

Tensification of voiced stops in English loanwords in Korean

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1. Overview

(1) English voiced stops are usually realized as a lax stop when borrowed into Korean. But, word-initial prevocalic stops are realized as a tense stop of Korean in certain words.

• English voiced → Tense	• English voiced → Lax
bye-bye → [p*aj p*aj]	buyer → [paiə], *[p*aiə]
down → [t*aun]	dunk shoot → [tʌŋk ^{hi} sjut], *[t*ʌŋk ^{hi} sjut]
golf → [k*olp ^{hi}]	gulf (war) → [kʌlp ^{hi} cʌn], *[k*ʌlp ^{hi} cʌn]
jeep → [c*ip ^{hi}]	jean → [cin], *[c*in]

(2) Previously proposed explanations for tensification in English loans

- Japanese influence (mentioned in passing: M. Lee 1993; Kwon 1995) → Section 7.
- Part of general word-initial tensification in Korean (Yeo 1985, Shin and Davis 2004, Oh 2004) → Section 6.
- Phonetic similarity (Pae 1967 mentioned in Yeo 1985; Kim-Renaud 1974; S. Lee 1981) → The lexical restriction is difficult to explain.

(3) This paper

- Phonetic similarity + Diachrony + Orthographic convention
- Tense adaptation in words like (1) is a remnant of phonetic similarity-based adaptation from the early part of the 20th century.
- Subsequent changes in orthographic convention & phonetic structure made lax stops a more likely match for English in Present day Korean.

2. Some basic facts about distribution of tense stops in English loans

(4) Positional restriction (Oh 2004)

- NAKL Loanword list (1991): Only lax stops that correspond to word-initial prevocalic English voiced stops can be realized as tense stops.
- No tensification of a lax stop from an English cluster-initial voiced stop
drama → [tirama], *[t*irama]
black → [pillæk], *[p*illæk]
- No tensification of a lax stop in word-medial or final position¹
double → [t*əpil], *[t*əp*il]
board → [p*oti], *[p*ot*i]

¹ [p*ilt*in] ~ [p*iltin] 'building' is one possible exception.

(5) Dataⁱ

- NAKL (1991): loanword list (includes frequency counts from the source)
- NAKL (2002): frequency of Korean words (1.5 million words)
- English loanwords with word-initial prevocalic /b d g dʒ/
- These words are almost always written with initial lax stops following orthographic convention, regardless of their actual pronunciation.
- Availability of tense pronunciation is coded by the author.
- Compounds that share the same first component are collapsed: *bus*, *bus-ticket*, *bus-fare*, *bus-business*...

(6) Proportion of tense adaptation

(NAKL 1991)

Initial stop	N	Tense adaptation
/b/	141	25 (17.7%)
/d/	98	8 (8.2%)
/g/	47	10 (21.3%)
/dʒ/	24	7 (29.2%)
Total	310	50 (16.1%)

(NAKL 2002)

Initial stop	N	Tense adaptation
/b/	122	26 (21.3%)
/d/	71	8 (11.3%)
/g/	34	8 (23.5%)
/dʒ/	36	7 (19.4%)
Total	263	49 (18.6%)

(7) Frequency

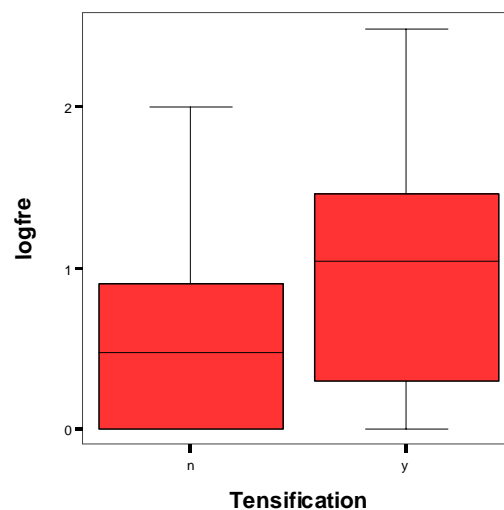
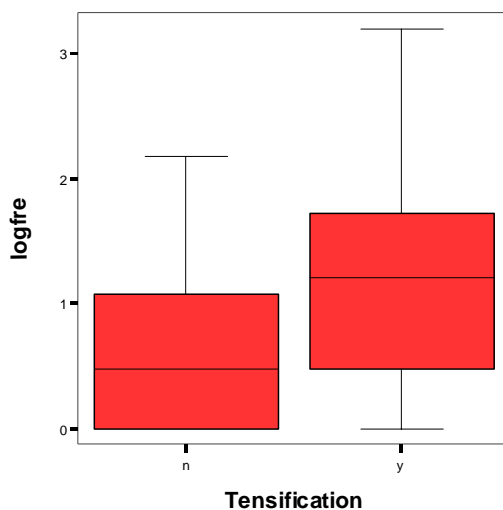
- Many of the words showing tense adaptation are very commonly used words and have a higher average frequency ($p < 0.001$ in both corpora).

