

Current change in the loanword tonology of North Kyungsang Korean*

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Hwang, Young. 2020. Current change in the loanword tonology of North Kyungsang Korean. *Studies in Phonetics, Phonology and Morphology* 26.1. 185-204. Previous studies on the loanword tonology of North Kyungsang (NK) