

Directionality and opacity: overview

9 Nov. 2017

1 What’s the problem with counterbleeding in OT?

- Chinese example: 3rd (aka 213) tone sandhi

	/xiao ²¹³ gou ²¹³ pao ²¹³ / small dog run ‘The small dog runs	*213 213	IDENT(tone)	
<i>a</i>	xiao ²¹³ gou ²¹³ pao ²¹³	*!*		
<i>b</i>	xiao ³⁵ gou ²¹³ pao ²¹³	*!	*	
☞ <i>c</i>	xiao ²¹³ gou ³⁵ pao ²¹³		*	
☞ <i>d</i>	xiao ³⁵ gou ³⁵ pao ²¹³		**	<i>Wait, why is this an option? It’s harmonically bounded!?</i>

- Derivational analysis

213 → 35 / __ 213	<i>apply left to right</i>	/xiao ²¹³ gou ²¹³ pao ²¹³ / xiao ³⁵ gou ²¹³ pao ²¹³
	<i>2nd iteration</i>	xiao ³⁵ gou ³⁵ pao ²¹³
		[xiao ³⁵ gou ³⁵ pao ²¹³]
		<i>self-counterbleeding</i>

<i>apply right to left</i>	/xiao ²¹³ gou ²¹³ pao ²¹³ / xiao ²¹³ gou ³⁵ pao ²¹³	
	<i>2nd iteration</i>	--
		[xiao ²¹³ gou ³⁵ pao ²¹³]
		<i>self-bleeding</i>

2 People have come up with various ways to make some (self-)counterbleeding go away

- Sanders (2001, 2002): final devoicing counterbleeds V raising?
 - No, vowel raising is **unproductive**
 - doesn’t exist in other languages
 - no phonetic motivation
 - lots of exceptions ([pɔɾ] ‘leek’)
 - didn’t apply in a wug test
 - not part of a Polish accent when speaking other languages
 - Analysis: /grɔb/ and /grup/ are both listed allomorphs

	/grɔb/
ɔ → u / __ [+voice, -nasal]#	grub
[-son] → [-voice] / __ #	grup
	[grup]

- Pater (1999): W. Austronesian obstruent deletion counterbleeds nasal assimilation?

- No, the two consonants just **fuse** in one step
 - / maŋ₁+s₂ulsi / → [man_{1,2}ulsi]
- Works for any case where a segment spreads some of its features and then deletes
- No problem in OT
 - As long as we do some fancy footwork to ensure the right features

nasal assimilation	/maŋ+sulsi/
C deletion	mansulsi
	manulsi
	[manulsi]

/ maŋ ₁ +s ₂ ulsi /	*ŋ+OBSTRUENT	MAX-C	IDENT(place)/obstruent “If an input obstruent and a surface segment correspond, they must have the same place of articulation”	IDENT(place)
a maŋ ₁ s ₂ ulsi	*!			
b man ₁ s ₂ ulsi	*!			*
c man _{1,2} ulsi				*
d maŋ _{1,2} ulsi			*!	*
e maŋ ₁ ulsi		*!		

- English tapping counterbleeds Canadian Raising?

- No, it's **paradigm uniformity**

	/ɪajtə/
aj → ʌj / __ [-voice]	ɪʌjtə
tapping	ɪʌjɾə
	[ɪʌjɾə]

/ɪajtə/ base: [ɪʌjt]	*aj[-voice]	*VtV (roughly!)	IDENT(low)- BaseOutput	IDENT(low)- InputOutput	IDENT(cont)
a ɪajtə	*!	*!	*!		
b ɪʌjɾə			*!		*
c ɪʌjtə		*!			
d ɪʌjɾə					*

3 Speech planning could be another source of apparent counterbleeding

- The transparent candidate is actually more difficult to plan
 - because the rule's trigger is in the future, compared to the target: 213 → 35 / __ 213
- Planning transparent [xiao²¹³ gou³⁵ pao²¹³]

/xiao²¹³/
has been
retrieved—deciding
whether to apply
the rule

/gou²¹³/
has been retrieved
(provides __213
environment)

/pao²¹³/
maybe still in process of
being retrieved—we don't
know if provides __213
enviro or not

4 What does it mean for the grammar?

- It's not like [xiao³⁵ gou³⁵ pao²¹³] is a speech error
 - The grammar still needs to mark the counterbleeding candidate as grammatical
- Maybe not only is the speech-planning window variable, but the “grammar window” is variable

- One derivation is the whole string → bleeding

	/xiao ²¹³ gou ²¹³ pao ²¹³ /	*213 213	IDENT(tone)
<i>a</i>	xiao ²¹³ gou ²¹³ pao ²¹³	*!*	
<i>b</i>	xiao ³⁵ gou ²¹³ pao ²¹³	*!	*
☞ <i>c</i>	xiao ²¹³ gou ³⁵ pao ²¹³		*
<i>d</i>	xiao ³⁵ gou ³⁵ pao ²¹³		**!