(NAKL 1991)

Tensification	Mean	Std. Deviation	N
N	12.98	23.383	260
Y	102.80	258.765	50
Total	27.47	110.323	310

(NAKL 2002)

Tensification	Mean	Std. Deviation	N
N	7.74	11.674	214
Y	40.29	80.444	49
Total	13.80	38.178	263



3. English voiced stops in Korean in 1930's (S. Kim 2003)

(8) *Modern Chosun Loanword Dictionary* (1937) by Lee Jong-Keuk

- Compilation of loanwords from written sources in the 1930's
- In the early decades of the 20th century, there was a strong tendency to match foreign sounds as closely as possible and many went so far as inventing new symbols to transcribed foreign sounds (Yu 1988)
- This dictionary was published before the establishment of “Convention on loanword transcription (1941)” by *Hangeul Hakhoe*
- Likely reflect Korean speakers' perception of foreign sounds fairly closely

(9) Adaptation of English voiced stops in *Modern Chosun Loanword Dictionary*

a. Word-initial

Initial stop	N	Tense adaptation	Lax adaptation	Tense and Lax
/b/	194	122 (62.9%)	34 (17.5%)	38 (19.6%)
/d/	178	92 (51.6%)	43 (24.2%)	43 (24.2%)
/g/	118	68 (57.6%)	25 (21.2%)	25 (21.2%)
Total	490	282 (57.6%)	102 (20.8%)	106 (21.6%)

- Voiced stops in word-initial position are adapted as tense or lax and tense adaptation is the majority.

b. Word-medial

Initial stop	N	Tense adaptation	Lax adaptation	Tense and Lax
/b/	100	3 (3%)	96 (96%)	1 (1%)
/d/	154	3 (1.9%)	151 (98.1%)	0 (0%)
/g/	95	0 (0%)	95 (100%)	0 (0%)
Total	349	6 (1.7%)	342 (98%)	1 (0.3 %)

- Voiced stops in word-medial position are consistently adapted as a lax stop.

4. Phonetic similarity

(10) Phonetic correlates of lax vs. tense stop distinctions in Korean (Cho et al. 2002 and references cited therein)

- Vocalic cues
 - a. Higher F0 of the following vowel for tense stops
 - b. Abrupt onset of vowel formants following tense stops
- Consonantal cues
 - a. Lower VOT for tense stops
 - b. Closure duration (not relevant for word-initial position (J.-I. Han 1992))
- **In present day Korean , vocalic cues outweigh the VOT cue** (Kim et al. 2002, Silva 2006)

(11) English word-initial voiced stops

- **F0** is lowered following English voiced stops (Hombert et al. 1979 among others)
 → Better matched by Korean **lax** stops

(From Ishihara 1998)

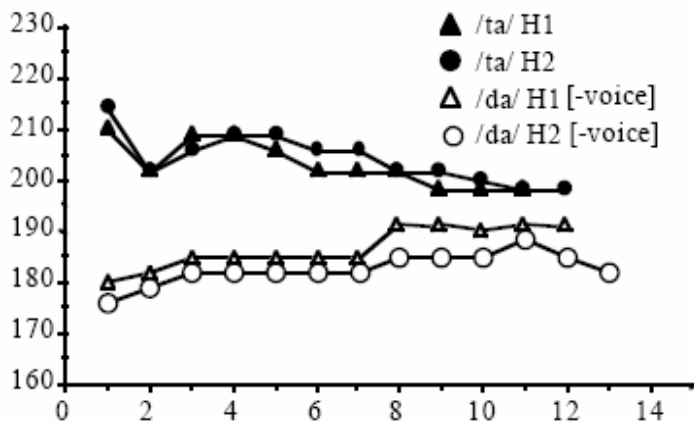


Figure 4: F0 perturbation of /ta/ (H) and /da/ (H) (Speaker FM1)

- Low or Negative **VOT** for English voiced stops (Lisker and Abramson 1965)
 → Better matched by Korean **tense** stops
- Adaptation as Korean lax stop is expected given the primacy of vocalic cues in present day Korean.

