

# Postnasal Voicing, Japanese *Rendaku* and the Naturalness Condition

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## Postnasal Voicing

A nasal immediately followed by a voiceless obstruent is generally considered marked (i.e., dispreferred) for both articulatory reasons (Huffman 1993) and perceptual reasons (Ohala and Ohala 1993). The assimilatory pressure that repairs such sequences or prevents them from arising in the first place is commonly called **postnasal voicing** (PNV) and is attributed by OT enthusiasts to a (putatively universal) constraint such as \*NC<sub>0</sub> (Kager 1999).

## Rendaku

In modern Tokyo Japanese (MTJ), many morphemes beginning with an obstruent have one allomorph in which the initial obstruent is voiceless and another in which it is voiced, as in:

/tana~/dana/ /tana/ ‘shelf’  
 /iwa+dana/ ‘rock ledge’ (cf. /iwa/ ‘rock’)

The initial voiced obstruent in /dana/ is an instance of *rendaku* ‘sequential voicing’.

*Rendaku* does not actually occur in every compound with an eligible second element, and although many factors are known to affect likelihood of *rendaku* to some degree, the phenomenon is to a significant extent unpredictable.

## Phonetic Opacity

The /t~/d/ alternation involves only voicing ([t]~[d]), but in other cases a voiceless obstruent and its *rendaku* partner differ in more than just voicing (Takayama 2013:109; Vance 2015:397–398).

/f~/b/ : [ϕ]~[b] /c~/z/ : [ts]~[dz]/[z]  
 /h~/b/ : [h]/[ç]~[b] /s~/z/ : [s]~[dz]/[z]  
 /t~/d/ : [t]~[d] /š~/j/ : [ç]~[dʒ]  
 /č~/j/ : [tʃ]~[dʒ] /k~/g/ : [k]~[g]/[ŋ]

*Rendaku* was already well established in 8th-century Old Japanese (OJ), and the **phonetic opacity** of the alternations in MTJ is due to several different phonological changes that have taken place in the last 1,200 years.

## Orthographic Transparency

The moraic *kana* subsystems of the Japanese writing system (*hiragana* and *katakana*) represent the *rendaku* alternations in a uniform way, using a diacritic (゛) called *dakuten*:

ふね /fune/ ‘boat’	は /ha/ ‘leaf’
こぶね /ko+bune/ ‘small boat’	あおば /ao+ba/ ‘green leaf’
と /to/ ‘door’	ち /çi/ ‘blood’
あみど /ami+do/ ‘screen door’	はなぢ /hana+ji/ ‘nosebleed’
す /su/ ‘vinegar’	つつ /cucu/ ‘tube’
あまず /ama+zu/ ‘sweet vinegar’	やづつ /ya+zucu/ ‘quiver’
しま /šima/ ‘island’	かお /kao/ ‘face’
こじま /ko+jima/ ‘small island’	えがお /e+gao/ ‘smile face’

The reason for this **orthographic transparency** is that *kana* first came into use ca. 900, before the phonological changes mentioned above had taken place.

## Dakuon

The traditional term *dakuon* denotes either an entire mora beginning with a voiced obstruent or just the voiced obstruent alone. Following the custom of Japanese philological research, the replacement of a voiceless obstruent with its *rendaku* partner can be called *dakuon-ka* ‘*dakuon*-ization’ (abbreviated hereafter as D) to distinguish it from straightforward phonetic voicing.

It is also common practice to refer to the orthographic manifestation of D in (i.e., the addition of the diacritic to the first letter of the *kana* representation of a morpheme) as D.

## The History of PNV

PNV was an automatic process in Japanese a millennium ago but was no longer automatic a few centuries later (Frellesvig 2010). It affected mostly Sino-Japanese vocabulary items, and traces of it remain in MTJ, but since the voiced–voiceless pairings involved are the same as the *rendaku* pairings, it is more appropriate to refer to the present-day cases as PND (postnasal *dakuon-ka*) rather than as PNV:

北緯 /hoku-i/ ‘north latitude’  
 南北 /naN·boku/ ‘south and north’  
 終了 /šuu-ryoo/ ‘conclusion’  
 臨終 /riN·juu/ ‘moment of death’

In addition, PNV affected some inflectional forms of verbs in Early Middle Japanese (EMJ), including the “gerund” form:

OJ	EMJ	MTJ
/yomi-te/ [jomite]	> /yoN-de/	> /yoN-de/ ‘reading’
/tobi-te/ [tō <sup>m</sup> bite]	> /toū-de/	> /toN-de/ ‘flying’
/masi-te/ [masite]	> /masi-te/	> /maši-te/ ‘increasing’

## Morphophonemic Opacity

As PNV ceased to operate automatically, its effects became increasingly opaque.

(1) The merger of nasal /ū ī/ with oral /u i/ affected both Sino-Japanese words and inflectional forms of native verbs:

MTJ/kag-u/ ‘sniff’ EMJ/kaī-de/ > MTJ/kai-de/ ‘sniffing’  
 MTJ/kak-u/ ‘write’ EMJ/kai-te/ > MTJ/kai-te/ ‘writing’  
 EMJ/toū-goku/ > MTJ/too-goku/ ‘eastern provinces’  
 EMJ/saN-goku/ > MTJ/saN-goku/ ‘three kingdoms’

(2) Many Sino-Japanese words coined in Late Middle Japanese (LMJ) lacked PNV, and some older vocabulary items that had PNV later lost it via analogical leveling:

LMJ/saN-kaku/ > MTJ/saN·kaku/ ‘triangle’ [13th c.]  
 LMJ/teN-ga/ > MTJ/teN·ka/ ‘under heaven’ [9th c.]

(3) Some Sino-Japanese doublets show the same pairings that PNV produced:

財政 /zai-sei/ ‘financial affairs’ /zai/ = *goon* 呉音 (older)  
 財布 /sai-fu/ ‘wallet’ /sai/ = *kan’on* 漢音 (newer)  
 管財 /kaN·zai/ ‘estate administration’

## The Naturalness Condition

According to what Postal (1968) called the “naturalness condition,” classes of segments that behave together phonologically must be definable in phonetic terms (Mielke 2008; Ladd 2014), but not all researchers have accepted this idea.

A phonological analysis of MTJ that uses D as a phonological feature can characterize a psychologically real symmetry between two classes of consonants as ±D without worrying about the mismatch between D and phonetic voicing.

If D is understood as purely phonological and not conflated with phonetic voicing, the irregularity of PND in MTJ (like the irregularity of *rendaku*) is a manageable problem.

There is no longer any reason for the dubious claim that this phonetically motivated assimilation process is active but mysteriously limited to the “native” sector of the vocabulary. Monomorphemic native words like /iNčiki/ ‘trickery’ are no more problematic than monomorphemic loanwords like /beNči/ ‘bench’.

And, the conspicuous absence of assimilatory repairs in native contracted forms like /aNta/ (< /anata/ ‘you’) and /bokuNči/ (< /boku no uči/ ‘my house’) is exactly what one would expect if PNV is no longer active.

## Conclusion

PND in modern Tokyo Japanese is not a manifestation of PNV (a phonetically grounded constraint) but a historical relic that provides valuable clues for historical linguists.

Among the interesting questions that remain are:

- (1) How exactly does phonetic grounding get lost?
- (2) Once it is lost, what allows the morphophonemic alternations left behind to remain psychologically active?

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