Variable vowel adaptations of English word-final stops in Korean loanword phonology

Na-Young Ryu & Sung-Hoon Hong

DEPARTMENT OF ENGLISH LINGUISTICS
GRADUATE SCHOOL
HANKUK UNIVERSITY OF FOREIGN STUDIES

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1.Introduction

- Show a variable rule analysis of patterns of vowel epenthesis of English loanwords that end in word-final stops in Korean.
- Predict the likelihood of vowel epenthesis based on the results of factor weight of linguistic factors.
- Examine three patterns of vowel epenthesis in English loanwords adaptation in Korean.

a. Vowel epenthesis
b. No vowel epenthesis
c. Variable vowel epenthesis

2. Data

- **445 English loanwords that end in word-final stops**

  (The National Institute of the Korean Language 2001,2002,2007, Kang 2003, Rhee2001)

- **Examples of three patterns of vowel epenthesis**

Vowel epenthesis	No vowel epenthesis	Variable vowel epenthesis	Total
214	201	40	445
47%	44.2%	8.8%	
'light' → [la.i.t^hɨ]	'group' → [kɨ.lup]	'soup' → [sup] ~ [su.p^hɨ]	
'red' → [lɛ.dɨ]	'bag' → [pæk]	'hip' → [hip] ~ [hi.p^hɨ]	
'leage' → [li.gɨ]	'comic' →[k^ho.mik]	'cassette' → [k^ha.sɛt] ~ [k^ha.sɛ.t^hɨ]	

3.Method

Method: GOLDVARB X program (Sankoff et al 2005)

(http://individual.utoronto.ca/tagliamonte/goldvarb.htm)

- GOLDVARB X is a **tool of historical linguistics and sociolinguistics** to explicate patterns of variation between alternative forms in language use.
- This program can be used with **linguistic and extra-linguistic factors** that results in probabilities of rule application.
- A variable rule analysis computes **a multivariate statistical model**, on the basis of observed token counts.
- Each determining factor is assigned **a numerical factor weight** that describes how it influences the probabilities of choice of either form.

3.Method

Cardoso (2007) : The variable development of English word-final stops by Brazilian Portuguese speakers

Final GOLDVARB probabilistic results (Level 2 and Level 3)

Factor groups	Likelihood of coda occurrence factors		
Proficiency Level	Level 2	Level 3	
	.37	.61	
Style	Informal	Formal	
	.36	.65	
Place of articulation	Labial	Dorsal	Coronal
	.31	.24	.54
Word size	Monosyllabic	Polysyllabic	
	.23	.84	
Input probability		.29	

Previous studies
(Linguistic factor groups)

- Researchers have proposed several linguistic factors that influence the possibility of vowel insertion after English word-final stops.(Hirano 1994, O.Kang 1996, P.Lee 1998, Jun E2002, Y.Kang 2003)

(1) Tenseness of the pre-final vowel (tense vs. lax)

(2) Voicing of the final stop (voiced vs. voiceless)

(3) Place of articulation of the final stop (coronal vs. labial & dorsal)

(4) The number of syllable (monosyllabic vs. polysyllabic)

(5) Stress of the final stop

(6) Release after a final stop

Four linguistic factor groups

Factor groups	Factors	Examples		
Tenseness of the pre-final vowel	tense	'byte'	→	[pa.i.tʰɨ]
	lax	'black'	→	[pɨl.læk]
Voicing of the final stop	voiced [b, d, g]	'code'	→	[kʰo.dɨ]
	voiceless [p,t, k]	'technique'	→	[tʰɛ.kʰɨ.nik]
Place of articulation of the final stop	coronal [t, d]	'trade'	→	[tʰɨ.lɛ.i.dɨ]
	labial [p, b]	'cup'	→	[kʰʌp]
	dorsal [k, g]	'clinic'	→	[kʰɨl.li.nik]
The number of syllable	monosyllabic	'lap'	→	[læp]
	polysyllabic	'cosmetic'	→	[kʰo.sɨ.mɛ.tʰik]

