

## Some other types of opacity

(1) A case of counterfeeding in the environment: Japanese *rendaku*

- Second element becomes voiced in certain types of compounds
- From *ren* 'sequential' + *daku(on)* 'voiced'; examples from Ito & Mester (2003a)

/t/	<i>kuma</i>	'bear'	+	<i>te</i>	'hand'	⇒	<i>kuma-de</i>	'rake'
	<i>umi</i>	'sea'		<i>tori</i>	'bird'	⇒	<i>umi-dori</i>	'sea bird'
/k/	<i>huta-</i>	'two'		<i>ko</i>	'child'	⇒	<i>huta-go</i>	'twin'
	<i>ori-</i>	'fold'		<i>kami</i>	'paper'	⇒	<i>ori-gami</i>	'paper-folding'
	<i>ao</i>	'green'		<i>kaeru</i>	'frog'	⇒	<i>ao-kaeru</i>	'green frog'
/s/	<i>ume</i>	'plum'		<i>su</i>	'vinegar'	⇒	<i>ume-zu</i>	'plum vinegar'
	<i>hana</i>	'flower'		<i>sono</i>	'garden'	⇒	<i>hana-zono</i>	'flower garden'
/h/	<i>hana</i>	'flower'		<i>hi</i>	'fire'	⇒	<i>hana-bi</i>	'fireworks'
	<i>ike-</i>	'arrange'		<i>hana</i>	'flower'	⇒	<i>ike-bana</i>	'flower arranging'

Lyman's Law: at most one voiced obstruent per morpheme

<i>kaki</i>	'persimmon'
<i>kagi</i>	'key'
<i>gaki</i>	'kid'
* <i>gagi</i>	(no such words)

- True of Yamato and Sino-Japanese vocabulary
- Not true of foreign borrowings (e.g., *boodobiru* 'vaudeville') or mimetic words (e.g., *zabu-zabu* 'splashing a lot')
- Blocks *rendaku* when second element already has a voiced element

/t/	<i>kagi</i>	'key'	+	<i>taba</i>	'bundle'	⇒	<i>kagi-taba</i>	'bunch of keys'
	<i>mata</i>	'crotch'		<i>tabi</i>	'travel'	⇒	<i>mata-tabi</i>	'wandering life of a gambler'
	<i>ao</i>	'green'		<i>tokage</i>	'lizard'	⇒	<i>ao-takage</i>	'green lizard'
/k/	<i>ai</i>	'together'		<i>kagi</i>	'key'	⇒	<i>ai-kagi</i>	'passkey'
	<i>ao</i>	'green'		<i>kawazu</i>	'frog'	⇒	<i>ao-kawazu</i>	'green frog'
/s/	<i>naga-</i>	'long'		<i>sode</i>	'sleeve'	⇒	<i>naga-sode</i>	'long-sleeved'
/h/	<i>tori</i>	'bird'		<i>hada</i>	'skin'	⇒	<i>tori-hada</i>	'goosebumps'

(2) Another process: *g-weakening*:

- Tokyo: non-initial /g/ → [ŋ] variably, gradiently ([y] in some other dialects)

Initial	Non-initial
<i>gama</i> 'toad'	<i>kaga</i> ~ <i>kaŋa</i> 'flower bud'
<i>geta</i> 'clogs'	<i>kage</i> ~ <i>kaŋe</i> 'shade'
<i>goma</i> 'sesame seeds'	<i>kago</i> ~ <i>kaŋo</i> 'basket'
<i>gimu</i> 'obligation'	<i>kagi</i> ~ <i>kaŋi</i> 'key'

- Creates alternations: /gai/ 'foreign'

X	+	/d̥ʒiN/ 'person'	→	[gaid̥ʒiN]	'foreigner'
/koku-/ 'country'	+	X	→	[kokugai] ~ [kokuŋai]	'abroad'

(3) Ito & Mester (2003b, building on much previous work): *rendaku* interacts with *g-weakening*

UR	ori + kami	saka-toge
<i>rendaku</i>	origami	—
<i>g-weakening</i>	oriŋami	sakatoŋe
SR	oriŋami	sakatoŋe

- Rendaku feeds g-weakening in the input (creates g's that can weaken)
- g-weakening counterfeeds rendaku in the environment (removes Lyman's Law violations, but too late)

(4) Pieces of an OT analysis

- Constraint demanding rendaku: I'll call it RENDAKU
  - Ito & Mester argue that there is a [+voi] morpheme; use REALIZEMORPH
- Lyman's Law condition: \*D...D
  - OCP effect, or constraint conjunction (\*D<sup>2</sup> within the domain of the morpheme)
- IDENT<sub>IO</sub>[±voi], IDENT<sub>IO</sub>[±nas]

Rendaku:

	/hana-sono/	*D...D	REDAKU	ID[voi]
*D...D	a. hana-sono		*!	
	☞ b. hana-zono			*
REDAKU				
IDENT <sub>IO</sub> [±voi]	/naga-sode/	*D...D	REDAKU	ID[voi]
	☞ a. naga-sode		*	
	b. naga-zode	*!		*

