

Vowel Length and *Rendaku*

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Abstract

Japanese inter-vocalic voicing (= *rendaku*) is a complicated problem with many exceptions, such as the one ordinarily called ‘Lyman’s Law’. This paper investigates the possibility that vowel length influences *rendaku*. We hypothesize that *rendaku* occurs after short vowels, as in the family name 小川 [ogawa], but not after long vowels, as in the name 大川 [okawa]. We also test the claim that *rendaku* occurs rarely in non-native Sino-Japanese names. We conclude that these factors are tendencies of greater or lesser strength.

Keywords: *rendaku* (= sequential voicing), vowel length, native names
(= Yamato- kotoba), Sino-Japanese names

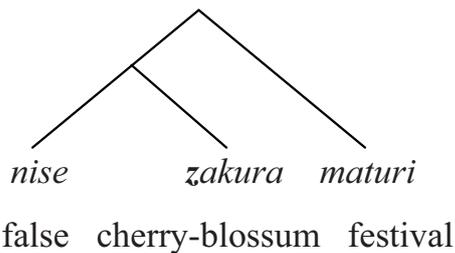
1. Introduction

This paper looks at a Japanese linguistic phenomenon which is usually called *rendaku* (= 連濁) in Japanese and in many English-language works (e.g., Vance 2007: 153, note 2; Ito & Mester 2003: 71ff; Takeuchi 1999: 48-50, and so on), although the term is sometimes translated as ‘sequential voicing’ following Martin (1952: 48), as in Yamaguchi (2007: 20-17), Iwasaki (2002: 22-24), and Shibatani (1990: 177ff). For the most part, *rendaku* is essentially intervocalic voicing assimilation¹, and it changes the voiceless initial consonant of a word into its corresponding voiced sound when it is preceded and followed by a voiced sound in a compound, as in *aburazemi* ‘a

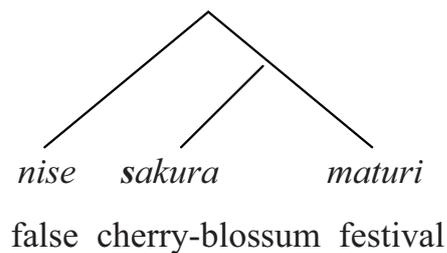
English Dictionary (1995: 450) also state that *mai-* functions as a prefix.⁵

Another morphological factor which can block *rendaku* relates to word structure in compounds made up of more than two — almost always three — elements. Shibatani (1990: 175) writes that ‘the segment that is affected and becomes voiced must belong to the word that is the lexical head of the constituent functioning as the domain of voicing.’ Shibatani gives the example of $\{(nise\ zakura)\ mature\}$ ‘(fake cherry) festival’ versus $\{nise\ (sakura\ mature)\}$ ‘fake (cherry festival)’. In structural terms, *rendaku* is normally permitted in a left-branching word like (8a) where *nise* and *sakura* fit together and together modify *maturi*, but not in a right-branching tree like (8b), where *sakura* and *maturi* fit together and are modified by *nise*:

(8) a.



b.



Rendaku is not permitted in (8b) because *nise* and *sakura* are not in the same constituent.

Finally, some blocking factors are the semantic and refer to the meaning relations of the words in a compound. One restricting semantic factor commonly noted (Shibatani 1990: 174-75; Vance 1987: 144) is the ‘equality’ of the elements in the compound. In most ordinary two-element compounds, one element, usually the first, is a modifier of the other (Vance 1987: 144). In such ordinary compounds, it generally seems to be the case that the second element, if a native word like *kami* ‘paper,’ DOES undergo *rendaku*, as in (9), if no other blocking factor (such as Lyman’s Law) interferes: *shiro* modifies *kami*, so *rendaku* is possible:

(9) [k] → [g] *siro* + *kami* → *sirogami* **sirokami*
 white paper ‘white paper’

On the other hand, compounds made up of non-modifying, coordinate elements (often called *dvandva* compounds from the Sanskrit term for this type of compound, (e.g., Bauer 2006: 723-24; Takeuchi 1999: 50; Shibatani 1990: 174-75; Otsu 1980: 213), such as *sirokuro* ‘white and black’, do not undergo *rendaku* because the two elements are coordinate and of equal status:⁶

(10) [k] ⇔ [g] *siro* + *kuro* *sirokuro* **siroguro*
 white black “white and black”