- Another derivation is two words at a time → counterbleeding

	/xiao ²¹³ gou ²¹³ /	*213 213	IDENT(tone)
<i>a</i>	xiao ²¹³ gou ²¹³	*!	
☞ <i>b</i>	xiao ³⁵ gou ²¹³		*

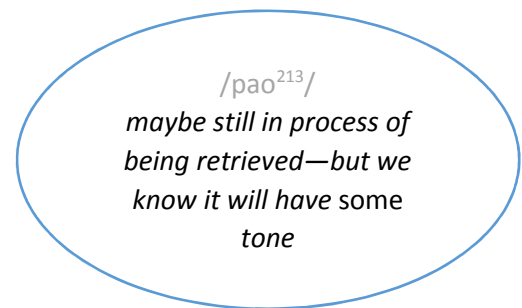
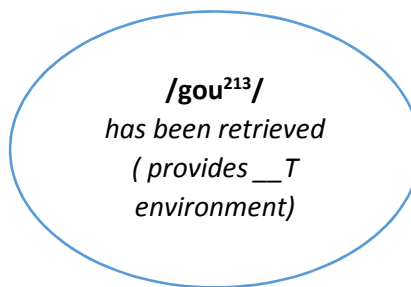
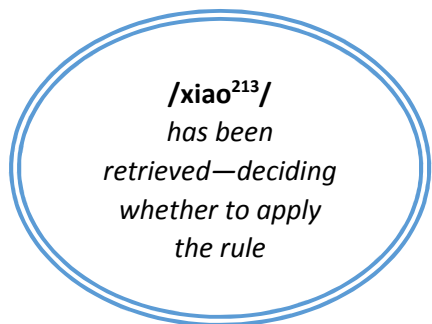
then

	xiao ³⁵ gou ²¹³ + pao ²¹³	*213 213	IDENT(tone)
<i>c</i>	xiao ²¹³ gou ²¹³ pao ²¹³	*!*	*
<i>d</i>	xiao ³⁵ gou ²¹³ pao ²¹³	*!	
<i>e</i>	xiao ²¹³ gou ³⁵ pao ²¹³		**!
☞ <i>f</i>	xiao ³⁵ gou ³⁵ pao ²¹³		*

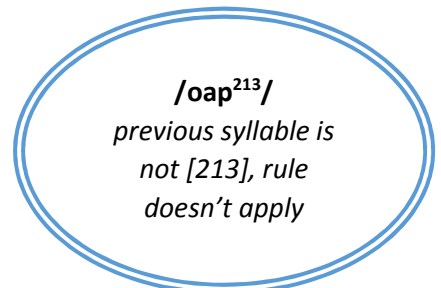
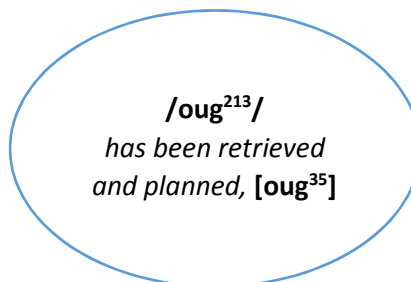
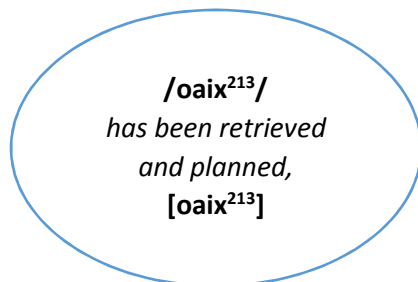
- In this sentence, we might expect this cyclicity by the syntactic bracketing anyway:
 - [xiao gou]_{DP} [pao]_{VP}
 - e.g., Duanmu (2007) (and many others!)
- When bracketing is different, both options are still possible, though in different proportions (right?)
 - [gou]_{DP} [hen hao]_{VP}
dog very good ‘The dog is good’
 - So we’d need to allow the grammar to look at sequences incrementally *even when the syntax doesn’t justify it*
 - unless we want to give up on standard OT

