

Featural Sympathy: Feeding and Counterfeeding Interactions in Japanese

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The purpose of this squib is to make two points regarding opacity-creating Sympathy constraints in Optimality Theory (as proposed in McCarthy 1997 and further extended in Ito and Mester 1997b):

- (1) Just like general Faithfulness, Sympathy must be sensitive to individual features.
- (2) The abstractness entering the language system in the form of Sympathy-governed optimization can sometimes be anchored in concrete properties of the speech situation, once language variation and the coexistence of dialects and sociolects are taken into account: one dialect's sympathy candidate can be another dialect's output.

The evidence to be discussed comes from the interaction, in the standard (Tokyo) dialect of Japanese, of (i) Sequential Voicing, (ii) the Obligatory Contour Principle (OCP), and (iii) Voiced Velar Nasalization, which show both feeding and counterfeeding interactions.

1 Sequential Voicing

As is well known, the Sequential Voicing alternation in Japanese, stated in (3) in traditional rule format, voices stem-initial consonants of the second member of a compound (4a), but is blocked whenever the targeted stems contain voiced

This note grew out of discussions regarding Sympathy in the phonology proseminar at UC Santa Cruz (Ling 216, Spring 1997), and we are grateful to the participants, in particular, Dan Karvonen, Motoko Katayama, Adam Sherman, and Rachel Walker, for helpful comments and questions. This work was partially supported by faculty senate grants from the University of California at Santa Cruz and by the National Science Foundation under grant SBR-9510868. The names of the authors appear in alphabetical order.

obstruents (4b).

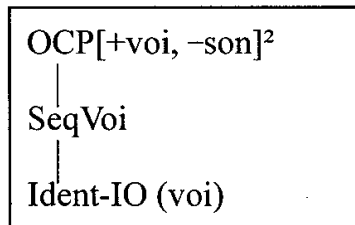
- (3) Sequential Voicing Rule (*Rendaku*; formulation here adapted from Otsu 1980)

$C \rightarrow [+voi] / \quad] + [_ X]$ Condition: X does not contain [+voi, -son]

- (4) a. Sequential voicing in compounds:
 tama ‘ball’ teppoo+**d**ama ‘bullet’
 sono ‘garden’ hana+zono ‘flower garden’
- b. Blocking of sequential voicing in stems containing voiced obstruents (“*Lyman’s Law*,” OCP on [+voice, -son]):
 taba ‘bundle’ satsu+**t**aba ‘wad of bills’ *satsu-**d**aba
 sode ‘sleeves’ furi+ sode ‘long-sleeved kimono’ *furi-**z**ode

The OT analysis of Sequential Voicing in Ito and Mester 1996, 1997a is given in (5), followed in (6) by tableaux justifying the two individual ranking relations.¹

- (5) Relevant Constraint Ranking accounting for (4):



¹ Here and throughout, “OCP[+voi, -son]” stands for the self-conjunction of the markedness constraint *[+voi, -son] against voiced obstruents (i.e., *[+voi, -son]&₁ *[+voi, -son], (for details and justification of this approach to traditional OCP-effects, see Alderete 1997 and Ito and Mester 1996; see Smolensky 1995 for the general theory of local constraint conjunction). SeqVoi (conceivably reducible to a voicing contour condition affecting derived environments, see Ito and Mester 1996) is the constraint responsible for the appearance of compound voicing, and Ident-IO(voi) is a faithfulness constraint requiring that two segments that stand in correspondence, one in the input and one in the output, be identically specified for the feature [voice]. Mutatis mutandis, other Ident constraints have similar definitions (see McCarthy and Prince 1995).

(6) Ranking justifications:

a. OCP » SeqVoi

/satsu-taba/	OCP[+voi, -son] ²	SeqVoi	Ident-IO(voi)
a. satsu-daba	*!		*
☞ b. satsu-taba		*	

b. SeqVoi » Ident-IO(voi)

/hana-sono/	OCP[+voi, -son] ²	SeqVoi	Ident-IO(voi)
☞ a. hana-zono			*
b. hana-sono		*!	

2 Velar Nasalization

Voiced Velar Nasalization (VFN) (7) is responsible for the velar nasal η replacing the plosive g in the Tokyo dialect in nonprosodic-word-initial position (*geta* vs. *ka η i*, see e.g., Trubetskoi 1949:293 for the basic generalization); actual $g \sim \eta$ alternations are shown by the last two examples, which involve bound Sino-Japanese morphemes).

