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

1. 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 *NÇ (Kager 1999).

2. *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. An example is /tana/~/dana/ 'shelf', which begins with /t/ as a word on its own but with /d/ as the second element in the compound /iwa+dana/ 'rock ledge' (cf. /iwa/ 'rock'). The initial voiced obstruent in /dana/ is an instance of *rendaku* 'sequential voicing'. In /t/~/d/ the alternation involves only voicing ([t]~[d]), but in other cases a voiceless obstruent and its *rendaku* partner differ in more than just voicing (Vance 2015), as shown in (1).

(1) a. /f/~/b/ ([ɸ]~[b])
b. /h/~/b/ ([h]/[ç]~[b])
c. /t/~/d/ ([t]~[d])
d. /č/~/ǰ/ ([tɕ]~[dʑ])
e. /c/~/z/ ([ts]~[dz]/[z])
f. /s/~/z/ ([s]~[dz]/[z])
g. /š/~/ǰ/ ([ɕ]~[dʑ])
h. /k/~/g/ ([k]~[ɡ]/[ŋ])

The moraic *kana* subsystems of the Japanese writing system (*hiragana* and *katakana*) represent the *rendaku* alternations in (1) in a uniform way, using a diacritic called *dakuten*: 〈゛〉. The examples in (2) illustrate.

(2) a. ふね /fune/ 'boat'
こぶね /ko+bune/ 'small boat'
b. は /ha/ 'leaf'
あおば /ao+ba/ 'green leaf'
c. と /to/ 'door'
あみど /ami+do/ 'screen door'
d. ち /či/ 'blood'
はなぢ /hana+ǰi/ 'nosebleed'
e. つつ /cucu/ 'tube'
やづつ /ya+zucu/ 'quiver'
f. す /su/ 'vinegar'
あまず /ama+zu/ 'sweetened vinegar'
g. しま /šima/ 'island'
こじま /ko+ǰima/ 'small island'
h. かお /kao/ 'face'
えがお /e+gao/ 'smiling face'

The traditional term *dakuon* denotes either an entire mora beginning with one of the voiced obstruents in (1) 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 (2) (i.e., the addition of the diacritic to the first letter of the *kana* representation of a morpheme) as D. The historical explanation for the patterns in (1) and (2) is that several well-known phonological changes have occurred since *kana* first came into use around 900.

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 (Vance 2015).

3. The Naturalness Condition

Since *SPE* (Chomsky and Halle 1968) it has been widely assumed that there is "an inventory of elements [i.e., features] that are capable of describing both phonological symmetries and properties of speech" (Ladd 2014). According to what Postal (1968) called the "naturalness condition," classes of segments that behave together phonologically must be definable in phonetic terms (Ladd 2014). Not all researchers have accepted the naturalness condition,

however, and Ladd (2014), citing the work of several other scholars, argues forcefully that it should be abandoned.

If it is abandoned, a phonological analysis of MTJ can use D as a phonological feature without worrying about the mismatch between D and phonetic voicing. The attraction of such an analysis is that the presence vs. absence of D characterizes a symmetry between two classes of consonants that is undoubtedly psychologically real for native speakers, despite the phonetic heterogeneity of the pairings in (1).

4. Postnasal Voicing in the History of Japanese

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 in (1), it is more appropriate to refer to the present-day cases as PND (postnasal *dakuon-ka*) rather than as PNV.

Many phonologists assume that PND (called PNV) is still active in MTJ but that it applies exclusively or mainly to native Japanese elements (Itô and Mester 2003; Labrune 2012). The basic claim is that morpheme-internal sequences of the moraic nasal /N/ followed by a voiceless obstruent never occur in native Japanese vocabulary items (Itô and Mester 1999). This paper will argue that the evidence even for this narrow claim is about MTJ is flimsy, and that the native examples cited in support of PND are just relics of what was originally PNV.

Once D is understood as a purely phonological feature and not conflated with phonetic voicing, the irregularity of PND in MTJ (like the irregularity of *rendaku*) becomes a manageable problem. There is no longer any reason for the dubious claim that a phonetically motivated assimilation process (i.e., PNV) is active but mysteriously limited to a specific 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.

The conclusion offered is that it is misguided to try to maintain the naturalness condition by treating PND as a manifestation of PNV (a phonetically grounded OT constraint).

References

Chomsky, N. and Halle, M. 1968. *The sound pattern of English*. New York: Harper & Row.

Frellesvig, B. 2010. *A history of the Japanese language.* Cambridge: Cambridge University Press.

Huffman, M. K. 1993. Phonetic patterns of nasalization and implications for feature specification. *Phonetics and phonology V: Nasals, nasalization, and the velum*, ed. by M. K. Huffman and R. A. Krakow, 303–327. San Diego: Academic Press.

Itô, J. and Mester, A. 1999. The phonological lexicon. *The handbook of Japanese linguistics*, ed. by N. Tsujimura, 62–100. Oxford: Blackwell

Itô, J. and Mester, A. 2003. *Japanese morphophonemics: Markedness and word structure.* Cambridge: MIT Press.

Kager, R. 1999. *Optimality theory.* Cambridge: Cambridge University Press.

Labrune, L. 2012. *The phonology of Japanese.* Oxford: Oxford University Press.

Ladd, D. R. 2014. *Simultaneous structure in phonology*. Oxford: Oxford University Press.

Ohala, J. J. and Ohala, M. 1993. The phonetics of nasal phonology: Theorems and data. *Phonetics and phonology V: Nasals, nasalization, and the velum*, ed. by M. K. Huffman and R. A. Krakow, 225–249. San Diego: Academic Press.

Postal, P. 1968. *Aspects of phonological theory*. New York: Harper & Row.

Vance, T. J. 2015. Rendaku. *The handbook of Japanese phonetics and phonology*, ed. by H. Kubozono, 397–441. Berlin: De Gruyter Mouton.