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### **Authors**

Ito, Junko  
Mester, Armin  
Padgett, Jaye

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## Lexical Classes in Japanese: a Reply to Rice

Junko Ito, Armin Mester, and Jaye Padgett  
University of California, Santa Cruz

Ito, Mester, and Padgett (1995) make an argument, based on the interaction of compound voicing and postnasal voicing in Japanese, that the [voice] specification of certain nasal-obstruent clusters, though redundant, is phonologically active. The argument presupposes a well known division of the Japanese lexicon into separate *strata*—native or YAMATO, SINO-JAPANESE, sound-symbolic or MIMETIC, and more recent borrowings. Recently, Rice (1997) has attempted to cast doubt on the argument for active redundant [voice], by questioning the motivation for the relevant lexical strata. The intention of this squib is to address her arguments, and show that the posited stratal divisions for Japanese are indeed well motivated.

### 1 Background

Compound voicing (*Rendaku*) involves the voicing of initial obstruents in second compound members meeting the right structural conditions, as shown in (1) (see Ito, Mester, and Padgett 1995, Rice 1997, and works cited there for further examples).

(1) ori + **kami**    6 origami    ‘paper folding’

Rendaku is blocked when the targeted word already contains a voiced obstruent, as shown in (2).

(2) •iro + **tabi**    6 •iro**tabi**    ‘white socks’            \*•iro**dabi**

This blocking, known as Lyman’s Law, is a reflex of a more general prohibition on roots containing two voiced obstruents, such as \**dabi*, \**baga*, etc. Both the constraint on roots and Lyman’s Law are attributed to an Obligatory Contour Effect involving [voice] by Ito and Mester (1986). The argument for active redundant [voice] is based on the fact that postnasal obstruents also block Rendaku, as shown in (3).

(3) take + **tombo**    6 take**tombo**    ‘bamboo dragonfly’ (a toy)    \*take**domb**o

This fact is significant, because voicing in postnasal obstruents is predictable (in YAMATO words—see below). There are no words such as \**tompo* or \**unsari* next to actual *tombo* ‘dragonfly’ and *unzari* ‘disgusted’, etc. Within traditional generative theories of underspecification (see Steriade 1995 for references and an overview), this implies that postnasal voicing is underlyingly absent and therefore phonologically inactive. In fact, the

assumption of underspecification has been viewed as crucial to understanding Lyman's Law, since sonorants do not generally block Rendaku, as can be seen in (1) above. Voicing in sonorants is predictable, hence unspecified, according to this reasoning; voicing is therefore not present to block Rendaku in such words. In this context forms like those in (3) present a paradox: postnasal voicing is predictable, and derives from nasal voicing (itself also predictable), so it is unexpected that these forms would block Rendaku. The account presented by Ito, Mester, and Padgett (1995), though diverging a great deal from earlier underspecificationist assumptions, maintains the basic idea of underspecification for sonorants generally. Voicing in nasal-obstruent clusters is phonologically present and active, however, due to the interplay of the constraints posited within that account. In this way the facts of (1)-(3) are reconciled.

## **2 Lexical strata: stative patterns and alternations**

The Rendaku alternation is characteristic of the YAMATO, or native, vocabulary stratum in Japanese. Similarly, postnasal voicing is a property of YAMATO words. Looking to other lexical strata, one can find nasals followed by voiceless obstruents, as in *sam-po* 'walk', *han-tai* 'opposite', and *ka Ōkei* 'relation'; these are all SINO-JAPANESE compounds, borrowings from Chinese with a very long history in Japanese. More recent borrowings such as *kompyuutaa* 'computer', *santa* 'Santa (Claus)', and *ya Ōkiizu* 'Yankees (baseball team)' also provide many examples of voiceless obstruents following nasals. Given that the Japanese vocabulary as a whole includes both words like *ka Ōgae* and words like *ya Ōkiizu*, Rice (1997) suggests that voicing in postnasal obstruents should actually be treated as contrastive everywhere in Japanese. Were this true, then Japanese would not provide a case of a feature that is at the same time active and redundant. Indeed, Rice's main concern is to preserve the strong underspecificationist stance that predictable features are never phonologically active.

Rice (1997:541) correctly notes that postnasal voicing can be seen as redundant only if "redundancy is computed over only a portion of the lexicon, the native, or YAMATO, vocabulary of the language", and then argues that this computation might not be possible. That is, she suggests that faced with a choice of positing separate classes such as YAMATO and SINO-JAPANESE, versus positing a postnasal voicing contrast, learners might more plausibly do the latter. However, the arguments for this point of view do not hold up.