- Exercise for the reader: eliminate the candidate [naga-zote] (device competing obstruent to allow rendaku to apply; this candidate currently wins)

g-weakening:

	/gaki/	*[ŋ]	*VgV	ID[nas]		/kagi/	*[ŋ]	*VgV	ID[nas]
*[ŋ]	☞ a. gaki					a. kagi		*!	
	b. ŋaki	*!		*		☞ b. kaŋi			*
*VgV									
IDENT <sub>IO</sub> [±nas]	/ŋaki/	*[ŋ]	*VgV	ID[nas]		/kaŋi/	*[ŋ]	*VgV	ID[nas]
	☞ a. gaki			*		a. kagi		*!	
	b. ŋaki	*!				☞ b. kaŋi			

(5) Rendaku feeds g-weakening: no problem

/ori-kami/	*D...D	*[ŋ]	REDAKU	*VgV	Id <sub>IO</sub> [voi]	Id <sub>IO</sub> [nas]
a. ori-kami			*!			
b. ori-gami				*!	*	
☞ c. ori-ŋami					*	*

(6) g-weakening counterfeeds rendaku in the environment: incorrect prediction

/ao-tokage/	*D...D	*[ŋ]	REDAKU	*VgV	Id <sub>IO</sub> [voi]	Id <sub>IO</sub> [nas]
a. ao-tokage			*!	*		
b. ao-dokage	*!			*!	*	
☞ c. ao-tokaŋe			*!			*
☞ d. ao-dokaŋe					*	*

- Surface [ŋ] can't enforce Lyman's Law; predicts transparent feeding interaction
- The intuition: correct *ao-tokaŋe* acts as if the [ŋ] was actually a [g]

(7) A sympathy analysis is possible

- Sympathy candidate  $\aleph_F = [ao-tokage]$

- This candidate would be the winner if *g*-lenition did not apply (IDENT<sub>IO</sub>[±nas] ranked on top; the selector constraint)
- The actual output *ao-tokaje* is faithful to voicing of  $\aleph_F$  (sympathy constraint = \*IDENT[voi])

/ao-tokage/	*Id[voi]	*D...D	*[ŋ]	RENDAKU	*VgV	Id <sub>IO</sub> [voi]	*Id <sub>IO</sub> [nas]
☞ a. ao-tokage				*	*!		✓
b. ao-dokage	*!	*			*	*	✓
☞ c. ao-tokaje				*			*
d. ao-dokaje	*!					*	*

- The sympathy constraint \*Id[voi] “deactivates” RENDAKU (complementary violations), but crucially, only when there is the potential for *g*-weakening (that is, when the selector constraint \*Id[nas] actually selects a subset of the candidates)

## (8) Problems with this analysis

- Ito & Mester (2003b): it only works if we assume /g/ (ROTB issue). Compare:

/ao-tokaje/	*Id[voi]	*D...D	*[ŋ]	RENDAKU	*VgV	Id <sub>IO</sub> [voi]	*Id <sub>IO</sub> [nas]
a. ao-tokage				*	*!		*
b. ao-dokage	*!	*			*	*	*
c. ao-tokaje				*			✓
☞☞ d. ao-dokaje	*!					*	✓

- Selector \*IDENT[nas] can't help if UR has nasal /ŋ/
- Perhaps some other selector? We need to favor  $\aleph_F$  with [g], so has to be some constraint favoring /g/ → [ŋ]
- Yet no faithfulness constraint could favor candidates (a,b) over (c,d); would need to admit possibility of  $\mathcal{M}$  selector (like \*ŋ)
- More important: seems to miss a fundamental difference between rendaku & *g*-weakening

Rendaku	<i>g</i> -weakening
Categorical	Gradient
Consistency within lexical items	Variable across utterances
Numerous lexical exceptions	Applies across the board
Sensitive to morphological structure	Sensitive only to initial/non-initial

- Rendaku has hallmarks of a lexical process, *g*-weakening looks post-lexical

## (9) Ito &amp; Mester's solution: adopt a stratal model of OT (Kiparsky 1998, and various other works)

- Lexical stratum: rendaku is active, *g*-weakening is not

/ori-kami/	*D...D	*ŋ	RENDAKU	*VgV	Id <sub>IO</sub> [voi]	Id <sub>IO</sub> [nas]
a. ori-kami			*!			
☞ b. ori-gami				*	*	
c. ori-ŋami		*!			*	*

/ao-tokage/	*D...D	*ŋ	RENDAKU	*VgV	Id <sub>IO</sub> [voi]	Id <sub>IO</sub> [nas]
☞ a. ao-tokage			*	*		
b. ao-dokage	*!			*	*	
c. ao-tokaje		*!				*
d. ao-dokaje		*!			*	*

/ao-tokaje/	*D...D	*ŋ	RENDAKU	*VgV	Id <sub>IO</sub> [voi]	Id <sub>IO</sub> [nas]
☞ a. ao-tokage			*	*		*
b. ao-dokage	*!			*	*	*
c. ao-tokaje		*!				*
d. ao-dokaje		*!			*	*

