

# Positional Restrictions on the Non-nasal Coda Phoneme $\varrho$ in Japanese

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black+tree#country-BAUTIFYING.MASCLINE

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## 1 Introduction

In this talk I clarify that the strength of positional restrictions on the non-nasal coda phoneme  $\varrho$ <sup>1</sup> in Japanese can be divided into four levels. This study intends to characterize  $\varrho$  both phonetically and phonologically and to describe how it is phonologically opposed to the nasal coda phoneme  $N$ , in an effort to reconstruct the phonemic system of Old Japanese.

## 2 Coda phonemes in Japanese

Supposing that syllables in Modern Japanese (hereafter “MJ”) consist of one obligatory component and three optional components as in (1) below, we find out that a variety of nasals (including nasal vowels) and obstruents<sup>2</sup> appear in coda slots:

- (1) Syllable structure in MJ:  $(O)(M)N(C)$

*O*: onset *M*: medial *N*: nucleus *C*: coda ,: mora boundary ( ): optional

- (2) Structurally different monosyllable words in MJ

<i>_N_</i>	<i>O_N_</i>	<i>_MN_</i>	<i>_N,C</i>	<i>OMN_</i>	<i>O_N,C</i>	<i>_MN,C</i>	<i>OMN,C</i>
<i>_o_</i>	<i>t_e_</i>	<i>_wa_</i>	<i>_u,N</i>	<i>tsja_</i>	<i>g_i,N</i>	<i>_jo,i</i>	<i>mjo,o</i>
[o	te	wæ	u↓N	t̃æ	g <sup>i</sup> ↓N	jo↑i	m <sup>o</sup> ↓:] <sup>3</sup>
tail	hand	circle	luck	tea	silver	early evening	strange

<sup>1</sup> Roman letters in italics denote phonologically distinctive categories in most variations.

<sup>2</sup> In this paper, obstruents are limited to non-nasal obstruents and are used as the antonym of sonorants. Strictly speaking, this definition is not correct because obstruents do not exclude nasal ones as [m], [n], and so on which are sonorants simultaneously.

<sup>3</sup> The phonetic values of vowel phonemes are affected by the adjacent phones in Japanese. For example, the allophones of a vowel phoneme slightly differ from each other in position of the tongue dorsum, depending on the point of articulation of the preceding phones. This is because the tongue dorsum stays relatively forward immediately after phones articulated at the hard palate and backward after phones at the velum or uvula. Additionally, vowels immediately adjacent to nasals (especially, vowels before nasals) are nasalized by the preparation or perservation of lowering the velum so that air may escape through the nose. For this reason,

(Continued on the following page)

↑: rising between morae (\*upstep) ↓: falling between morae (\*downstep)

As seen in the following examples, nasals and obstruents in coda slots are phonologically opposed to each other, whereas there are neither oppositions between the nasals nor those between the obstruents:

(3) Oppositions between nasals and obstruents in coda slots

- |                               |                          |                        |
|-------------------------------|--------------------------|------------------------|
| a.                            | b.                       | c.                     |
| [sɐ↓n.t̃ɛi] ‘production area’ | [sɐ↓ŋ.kʲi] ‘three terms’ | [sɐ↑ĩ.ɛiN] ‘strikeout’ |
| [sɐ↓t̃.t̃ɛi] ‘sensing’        | [sɐ↓k̃.kʲi] ‘a wile ago’ | [sɐ↑ɛ.ɛiN] ‘reform’    |

(4) Complementary distribution of nasals in coda slots

- a. [sɐ↑m.pɛ̃i] ‘three losses’ (cf. \*[sɐ↑n—], \*[sɐ↑ŋ—])  
 b. [sɐ↓n.t̃ɛ̃i] ‘three statues<sup>[三體]</sup>’ (cf. \*[sɐ↓m—], \*[sɐ↓ŋ—])  
 c. [sɐ↓ŋ.kɛ̃i] ‘three times’ (cf. \*[sɐ↓m—], \*[sɐ↓n—])