Stratal divisions have long played a role in linguistics, both in the phonology of Japanese and elsewhere (on Japanese, see Martin 1952, 1987, McCawley 1968, Ito and Mester 1986, 1995a,b, Vance 1987; on lexical strata in other languages, see Chomsky and Halle 1968, Kiparsky 1968, Postal 1968, Saciuk 1969, Nessly 1971, Lightner 1972, Holden 1976, and Mohanan 1986). The posited separation between YAMATO and SINO-JAPANESE, in particular, is based on at least the following phonological differences:<sup>1</sup>

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<sup>1</sup> For (4a-c), see Cho 1989, Ito 1986, Ito & Mester 1996, Martin 1952, Padgett 1995, and Tateishi 1989; for (4d), see McCawley 1968:62-73 ("C" refers to palatalized (true) consonants).

(4)	YAMATO	SINO-JAPANESE
a. roots are maximally one foot	--	yes
b. all vowels are high (first root vowels exempted)	--	yes
c. vowel syncope and fusion of obstruents	–	yes
d. C <sup>y</sup> o, C <sup>y</sup> u sequences are excluded	yes	--
e. Rendaku voicing	yes	--
f. Lyman’s Law	yes	--
g. postnasal voicing	yes	--

In addition, the two classes can be distinguished according to morpheme combinatorics. SINO-JAPANESE morphemes are bound roots that combine largely with each other, forming a large, learned and technical vocabulary analogous to the LATINATE vocabulary of English. In English, a distinction between GERMANIC and LATINATE classes of morphemes is, to our knowledge, not controversial, whether in traditional rule-based phonology and morphology or in Optimality Theory (see, for example, Prince & Smolensky (1993:49) on *cit-ation* vs. *\*writ-ation*). It is such clustering of phonological and morphological properties, commonly seen in languages investigated in detail, that motivates the stratal divisions of Japanese or English.<sup>2</sup> As usual, the overall criterion is regularity and systematicity, not exceptionlessness (see Kiparsky’s (1988:363-373) illuminating discussion of the neogrammarians’ “exceptionlessness” hypothesis). A general and well-established pattern is not disturbed by a handful of counterexamples. This is especially so when the pattern is embedded in a large network of interlocking generalizations, involving independently justified and universal constraints.

A good part of Rice’s argument against this stratal division rests on the claim that what is involved in lexical stratification is not only surface-opaque, but also purely distributional:

- (5) “Much of the evidence for lexical stratification that Ito and Mester (1995:818) cite comes not from phonological alternations but from distribution. For instance, Rendaku is the only alternation that they cite for Japanese. The other criteria are distributional [...]”

Rice (1997:546-7)

Yet there are a large number of alternations involving the relevant constraints other than Rendaku (see above), and the relevant facts are amply documented and analyzed in Western structuralist and generative literature since Martin (1952). We illustrate these now.

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<sup>2</sup> It is important not to identify the synchronic classifications of an item as GERMANIC or YAMATO with its etymological history. Borrowed words, in particular ones of frequent use, are sometimes treated as native by speakers. This phenomenon is well-known for alternations that are wide-spread and productive (though not necessarily exceptionless) in their stratum, as is the case with Rendaku voicing (see Ito & Mester 1995b:830 for examples and references, and Rice 1997:544-545 for further examples).

## 2.1 Postnasal voicing alternations

First, a well-known alternation associated with postnasal voicing is literally presented in Ito, Mester, and Padgett (1995:575-576 (data); 601 (analysis)), the very article Rice is reacting to. The gerundive suffix *-te* and the past suffix *-ta* (6a) take on postnasal voicing after verbs ending in nasals (6b). Both verbal roots and their suffixes belong to the YAMATO stratum.

