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Rendaku Dampening and Prefixes

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Abstract
Although it is well-known that the honorific prefixes o-, go- and mi- block rendaku, it has long been noted that certain compound initial elements (not necessarily prefixes) also appear to block, or at the very least dampen, rendaku. Commented upon in the literature has been the role of the lowest numerals, hito ‘one’ and futa ‘two’, in severely inhibiting rendaku, as well as the fact that some elements, such as oo- ‘large’ and the allomorphs ko- and o- ‘small’, appear to have no dampening effect on rendaku whatsoever.

Not examined in the research to date, however, are other elements, such as kata ‘one (often of two)’, bacu ‘first, initial’ or shira ‘white’, which also dampen rendaku. Possible triggers for rendaku dampening include boundness, productivity, optional generation of the mora obstruent, and apophony. Using data from the rendaku database, this presentation will seek to make sense from the confusing behaviour of these and other elements and show that, ultimately, the trigger for dampening appears to lie in numericality.*

Key words: Japanese, rendaku, morphophonology, compounds, prefixes

1. Preliminaries: Rendaku and its restrictions
Rendaku, or sequential voicing, is a well-known morphophonological phenomenon found in Japanese, whereby the voiceless initial consonant of a non-initial element in a compound may be voiced, as in:

(1) \( k \sim g: \) waka + kaeru \( \rightarrow \) wakagaeru
‘young’ ‘change’ ‘be rejuvenated’

\( s \sim z: \) neko + se \( \rightarrow \) nekoze
‘cat’ ‘back’ ‘hunchback’

\( s \sim f: \) shio + šake \( \rightarrow \) šijake
‘salt’ ‘salmon’ ‘salted salmon’

\( t \sim d: \) moji + toori \( \rightarrow \) mojidoori
‘letter, character’ ‘accordingly’ ‘literally’

\( c \sim z: \) cuke + cume \( \rightarrow \) cukezume
‘attach, stick’ ‘finger nail’ ‘false nails’

*This research is a product of the NINJAL ‘The Japanese Lexicon: A Rendaku Encyclopedia’ Collaborative Research Project and has its genesis in a paper given at the International Conference on Phonetics and Phonology at Kyoto University in December 2011. The author would like to thank those present for their valuable comments.
one’s body    near       ‘familiar, close’

‘dumpling’    ‘nose’      ‘button nose, snub nose’

‘middle-age’    ‘fatness’      ‘middle-age spread’

Over the years, a number of different factors have been put forward claiming to block, dampen, constrain, or otherwise restrict rendaku. In approximate order of fame, these have included:

• **Motoori-Lyman’s Law.** Discovered, in all likelihood independently, by Motoori (1822) and Lyman (1894). If a non-initial element contains a voiced obstruent, rendaku is blocked: thus, morphemes such as *kubi* ‘neck’, *toride* ‘fortress’ or *kange* ‘thought’ never undergo rendaku in compounds. Violations of Motoori-Lyman’s Law are rare, but include a number of compounds containing *haši* ‘ladder’, as well as a few other infrequent or obscure compounds, such as *fusunibaru* ‘tie up’ and *adajigarai* ‘horribly salty’ (see also Martin 1987: 115, Suzuki 2005).

• **Right Branch Condition.** Proposed by Otsu (1980) and refined by Itô and Mester (1986), but see criticism in Vance (1980b: 234, 1987: 138–139) and Kubozono (2005: 12–15). Here, rendaku is restricted to elements on the right branch of a constituent structure. In other words, a compound eschews rendaku when it is itself the head of a larger compound: e.g. *fuyoo teate* ‘family allowance’ or *jidoo furikomi* ‘automatic transfer’ (where *teate* ‘allowance’ and *furikomi* ‘cash transfer’ are themselves compounds). Violations of the right branch condition are not infrequent and include compounds containing, amongst others, the compounds³ *kimono* ‘ki-mono’, *sakaya* ‘off-licence, liquor store, bottle shop’, *šiai* ‘match, contest, bout’, *šikake* ‘device, contraption’, *šitate* ‘tailoring’, *šikiai* ‘relationship’, *šeriiai* ‘competition’ and *kamišimo* ‘kamishimo’. ⁴