Yet another semantic factor that can block *rendaku* is the semantic relationship holding between the modifier and the head of the compound (Vance 1987: 145-46). If semantic role of the initial modifier is that of the Patient (= Theme), roughly meaning the nominal element that most directly receives the force of the verbal action depicted by the second element of the compound, then it seems that *rendaku* is ordinarily blocked. For instance, in (11) *rendaku* does not apply to the initial [t] of *tataki* ‘beat’ because the initial modifier *kane* ‘gong’ depicts the object (= the semantic Patient) that is being hit:

(11) [t] ⇔ [d] *kane* + *tataki* *kanetataki* **kanedatataki*
 gong beat ‘gong hitting’

In contrast, if the semantic role of the nominal modifier is that of Instrument, the tool or implement which is used to perform the verbal action, then *rendaku* is permitted. For example, *kaki* ‘writing’ is the head of the compound *penkaki*, and the initial modifier *pen* ‘pen’ is the semantic Instrument which is used to do the writing, and therefore *rendaku* is permitted:

(12) [k] → [g] *pen* + *kaki* → *pengaki* **penkaki*
 pen writing ‘pen-writing’ [= writing with a pen]

To make matters even more complex, there may be yet other factors which serve to block the application of *rendaku*, a point we touch upon again in our conclusion.

1.2. Another phonological factor: hypothesis.

This paper investigates yet another phonological factor which may block *rendaku*. This factor is whether the vowel before the affected consonant is a short or a long vowel.⁷ A characteristic pair of examples would be the voicing of the [k] in *kawa* “river” in the family name 小川 [ogawa], where the preceding vowel is short (13a), versus the lack of voicing in 大川 [ōkawa], where the preceding vowel is long (13b):

- (13) a. 小川 o + *kawa* → [ogawa] b. 大川 ō + *kawa* → [ōkawa]

This contrastive behavior is not limited to short [o] and long [ō], although examples with these two vowels seem to be far-and-away the most common. In (14a), the [t] of *to* “door” is voiced after a short [e] vowel, while in (14b) the [t] is left unvoiced after a long [ē] (O’Neil 1972: 201, 202):

- (14) a. 江戸 e + *to* → [edo] b. 永戸 ē + *to* → [ēto]

Similarly in (15a), the [h] of *hara* “field” is voiced after a short [i] vowel but unchanged when following the long [ī] in (15b) (O’Neil 1972: 220, 222):

- (15) a. 井原 i + *hara* → [ibara] b. 飯原 ī + *hara* → [īhara]

In this paper, our hypothesis is that *rendaku* is permitted when the preceding vowel is short but blocked when the preceding vowel is long.

- (16) **Hypothesis:** *Rendaku* is required after a short vowel, but *rendaku* is blocked after a long vowel.

Out of analytical necessity, we also test the claim that *rendaku* is largely restricted to native Japanese words in compounds and does not normally occur in Sino-Japanese words.

Next in §2, we explain the methodology that we have employed to test this kind

of phonological patterning. Then, in §3, we analyze a corpus of Japanese names comprised of compounds in which *rendaku* is theoretically possible. Finally, in §4, we summarize our findings and propose suggestions for future research.

2. Methodology

2.1. Corpus.

To test the claim that *rendaku* will occur after a short vowel, as in the family name *Ogawa*, but will be blocked after a long vowel, as in the family name *Ōkawa*, we analyzed the Japanese examples given in O’Neil’s exhaustive list of Japanese names, *Japanese names* (1972). Since O’Neil’s work covers some 36,000 names (1972: vii), it was necessary to limit the database in some manner. For the sake of expediency, we decided to confine our corpus to the Japanese names which begin with short [o] or long [ō]. This seemed a reasonable choice since there are far, far more Japanese names beginning with short [o] or long [ō] than any other Japanese short-and-long vowel pair and since this choice guaranteed that we would have hundreds of (actually over a thousand) tokens to analyze, although it would be desirable if more tokens were considered, even if that is unrealistic in this exploratory paper.

Corpus of Japanese names: Irrelevant tokens. Let us turn to the corpus of Japanese names in O’Neil’s collection. All together, 1154 Japanese names are given in O’Neil’s section (1972: 281-87) of words beginning with an ‘o’ whether short [o] or long [ō].