(7) Voiced Velar Nasalization: /g /→[η] /_{PrWd}[...___ (where... ! \emptyset)

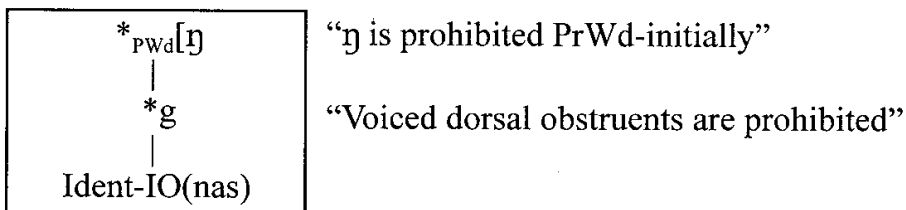
a. _{PrWd} [g.....]	b. _{PrWd} [..... η ..]
geta 'clogs'	ka η i 'key'
go '(game of) Go'	toka η e 'lizard'
gai+jiN 'foreigner'	koku+ η ai 'abroad'
guu+zEN 'accidental occurrence'	soo+ η uu 'meet accidentally'

The analysis of VFN follows the standard OT format for dealing with such allophonic relations (8): the faithfulness constraint (here, Ident-IO(nas), which militates against changes in nasality) ranks below the segmental markedness constraint (here, *g), which in turn is dominated by a contextual markedness constraint (here, *_{PrWd}[η]).² The ranking justifications in (9) confirm the allo-

² See McCarthy and Prince 1995, Ito and Mester 1997a for the phonetic motivation of the individual markedness constraints.

phonic patterning.

(8) Relevant constraint ranking accounting for (7):



(9) Ranking justifications:

a. *_{PWd}[ŋ] » *g

/geta/ ‘clogs’	* _{PWd} [ŋ]	*g	Ident-IO(nas)
☞ a. geta		*	
b. ŋeta	*!		*

b. *g » Ident-IO(nas)

/kagi/ ‘key’	* _{PWd} [ŋ]	*g	Ident-IO(nas)
a. kagi		*!	
☞ b. kaji			*

3 Interaction between Sequential Voicing and Velar Nasalization

Both feeding and counterfeeding interactions are found between Sequential Voicing and Velar Nasalization. Feeding interactions are illustrated in (10), where stem-initial Sequential Voicing feeds stem-initial VVN: *k* becomes *g* through Sequential Voicing, which in turn undergoes Voiced Velar Nasalization to become surface *ŋ*. In rule terminology, SeqVoi feeds VVN (11).

- (10) Feeding interaction: $k \rightarrow g \rightarrow \eta$
- | | | | |
|--------|------------|---------------------|---------------------------|
| kuni | ‘country’ | yuki + η uni | ‘snow country’ |
| kami | ‘paper’ | ori + η ami | ‘origami paper’ |
| kaki | ‘writing’ | yoko + η aki | ‘horizontal writing’ |
| kusuri | ‘medicine’ | nuri + η usuri | ‘medical ointment/cream’ |
| kirai | ‘dislike’ | onna+ η irai | ‘woman-hater, misogynist’ |

- (11) /ori + kami/
 SeqVoi: ori **g**ami
 VVN: ori η ami
 [ori η ami]

On the other hand, as pointed out in Ito and Mester 1997a, stem-internal η (12a) blocks Sequential Voicing, which means that in terms of Lyman’s Law (OCP on voiced obstruents), the segment in question behaves as a voiced obstruent (12b), not as a sonorant (12c).

- (12) Counterfeeding interaction:
- | | | | | | |
|----|------|-----------|----------------------|-----------------------|-----------------------|
| a. | toji | ‘sharpen’ | hasami+toji | ‘knife grinder’ | *hasami- do ji |
| | toge | ‘thorn’ | saka+toge | ‘reverse thorn’ | *saka- do ge |
| b. | taba | ‘bundle’ | satsu+taba | ‘wad of bills’ | *satsu- da ba |
| | sode | ‘sleeves’ | furi+ sode | ‘long-sleeved kimono’ | *furi- zo de |
| c. | tama | ‘ball’ | teppoo+ da ma | ‘bullet’ | |
| | sono | ‘garden’ | hana+zono | ‘flower garden’ | |

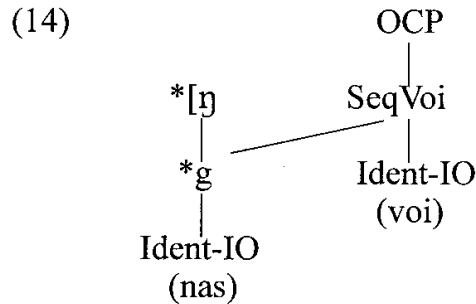
Since Sequential Voicing must precede VVN to achieve the feeding interaction in (11), OCP-blocking is the expected result in (13).