• **Coordinate Compounds.**⁴ Coordinate compounds are double-headed and, as noted by Okumura (1955), in these compounds rendaku is blocked: e.g. *temahima* ‘time and labour’, *ikisini* ‘life and death’, *sukikirai* ‘likes and dislikes, personal preferences’. Violations are extremely rare, but include *amazuqpai* ‘sweet-and-sour’, *miqakure* ‘appearing and disappearing’ and *itagyuu* ‘painfully itchy’. Reduplicated coordinate compounds show no constraints on rendaku, however: e.g. *kirekire* ‘fragments, scraps’, *czunce* ‘always’, *samuzamu* ‘wintry, bleak’.⁵

• Restrictions based on **lexical stratum.** Elements from the foreign stratum (gairaigo)⁶ block

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¹ Morpheme-initial Modern Japanese *b* and *f* derive from an earlier *p* (Kiyose 1985, Numoto 2007), hence the *b-b* and *f-b* allomorphies.


³ Whether these examples are actually perceived as compounds or not by native speakers, and the relationship between any possible perception and right branch condition violation, is beyond the scope of this paper.

⁴ Also known as copulative or dvandva compounds.

⁵ Reduplicated coordinate compounds which can be interpreted as onomatopoeic in nature block rendaku, in line with onomatopoeic morphemes in general: e.g. *fusafula* ‘bushy, tufty’, *šiwiwa* ‘wrinkly, crinkled’. The same applies to child language: *baitai* ‘crawling’, *šete* ‘hand’.

Violations are highly sporadic, but include a few compounds containing *karuta* ‘card game’ and *kiseru* ‘pipe’ (Irwin 2011: 150–153). Elements from the Sino-Japanese stratum (*kango, jiongo*) severely dampen rendaku, with perhaps only 10% or so of compounds evincing the phenomenon (Irwin 2005).

- **Restrictions based on part of speech.** Rendaku is heavily dampened when all elements are verbs (Okumura 1955, Vance 2005): e.g. *cumi kasanaru* ‘accumulate’, *dakišimeru* ‘embrace, hug’. When the non-initial element is a deverbal noun, argument type compounds – those where the initial element is the internal argument of the verb – evince rendaku dampening (Okumura 1955, Yamaguchi 2011): e.g. *kubišuri* ‘suicide by hanging’, *yošukasi* ‘staying up late’.

Even when none of the five factors above applies, rendaku will often still fail to be triggered. Many morphemes show a strong predilection towards rendaku (*tokoro* ‘place’, *kao* ‘face’, *suši* ‘sushi’), others a strong antipathy against it (*take* ‘mushroom’, *kuso* ‘shit’, *cuči* ‘soil, earth’). Yet other morphemes appear rendaku immune (*šio* ‘tide’, *saki* ‘tip, point, ahead’, *kasu* ‘dregs, lees’): see Rosen (2003) and Irwin (2009a). Certain compounds may even show rendaku and non-rendaku variants (*cukeši ~ cukeši* ‘dipping sauce’, *yošuri ~ yožuri* ‘night fishing’, *curiša ~ curiški* ‘rope bridge’).

### 2. Rendaku and prefixes: The literature

Significantly neglected as a dampening factor on rendaku has been the effect of certain compound-initial elements. To the author’s knowledge, the subject has been touched upon to any extent in the literature only by Nakagawa (1966), Satō (1989) and Itō (2008). The former notes that:

> [When sequentially voiceable lexemes are prefixed by basic numerals such as *hito* ‘one’, *futa* ‘two’ or *mi* ‘three’, they do not undergo rendaku, as is the case also with the honorific prefixes *o-/go-/gyo-/oN-* ‘honorific’, *ma-* ‘right, directly’, *kata-* ‘one (of two)’, *kara-* ‘Cathay’, etc. That said, there are examples where rendaku does occur with *futa* ‘two’, such as *futagokoro* ‘duplicity’, *futaba* ‘bud’ and *futago* ‘twin’, and research here is required.]