Of this grand total, many names were irrelevant to our purposes and were omitted from consideration. Some tokens were cut because (a) they merely repeat a previous token. O’Neil frequently repeats names in two fashions. First, he sometimes repeats a family name if two or more famous people shared the same surname. Thus O’Neil’s entry for the family name *Oda* has entries both for *Oda Nobunaga*, the first Shogun

element 帯 *obi*. While the word-initial short [o] vowel cannot affect *rendaku* in the second element of the compound, the short [i] vowel at the end of the word certainly can:

- (27) 帯 *obi* + 平 *hira* → *Obibira*
 kimono sash flat

This procedure also had the beneficial result of including tokens for which the triggering vowel was not either short [o] or long [ō]. For instance, in (27) above, the triggering vowel is short [i] of *obi*. The other three Japanese vowels also appeared as triggers (or not, as the case may be), as exemplified in (28):

- (28) a. [a] 小佐 *asa* + 手 *te* → *Osade*
 b. [u] 奥 *oku* + 原 *hara* → *Okuhara*
 c. [e] 桶 *oke* + 川 *kawa* → *Okekawa*

Secondly, it was possible to increase the total number of tokens to analyze by adding names like 小花沢 [obanazawa] which are made up of more than two kanji. *Rendaku* can apply twice: the initial element 小 [o] triggers *rendaku* in 花 [hana], yielding [obana], and the [a] at the end of 小花 [obana] triggers *rendaku* in 沢 [sawa], yielding [obanazawa], as illustrated in (29):

- (29) a. 小 o + 花 *hana* + 沢 *sawa* → *Obanazawa*
 small flower creek

Altogether 90 more tokens, most of which had a trigger other than long [ō] or short [o], could be added to our database by considering a second or even a third possible *rendaku* site in a complex 3-or-more-element compound.

This left a total of 477 Japanese names for analysis. We describe the results of our analysis in the following section.

3. Analysis

When we first surveyed our database carefully, we were reminded of McCawley's despairing words concerning the analysis of *rendaku* in Japanese. McCawley's wrote (1968: 87, note 18)

(30) I am unable to state the environment in which the 'voicing rule' applies. The relevant data are completely bewildering.

And certainly, there does seem to be a considerable amount of chaos in the application or non-application on *rendaku* in Japanese family names. A name like 小浜 is a good example of a name that may be pronounced either [obama] or [ohama], seemingly at random.

Nevertheless, with this much said, our study suggests that there are at least some strong tendencies. Our hypotheses were (1) that *rendaku* would apply after short vowels, as in the pronunciation of the family name 小川 [ogawa] but (2) would not apply after long vowels, as in the pronunciation of the family name 大川 [okawa]. It was necessary to also examine a third hypothesis in order to conduct our study, namely (3) that *rendaku* does not apply to Sino-Japanese words regardless of vowel length.

In our analysis of 1171 family names, 477 tokens were deemed relevant for study. Of this sub-total, 307 tokens (= 64%) were in line with our three hypotheses, while 170 (= 36%) contradicted them.

(31) Hypotheses supported by 307 tokens = 64%

Hypotheses contradicted by 170 tokens = 36%

In brief, speaking roughly, our hypotheses held true two-thirds of the time but failed one-third of the time. These kinds of percentages are not good enough for rocket science, but they are good enough to tell us vowel length and whether the name is of native Japanese or Sino-Japanese origin seem to be important factors in determining

their pronunciation.

Let us look at our three hypotheses one by one, beginning with hypothesis three which claims that *rendaku* applies to native Japanese words but not to borrowings such as those from the Sino-Japanese lexical stratum. In the database of relevant examples, there were a total of 74 relevant tokens in an environment in which *rendaku* could possibly apply to a word of Sino-Japanese origin. Of these 74, for 56 tokens (= 76%) *rendaku* did NOT occur, as predicted, while for 18 tokens (= 24%), *rendaku* occurred counter to prediction.

(32) Hypothesis 3: *Rendaku* does NOT occur in words in the Sino-Japanese Lexical Stratum

Hypothesis supported by 56 tokens = 76%

Hypothesis contradicted by 18 tokens = 24%

We were somewhat shocked by these percentages because, like most others studying this matter, we were under the impression that *rendaku* was rather rare with words in the Sino-Japanese lexical stratum, but we feel that 24% is anything but rare. The exact breakdown is that, for the 22 tokens of words following long vowels, *rendaku* did not occur, as predicted, in 17 cases (= 77%) but did occur in 5 cases (= 23%). For the 52 tokens of words following short vowels, *rendaku* did not occur, again as predicted, in 39 cases (= 75%) but did occur in 13 cases (= 25%).

We believe that, although the number of tokens is distressingly small, the frequency of consonant voicing after either short or long vowels in the Sino-Japanese lexical stratum is far higher than expected and is perhaps the single most important area for further research on this topic.

The next hypothesis was that, for native Japanese words, consonants following a short vowel would voice. Perhaps because Japanese was originally a strongly CV language and because CVV syllables are largely invasive, it may not be surprising

that, of the 477 relevant tokens, this was the largest sub-group with 294 tokens. However, this subgroup is the most chaotic in the sense that the percentages of tokens in line with our hypothesis and those in conflict were the most closely balanced. Of the total of 294 relevant tokens in which the consonant followed a short vowel, 170 (= 58%) were voiced, as predicted, whereas 124 (= 42%) were not voiced.

