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Sequential Voicing in Old Japanese

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Abstract

This study tackles sequential voicing in Old Japanese with a focus on three matters: (a) the interaction of the eight vowels and aspirated consonants; (b) the association of the written system and sequential voicing; and (c) the interaction between the combinationality of each constituent and sequential voicing. Four hundred and seventy-two compound nouns of Old Japanese were collected from the corpus 'The Japanese Lexicon: A Rendaku Encyclopedia' by NINJAL. The findings reveal that (i) /k/ has the largest token number of sequential voicing and /p/ has the second largest token number, followed by /s/ and /t/; (ii) regarding the eight vowels /a/, /e_1/, /e_2/, /i_1/, /i_2/, /o_1/, /o_2/ and /u/, /a/ is most likely to form a [N_1-N_2] whose initial consonant is /k/, /p/ and /t/. It is not likely for the vowel /a/ to invite a voiced '/s/-initial' N_1'; /o_1/ and /o_2/ are both likely to combine with a voiced consonant /k/; /t/ and are less likely to yield a voiced /s/; /e_1/ is more likely to invite a voiced consonant than /e_2/, but /e_1/ does not invite a voiced /p/; /e_2/ does not yield a voiced /s/; and /i_1/ is likely to take a voiced consonant than /i_2/. /k/ and /t/ are the two consonants that are most likely to be voiced when forming a N-N with N_1 ends with /i_1/. /i_2/ does not invite a voiced /p/, /s/ or /t/; /u/ never results in a voiced /s/; (iii) there is a split in the characters that renders a voiced phoneme or an unvoiced phoneme; and (iv) the semantic relationship of N_1 and N_2 in [N_1-N_2] that bears sequential voicing is of six types, of which the most frequent relationship of N_1 and N_2 is [Modifier - N_2]. The [prefix-N_2] construction is not subject to sequential voicing.

Keywords: Sequential voicing, Old Japanese, Vowels, Consonant alternation, Semantic relation

1. Introduction

In Modern Japanese, nominal compounds [N_1 - N_2] fall into seven subtypes regarding the semantic relation between N_1 and N_2, as follows:

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(1) a. Object + Tran.$_{CONJ.}$;

b. Instrument + Tran.$_{CONJ.}$;

c. Modifier – Tran.$_{CONJ.}$;

d. Place – Tran.$_{CONJ.;}$

e. Method – Tran.$_{CONJ.;}$

f. Cause – Tran.$_{CONJ.;}$

g. Subject – Tran.$_{CONJ..}$

Among these variations, sequential voicing is only subject to the [N_{OBJECT} – $N_{TRAN.conj.}$] type. Sequential voicing is a phonological phenomenon: during the process of forming a nominal compound, the second constituents (N_2) rendered by aspirated consonants /k/, /s/, /h/ and /t/ become voiced.

(2) The consonants that are likely to be voiced (Kubozono 1999):

h. /k/ →/g/;

i. /s/ →/z/, /ɕ/→/(d)ʑ/;

j. /t/ →/d/, /tɕ/→/(d)ʑ/, /ts/ →/(d)z/;

k. /h/, /ç/, /ɸ/ →/b/.

(3) Provides an illustration of this consonant alternation:

(3) Illustrations of consonant alternation:

a. *kaeru* ‘frog’	→	*ama* ‘rain’ + **ka**eru	*ama**ga**eru* ‘tree frog’
b. *tsubushi* ‘crush’	→	*jikan* ‘time’ + tsubushi	*jikantsubushi* ‘time-killing’
c. *tsukuri* ‘make something’	→	*te* ‘hand’ + **tsu**kuri	*te**du**kuri* ‘hand-made’
d. *ko* ‘child’	→	*oya* ‘parent’ + ko	*oyako* ‘parent + child’

Sequential voicing has been studied intensively in Japanese linguistics since 1767. This boom was kicked off by the publication of Motoori Norinaga (1767–98), *Kojiki den*, ‘A study on *kojiki*’. Many scholars from different backgrounds have dedicated works to the constraints on sequential voicing, e.g. Motoori, Lyman (1894), Sakurai (1972), Kindaichi (1976), Akinaga (1977), Morita (1977), Okumura (1980), Yamaguchi (1988), Ohta (1998), etc. This line of research tackles the phenomenon from a phonological perspective. Motoori Norinaga demonstrated that, when N2 already contains a voiced consonant, sequential voicing should be avoided. Later, American linguist Lyman proposed similar observations in 1894.