(6) a.	mi-	‘see’	mi-te	‘seeing’	mi-ta	‘saw’
	ha•ir-	‘run’	ha•it-te	‘running’	ha•it-ta	‘ran’
	kaw-	‘buy’	kat-te	‘buying’	kat-ta	‘bought’
b.	with postnasal voicing:					
	yom-	‘read’	yon-de	‘reading’	yon-da	‘read’
	fum-	‘step on’	fun-de	‘stepping on’	fun-da	‘stepped on’
	kam-	‘chew’	kan-de	‘chewing’	kan-da	‘chewed’
	•in-	‘die’	•in-de	‘dying’	•in-da	‘died’
	in- <sup>3</sup>	‘leave’	in-de	‘leaving’	in-da	‘left’

Besides this fully regular and widespread alternation involving inflectional endings, compounding of verbal roots also provides a context where postnasal voicing is seen to emerge as an alternation. The situation arises whenever the first of the two roots ends in a nasal and the second one begins with a voiceless obstruent, as illustrated in (7).

(7)	fumu	‘to step on’	/fum+VERB/	
	tsukeru	‘attach’	fun-dzukeru	‘trample on’ *fun-tsukeru
	haru	‘stretch’	fum-baru	‘resist’ *fum-paru
	kiru	‘cut’	fuŌ-giru	‘give up’ *fuŌ-kiru
	•ibaru	‘tie’	fun-d̥ibaru	‘immobilize’ *fun-•ibaru

## 2.2 Alternations associated with other constraints

Rice similarly suggests that the other ‘non-surface-transparent’ constraints involved in the stratification of the Japanese lexicon lack support from alternations. These include segmental conditions (traditionally considered allophonic, e.g., affricate *ts* only before *u*), a constraint against singleton *p*, as well as the constraint against voiced obstruent geminates. We take up each of these in turn.

Consider first one of the segmental conditions mentioned by Rice<sup>4</sup>, namely, the restriction on alveolar affricate *ts*, only occurring before the vowel *u*. We find it quite surprising that Rice mentions this as a condition without alternations, since the *t~ts* alternation is well known as a textbook example of a segmental alternation found in Japanese (e.g., Halle & Clements 1983:123, among others), and in fact, is also exemplified in

<sup>3</sup> This root is archaic in contemporary Japanese.

<sup>4</sup> cf. Rice (1997:547): “[...] bilabial fricatives and alveolar affricates are disallowed in the YAMATO and SINO-JAPANESE vocabulary except before certain vowels but are found in other strata; and so on. However, these “constraints” are all rendered opaque by the fact that there are surface counterexamples.”

Ito & Mester (1995b:825), the same work Rice is referring to in her comments quoted in (5) and in footnote 4. The alveolar affricate *ts* occurs as an allophonic variant of *t* before the vowel *u*, and this alternation is widely observed in conjugated forms of verbs:

- (8) **kat-anai** ‘win-NEGATIVE-PRESENT’  
**kat-e** ‘win-IMPERATIVE’  
**kats-u** ‘win-PLAIN PRESENT’

Other verbs, with the same set of alternations, include *tat-* ‘stand’, *kat-* ‘win’, *ut-* ‘shoot’, *mot-* ‘hold’, *hanat-* ‘release’, etc. Given what Rice claims about the redundancy/contrastiveness of postnasal voicing, parity of reasoning demands that the existence of some peripheral items where *ts* occurs before other vowels (e.g., *ttaa* ‘czar’, *tsepperiN* ‘Zeppelin airship’, *kantsoone* ‘canzone’) necessitates the underlying contrastive specification of all occurrences of the alveolar affricate, including those participating in fully regular alternations.

Second, the ban against singleton *p*, ruling out any *p* that is exclusively linked to onset position, is not purely distributional. Rather, it forces an underlying singleton *p* to debuccalize to *h*. Numerous examples of *h~p* alternations can be cited from verb-root compounding (9a) (where the prefixal roots *hik-* ‘pull’ and *tsuk-* ‘stab’ induce gemination of the following consonant, see also (10)), intensifying *ma-* prefixation (9b), Sino-Japanese root compounding (9c), and Rendaku compounds where the overlay of voicing results in an overall *h~b* alternation (9d).<sup>5</sup>

- |        |                  |                |                    |                      |                        |
|--------|------------------|----------------|--------------------|----------------------|------------------------|
| (9) a. | <b>haru</b>      | ‘stretch’      | <b>hip-paru</b>    | ‘pull strongly’      | ( <b>hik-</b> ‘pull’)  |
|        | <b>ha•iru</b>    | ‘run’          | <b>tsup-pa•iru</b> | ‘dash, race’         | ( <b>tsuk-</b> ‘stab’) |
| b.     | <b>hiruma</b>    | ‘daytime’      | <b>map-piruma</b>  | ‘broad daylight’     |                        |
|        | <b>hadaka</b>    | ‘naked’        | <b>map-padaka</b>  | ‘stark naked’        |                        |
| c.     | <b>hatsu-bai</b> | ‘sale’         | <b>•up-patsu</b>   | ‘departure’          |                        |
|        | <b>hai-tatsu</b> | ‘distribution’ | <b>•im-pai</b>     | ‘worry’              |                        |
| d.     | <b>hana</b>      | ‘flower’       | <b>ike+bana</b>    | ‘flower arrangement’ |                        |
|        | <b>hata</b>      | ‘side, bank’   | <b>kawa+bata</b>   | ‘river bank’         |                        |