(33) Hypothesis #1: *Rendaku* occurs after short vowels in the native Japanese names

Hypothesis supported by 170 tokens = 58%

Hypothesis contradicted by 124 tokens = 42%

These percentages seem to be saying that voicing after a short vowel is pretty much a throw of the dice: half the time you'll get voicing, and half the time you won't. Our hypothesis that *rendaku* occurs after short vowels was only very weakly supported.

The last hypothesis was that *rendaku* would not occur after long vowels. The total number of native-Japanese words following a long vowel was 109 tokens. Of these, there was no voicing, as predicted, in 81 cases (= 74%), but there was voicing, against our predictions, in 28 cases (= 26%).

(33) Hypothesis #2: *Rendaku* does not occur after long vowels in the native Japanese names

Hypothesis supported by 81 tokens = 74%

Hypothesis contradicted by 28 tokens = 26%

These percentages would appear to indicate that there is a clear tendency for consonants not to voice after long vowels, but this is true only three-quarters of the time. In the other one-quarter, we get voicing. So long vowels blocking *rendaku* is only a tendency.

4. Conclusion

In sum, there is only a slight tendency (= 58%) for *rendaku* to occur after a short vowel in Japanese names, as in the family name 小川 [ogawa]. In contrast, there is a much stronger tendency (= 74%) for *rendaku* NOT to apply after long vowels, as in the name 大川 [ogawa]. Contrary to expectations, there was a surprisingly large number of Sino-Japanese names (= 24%) in which voicing occurred, as in the final element of the common family name 大久保 [ōkubo].

As for future studies, there are any number of possibilities. For one thing, while a corpus of 1171 tokens of Japanese family names is not insubstantial, it is clearly the case that our corpus is severely restricted, made up entirely of names beginning with a short or long “o”, and so it is not clear how much one can generalize on the analysis made here. On the other hand, it is fortunate that O’Neil’s work turns out to contain an abundance of tokens of Japanese names which have an initial element that is either short [o] or long [ō] – a total of 318 to be exact.⁸ As a result, we feel fairly confident that our data are most likely representative, especially because we have been able to add tokens with all five of the Japanese vowels.

Nevertheless, one obvious improvement would be to analyze more family names. O’Neil’s work includes some 36,000 family names, so it would be good to analyze a larger corpus of Japanese names. Similarly, our study focused on the names of Japanese people and places. While there is no reason to doubt that personal and place names are NOT representative of the phonological patterns in Japanese words in general, there is equally no reason to believe that personal and place names are characteristic of all Japanese words. So future studies might include common nouns, such as 小琴 [ogoto] “small koto” and 大手 [ōte] “major companies”, as well. In addition, it might be interesting to look at the voicing patterns in non-nominal constructions, such as verbal compounds like 差し込み [sašikomi] “insertion” versus

行き止り [ikidamari] “come to a stop”.

In another direction, we were often struck by questions of whether there were – or were not – micro-patterns in our corpus. We have not addressed these questions directly, but it may be the case that certain word-forms favor *rendaku*, while certain other word-forms resist voicing. We have also occasionally speculated that the seeming chaotic tendencies we see in our corpus may be part of a much larger linguistic pattern. In particular, we wonder if there may not be something like a “linguistic conspiracy”, a term Kisseberth’ coined in 1970, of a sort that favors voiceless consonants over voiced consonants. Of course, any such statement must be strongly qualified since it has been the case that Old Japanese did not contain word-initial voiced consonants but now does, in contradiction to the tendency we have just suggested.

Endnotes

¹ *Rendaku* is a controversial topic in Japanese linguistics. What we may call ‘regular *rendaku*’ is most often common-place intervocalic voicing. In cases like *abura* + *semi* becoming *aburazemi* “a large brown cicada” given in the body of this paper, *rendaku* is simple intervocalic consonant voicing where voiceless [s] becomes voiced [z] between voiced vowels. What we may call ‘irregular *rendaku*’ refers to cases in which it APPEARS that [h] alternates with [b] or with [p] as in (i) and (ii):

- | | | | |
|----------------|------------------|---|-----------------|
| (i) [h] → [b] | yae + ha | → | ya ba |
| | oblique tooth | | “oblique tooth” |
| (ii) [h] → [p] | san + hai | → | san pai |
| | sprinkle ash | | “sow” |

The problem of irregular *rendaku* was ‘solved’ by James McCawley (1968) in the classical Generative Phonology model by including historical sound changes – in

this case the historical sound changes commonly referred to as Labial Weakening or words to this effect (Shibatani 1990: 166-67) — into the derivation. For present purposes, we adopt McCawley’s analysis. McCawley’s inclusion of ancient phonological sound changes into derivations has proved unattractive to some Japanese linguists, despite their agreement that the historical sound changes actually took place since there is nothing (except the facts of irregular *rendaku*) to suggest sound alternations like [p] → [b] or [p] → [h] are more than mere ‘historical relics having no synchronic phonetic motivation’ (Shibatani 1990: 167) in the modern Japanese language.