The constraints are not limited to phonology or morphology, but extend to syntax: in other words, when N1 is the subject or object of N2, sequential voicing does not occur, cf. (4).

(4) a. Gohan	o	taku	→	gohantaki
food	ACC	cook		food cooking
b. yuki	ga	furu	→	yukifuri
snow	NOM	fall		snow falling

Another pathway comes from lexical semanticians, inspiring a morpho-syntactic approach. Representative work includes OHtsu (1980) on three-word compound nouns, indicating that, in a [N_1-N_2-N_3] compound, only the [left-headed N-N], i.e. [[N_1-N_2]-N_3], pattern accepts sequential voicing. This view is confirmed by Ito and Mester (1986), Satoo (1989) and Takayama (2001).

A different view comes from Ishizuka (1801), who noted that, in Old Japanese, when there is a voiced consonant in the first noun (N_1), the other nouns will not be voiced. Further diachronic work includes Lv (2014), who carried out an investigation on the sequential voicing regarding Sino-Japanese: '～san', '～sei', '～hon'.

Another line of research bears relevance to the present study, arguing in favour of semantic factors, i.e. the semantic relationships between N_1 and N_2. Representative work includes Ito (2008). Three constraints are proposed, as follows:

(5) Constraints on sequential voicing

a. Loanwords, Sino-Japanese (Note 1), compound verbs and onomatopoeia are ruled out;

b. When N1 and N2 are assigned to a coordinate relation, sequential voicing can be avoided;

c. When N_1 behaves as a modifier to N_2, the compound noun will avoid sequential voicing.

Figure 1 summarises the previous streams that contribute to the study of sequential voicing.

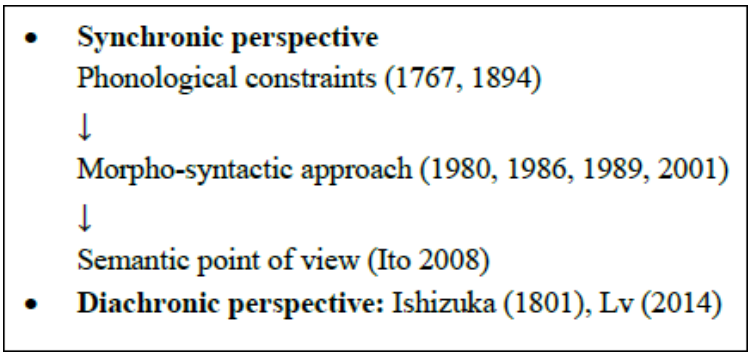

Figure 1. The streams that contributes to the study of sequential voicing

Although previous work has contributed a good deal to the phonligcal, morphological and semantic phenomena of sequential voicing, there is room for further attention.

1.1 Sequential Voicing in Old Japanese (7th-8th Century AD.)

Old Japanese is a dead language used in the Asuka and Nara periods. Essentially, its vowel system differs a good deal from Modern Japanese. The vowel harmony presented in Modern Altaic language families is displayed in Old Japanese. Unlike Modern Japanese, which contains five vowels, /a/, /i/, /u/, /e/ and /o/, there are two tyoes of the vowels /i/, /e/ and /o/, one known as *koo-rui* (type A: /i_1/; /e_1/; /o_1/) and one known as *otsu-rui* (type B: /i_2/; /e_2/; /o_2/. As a result, Old Japanese has eight vowels: /a/, /e_1/, /e_2/, /i_1/, /i_2/, /o_1/, /o_2/ and /u/ (cf. Bjarke Frellesvig 2010). Given this, the present study aims to pin down how the unique vowel system in Old Japanese interacts with consonant alternation (from aspirated to voiced). Moreover, Old Japanese features serial word construction. Therefore, this study wishes to confirm whether there is a patterning of the consonant alternation, such as when the serial noun combination is assigned to [[N_1-N_2]-N_3]: as Ohtsu (1980) put it, it is likely to have sequential voicing.