Nakagawa (1966: 314)

Nakagawa here claims that there are two types of compound initial element which block rendaku: honorifics and numerals. That the former block rendaku is widely accepted and this issue will not be pursued further. Numerals are more problematic. Nakagawa notes examples where *futa* ‘two’ does admit rendaku and also stresses that his claim applies only to ‘bare’ numerals (what he terms *suusi no kibonkei* ‘basic form numerals’: e.g. *bito* ‘one’, *futa* ‘two’), not full (e.g. *bitoku, futaku*) or Sino-Japanese ones (e.g. *iči, ni, saN*). These claims will be examined in more detail below.

Satō (1989: 257) notes that ‘接頭語 (御, 真, 片, 唐など) は連濁を起こしにくい [prefixes (e.g. *o-/go-/gyo-/on*– ‘honorific’, *ma*– ‘right, directly’, *kata*– ‘one (of two)’, *kara*– ‘Cathay’,

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7 Since most such compounds are double-headed, dampening here may also be viewed as a product of co-ordination.

8 *Kara*, written 加羅 (also *Kaya* 加耶/伽耶 or *Mimana* 任那), was a 3rd–6th century CE kingdom in the southern Korean peninsula. Subsequently, in the second half of the first millennium, the meaning of *kara* was broadened to include Korea and China in general, and came to be written as *韓* (the character employed in modern Japanese for South Korea) or *唐* (the character used in modern Japanese for the Tang
etc.) dampen rendaku]. He then goes on to list examples, such as karakasa ‘bamboo and oiled paper umbrella’ and katakana ‘katakana script’. Satō seems to be claiming that all prefixes dampen rendaku: I will have more to say on this below.

Ito (2008: 87) reiterates Nakagawa’s (1966) claim for honorifics and numerals, but also cites kara ‘Cathay’ as a compound-initial element where ‘连接は起こらない [rendaku is blocked]’. It is not the case, however, that kara totally blocks rendaku, as pointed out by Otsu (1980), and shown also by such compounds as karado ‘hinged door’, karabito ‘Chinese, Korean, foreigner’ and karaginu ‘Heian period woman’s short coat’.

3. The data

The data employed below are extracted from the rendaku database (Irwin forthcoming). This database has as its data sources the two dictionaries Shinmura (2008) and Watanabe et al. (2008), and includes all compounds found in these dictionaries which have a possible rendaku site. Although the database contains over 34,000 such compounds, those violating either Motoori-Lyman’s Law or the Right Branch Condition, those whose rendaku site is from either the Sino-Japanese or foreign vocabulary stratum, and those which are coordinate compounds (both reduplicated and otherwise) have been excised. This results in a residue of 30,135 compounds, whose breakdown by part of speech is shown in Fig. 1. Pure nouns are the most frequent, comprising 59% of the database, with deverbal nouns and verbs making up a further 29% and 10%, respectively. Both deadjectival nouns and adjectives are infrequent, each comprising a little over 1% of the database.

Fig. 1  Rendaku database breakdown by part of speech

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9 These remaining 30,135 compounds have not yet been error-checked. The large size of the database means, however, that it is highly unlikely any errors that do exist will alter the statistics below to the extent where the tentative conclusions presented in §4 are put into question.
Fig. 2 shows the rendaku rates for each of these five parts of speech. As discussed in §1, verbs are conspicuous in evincing a vastly lower rendaku rate: a mere .185 as against an average of .695. If verbs are then excised from the statistics, we are left with an average rendaku rate (henceforth ARR) of .749, across a spread ranging from adjectives at .639 to deadjectival nouns at .815.

Table 1 shows the rendaku rates for 17 initial elements extracted from the database which appear to have a dampening effect on rendaku. These include not only ma, kata, kara and the bare numerals mentioned in earlier studies (see §2),¹⁰ but also hacu, moro, sira and mai. These are sorted in ascending order according to rendaku rate, while a gloss and the number of occurrences as a compound-initial element (n) are also given for each. Those elements which appear in fewer than ten compounds, and are thus of less statistical significance, are listed separately in shaded rows in the lower half of the Table.