5 Planning-related predictions

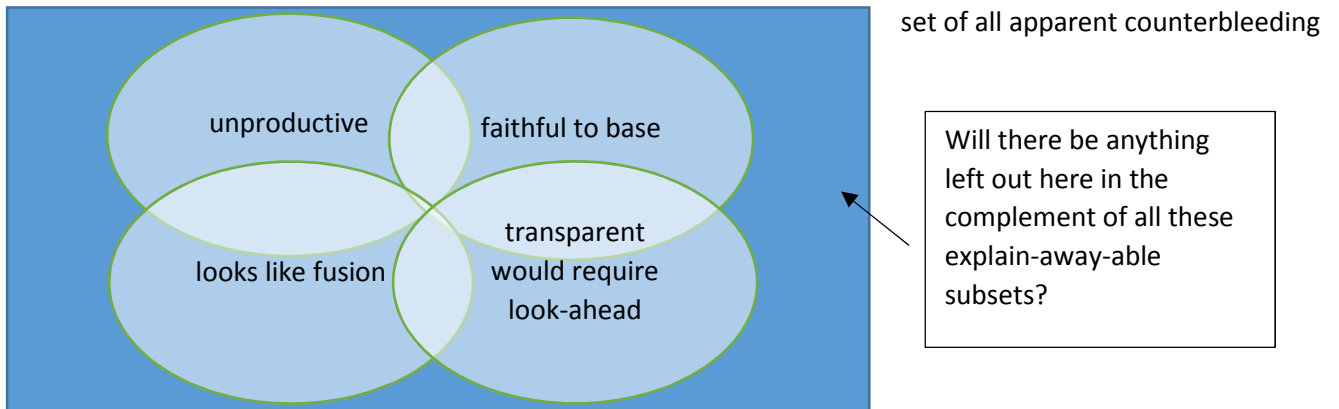
- The counterbleeding candidate is “easier”
 - increased difficulty (verbal-working-memory load, lower frequency/predictability of upcoming word) should favor counterbleeding
- The difficulty comes in knowing the tones of words in the future
 - A sandhi rule that doesn't care *what* tone comes next shouldn't show (as much?) counterbleeding
 - assume there is such a thing as a syllable with no tone
 - just interpolate the pitch
 - 213 → ∅ / __T
 - i.e., delete the 213 tone if the next syllable has any tone
 - During planning of /xiao²¹³/, we know enough about /pao²¹³/ to know that we don't need to change /xiao²¹³/'s tone:



- A right-to-left rule shouldn't show any such effects
 - increased difficulty (verbal-working-memory load, lower frequency/predictability of upcoming word) should favor counterbleeding
 - Hypothetical Niradnam Nichese 3rd tone sandhi:
 - 213 → 35 / 213 __
 - for input /oaix²¹³ oug²¹³ oap²¹³/...
 - transparent: [oaix²¹³ oug³⁵ oap²¹³]
 - counterbleeding: [oaix²¹³ oug³⁵ oap³⁵]
 - No planning difficulty with the transparent candidate