1.2 Writing System in Old Japanese

In Early Old Japanese, the script *hentai-kanbun*, 'variant Chinese', is used. the conjugations are rendered by Chinese characters: the gerund form is conveyed by 弖 'て'; the provisional form is denoted by 婆 'ば'; and the adnominal form of the *ichi dan* conjugation is rendered by the Chinese character 流 'る'. A second script in the Early Nara Period is *Junsei-kanbun*, 'purely classical Chinese', which is deemed to have been the official language in the Nara Period. In Late Old Japanese, logographic writing and phonographic writing were both borrowed. Phonographic writing is likely to render nouns, verbs and adjectives and logographic writing tends to convey case particles. In essence, a non-voicing consonant and a voiced consonant are written in different characters. For instance, 加 represents the non-vocal syllable 'ka', whilst 我 represents the voiced syllable 'ga'. Therefore, this study aims to uncover how the writing script interacted with consonant alternation.

The data is drawn from the 'Old Japanese Rendaku Database (version 1.0)'. It is the product of collaboration between the Rendaku Encyclopedia project carried out at the National Institute for Japanese Language and Linguistics (NINJAL) and the Oxford Corpus of Old Japanese (OCOJ) project carried out at the University of Oxford.

This paper is structured as follows. Section 1 summaries past work on sequential voicing. Section 2 presents quantified data, tackling the interactions of the alternation possibilities of vowels and consonants. Section 3 turns to the scripts that represent voiced and non-voiced consonants. Section 4 delves into the combinationality (or the lexicalisation degree) of the multiple-noun constructions that incorporate sequential voicing. Section 5 highlights the results and concludes the paper.

2. The Interactions of Vowels and the Voiced Consonants

As sequential voicing only takes place with the aspirated consonants, this study will focus on four consonants, /k/, /p/, /s/ and /t/, examining the interaction between them and the eight vowels /a/, /e_1/, /e_2/, /i_1/, /i_2/, /o_1/, /o_2/ and /u/.

(6) a. **Consonants**

/k/, /p/, /s/, /t/

b. **Vowels**

/a/, /e_1/, /e_2/, /i_1/, /i_2/, /o_1/, /o_2/, /u/

(7)– (12) provides illustrations of sequential voicing regarding each vowel and consonant in Old Japanese.

(7) **/o_1/ + a voiced consonant**

e.g. 琴 koto + 蒜 kami → koto**g**ami

(8) **/o_2/ + a voiced consonant**

e.g. 野 nwo + 蒜 piru → nwo**b**iru

(9) **/e_1/ + a voiced consonant**

e.g. 朝寝 asa-ne + 髪 kami → asane**g**ami

(10) **/e_2/ + a voiced consonant**

e.g. 八重 ya-pye + 垣 kaki → yapye**g**aki

(11) **/a/ + a voiced consonant**

e.g. 下 shita + 恋 kwopwi → sita**g**wopwi

(12) **/u/ + a voiced consonant**

e.g. 松 matsu + 原 hara → matsu**b**ara

Four hundred and seventy-two compound nouns of Old Japanese were collected from the corpus 'The Japanese Lexicon: A Rendaku Encyclopedia' by NINJAL. A search on the database revealed that the sequential voicing of the aspirated consonants distribute as follows: the compound nouns for which N_2 begins with the consonant /k/ have the largest token number of sequential voicing; the compound nouns for which N_2 begins with the consonant /p/ have the second largest token number (126); the compound nouns for which N_2 begins

with the consonant /s/ are attributed 61 tokens; and 114 tokens go to the compound nouns for which N_2 begins with the consonant /t/. Moreover, this study calculated the distribution of N_1 ending with the vowels /a/, /e_1/, /e_2/, /i_1/, /i_2/, /o_1/, /o_2/ and /u/. The findings are summarised in Table 1.