5. From the 1930's to the present day Korean: Tense > Lax

(12) Phonetic cues for laryngeal contrast in 1930's

- Historical phonetics?: Primacy of vocalic cues in laryngeal contrast is likely a fairly recent development (Silva 2006) and VOT could have played a more important role in the first half of the 20th century than it does in present day Korean.

(13) Transcription convention

- *Rules on loanword transcription* [외래어 표기법] (1985), Ministry of Education
“In principle, tense consonants should not be used for transcribing plosives.”
- This likely helped to further promote the use of lax stops over tense stops for word-initial English voiced stops.

(14) Replacement and resistance

- Replacement

gap: /k*æp^h/ (1937) > /kæp/

journal: /c*ənal/ (1937) > /cənəl/

....

- Resistance
 - a. Words that retain the initial tense stops tend to be high frequency words.(see (7) above.)
 - b. Their established use kept them from being replaced by a newer form.
- Doublets (S. C. Kim 2000)

boy:	/p*oi/	‘a male page’	(older)
	/poi/	‘boy’	(newer)

6. Tensification of word-initial lax stops in Native and Sino-Korean words

(15) Tensification in Native Korean and Sino-Korean words

- Native Korean words

kupta ~ k*upta ‘to grill’ tak*ta ~ t*ak*ta ‘to scrub’

pok*ta ~ p*ok*ta ‘to stir fry’ sonaki ~ s*onaki ‘rain shower’

cokak ~ c*okak ‘piece’

- Sino-Korean words

komul ~ k*omul ‘junk’ pon(t*ita) ~ p*on(t*ita) ‘to copy’

sæŋ (məli) ~ s*sæŋ (məli) ‘straight hair’ socu ~ s*ocu ‘a type of liquor’

(16) Continuation of a historical change that goes back to Middle Korean

- There was no Lax vs. Tense contrast in Early Middle Korean.
- Changes in 16~18 Century Korean (Heo 1965, K. M. Lee 1972)

/koc/ > /k*oc^h/ 'flower'
 /pulhwi/ > /p*uli/ 'root'
 /kac^hi/ > /k*ac^hi/ 'magpie'
 /kæskta/ > /k*æk*ta/ 'to pick'
 /kit^h/ > /k*it^h/ 'end'

- The shift to tense stops is more advanced in southern dialects (Cenla and Kyengsang) (T. Y. Choi 1983, K. Y. Lee 1996, 2000)

/kalc^hi/ > /k*alc^hi/ 'cutlass fish'
 /tok*epi/ > /t*ok*epi/ 'a goblin'
 /pænkæ/ > /p*ænkæ/ 'lightning'

- In sociolinguistic studies, younger speakers show more tensification than older speakers. (M. J. Lee 1989, Y. K. Kim 2004).
- Doublets: newer forms show the tense stops, contrary to initial tense stops in English loans (cf. [poj] vs. [p*oj]).

(From D. G. Park 1995)

/casik/ 'offspring' > /c*asik/ 'son of a gun(?)'
 /calita/ 'to be cut' > /c*alita/ 'to be expelled, fired'
 /ki/ 'Chi' > /k*i/ 'talent, aptitude'

★ **The direction of change (lax > tense) is the opposite from the change in English loans (tense > lax).**

(17) Distribution of tense stops in native and sino-Korean words

- Tense stops are almost nonexistent in Sino-Korean morphemes as Sino-Korean words are borrowed during the period when Korean did not have phonemic tense consonants. (K. M. Lee 1972)
- Relatively few Sino-Korean words are affected by the general tensification process compared to native words (D. G. Park 1995)

	Lax stop-initial words	Tensification
Native Korean	5,216	207 (4.0%)
Sino-Korean	16,950	26 (0.2%)
Cf. English loans based on (6)	310	50 (16.1%)

- Even including the newly created word-initial tense stops, the proportion of tense stops compared to lax stops is fairly low in native and Sino lexicon², in contrast to English that found in English loans.