From Table 1, it is readily apparent that Nakagawa’s claim that bare numerals dampen or block rendaku bears up: hito ‘one’, yo(N) ‘four’, nana ‘seven’, kokono ‘nine’ and momo ‘hundred’ never admit rendaku, while the only bare numeral occurring more than 10 times with a rendaku rate exceeding .300 is či ‘thousand’. Compare this with the following rendaku rates found for full numerals:¹¹ hitocu ‘one’ .615, micu ‘three’.933, yocu ‘four’ .969, yacu ‘eight’ .700.

Fig. 2  Rendaku rates by part of speech

¹⁰ Not included are the three bare numerals mu ‘six’, too ‘ten’ or yorozu ‘ten thousand’, which do not occur in the database.

¹¹ Examples are only cited for those full numerals which appear ten times or more in the database. Although no Sino-Japanese numeral appears ten times or more as an initial element in the database, these too show rendaku rates conforming closely to the ARR.
### Table 1  Rendaku rates of dampening elements

<table>
<thead>
<tr>
<th>element</th>
<th>gloss</th>
<th>n</th>
<th>rendaku rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>hito 一</td>
<td>one</td>
<td>64</td>
<td>.000</td>
</tr>
<tr>
<td>ma 真</td>
<td>right, directly¹²</td>
<td>18</td>
<td>.056</td>
</tr>
<tr>
<td>mi 三</td>
<td>three</td>
<td>25</td>
<td>.060</td>
</tr>
<tr>
<td>shira 白</td>
<td>white</td>
<td>50</td>
<td>.220</td>
</tr>
<tr>
<td>futa 二</td>
<td>two</td>
<td>17</td>
<td>.294</td>
</tr>
<tr>
<td>kara 唐</td>
<td>Cathay</td>
<td>47</td>
<td>.319</td>
</tr>
<tr>
<td>moro 諸</td>
<td>many, both, two</td>
<td>15</td>
<td>.333</td>
</tr>
<tr>
<td>kata 片</td>
<td>one (often of two)</td>
<td>57</td>
<td>.360</td>
</tr>
<tr>
<td>baku 初</td>
<td>first, initial</td>
<td>47</td>
<td>.436</td>
</tr>
<tr>
<td>chi 千</td>
<td>thousand</td>
<td>13</td>
<td>.462</td>
</tr>
<tr>
<td>ya 八</td>
<td>eight</td>
<td>9</td>
<td>.111</td>
</tr>
<tr>
<td>momo 百</td>
<td>hundred</td>
<td>9</td>
<td>.000</td>
</tr>
<tr>
<td>nana 七</td>
<td>seven</td>
<td>7</td>
<td>.000</td>
</tr>
<tr>
<td>mai 毎</td>
<td>every</td>
<td>4</td>
<td>.000</td>
</tr>
<tr>
<td>yo / yoN 四</td>
<td>four</td>
<td>4</td>
<td>.000</td>
</tr>
<tr>
<td>kokono 九</td>
<td>nine</td>
<td>3</td>
<td>.000</td>
</tr>
<tr>
<td>icu 五</td>
<td>five</td>
<td>2</td>
<td>.500</td>
</tr>
</tbody>
</table>

### 4. Dampening triggers: Exclusions and conclusions

If we remove from Table 1 (a) numerals and (b) elements appearing in the database less than ten times, there remain the six elements *ma, shira, kara, moro, kata* and *baku*. Some examples of each appearing as the initial element in a compound where rendaku is blocked are illustrated in (2). In this final section, I will seek an explanation for these elements’ dampening effect and attempt to draw some conclusions.