Table 1. Vowels and consonant alternation in Old Japanese

Vowels	*/k/ not voiced*	*/k/ voiced*	*/p/ not voiced*	*/p/ voiced*	*/s/ not voiced*	*/s/ voiced*	*/t/ not voiced*	*/t/ voiced*
/o_1/	20	9	16	4	6	1	11	6
/o_2/	10	7	2	3	4	1	3	5
/e_1/	7	11	3	0	2	1	6	2
/e_2/	5	3	0	1	0	0	2	1
/i_1/	23	11	19	9	6	1	13	10
/i_2/	3	5	0	0	0	0	0	0
/a/	49	24	34	19	39	1	35	16
/u/	16	6	11	4	8	0	6	4

A more detailed picture of the vowels and their interaction with the possibilities of sequential voicing is summarised in Figure 2.

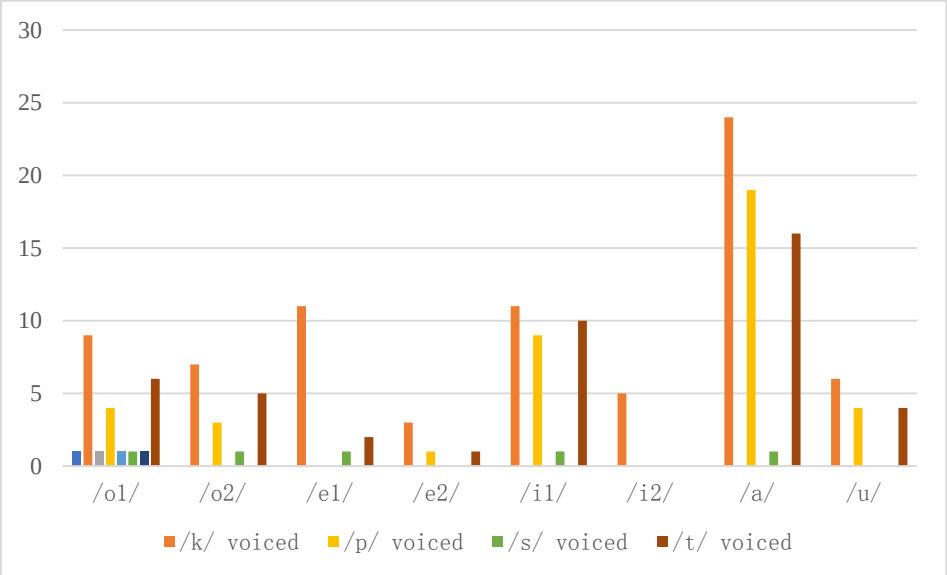

Figure 2. The interaction of vowels and consonant alternation in Old Japanese

Figure 2 reveals the following.

(a) The vowel /a/ is most likely to form a compound noun for which N_2 begins with the consonant /k/, /p/ or /t/. It is not likely for the vowel /a/ to invite a '/s/-initial N_1' becoming voiced.

(b) /o_1/ and /o_2/ present a similar picture: both are likely to give rise to sequential voicing regarding the consonant /k/ and /t/ and less likely to yield sequential voicing regarding /s/.

(c) For /e_1/ and /e_2/, the compound nouns for which N_1 ends with the vowel /e_1/ are likely to have a voiced consonant; the compound nouns for which N_1 ends with the vowel /e_2/ are not likely to. /e_1/ does not invite sequential voicing when forming a compound noun when N_1 begins with the consonant /p/. /e_2/ does not yield sequential voicing when forming a compound noun when N_2 begins with the consonant /s/.