4. Quantitative results

- **Vowel epenthesis & No vowel epenthesis**

Vowel epenthesis	Factor weight	No vowel epenthesis	Factor weight
Tense	.93	Labial	.92
‘date’, ‘download’, ‘food’		‘workshop’, ‘membership’	
Coronal	.80	Polysyllabic	.73
Monosyllabic	.75	Dorsal	.67
Voiceless	.35	Voiceless	.65
Dorsal	.32	Monosyllabic	.24
Polysyllabic	.27	Coronal	.20
Lax	.15	Voiced	.13
Labial	.7	Tense	.7

- **Vowel epenthesis: Tense> Voiced > Coronal > Monosyllabic**
- **No vowel epenthesis: Labial > Lax > Polysyllabic > Dorsal > Voiceless**

4. Quantitative results

Combination of linguistic factors of vowel epenthesis & No vowel epenthesis

Factor combination	Vowel epenthesis	
Tense + coronal + voiced + 1	24	‘clinic’ ‘comic’ ‘public’ ‘graphic’ ‘topic’
Tense + coronal + voiced + 2	23	
Tense + dorsal + voiceless + 1	18	
Lax + coronal + voiced + 2	13	
Lax + dorsal + voiceless + 2	0	59
Lax + labial + voiceless + 2	0	33
Lax + labial + voiceless + 1	0	25

4. Quantitative results

- **Frequency of linguistic factors of variable vowel epenthesis**

Group	Tenseness of the pre-final vowel		Place of articulation			The number of syllable		Voicing of the final stop	
Factor	Tense	**Lax**	**Coronal**	Dorsal	Labial	1	2	Voiced	**Voiceless**
N	9	**31**	**30**	5	5	20	20	3	**37**
%	0.23	**0.78**	**0.75**	0.13	0.13	0.5	0.5	0.08	**0.93**