Count based on NAKL (2002) + D. G. Park (1995)

	Lax and Tense stop-initial words combined	Tense stop-initial words
Native and Sino-Korean words	24,724	1,778 (7.2%)
Cf. English loans based on (6)	310	50 (16.1%)

★ **The rate of tensification in English loans are far higher than that in Sino-Korean words, indicating that tensification does not come from the same sound change in the two cases.**

(18) Tensification and semantic coloring (D. G. Park 1995)

- Emphatic connotation
 - /cinhata/ ~ /c*inhata/ ‘dark, thick’
 - /cokacoak/ ~ /c*okakc*okak/ ‘tiny pieces’
 - /cilkita/ ~ /c*ilkita/ ‘tenacious, durable’
 - /seta/ ~ /s*eta/ ‘strong’
- Pejorative connotation
 - /komul/ ~ /k*omul/ ‘junk’
 - /kolt^hoŋ/ ~ /k*olt^hoŋg/ ‘bonehead’
 - /saipi/ ~ /s*aipi/ ‘fake’
 - /pek*ita/ ~ /p*ek*ita/ ‘to copy’
 - /casik/ > /c*asik/ ‘offspring’ → ‘son of a gun(?)’
 - /calita/ > /c*alita/ ‘to be cut’ → ‘to be expelled, fired’

★ **Tensification in English loans do not seem to add similar connotation.**

² The statistics suggests that the assertion that “[the] three-way stop system is beginning to restructure into a two way system comprising tense and aspirated stops (Shin and Davis 2004)” seems premature if not unfounded. Rather the current change seems to be shoring up the newly created tense category, which is underutilized as it is. D. G. Park (1995) observes that tensification often creates minimal pairs out of existing homophones.

- /seta/, */s*eta/ ‘to count’
/seta/ ~ /s*eta/ ‘strong’
- /kamta/, */k*amta/ ‘to tie’
/kamta/ ~ /k*amta/ ‘to wash (hair)’
- /cekta/, */c*əkta/ ‘to jot down’
/cekta/ ~ /c*əkta/ ‘little (in amount)’
- /colta/, */c*olta/ ‘to dose’
/colta/ > /c*olta/ ‘to thicken (by boiling)’

Also, the fact the tensification is blocked if it would result in homophony (D. G. Park 1995) similarly disputes the claim that the lax vs. tense contrast is disappearing from the language.

- /kata/, */k*ata/ ‘to go’ cf. /k*ata/ ‘to peel’
/cata/, */c*ata/ ‘to sleep’ cf. /c*ata/ ‘salty’
/kalta/, */k*alta/ ‘to change’ cf. /k*alta/ ‘to spread, put down’
/titta/, */t*itta/ ‘to listen’ cf. /t*itta/ ‘to pick’

7. Japanese influence?

(19) Many English words were borrowed through Japanese and these words are marked by various phonological characteristics unexpected in direct borrowings (Kang et al. 2007).

(20) Japanese voiced stops are realized as a lax stop when borrowed into Korean, almost without exception. This is also the case in word-initial position (Ito et al. 2006, H. Kim 2006).

- Japanese voiced → Lax

/dai/ → /tai/ ‘table’

/gara/ → /kara/ ‘pattern’

/bentoo/ → /pent*oo/ ‘lunch box’

(21) Japanese voiceless stops and geminates are generally adapted as tense stops into Korean. Could such general prevalence of tense stops in Japanese-style loans in general influence the English loans such that even lax stops coming from English voiced stops to be realized as tense?

- Not likely
- Other “Japanese traits” tend to correlate with one another such that words containing a particular Japanese trait (A) tend to be show more of the other Japanese traits than the words that do not contain the same Japanese trait. (Kang et al. 2007)
- But, tense realization of English voiced stops does not show such correlation with other known Japanese traits.(p = 0.88)

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ⁱ Tensification is more likely when the English word is monosyllabic than polysyllabic. This is statistically significant even after the frequency effect ((6) above) is factored out. (p=0.03)

NAKL (2002)

# of syllables in English	N	Tense adaptation
Monosyllabic	108	32 (29.6%)
Polysyllabic	155	17 (11.0%)
Total	263	49 (18.6%)