(d) Among /i_1/ and /i_2/, N_1 that ends with the vowel /i_1/ appears more likely to take a voiced consonant than N_1 ending with /i_2/. k/ and /t/ are the two consonants most likely to be voiced when forming a N-N with N_1 ending with /i_1/. No data suggests that /i_2/ would give rise to sequential voicing when forming a compound noun for which N_1 begins with /p/, /s/ or /t/.

(e) /u/ never results in sequential voicing when forming a compound noun for which N_1 begins with /s/.

3. Writings and Sequential Voicing

Having highlighted the phonological features of sequential voicing in Old Japanese, we are now in the position to explore what the writing script has to do with the phonological matter. This study examined the 472 data entries and formed the following picture: there are different characters rendering a voiced phoneme or an unvoiced phoneme.

The opening characters differ according to whether they convey a voiced phoneme or not.

(13). **/k/-phoneme-initial characters**

- **垣**, **上**, **鴨**, **金**, **川**, **柄**, **形**, **茅**, **笥**, **薦**, **頃**, **衣**, **言**, **事**, **隈**, **雲**, **杭**, **草**, **子**, **駒** and **恋** can render both a voiced and an unvoiced phoneme.
- **貝**, **桑**, **酒** and **霧** seem solely to render a voiced phoneme.
- **樫**, **風**, **国** and **木** seem solely to convey an unvoiced phoneme.

Table 2. /k/ phoneme initial characters' phonological role

Writings	*Voiced phoneme*	*Unvoiced phoneme*	*Both voiced and unvoiced phoneme*
垣，上，鴨，金，川，柄，形，茅，笥，薦，頃，衣，言，事，隈，雲，杭，草，子，駒，恋			○
貝，桑，酒，霧，	○	×	
樫，風，国，木	×	○	

(14). **/p/ phoneme initial characters**

- **花**, **原**, **柱**, **機**, **人** and **船** can render a voiced and an unvoiced phoneme.
- **葉**, **吹**, **袋** and **衾** seem always to render a voiced phoneme.
- **橋**, **瓮**, **日**, **辺** and **重** seem only to convey an unvoiced phoneme.

Table 3. /p/-phoneme-initial characters' phonological role

Writings	***Voiced phoneme***	***Unvoiced phoneme***	***Both voiced and unvoiced phoneme***
花，原，柱，機，人，船			○
葉，吹，袋，衾	○	×	
橋，瓮，日，辺，重	×	○	

(15). **/s/-phoneme-initial characters**

- **瀬**, **白** can render a voiced and a unvoiced phoneme.
- No character seems to always render a voiced phoneme.
- **更**, **兄**, **数**, **島**, **霜**, **潮**, **代**, **獣**, **洲**, **菅**, **薄**, **十**, **麻** seem to solely convey an unvoiced phoneme.

Table 4. /k/ phoneme initial characters' phonological role

Writings	*Voiced phoneme*	*Unvoiced phoneme*	*Both voiced and unvoiced phoneme*
瀬，白，			○
	○	×	
更，兄，数，島，霜，潮，代，獣，洲，菅，薄	×	○	

(16). **/t/ phoneme initial characters**

- **玉**, **手**, **父**, **鳥**, **津** and **妻** can render a voiced and an unvoiced phoneme.
- **竹** and **処** seem solely to render a voiced phoneme.
- **栲**, **大刀**, **橘**, **時**, **月**, **苞**, **露** and **戸** seem solely to convey an unvoiced phoneme.

Table 5. /k/ phoneme initial characters' phonological role

Writings	*Voiced phoneme*	*Unvoiced phoneme*	*Both voiced and unvoiced phoneme*
玉，手，父，鳥，津，妻			○
竹，処	○	×	
栲，大刀，橘，時，月，萓，露，戸	×	○	

4. Sequential Voicing and Lexical Semantics

Drawing on the restrictions of sequential voicing highlighted above, this section moves on to consider what the combinationality of the two constituents might have to do with sequential voicing. This is explained by the following: in Old Japanese, serial verb constructions and serial noun combinations are extensively employed.