(5) Complementary distribution of obstruents in coda slots

- a. [se↑p̃.pɛ.ku] ‘urgency’ (cf. \*[se↑t̃—], \*[se↑k̃—])  
 b. [se↓t̃.tɛ.ku] ‘my house (modestly)<sup>[拙宅]</sup>’ (cf. \*[se↓p̃—], \*[se↓k̃—])  
 c. [se↓k̃.kɛ.ku] ‘with some fortune or efforts<sup>[折角]</sup>’ (cf. \*[se↓p̃—], \*[se↓k̃—])

On the basis of the distribution of nasals and obstruents in coda slots as in (3)–(5), we can determine the following two types of coda phoneme: the nasal coda phoneme *N* and the non-nasal *Q*<sup>4</sup>. The former and the latter are traditionally called “hatsuon<sup>[撥音]</sup> (lit. ‘flicking sound’)” and “sokuon<sup>[促音]</sup> (lit. ‘choked sound’)” in Japanese linguistics, respectively. According to the following description in *Shittan Yōketsu*<sup>[悉曇要訣]</sup>, written in 1101 or later, these coda phonemes seem to have been from the late Heian period (11–12 C) or earlier<sup>5</sup>:

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[ɸ↓N], [t̃ɛ̃], [gʲ↓N], [jo↑i], and [mʲo↓:] in (2) should be respectively transcribed as [ɸ↓N], [t̃ɛ̃], [gʲ↓N], [jo↑i], and [mʲo↓:] strictly speaking. Such diacritics, however, are completely omitted for brevity’s sake in this talk because the precise phonetic values can be easily estimated without them.

<sup>4</sup> In this case the phonetic values of these coda phonemes can be defined as follows:

- (I) As seen in (3)–(5), *N* is realized as nasals the point of articulation of which always fit those of the next phones by regressive assimilation, and *Q* as obstruents both of the point and manner of articulation of which are regressively assimilated.

<sup>5</sup> Nasals and obstruents in coda slots are considered to have existed then, considering the following examples, in which {ru} appears to be regressively assimilated with nasals:

- (II) a. {ar-<sup>u</sup>mer-i} ‘to be-EVD-DECL’ → あ(ヱ/ん)めり /aN.me.ri/ \*\*[ɛn.me.ɽ̃i]

(Continued on the following page)

(6) Description about sandhi of *r*-initial syllables in *Shittan Yōketsu*

日本ニモラリルレロハ急声ノ時成ニツノ音ニ一。サリシヲサツシトイヒトリサカヲトツサ  
カトイヒハリテヲハツテトイヒキリテヲキツテトイヒカリシヲカツシトイヒアリシヲ  
アツシトイフ等也。或同舌内故ノ音ト成ルアリ。タリナムヲタンナムトイヒアリナム  
ヲアンナムトイヒシリナムヲシンナムトイヒサルノトキヲサンノトキトイヒトリノトキ  
ヲトンノトキトイヒトリノウミヲトンノウミトイヒヒダリノヒダンノトイフ。

### 3 Positional restrictions on Japanese coda phonemes

#### 3.1 On the nasal coda phoneme *N*

Some of the nasal coda phoneme *N* are derived from the nasal phonemes *m* or *n* in coda slots of Sino-words. These *m* and *n* used to avoid standing immediately before non-consonantal phonemes or, from another viewpoint beyond micro-phonotactics, onsetless syllables. The nasal phonemes take the avoidance by sandhi in which they copy themselves to the next empty onset slots as follows:

(7) Old Sino-words with sandhi in which *m* or *n* in coda slots copies itself to the next empty onset slots