(2) *ma* + *fuyu* > *mafuyu*  
‘right, directly’ + ‘winter’ > ‘midwinter’

*shira* + *hata* > *shirabata*  
‘white’ + ‘flag’ > ‘white flag, flag of surrender’

---

¹² It is necessary to keep separate the two main polysemes found for *ma* when it appears in rendaku compounds – Satō’s (1989) formulation cited in §2 is too crude. The first of these may be grossly glossed as ‘right, directly’ (see (2) below for examples). The second definition may be glossed as ‘the archetype of a certain species or type’ and is mostly applied to flora and fauna (e.g. *madai* ‘red sea bream’, *maguro* ~ *makura* ‘white mulberry’, *madako* ‘common octopus’), though not always (*magokoro* ‘sincerity, devotion’, *magana* ‘early Japanese writing system’). The former definition dampens rendaku and it is the statistics for this definition, and only this definition, which are shown in Table 1. The latter definition exhibits a rendaku rate of .548 (*n* = 21), thus conforming more closely to the ARR. A third minor definition found for *ma* is as an obsolete euphemistic-honorific prefix. Examples are few (*matama* ‘jewel’, *makui* ‘comb’, *matoko* ‘bed’) and found only in pre-modern texts. As with other honorifics (§2), in such compounds rendaku never occurs. Finally, there exist four database entries where the definition of *ma* is unclear – these have been excluded from all statistics.
Traditional Japanese grammar makes a distinction between compounds (fukugō 複合語) and derivatives (haseigo 派生語), the former being composed of ‘stem+stem’, the latter of ‘affix+stem’. Could it be that rendaku dampening is restricted to prefix+stem derivatives? That forms such as those in (2) should not, in fact, be considered compounds? The problem in proving such a trigger exists, however, lies in distinguishing a prefix from a compound-initial element. What makes a common initial element such as šira (n = 50) or kata (n = 57), more prefix-like than other common initial elements which do not dampen rendaku, such as abura 油‘fat’ (.682, n = 41) or onna 女‘woman’ (.886, n = 35)?

Fortunately, the situation can be resolved by following Hōjō (1973), a well-known list of Japanese prefixes. All the six elements ma, šira, kara, moro, kata, hacu appear on Hōjō’s list and thus can indeed be considered prefixes. Unfortunately, many other prefixes, including those shown in Table 2 (again, limited to those occurring in ten compounds or more), also appear in Hōjō. Since these all show rendaku rates close to the ARR (indeed, in many cases higher), it cannot be contended that dampening is triggered by, or restricted to, derivatives rather than compounds. Satō’s (1989) claim (§2) is infelicitous.

<table>
<thead>
<tr>
<th>element</th>
<th>gloss</th>
<th>n</th>
<th>rendaku rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ma 間</td>
<td>interval</td>
<td>16</td>
<td>1.000</td>
</tr>
<tr>
<td>ko 小</td>
<td>small</td>
<td>141</td>
<td>.856</td>
</tr>
<tr>
<td>te 手</td>
<td>hand</td>
<td>143</td>
<td>.836</td>
</tr>
<tr>
<td>ryoo 両</td>
<td>both</td>
<td>16</td>
<td>.813</td>
</tr>
<tr>
<td>o 小</td>
<td>small</td>
<td>31</td>
<td>.806</td>
</tr>
<tr>
<td>ban 半</td>
<td>half</td>
<td>27</td>
<td>.630</td>
</tr>
<tr>
<td>oo 大</td>
<td>large</td>
<td>139</td>
<td>.602</td>
</tr>
</tbody>
</table>

Other possible dampening triggers can be envisaged. A more or less exhaustive list would contain the following:

- **Phonology and suprasegmentals.** There is nothing in the phonology, phonotactics or accentual patterns of ma-, šira-, kara-, moro-, kata-, hacu- which sets them apart from those prefixes in Table 2, and others. The same may be said for their moraic and syllabic length.
- **Bound vs. free prefixes.** A bound prefix may only occur as a prefix, whilst a free prefix may also occur as an independent word. The six prefixes in (2) are evenly split in this respect:
three are bound (šira-, kata-, moro-), while three are free (kara, ma, hacu). Since among
the prefixes in Table 2, we find both bound (oo-, ryoo-, ko-, o-) and free prefixes (ma, te), bound-
ness does not appear to be a trigger for dampening.

- **Apophony.** There exist a small group of nouns with variation in their final vowel: a free form
and a bound form. Although no longer productive, the most common variation is between
final free -e and final bound -a. The prefix šira- is apophonic, appearing in its bound form
rather than its free form, širo.