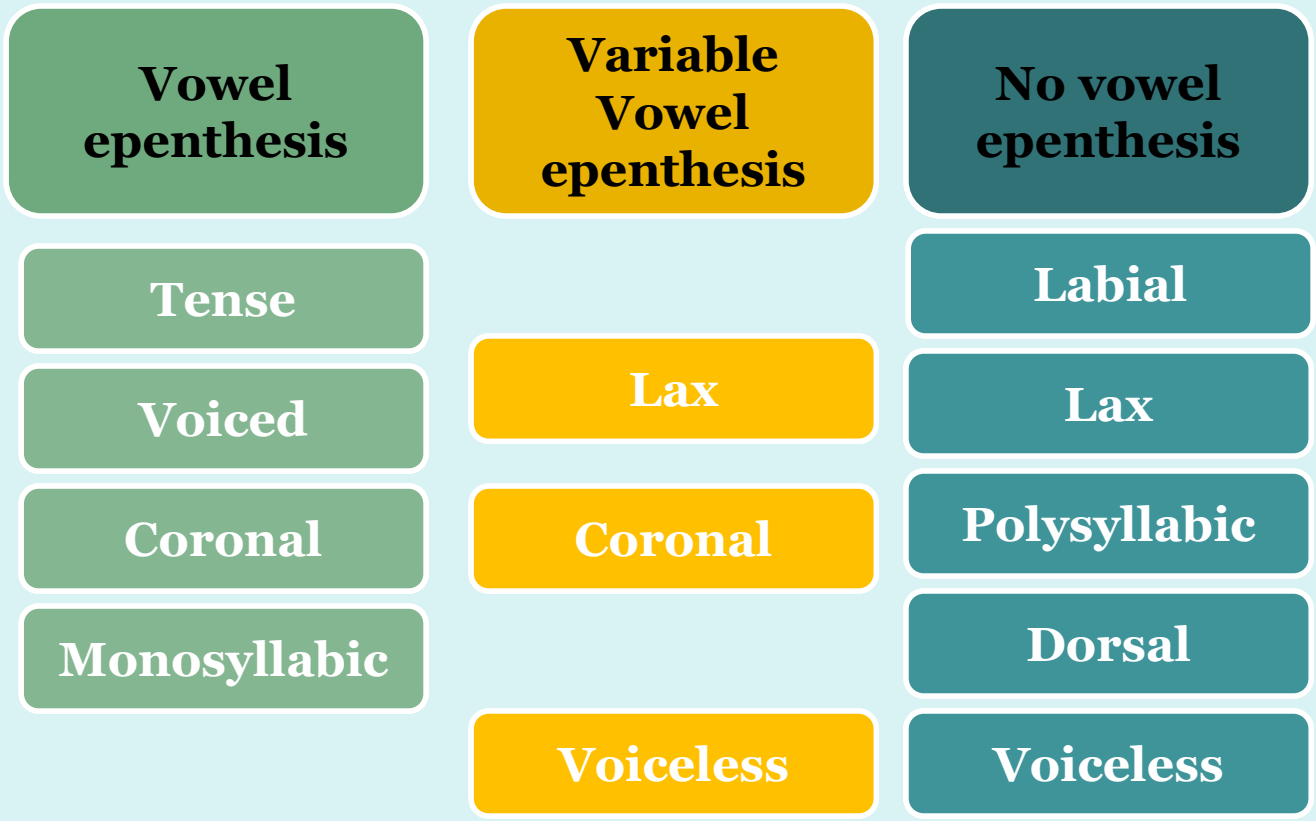
4. Quantitative results

•**Combinations of linguistic factors for variable vowel epenthesis**

Factor combination	Variable vowel epenthesis	
Lax + coronal + voiceless +1	**8**	**24%**
Lax + coronal + voiceless +2	**16**	**42%**
'credit', 'merit' , 'robot' , 'rocket'	1	3%
Lax + coronal + voiced + 2	2	5%
Lax + dorsal + voiceless +1	3	8%
Lax + dorsal + voiced + 1	1	3%
Tense+ coronal + voiceless +1	2	5%
Tense + dorsal + voiceless + 1	1	3%
Tense + labial + voiceless + 1	4	10%

4. Quantitative results

- **Main factors affecting of three patterns of vowel epenthesis**



5. Cross-tabulation of two factor groups

	Vowel epenthesis	Variable Vowel epenthesis	No vowel epenthesis
	%	%	%
Tense & Coronal	90	3	7
Tense & Dorsal	94	3	3
Tense & Labial	72	22	6
Tense & Monosyllabic	91	7	2
Tense & Polysyllabic	86	3	11
Tense & Voiced	100	0	0
Tense & Voiceless	84	8	8
Lax & Coronal	42	23	35
Lax & Dorsal	10	4	86
Lax & Labial	0	1	99
Lax & Monosyllabic	32	12	57
Lax & Polysyllabic	13	11	76
Lax & Voiced	60	7	33
Lax & Voiceless	13	12	75

6.Conclusions

- **Vowel epenthesis:** When a word-final stop is '***voiced***' and '***coronal***', pre-final vowel is '***tense***' and number of syllable is '***monosyllabic',*** an epenthetic vowel [ɨ] is more likely to be inserted.

- **No vowel epenthesis**: When a pre-final vowel is '***lax***', final-stop is '***voiceless and dorsal/labial***', as well as number of syllable is '***polysyllabic***', the final [ɨ] tends not to appear in the coda position.

- **Variable vowel epenthesis**: when a pre-final vowel is '***lax***' and final stop is '***voiceless***' and a place of articulation of a final stop is '***coronal***', the occurrence of final [ɨ] is optional.

- The more the phonological factors are **cross-tabled,** the higher the possibility of vowel variation patterns occurs.

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