- a. *kwan-\_\_om*<sup>[觀音]</sup> → *kwan.n\_om* ‘Avalokiteśvara; the Goddess of Mercy’, *han-\_\_ou*<sup>[反應]</sup> → *han-n\_ou* ‘reaction’ (No example of *m*-copy.)
- b. *om-\_\_jau*<sup>[陰陽]</sup> → *om.mjau* ‘two opposite and complementary universal categories in Chinese philosophy’, *hen-\_\_ja.ku*<sup>[變易]</sup> → *hen-nja.ku* ‘changing’
- c. *sam-\_\_wi*<sup>[三位]</sup> → *sam.mwi* ‘three persons; the third rank’, *ten-\_\_wau*<sup>[天皇]</sup> → *ten-nwau* ‘emperor’

Nevertheless, *N* can come in most coda slots including those of the final syllables, and especially, modern *N* can precede onsetless syllables directly even in Sino-words<sup>6</sup> as follows:

(8) Modern Sino-words without sandhi

- a. *iN-\_\_ei*<sup>[陰影]</sup> ‘shade’, *aN-\_\_i*<sup>[安易]</sup> ‘easy(-going)’ (cf. *\*iN.m\_ei*, *\*aN.n\_i*)

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b. {*ar-<sup>n</sup>nar-i*} ‘to be-HS-DECL’ → あ(づ/ん)なり /aN.na.ri/ \*\*[en.ne.ɾi]

\*\* : reconstructed or suppositional form

<sup>6</sup> In onomatopoeia, phonologically odd native words, *N* can precede onsetless syllables as follows:

(III) *jaN-\_\_wa.ri* (cf. *ja.wa*) [jɛ̃w̃.ɰɛ̃.ɾi] ‘softly’, *boN-\_\_ja.ri* (cf. *bo.jo*) [bõjɛ̃.ɾi] ‘vaguely’



c.  $\widehat{tsja.w-i.ma.s-u=ze}^{(1)} \rightarrow \widehat{tsja.wi.ma,s.ze}^{(2)} \rightarrow \widehat{tsja,i.ma,s.se}^{(3)} \rightarrow \text{---}ma,Q.se$   
to\_differ-POL-NPST=CNFM.INFM [ $\widehat{teɛ̃}.mɛs\downarrow.se$ ] (Ibid)

<sup>(1)</sup> The deletion of the nuclei of  $O\_N\_$  syllables to decrease one syllable while keeping the number of morae ((9a)  $3\sigma-3\mu$  to  $2\sigma-3\mu$ ; (9b)  $3\sigma-3\mu$  to  $2\sigma-3\mu$ ; (9c)  $5\sigma-5\mu$  to  $4\sigma-5\mu$ ).

<sup>(2)</sup> Progressive assimilation of the voicedness (= [-voiced]).

<sup>(3)</sup> Regressive assimilation.

#### 4 Unique distribution of $Q$ in minor dialects

$Q$ , however, appears also in coda slots not followed by voiceless onsets, namely coda slots of the final syllables or those followed by voiced onsets, in some dialects of MJ. Interestingly, it can come in coda slots immediately before non-nasal obstruent onsets in all of the dialects but in the other coda slots only in few of the dialects.

Considering this difference in the strength of positional restrictions on  $Q$ , we find out that this coda phoneme avoids immediately preceding the following syllable components in ascending order from the least restrictive ones to the most:

(10) Syllable components which  $Q$  shuns immediately preceding<sup>8</sup>

- a. The voiced obstruent onsets  $b$ ,  $d$ ,  $z$ , and  $g$  (e.g.  $toQ.g_a$  [ $to\overline{g}\downarrow.g\overline{e}$ ] ‘to fly:NPST:INFM’<sup>9</sup>)
- b.1. The nasal sonorant onsets  $m$  and  $n$  (e.g.  $toQ.n_a$  [ $to\overline{d}\downarrow.n\overline{e}$ ] ‘to fly:NPST:CALL’)
- b.2. The non-nasal sonorant onset  $r$  (e.g.  $huQ.rjo.ru$  ‘to fall:IPFV:NPST’,  $oQ.rjoN.no.ni$  ‘to go down:IPFV:NPST:DSTFV’<sup>10</sup>; See Figure 1 on page 6 for more examples)
- c.1. The medials  $w$  and  $j$  (e.g.  $toQ._woQ$  [ $to\overline{?}\downarrow.o\overline{?}$ ] ‘to fly:IPFV:NPST’<sup>11</sup>,  $toQ._jo.ka$  [ $to\overline{?}\downarrow.jo\downarrow.k\overline{e}$ ] ‘to fly:NPST:CMPR’)