- (13) /saka+toge/
 SeqVoi: — d.n.a. — (blocked by the OCP)
 VVN: saka toge

The interaction between stem-internal VVN and stem-initial Sequential Voicing is thus counterfeeding: Had VVN applied first, it would have fed SeqVoi, because the OCP would not have found a voiced obstruent in the relevant stem. (Those who find this kind of terminology illuminating will note that VVN counterfeeds Sequential Voicing by counterbleeding the OCP.)

The first step of the OT analysis consists in connecting the two ranked sub-hierarchies of constraints (5) and (8) as in (14), where SeqVoi dominates *g

and Ident-IO(nas), crucially commanding violations of the latter (as in (15c) vs. (15a); see Ito and Mester 1997a:435–437). However, this leaves us with the usual opacity conundrum brought into focus by McCarthy 1997. Whereas the correct winner is derived for the feeding (i.e., transparent) case (15),³ the wrong candidate emerges victorious in the counterfeeding (i.e., opaque) case (16).



(15) Transparent analysis with the constraint schema (14)—correct result:

/ori-kami/	OCP [+voi, -son] ²	SeqVoi	*g	Ident-IO (nas)	Ident-IO (voi)
a. ori-kami		*!			
b. ori-gami			*!		*
c. ori-ŋami				*	*

(16) Transparent analysis with the constraint schema (14)—wrong result:

/saka-toge/	OCP [+voi, -son] ²	SeqVoi	*g	Ident-IO (nas)	Ident-IO (voi)
a. saka-toge		*!	*		
b. saka-doge	*!		*		*
Desired winner: c. saka-toŋe		*!		*	
Wrong winner: d. saka-doŋe				*	*

The only way that the desired winner could actually win in (16) would be by

³ Further issues involving optionality of VVN in certain types of compounds are discussed in Ito and Mester 1997a.

ranking Ident-IO (voi) above SeqVoi, in order to counteract the fatal SeqVoi violation—but this is an obvious impossibility since it would essentially amount to making SeqVoi inactive.

This case, then, is a further instance confirming McCarthy's 1997 contention that it is not possible to capture this kind of opaque counterfeeding interaction in canonical Optimal Theory (see McCarthy 1997 for a more formal exposition of the problem).

4 Sympathy to a Non-nasalizing Candidate

The main outlines of a sympathy account of the opaque interaction between nasalization and voicing in Tokyo Japanese are already clear from what has been said so far about the situation in Tokyo Japanese. In conformity with all other cases of opacity (see the references cited earlier), Sympathy results in another co-candidate entering decisively into the computation of optimality (through faithfulness). Since it is the nasalization present in the output that obscures ('opacifies') the sequential voicing pattern, it stands to reason that the crucial sympathy candidate must be sought within the set of *non-nasalizing co-candidates*.

In Sympathy Theory, the sympathy candidate is determined through the normal constraint hierarchy—modulo top-ranking status assigned to some designated constraint C^* . This is expressed in a more formal way in (17) (see McCarthy 1997 and Ito and Mester 1997b for further details and justification; the whole procedure can be thought of as a separate optimization in the sense of Wilson 1997, playing the role of a subroutine within the overall optimization).

- (17) Given a constraint hierarchy \mathcal{C} and a designated constraint $C^* \in \mathcal{C}$,
- a. C^* partitions the candidate set into two subsets (as do all constraints):
 - (i) those that do not violate C^* , and
 - (ii) those that violate C^* (to whatever degree—gradience of violation is irrelevant as long as there is some candidate that does not violate C^* at all).
 - b. The designated sympathy candidate (= -candidate) is that element of subset (i) that best-satisfies $\mathcal{C} - C^*$ (the rest of the constraint system), in the standard optimality-theoretic sense (Prince and Smolensky 1993).

In other words, the ☞-candidate is the *best* among the C^* -observing candidates. Since we already know that Sympathy must be oriented towards a non-nasalizing co-candidate, C^* should be a constraint disfavoring nasalization, i.e., $C^* = \text{Ident-IO}(\text{nas})$. For each input, $\text{Ident-IO}(\text{nas})^*$ defines the subset of candidates showing no change in nasality. Among these non-nasalizing candidates, (17b) selects the *ceteris-paribus*-best as the ☞-candidate.