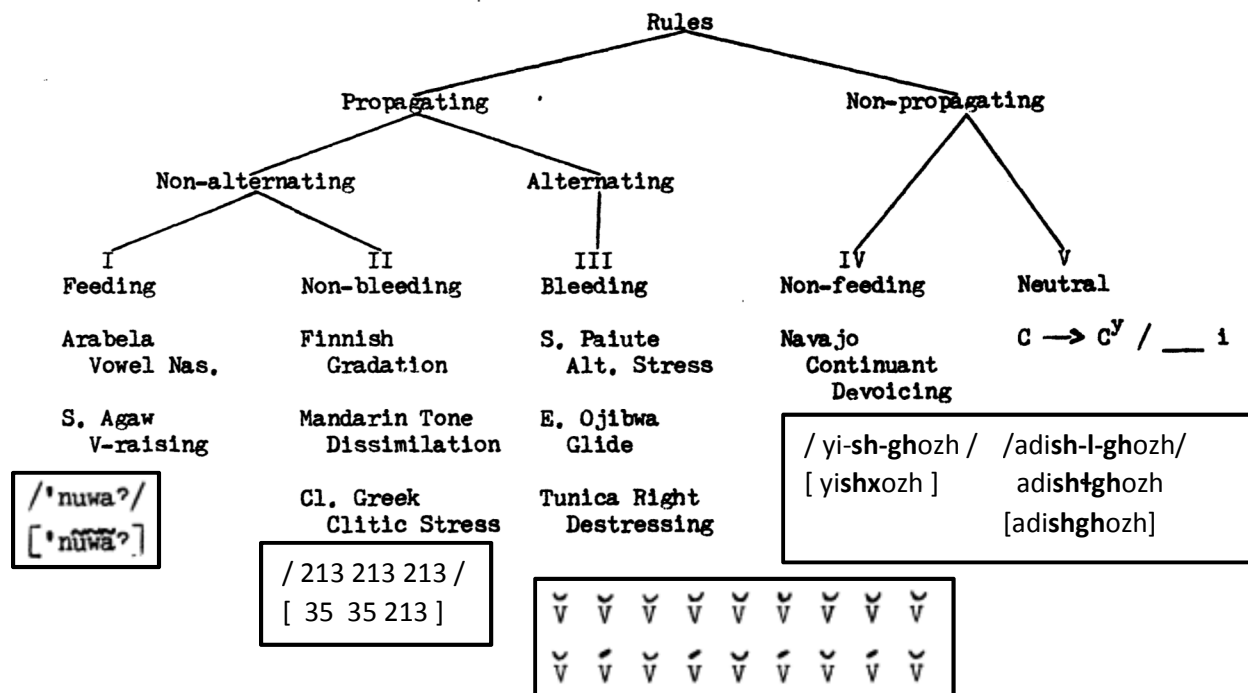
6 What is left for (self-)counterbleeding?



- If Niradnam Nichese 3rd tone sandhi existed, then we'd really have to take (self-)counterbleeding seriously...

7 A typology of directionality and self-(counter){f,bl}eeding

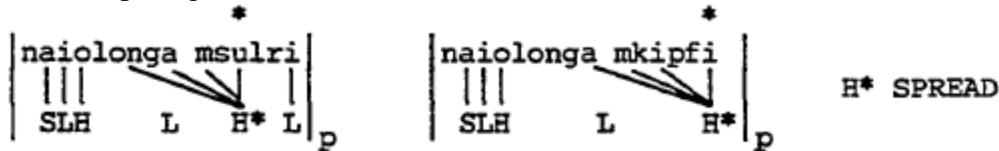
- Jensen & Stong-Jensen 1973, p. 74
 - propagating = iterative
 - alternating = self-bleeding



8 Directionality more generally

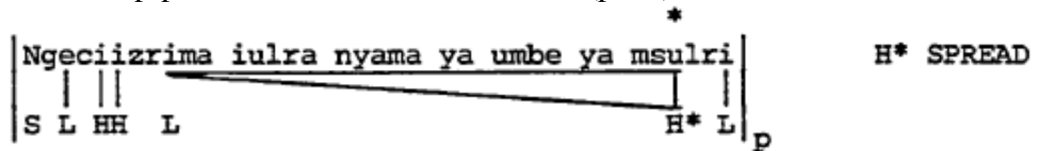
- Self-feeding also presents a challenge when it applies right-to-left
- McHugh 1990: Kivunjo Chaga (Bantu, Tanzania)

- (S=superhigh)



(p. 54)

- “It may therefore [because it isn’t stopped by word boundaries] spread back indefinitely within the p-phrase until it reaches a H tone.” (p. 56)



[Ngeciizrí'má iúlrá nyámá yá úmbé yá msúlri]_p TONE SHIFT
 he-can buy meat of cow of noble
 'He can buy the meat of a nobleman's cow'

(p. 57)

- I don't know if “may” means that the spread is optional
 - or just means that circumstances can exist that cause arbitrarily long spread
- If it's not optional, this is pretty demanding on speakers!
 - especially if there isn't an option to break up the utterance into shorter p-phrases

9 References

- Duanmu, San. 2007. *The Phonology of Standard Chinese*. 2 edition. Oxford ; New York: Oxford University Press.
- Jensen, John T & Margaret Stong-Jensen. 1973. Ordering and directionality of iterative rules. *Papers in Linguistics* 6(1). 66–90.
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