<sup>8</sup> The examples in (10a–b) except (10b.2) are from dialect spoken in Ichiki-Kushikino<sup>[市来-串木野]</sup> City, located in the Midwestern part of Kagoshima Prefecture, and the examples in (10b.2) Sanuki<sup>[讃岐]</sup> dialect, widely spoken in Kagawa Prefecture. (See Figure 2 on page 7 for the spoken areas of the dialects cited in this paper.)

<sup>9</sup> This word can be realized as [ $to\overline{k}.g\overline{e}$ ] or [ $to\overline{g}.g\overline{e}$ ], without the voiceless glottal stop [ $?$ ], in some dialects.

<sup>10</sup> These two forms are phonemic ones into which I transcribed words written in kara<sup>[假名]</sup> because I have not actually heard their phonetic forms.

<sup>11</sup> The voiceless glottal stop [ $?$ ] in the first coda slot is standing immediately before a vowel (e.g. [ $k\overline{e}\overline{?}.o\overline{?}$ ]), but phonologically, what  $Q$  precedes directly is considered to be not a nucleus but a medial (e.g.  $kaQ._woQ$ ). This is because nucleus-initial syllables are highly rare in this dialect, and furthermore, we should define the medial  $w$  in this example for the purpose of explaining the existence of  $toQ.gwoQ$  [ $to\overline{g}\downarrow.g\overline{o}\overline{?}$ ] ‘to fly:IPFV:NPST’,  $uQ.gwoQ$  [ $u\overline{g}\downarrow.g\overline{o}\overline{?}$ ] ‘to hit:IPFV:NPST’, and so on, which include the onset  $g$  following  $Q$ .

c.2. No components (e.g. *toQ* [toʔ] ‘to fly:NPST’)

d. Nuclei (no example)



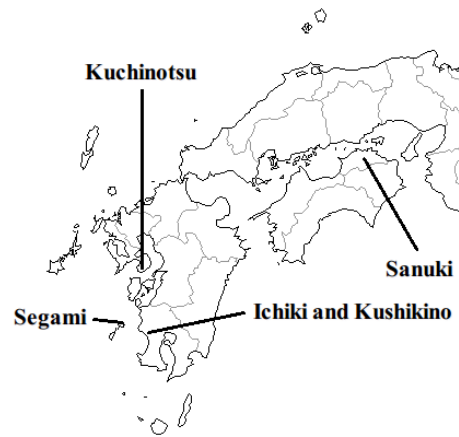
Figure 1 *qr* sequences which are seen in Kotoden's<sup>[電]</sup> enlightening signs denoting bad manners at stations and on trains

**Table 1 Correctness of *q* not followed by voiceless onsets in some dialects of MJ**

	Segami	Kuchinotsu	Sanuki	Ichi-Kushi <sup>(1)</sup>
(10a) <i>q</i> .O[-son, -nas, +voi]	OK	OK	OK > <i>N</i> <sup>(2)</sup>	OK
(10b.1) <i>q</i> .O[+son, +nas, +voi]		OK > <i>N</i>		OK > <i>N</i>
(10b.2) <i>q</i> .O[+son, -nas, +voi]			OK > <i>N</i>	
(10c.1) <i>q</i> ._M				OK
(10c.2) <i>q</i> #				OK
(10d) <i>q</i> .__N				