Finally, the constraint against voiced obstruent geminates plays an active role whenever a geminating construction is involved. The geminating pattern is exemplified in (10a) for verb-root compounding and intensive *-ri* adverb formation (*okkakeru*, *hissori*). In (10b), the otherwise expected voiced geminate constructions are avoided (*\*tsuddasu*, *\*•bbori*) in favor of a homorganic nasal + voiced obstruent sequence (*tsundasu*, *•mbori*).

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<sup>5</sup> For intensifying *ma-* prefixation and root compounding (9ab), see Poser 1984 for further exemplification and discussion; for the *h~p* alternation in Sino-Japanese compounding (9c), see Ito and Mester 1996; for the *h~b* alternation in Rendaku (9d), see Ito and Mester 1986.

(10)	a.	<b>kake-</b>	‘run’	<b>okkake-</b>	ru		‘run after’	( <i>ow-</i> ‘chase’)
		<b>tat-</b>	‘stand’	<b>tsuttats-</b>	u		‘stand straight’	( <i>tsuk-</i> ‘stab’)
		<b>biku-</b> <sup>6</sup>	‘frighten’	<b>bikku(-ri)</b>			‘surprising, frightening’	
		<b>hiso-</b>	‘secret’	<b>hisso(-ri)</b>			‘secretly’	
	b.	<b>de-</b>	‘go out’	<b>onde-</b>	ru	<b>*odde-</b>	ru	‘leave quickly’ (ow- ‘chase’)
		<b>das-</b>	‘put out’	<b>tsundas-</b>	u	<b>*tsuddas-</b>	u	‘thrust out’ ( <i>tsuk-</i> ‘stab’)
		<b>•obo-</b>	‘lone’	<b>•ombo(-ri)</b>		<b>*•obbo(-ri)</b>		‘lonely’
		<b>koga-</b>	‘burn’	<b>koŌga(-ri)</b>		<b>*kogga(-ri)</b>		‘toasted, roasted’

We emphasize that the forms cited here are neither novel nor exotic, and we find extensive discussion regarding these alternations in previous work (Martin 1952, Kuroda 1965, McCawley 1968, Poser 1984, Vance 1987, etc.). Thus, the criticism levied against the stratification of Japanese lexicon, namely, that it is only motivated by purely static constraints and not by alternations, is invalid.

But once the alternations are taken into consideration, no serious account is possible that does not, in some way, refer to lexical strata. In current Optimality Theory, accounting for an alternation usually involves ranking some markedness constraint above a relevant faithfulness constraint. Some alternations, even though central to the language (such as postnasal voicing for verbal endings in Japanese), are stratum-specific, necessitating some means of differentiating faithfulness in terms of lexical strata. Other theories employ different mechanisms, but the basic task to be accomplished remains the same. Given an analysis of the alternation, however, the stative-distributional side of the pattern is subsumed under the very same generalization— provided stratal distinctions within the lexicon are recognized.

### 3 Conclusion

Is the existence of alternations the ultimate litmus test for legitimate phonological generalizations? In other words, is purely distributional evidence really as worthless as Rice (1997) suggests? After all, there seem to be some strictly stative generalizations that are specific to certain lexical strata (see, for example, (4a,b,d) above). For phonological analysis, alternations are of course highly valuable as heuristic tools. However, instead of subscribing to an inductivist methodology that would turn phonological theory into alternation analysis, we suggest that the more productive approach is a deductive one, namely, to explore how far the explanatory net of phonology can be cast (see Yip 1996). The challenge that distributional generalizations pose for the theory is best met not by denying the evidence, but by new and imaginative solutions that make use of general theoretical principles.

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<sup>6</sup> The base (ungeminated) forms appear as reduplicated adverbs (e.g., *biku-biku*), or as stems of other lexical formations (*hiso-ka* =adj, etc.).

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