In the database, about 136 entries present sequential voicing (an appendix is provided at the end of the text). The semantic relations between the N_1 and N_2 in the serial noun constructions fall into six types, as follows.

(17) **The semantic relation between the N_1 and N_2 in Old Japanese**

(I). [Modifier – N_2]: N_1 is the modifier of N_2;

(II). [Possession – N_2]: N_1 is the possession of N_2;

(III). [Cause – N_2]: N_1 is the cause of N_2;

(IV). [Subject–object]: N_1 is subject and N_2 is the object;

(V). [Verb–object]: N_1 is verb and N_2 is the object;

(VI). N_1 and N_2 are reduplicated words.

The first type, (I). [Modifier – N_2], has six subtypes, as shown in (18).

(18) **Type I [Modifier – N_2] has six subtypes**

a. N1 indicates characteristics of N2;

b. N_1 indicates the quantity of N_2;

c. N_1 indicates the profession of N_2;

d. N_1indicates the place of N_2;

e. N_1 indicates the usage of N_2;

f. N_1 indicates the time of N_2.

The tokens of each type, along with illustrations, are provided in Table 6.

Table 6. The semantic relation between the N_1 and N_2 of the N-N that bears sequential voicing

The semantic relationship between N1 and N2	*Tokens*	*Illustrations*
(I) [Modifier – N_2]:		
a. Modifier (characteristic) – N_2	101	吉事 *yo-goto* ‘good things’
b. Modifier (quantity) – N_2	6	八節 *ya-bu* ‘many nodes’
c. Modifier (profession) – N_2	2	海人船 *ama-bune* ‘fisherman boat’
d. Modifier (time) – N_2	5	夕月夜 *yupu-toku-ywo* ‘evening moon’
e. Modifier (place) – N_2	15	宮柱 *miya-bashira* ‘palace pillar’
f. Modifier (usage) – N_2	7	針袋 *hari-bukuro* ‘needle bag’
(II) Possession – N_2	3	己妻 *ono-duma* ‘own spouse’
(III) Cause – N_2	1	朝寝髪 *asane-gami* ‘morning-sleep hair’
(IV) Subject–object	1	葉広 *pa-biro* ‘leaf spreading’
(V) Verb–object	2	語言 *katari-goto* ‘narrated words’
(VI) Reduplicated word	3	頃頃 *koro+goro* ‘nowadays’

As Table 6 suggests, the most frequent relationship of N_1 and N_2 is [Modifier – N_2] (136 tokens). The second largest number of tokens is attributed to [Possession – N_2] and [Reduplicated word]. [Verb–object] has the third largest applicability. Moreover, we note the following additional results: [Cause – N_2] (1 token) and [Subject–object] (1 token).

Furthermore, sequential voicing appears to be linked to the degree of combinationality of the multiple constituent. when the two constituents are tightly combined or being lexicalised into one word, it is likely that the second constituent would be voiced, as shown in the [Modifier – N_2] type. If, however, the first constituent acts as a prefix, sequential voicing will not be yielded.

(19) [Prefix – N_2]: N_2 is unlikely to be voiced

e.g. 真 + 梶 → ○ *ma-kadi* ‘Chinese mulberry’; ×*ma-gadi*

御 + 門 → ○ *mi-kadwo* ‘the honoured gate’; ×*mi-gadwo*

真 + 櫂 → ○ *ma-kai* ‘paired oars’; ×*ma-gai*

Why N_2 in [Prefix – N_2] does not yield sequential voicing is probably explained by the degree of lexicalisation of the multiple-nouns. In the data, 真梶 *ma-kadi* ‘Chinese mulberry’; 御門 *mi-kadwo* ‘the honoured gate’; and 真櫂 *ma-kai* ‘paired oars’, the prefix 真 and constituents 梶, 門 and 櫂 are temporally combined, which prevents the N_2 from being voiced.

5. Conclusion

This study has tackled sequential voicing in Old Japanese with a focus on three matters: (a) phonologically, the interaction between the vowels and the aspirated consonants; (b) the

association of written system and sequential voicing; and (c) the interaction between the degree of combinationality of each constituent in a multiple-noun construction and the possibility of sequential voicing. Four hundred and seventy-two data entries were examined and the following findings were reached.

(I) The compound nouns for which N_2 begins with the consonant /k/ have the largest token number of sequential voicing; the compound nouns for which N_2 begins with the consonant /p/ have the second largest token number (126); the compound nouns for which N_2 begins with the consonant /s/ are attributed 61 tokens; and 114 tokens go to the compound nouns for which N_2 begins with the consonant /t/.

(II) There were eight vowels in Old Japanese: /a/, /e_1/, /e_2/, /i_1/, /i_2/, /o_1/, /o_2/ and /u/. the interactions of these vowels and the possibilities of N_2's initial phoneme becoming voiced are as follows.

(a) The vowel /a/ is most likely to form a compound noun for which N_2 begins with the consonant /k/, /p/ and /t/. It is not likely for the vowel /a/ to invite a voiced '/s/-initial N_1'.

(b) /o_1/ and /o_2/ are both likely to combine with a voiced consonant /k/ or /t/ and are less likely to yield a voiced /s/.

(c) Regarding /e_1/ and /e_2/, the compound nouns for which N_1 ends with the vowel /e_1/ are likely to combine with a voiced consonant; the compound nouns for which N_1 ends with the vowel /e_2/ are not likely to. /e_1/ does not invite sequential voicing when forming a compound noun when N_1 begins with the consonant /p/. /e_2/ does not yield a sequential voicing when forming a compound noun when N_1 begins with the consonant /s/.

(d) For /i_1/ and /i_2/, N_1 that ends with the vowel /i_1/ is more likely to take a voiced consonant than N_1 ending with /i_2/. /k/ and /t/ are the two consonants most likely to be voiced when forming a N-N when N_1 ends with /i_1/. No data suggests that /i_2/ would give rise to sequential voicing when forming a compound noun for which N_1 begins with /p/, /s/ or/t/.

(e) /u/ never results in sequential voicing when forming a compound noun for which N_1 begins with /s/.

(III) Sequential voicing also differs based on the writing system. Old Japanese has three writing systems: *hentai-kanbun*, 'variant Chinese'; *junsei-kanbun*, 'classical Chinese'; and *man'yōgana*. Essentially, the characters that render a voiced phoneme, an unvoiced phoneme or both a voiced and an unvoiced phoneme are saliently split.

(IV) Due to the unique writing system, Old Japanese extensively employs serial verb construction and serial noun constructions. We have thus examined the semantic relationship of N_1 and N_2 of compound nouns that bear sequential voicing and have arrived at six types: [Modifier – N_2]; [Possession – N_2]; [Cause – N_2]; [Subject–object]; [Verb–object]; N_1 and N_2 are reduplicated words.

The most frequent relationship of N_1 and N_2 is [Modifier – N_2], which is explained by the combination of [a modifier and a noun] being tighter than other combinations such as

[Subject–object] or [Verb–object]. We thus contend that sequential voicing has to do with the combinationality of the multiple constituents. If the first constituent acts as a prefix , sequential voicing will not be invited.

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Note

Note 1. Three lexical strata coexist in Modern Japanese, i.e. native (wago), Sino-Japanese and loanwords.