  However, since other apophonic nouns appearing in their
bound form, such as ama- 雨 ‘rain’ (.917), ko- 木 ‘tree, wood’ (.706), funa- 船 ‘boat’ (.721)
or saka- 酒 ‘alcohol, saké’ (.700), exhibit rates of rendaku close to or higher than the ARR,
apophony cannot be considered a trigger for dampening.

- **Q-generation.** Some prefixes in (2) allow optional variants with the mora obstruent Q (e.g.
mafuyu ‘midwinter’ ~ maQpira ‘absolutely not, (lit. totally flat), katate ‘one hand, each hand’
~ kataQpaši ‘one after the other’), while others do not (see Irwin 2009b for more on Q-
geneneration in general). However, such Q-variation can also be found among Table 2 prefixes
(e.g. ooQpira ‘unreserved, uninhibited’). Q-generation too cannot be a trigger for rendaku
damping.

- **Productivity.** Since there is no agreed objective measure for productivity, the author asked a
small number of native Japanese speakers, all university staff, to rank the prefixes in (2) on a
scale of 1-5 for productivity (5 = most productive). Averaged out and rounded to the nearest
whole number, the results were: ma- 4, hacu- 3, kata- 2, moro- 2, šira- 1, kara- 1. While not
every Japanese speaker will agree with these average scores, most would probably agree that,
with the exception of ma-, the majority are comparatively unproductive. However, some
Table 2 prefixes (haN- 3, ma- 2, o- 1) scored poorly in the same survey and must also be
deemed unproductive. Productivity cannot be a trigger for rendaku damping.

- **Numerics.** Three prefixes in (2), kata-, hacu- and moro-, although not numerals, are numeri-
cally related. However, the Table 2 prefixes ryoo- and haN- are also numerically related,
the former in particular evincing a rendaku rate higher than the ARR. It should be noted,
though, that both these prefixes are Sino-Japanese.

  We have already seen in §2 that honorifics block rendaku, while the phenomenon is severely
dampened, and in the case of hito- ‘one’ blocked, by bare numerals. We have also seen that while
the elements in (2) are all prefixes, prefixhood is not in itself a contributory factor towards damp-
ening or blocking (Table 2). Only one factor of the six possible triggers outlined above has any
bearing on rendaku dampening: the last, numerics. While Nakagawa’s (1966) claim that bare
numerals strongly dampen rendaku is borne out by data furnished by the rendaku database (§3),
it requires some slight broadening in its scope:

\[
(3) \quad \text{with the exception of full numerals, native Japanese numerically-related initial elements}
\text{strongly dampen, or may even block, rendaku}
\]

  Note that the revised formulation given in (3) includes the rubric ‘native Japanese’: recall that
Sino-Japanese numerals (ichi, ni, san, etc.) and the Sino-Japanese numerically-related prefixes in
Table 2, ryoo- and haN-, have no apparent dampening effect. Why other prefixes such as ma-,

¹³ Both this free form širo and its antonym kuro ‘black’ show rendaku rates much closer to the ARR: .574 (n = 54) and .639 (n = 70), respectively.
šira- and kara- should dampen rendaku is a question whose answer can only be brought to light by further research.

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連濁抑制と接頭辞

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要旨
「オ、ゴ、ミ」等の敬語接辞が連濁を妨害することが数十年前から定説となっているが、連濁を妨害・抑制する複合語の第一要素は敬語接辞に限れていないことも、長年の研究を通じて知られるようになった。そして、低頻詞ヒト・ヲタの第一要素が連濁を抑制するのに対し、オオ（大）やコ・オ（小）等の第一要素が連濁に影響を及ぼさないことも、先行研究で取り上げられている。ところが、カタ（片）、ハツ（初）やシラ（白）等のように連濁を抑制すると見られる第一要素はまだ取り上げられていないままである。連濁抑制の主因は様々考えられるが、連濁データベースの使用を通じて、連濁を抑制する諸要素を吟味した結果、起因は数に関連する語であると結論づけられる。

キーワード：日本語、連濁、形態音韻論、複合語、接頭辞