In (18) (=16), two candidates do not violate $\text{Ident-IO}(\text{nas})$, (18a–b); the others (18c–d) violate $\text{Ident-IO}(\text{nas})$ and are not relevant for the ☞-competition (hence shaded out). Between (18a) and (18b), (18a) best-satisfies the remainder of the constraints and is hence marked as the (sympathy) ☞-candidate.⁴

(18)

/saka-toge/	OCP [+voi, -son] ²	SeqVoi	*g	Ident-IO (nas) [*]	Ident-IO (voi)
☞a. saka-toge		*	*		
b. saka-doge	*!		*		*
c. saka-toge		*		*	
d. saka-doge				*	*

It is instructive to note that the choice of $\text{Ident-IO}(\text{nas})$ as C^* is not at all far-fetched in the case of Japanese, but in fact strongly motivated by socio-linguistic factors present in the actual speech situation. After all, nasalizing dialects are in steady contact with nonnasalizing dialects, and in a non-

⁴ Since faithfulness to input nasality is the pivotal factor in determining the sympathy candidate, this analysis assumes that the input is in fact fixed as /saka-toge/. As Kazutaka Kurisu and Philip Spaelti (personal communication) point out, this raises a problem in the context of standard richness-of-the-base considerations (see Ito and Mester 1997a:425–427 for discussion of the case at issue here). For an alternative input of the form /saka-toge/, faithfulness to input nasality would wrongly lead to the choice of [saka-doge] as the sympathy candidate. This might show that the correct choice of the C^* -constraint favoring non-nasal co-candidates is not an IO-Faithfulness constraint (here, $\text{Ident-IO}(\text{nas})$), but rather a structural markedness constraint against η , which would eliminate the crucial dependence on input specifications. In a more general vein, the Kurisu-Spaelti argument shows that freedom-of-the-input issues need serious consideration in Sympathy Theory.

nasalizing (e.g., Kansai) dialect, where Ident-IO(nas) is undominated, the ☞ -candidate is the actual winning candidate. This shows that some apparently abstract feature of a given dialect's phonology, such as sympathy-governed optimization ("opacity"), can be linked to very tangible properties of the larger variation space within which the dialect in question is located.

To complete the analysis, the Sympathy constraint (a faithfulness constraint tying the output to the designated ☞ -candidate) remains to be fitted into the overall constraint ranking scheme. In the grammar of Tokyo Japanese, the [voice]-Sympathy constraint IDENT- ☞ O(voi) (19) dominates SeqVoi, as shown in (20).

- (19) Ident- ☞ O(voi): Corresponding segments in the output and the ☞ -candidate are identical in the voicing feature specification.

(20)

/saka-toge/	OCP [+voi, -son] ²	Ident- ☞ O(voi)	SeqVoi	*g	Ident- IO(nas) ☞	Ident- IO (voi)
☞ a. saka-toge			*	*!		
b. saka-doge	*!	*		*		*
☞ c. saka-toge			*		*	
d. saka-doge		*!			*	*

As the IDENT- ☞ O(voi) constraint column in (20) shows, the winning candidate (20c) is faithful (sympathetic) to the ☞ -candidate in terms of the voicing feature, whereas the competing candidate (20d) (the winner in (16)) loses because of the unfaithful (unsympathetic) voicing on [d]. The ☞ -candidate itself (20a) naturally fulfills IDENT- ☞ O(voi) but loses to (20c) with the *g constraint.

Finally, it is important to make certain that, after the inclusion of the sympathy constraint, the transparent feeding case (15) is still accounted for. For the input /ori-kami/, the winning candidate must have η , even though the ☞ -determining constraint IDENT-IO(NAS) selects the η -less form *ori-gami* as the object of sympathy. As shown in (21), this is the outcome predicted by

Ident- $\text{O}(\text{voi})$, which demands identity in voicing, but not in nasality. Crucially, *ori_gami* does better than *origami* on *g.

(21)

/ori-kami/	OCP [+voi, -son] ²	Ident- $\text{O}(\text{voi})$	SeqVoi	*g	Ident- IO(nas) [*]	Ident-IO (voi)
a. ori-gami				*!		*
b. ori-kami		*!	*			
c. ori-gami					*	*

In conclusion, and returning to the remarks at the outset, this analysis has demonstrated that, just like general Faithfulness, Sympathy can, and needs to be, feature-specific. In addition, in at least some cases where the relevant facts are accessible and have been studied in some depth, abstractness and opacity can reflect concrete features of the sociolinguistic environment.

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