<sup>(1)</sup> Segami<sup>[瀬上]</sup>: dialect spoken in a small village on Kami-Koshiki Island<sup>[上甌島]</sup>, located about 40 km west of the main land of Kagoshima Pref. Kuchinotsu<sup>[口之津]</sup>: dialect spoken at the Southern end of Shimabara Peninsula<sup>[島原半島]</sup>, Nagasaki Pref. Ichi-Kushi: Ichiki and Kushikino dialect

<sup>(2)</sup> *q* has been being replaced by *N* recently (e.g. Sanuki: *o.raq.bjo.ru* > *o.ran.bjo.ru* [o.↑[em.b<sup>h</sup>o↓.rɯ]); *buq.rjo.ru* > *buN.rjo.ru* [bu↑n.r<sup>h</sup>o↓.rɯ]; Kuchinotsu: *kiq.ne* [[k<sup>h</sup>i<sup>h</sup>q̄.n<sup>h</sup>e]]<sup>12</sup> (Minami 1959) > *kin.ne* [k<sup>h</sup>in.ne]; Kushikino: *kiq.ne* [k<sup>h</sup>i<sup>h</sup>d̄<sup>h</sup>↑.ne] > *kin.ne* [k<sup>h</sup>in↑.ne]).



**Figure 2**  
**Spoken areas of the dialects**  
**cited in this paper**

Among the four dialects in Figure 2, *q* in Segami is most strongly restricted in terms of its occurrence and is allowed only to precede obstruent onsets. *q* in Segami seems to avoid immediately preceding sonorants, which can be divided into onsets and medials phonotactically, as follows:

- (11) Alternation of sonorants with voiced obstruents which prevents *q* from preceding sonorants directly
- a. *ka,k-i+\_jo-ka*<sup>(1)</sup> → *ka,k.\_jo.ka*<sup>(2)</sup> → *ka,k.d̄zjo.ka*<sup>(4)</sup> → *ka,q.d̄zjo.ka*  
to write-EV+good-NPST [[kad.d̄z̄/dzo.↑ga]]  
(Kamimura 1965: 34)
- b. *we.k-u=me,e*<sup>(1)</sup> → *we,k.me,e*<sup>(3)</sup> → *we,k.gwe,e*<sup>(4)</sup> → *we,q.gwe,e*  
to put-NPST=NEG.INFR \*\*[weg.g<sup>w</sup>e:] (Minami 1967: 14)

<sup>12</sup> [[ ]] indicates phonetic transcriptions in previous studies.





d. Nuclei

Geographical differences in the strength of the positional restrictions might teach the phonetic values of  $Q$ , which Kuroda (1967) defines instead of  $Q$  and  $N$  on the basis of complementary distribution of these coda phonemes.  $Q$  is realized as voiceless obstruents and nasals immediately before voiceless onsets and voiced ones, respectively, because of regressive assimilation in Modern Standard Japanese. Its realization seems to vary between dialects, according to positional restrictions on  $Q$  in each dialect.

(14) The phonetic values of  $Q$

a.  $buQ.ko.wa.su$  ::  $buN.na.gu.ru$

[bʊk̚.ko.wɛ.sɪ] [bʊn.nɛ.gʊ.ɾʊ]

‘EMP:to break’ ‘EMP:to hit’

b.1.  $paa=des-u=neN$  →  $paa.des.neN$  →  $paa=deQ=neN$

airbrain=COP.POL-NPST=SE [pe:.den.neẽ]

b.2.  $su+udoN=des-u=ze$  →  $-des.ze$  →  $-des.se$  →  $-deQ.se$

nature+udon noodles=COP.POL-NPST=CNFM.INFM [—des.se]



Figure 3 パーデンネン and すうでんでっせ

### Abbreviations

ATT: attaining CMPR: comparative CNFM: confirming COP: the meaning of copula verb roots ‘to be sb/st’  
 DSTFV: dissatisfactory EMP: emphatic EV: epenthetic vowel GEN: genitive-nominative INFM: informing  
 INFR: inferential IPFV: imperfective NEG: negative NPST: non-past POL: polite PST: past SE: scope  
 expansion

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