- Crucial: \*ŋ must include context-free (unlike \*ŋ above), if we want to obey ROTB

- Postlexical stratum: reverse holds
  - \*VgV  $\gg$  \*ŋ, IDENT[voi]  $\gg$  RENDAKU
  - Ito & Mester assume that RENDAKU continues to “see” violations; this is not crucial (we can assume that postlexical stratum is no longer sensitive to compound structure)

origami	*D...D	*VgV	Id <sub>IO</sub> [voi]	*ŋ	RENDAKU	Id <sub>IO</sub> [nas]
a. ori-kami			*!			
☞ b. ori-gami		*!				
c. ori-ŋami				*		*

aotokage	*D...D	*VgV	Id <sub>IO</sub> [voi]	*ŋ	RENDAKU	Id <sub>IO</sub> [nas]
a. aotokage		*!				
b. aodokage	*!	*				
☞ c. aotokaŋe				*		*
d. aodokaŋe			*!	*		*

(10) What does this analysis buy us?

- ROTB issue solved (if we accept that context-free \*ŋ is involved)
- Possibly explains why *g*-weakening is not sensitive to lexical structure
- May also explain why lexical exceptions to *rendaku* but not *g*-weakening: output of Lexical stratum is phonological string only, no marking for exception features
- No obvious explanation for gradientness or variability, without further assumptions

(11) A rather different approach, based on the observation that *g*-weakening is variable

Kawahara (2002 BA Thesis): faithfulness among surface variants

- The form *ao-tokage* is not just a virtual sympathy candidate, but an actual surface form in spoken Japanese
- \*IDENT[voi] could actually be IDENT to the more careful/conservative variant
- Grammar of careful/conservative Japanese is like Lexical grammar in (??)
- Colloquial forms use something like “postlexical” grammar, but IDENT<sub>IO</sub> is actually IDENT<sub>OO</sub>—Base Ident to output of careful speech grammar (recursive evaluation; Benua 1997)

(12) An interesting and novel prediction of this approach

- What will happen when Tokyo speakers stop hearing conservative *VgV* forms like [tokage]?
- Various possibilities:
  - *Rendaku* will come to apply transparently. since these words have now been relexicalized to sonorants
  - Older speakers who still remember [tokage] will continue to say compounds like [aotokaŋe], creating apparent exceptions to *rendaku* which confuse learners and prevent them from learning *rendaku* correctly (maybe fricatives only, or not at all?)

(13) Some suggestive evidence: (from Dutch and German)

Middle High German		Middle Dutch	
sg.	pl.	sg.	pl.
le:bə	le:bən	le:və	le:vən
le:pst	le:pt	le:fs	le:ft
le:pt	le:bən	le:ft	le:vən

- Voicing alternations: final devoicing and voicing assimilation

A subsequent development in some dialects: apocope of final [ə] (morphologically restricted)

- 1sg ending -ə  $\Rightarrow$   $\emptyset$

A pattern found in a few areas of Germany and the Netherlands:

Bavarian dialects		Dutch dialects	
sg.	pl.	sg.	pl.
le:b ~ le:bə	le:bən	le:v ~ le:və	le:vən
le:pst	le:pt	le:fs	le:ft
le:pt	le:bən	le:ft	le:vən

- Apocope counterfeeds final devoicing (creates surface exceptions)
- Stated differently, these forms are immune to final devoicing, because it's as if the final schwa is still there (*ich leb*)

(14) So what happens when the [ə] forms get too rare to enforce this?

Middle High German		Modern Dutch	
sg.	pl.	sg.	pl.
le:bə	le:bən	le:f	le:vən
le:pst	le:pt	le:ft	le:vən
le:pt	le:bən	le:ft	le:vən

- Goeman (1999 diss, cited in van Oostendorp 2005): Dutch dialects with opaque interaction (*ik leev*) occur only in dialects that are on the boundary between apocope and non-apocope regions (-ə vs. ∅)—e.g., Twente
- Previously, this pattern was more common (presumably when schwas were more pervasive)
- Parallel in German: some dialects have devoicing, while in others, opacity helped lead to the demise of final devoicing (Southern Bavarian and Yiddish)

(15) Summary

- Many cases of opacity—in particular, cases of opacity in the environment that are not amenable to solutions discussed last week—may be analyzable as faithfulness among surface variants
- This points to another possible virtue of opacity: in addition to keeping surface forms more similar to URs for recognition/retrieval, it also helps keep neighboring dialects more similar to each other
- The “derivations recapitulate history” effect → speakers remember the recent past, or communicate with their grandparents and neighbors (who speak more conservatively)
- When such forms are no longer available, is that the end of opacity?

## References

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Ito & Mester (2003b) Lexical and postlexical phonology in Optimality Theory: Evidence from Japanese.

Kawahara (2002) Similarity among Variants: Output-Variant Correspondence. BA thesis, International Christian University.