976). Rule reordering, local order, and the function of rules. In Salikoko S. Mufwene, Carol A. Walker, and Sanford B. Steever (eds.), *Papers from the Twelfth Regional Meeting of the Chicago Linguistic Society*. Chicago: CLS, pp. 321-336.

Kiparsky, Paul (1968). Linguistic universals and linguistic change. In Emmon Bach and Robert Harms (eds.), *Universals in Linguistic Theory*. New York: Holt, Rinehart & Winston, pp. 170-202.

Lakoff, George (1969). On derivational constraints. In Robert I. Binnick, Alice Davison, Georgia M. Green, and Jerry L. Morgan (eds.), *Papers from the Fifth Regional Meeting of the Chicago Linguistic Society*. Chicago: CLS, pp. 117-139.

Lakoff, George (1970). Global rules. *Language* **46**, pp. 627-639.

Lakoff, George (1972). The global nature of the nuclear stress rule. *Language* **48**, pp. 285-303.

McCarthy, John J. (1999). Sympathy and phonological opacity. *Phonology* **16**, pp. 331-399.

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

McCawley, James D. (1973). Global rules and Bangubangu tone. In Michael J. Kenstowicz and Charles W. Kisseberth (eds.), *Issues in Phonological Theory*. The Hague: Mouton, pp. 160-168.

Miller, D. Gary (1975). On constraining global rules in phonology. *Language* **51**, pp. 128-132.

Munro, Pamela, and Peter John Benson (1973). Reduplication and rule-ordering in Luiseño. *International Journal of American Linguistics* **39**, pp. 15-21.

Newton, B.E. (1971). Ordering paradoxes in phonology. *Journal of Linguistics* **7**, pp. 31-53.

Newton, B.E. (1972a). *The Generative Interpretation of Dialect: A Study of Modern Greek Phonology*. Cambridge: Cambridge University Press.

Newton, B.E. (1972b). Loss of /r/ in a Modern Greek dialect. *Language* **48**, pp. 566-572.

Odden, David (2008). Ordering. In Bert Vaux and Andrew Nevins (eds.), *Rules, Constraints, and Phonological Phenomena*. Oxford: Oxford University Press, pp. 61-120.

Prince, Alan (2002). Entailed ranking arguments. Ms., Rutgers University, New Brunswick, NJ. [ROA-500]

Prince, Alan (2003) Arguing Optimality. In Angela C. Carpenter, Paul de Lacy, and Andries W. Coetzee (eds.), *University of Massachusetts Occasional Papers in Linguistics* **26**: *Papers in Optimality Theory II*. Amherst: GLSA, pp. 269-304.

Prince, Alan, and Paul Smolensky (2004 [1993]). *Optimality Theory: Constraint Interaction in Generative Grammar*. Oxford: Blackwell. [ROA-537]

Pyle, Charles (1972). On eliminating BMs. In Paul M. Peranteau, Judith N. Levi, and Gloria C. Phares (eds.), *Proceedings of the 8th Regional Meeting of the Chicago Linguistic Society*. Chicago: CLS, pp. 516-532.

Tesar, Bruce (1995). *Computational Optimality Theory*. Ph.D. dissertation, University of Colorado, Boulder. [ROA-90]

Tesar, Bruce, and Paul Smolensky (1998). Learnability in Optimality Theory. *Linguistic Inquiry* **29**, pp. 229-268.

Tesar, Bruce, and Paul Smolensky (2000). *Learnability in Optimality Theory*. Cambridge, MA: MIT Press.

Underhill, Robert (1976). Noun bases in two Eskimo dialects: A study in comparative morphophonemics. In Eric P. Hamp (ed.), *Papers on Eskimo and Aleut Linguistics*. Chicago: CLS, pp. 239-271.

Wilson, Colin (2006). Counterfeeding from the past. Ms., University of California, Los Angeles. [Available online at http://camba.ucsd.edu/blog/sadphig/files/2009/01/counterfeedingfromthepast.pdf]

Wolf, Matthew (2008). *Optimal Interleaving: Serial Phonology-Morphology Interaction in a Constraint-Based Model*. Ph.D. dissertation, University of Massachusetts Amherst. [ROA-996]

Comments most welcome:
matthew.wolf@yale.edu