² Lyman was, in 1894, the first Westerner to discuss exceptions to *rendaku* (Shibatani 1990: 174; Vance 1987: 136-139; Otsu 1980: 210). Lyman pointed out three broad cases in which *rendaku* does not apply. One notable set of exceptions is usually called Lyman’s Law in papers written in English (e.g., Vance 1987, Shibatani 1990, Ito and Mester 2003; Yamaguchi 2007: 21). In general, we expect that *rendaku* will voice the initial voiceless consonant of the second word in a compound, as *en* + *taku* changes to *endaku* “highrate”. However, Lyman’s Law states that, when the final element of a compound includes a voiced obstruent – the group of sounds including voiced stops, fricatives, and affricatives (namely Japanese [b d g z j]) – *rendaku* does NOT occur, with very few or perhaps no exceptions, as Ito and Mester (2003: 89) claim, which is a point we return to in the following endnote.

Some writers, such as Yamaguchi (2007: 21) give Lyman credit for being “the scholar who first recognized [Lyman’s Law] in the nineteenth century.” Others, however, are more skeptical. Vance (2007: 169-170) notes that the Japanese scholar Motoori Norinaga (1730-1801) stated something close to Lyman’s Law in his writing; also Vance says “there is a strong suspicion among experts on Japanese

linguistics that Lyman did not discover the ‘law’ that bears his name but rather learned about it from someone else that he did not acknowledge.” Nevertheless, it has become commonplace to call this exception to *rendaku* ‘Lyman’s Law’, and we will continue that practice here.

³ It is common to claim that Lyman’s Law blocks *rendaku* apparently without exception (Ito & Mester 2003: 89). However, Kindaichi (2005: 590) cites a Japanese linguist named Seichu Ooiwa who claimed to have found two counter-examples: *rei + tegami* → *reidagami* and *sho: + saburo* → *. Sho:zaburo*. Otsu (1980: 210-11) says these examples are ‘rather peripheral’, and we feel that Vance (1987: 137) gives a much more convincing example of a counter-example to Lyman’s Law, namely *nawa* ‘rope + *hasigo* ‘ladder, where the underlying [h] becomes voiced [b] despite the presence of a voiced obstruent later in the “same word,” becoming *nawabashigo* ‘rope ladder’ We are also inclined to agree with Otsu’s that, whatever is the status of these putative counter-examples, there is no doubt that Lyman’s Law is of ‘great generality’. Lyman’s Law is perhaps the only aspect of *rendaku* that applies with near-perfect regularity. In this paper, we conclude that everything else is merely a ‘tendency’.

⁴ It is often noted that, in rare cases, a non-native word may undergo *rendaku*. Yamaguchi (2007: 22) gives *ki + šōyu* becoming *kijōyu* ‘pure soy sauce’, which would be an example of *rendaku* applying to a Sino-Japanese word. However, we feel this is an uncommon, seldom-used word. A better example of voicing of a Sino-Japanese element might be the voicing to “b” in the family name 久保 [kubo].

In addition, although loanwords usually do not undergo *rendaku*, there are some interesting exceptions, namely early Portuguese loans (Loveday 1996: 50-

rendaku. We are also grateful to him for recommending O’Neil’s book *Japanese names* (1972) as a convenient way to test this hypothesis. While we will see that long vowel length often blocks voicing, we should acknowledge in advance any influence of vowel length on *rendaku* is just a tendency and that there are exceptions. On the one hand, although the family name 大林 [ōbayasi] contains a long vowel, *rendaku* occurs. Conversely, although the family name 小谷 [otani] contains a short vowel, *rendaku* does not apply. Finally, family names like 大島 can be pronounced as either [ošima] or [ōjima].

⁸ O’Neil lists an amazing number of kanji which can be realized as short or long ‘o’. Altogether O’Neil (1972: 281) lists 49 kanji which can be pronounced as short [o], including 小, 尾, 緒, 御, 於, 乎, and many others. O’Neil (1972: 281) gives 54 kanji which can be realized as long [ō], including 大, 王, 応, 押, 往, 横, and on and on.

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