Appendix

N2	N-N	The ending of N1
kami	koto+gami	o1
kamo	asi+gamo	i1
kane	ku+gane	
kani	asi+gani	i1
kapa	wo+gapa	o2
kapi	kaki+gapi	i1
kapi	kwopwiwasure+gapi	e1
kapi	wasure+gapi	e1
kapi	yama+gapi	
kapo	asa+gapo	
kara	ina+gara	
kara	para+gara	
kara	pisi+gara	
kata	sasara+gata	
kaya	taka+gaya	
ke	kusi+ge	i1
kokoro	two+gokoro	o2
komo	ma-wo+gomo	o2
komo	tatu+gomo	
koro	koro+goro	o1
koro	tukwi+goro	i2
koromo	sa+goromo	
koromo	sita+goromo	
koromo	tokiarapi+goromo	i2
koti	koti+goti	i1
koto	ipye+goto	e2
koto	katari+goto	i1
koto	koto+goto	o1
koto	pito+goto	o1
koto	yo+goto	o1
kuma	mi+guma	i1
kumo	sita+gumo	
kupa	nipi+gupa	i2
kupa	ura+gupa	
kupi	wi+gupi	i2
kuri	mitu+guri	
kusa	ayamye+gusa	e2
kusa	momoyo+gusa	o1
kusa	netukwo+gusa	o2

kusa	nikwo+gusa	o2
kusa	uwe+gusa	e1
kusi	kotona+gusi	
kusi	we+gusi	e1
kutu	uke+gutu	e1
kwiri	asa+gwiri	
kwiri	yupu+gwiri	
kwo	mana+gwo	
kwo	waku+gwo	
kwoma	aka+gwoma	
kwopwi	sita+gwopwi	
pa	momiti+ba	i1
pa	sasa+ba~sasa+pa	
pa	sita+ba	
pa	ti+ba	i1
pa	ura+ba	
pa	yaswo+ba	o2
paka	kari+baka	i1
pana	kapo+bana	o1
pana	sayuri+bana	i1
pana	sakura+bana~sakura+pana	
pana	wo+bana	o2
papaki	tama+bapaki	
para	matu+bara	
para	wakakurusu+bara	
pasira	mana+basira	
pasira	miya+basira	
pata	kana+bata	
patisu	pana+batisu	
pi	usura+bi	
piro	pa+biro	
piru	nwo+biru	o2
pito	ipye+bito	e2
pito	puna+bito	
pito	sakari+bito	i1
pito	satwo+bito	o2
pito	yama+bito	
pito	yamasapa+bito	
poso	pipa+boso	
pu	ya+pu~ya+bu	
puki	yama+buki	
pukurwo	pari+bukurwo	i1

pukurwo	suri+bukurwo	i1
pune	ama+bune	
pune	opo+bune	o1
pune	turi+bune	i1
pune	wo+bune	o2
pusuma	kwo+busuma	o2
pusuma	madara+busuma	
pusuma	musi+busuma	i1
pusuma	taku+busuma	
pwi	sita+bwi	
se	watari+ze	i1
sirwo	ne+zirwo	e1
ta	yama+da	
ta-suki	putwo+dasuki	o2
take	ikumi+dake	i1
take	tasimi+dake	i1
take	uwe+dake	e2
take	yo+dake	o1
tama	aka+dama	
tama	ana+dama	
tana	puna+dana	
tate	wo+date	o1
te	koromo+de	o1
te	matama+de	
te	sakwi+de	i2
te	tama+de~tama+te	
ti	asa+di	
ti	wo+di	o2
toko	ywo+doko	o2
tomo	kwo+domo	o2
tori	miyakwo+dori	o2
tori	moti+dori	i1
tori	mye+dori	e2
tori	na+dori	
tori	nipo+dori (~nipo+tori)	o1
tori	opowoso+dori	o1
tori	pamasu+dori	
tori	su+dori	
tori	ti+dori~ti+tori	i1
tori	wa+dori	
tori	wosi+dori	i1
tori	yasaka+dori	

tori	yama+dori	
tu	komori+du	i1
tukasa	nwo+dukasa	o2
tuki	saka+duki	
tuku-ywo	yupu+dukuywo	
tuma	oku+duma	
tuma	omopi+duma	i2
tuma	ono+duma	o1
tuma	pana+duma	
tuma	pasi+duma	i1
tuwe	tatuka+duwe	
two	ne+dwo	e1
two	tati+dwo	i1