

# Gemination in Japanese Loanwords

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## 1 Phonemic inventory of Japanese

The native phonemic inventory of Japanese consists of singleton consonants (like /p/, /t/, /k/) as well as geminate consonants (like /pp/, /tt/, /kk/). As shown by the minimal pair data in 1, they are contrastive, and thus separate phonemes. (Kubozono, 2009, p. 2)

- (1) a /kita/ ‘came’ vs. /kitta/ ‘cut (past)’  
b /saki/ ‘point’ vs. /sakki/ ‘a short time ago’

However, native Japanese phonotactics disallow the gemination of certain consonants. In particular, the gemination of voiced obstruents (/b/, /d/, /g/, /z/, etc.) is prohibited.

### 1.1 Emphatic gemination

In Japanese, gemination sometimes occurs in native words to express emphasis. As shown in 2, /d/ becomes devoiced /tt/ when geminated to avoid \*/dd/. (Kubozono, 2009, p. 3)

- (2) /tada/ ‘only’ → [tatta]      \*[tadda]


## 2 Loanword gemination

Despite the lack of voiced geminates in native Japanese phonology, they do appear in loanwords, as in 3. (Kawahara, 2015, p. 3)

- (3) a ‘red’ → /reddo/  
b ‘dog’ → /doggu/ (→ /dokku/)

However, there exist some loanwords for which the voiced geminate consonant can optionally be pronounced as devoiced, as in 3b, and in such cases, this is the form that ultimately assimilates into the lexicon. For this reason, I will use the markedness constraint \*VOIGEM. The tableau in 4 shows this constraint being used to account for the winning candidate, /tatta/, from 2.

(4)

/tada/ (emph)	*VOIGEM	FAITH(VOICE)
a. tadda	*!	
 b. tatta		*

### 2.1 Gemination licensing & motivation

The environment in which consonant gemination in English borrowings occurs is word-finally, when the preceding vowel is lax, as in 5. (Kawahara, 2015, p. 2)

- (5) a ‘cat’ → [kyatto]  
b ‘pack’ → [pakku]


### 2.1.1 Syllable weight

Background:

1. The first half of a geminate obstruent can be represented as /Q/, and in terms of weight, it counts as one mora ( $\mu$ ). Thus, 5b can also be written as [paQ.ku].
2. Japanese words tend to end in HH or HL sequences, so I use the constraint PROSODICFORM. (Kubozono, 2009, p. 4)
3. Japanese disallows closed syllables (CVC) for the most part (Shinohara, 1996, p. 7), but they still need to be expressed in the output when the source borrowed word contains them, because MAX(C) is ranked high.

The flowchart in 6 illustrates the process for the phonemicization of the English word ‘pack’ into a Japanese loanword, and its accompanying tableau is in 7.

- (6) i ‘pack’ /pak/ is a \*CVC syllable
- ii /u/ is epenthesized to break this into CV.CV  $\rightarrow$  /pa.ku/
- iii /pa.ku/ is \*LL word-finally
- iv moraic obstruent /Q/ is added to syllable 1 to increase moraicity  $\rightarrow$  /pa + Q/
- v [paQ.ku] is HL word-finally; PROSODICFORM is satisfied

	/pak/ ‘pack’	MAX(C)	PROSODICFORM	NOCODA	DEP(V)	DEP( $\mu$ )
	a. pak			*!		
	b. paQk			*!		*
(7)	 c. paQ.ku				*	**
	d. pa.Qku		*!		*	**
	e. pa.ku		*!		*	*
	f. pa	*!				

The moraic obstruent /Q/ does not count as a coda on its own, but it does increase moraicity and thus contributes to PROSODICFORM.

## Constraints

\*VOIGEM: Voiced obstruent geminates are prohibited

FAITH(VOICE): Don’t change voicing values in the output

PROSODICFORM: Words with 2 or more syllables must end in HH or HL sequences

MAX(C): Don’t delete consonants in the output

NOCODA: Output forms must not have codas

DEP(V): Don’t epenthesize vowels in the output forms

DEP( $\mu$ ): Don’t increase moraicity in the output forms

## References

- Kawahara, S. (2015). Geminate devoicing in japanese loanwords: Theoretical and experimental investigations. *Language and Linguistics Compass*, 9.
- Kubozono, H. (2009). Consonant gemination in japanese loanword phonology. *The Linguistic Society of Korea*.
- Shinohara, S. (1996). The roles of the syllable and mora in japanese: adaptation of french words. *Cahiers de linguistique - Asie orientale*, 25(1):87–112.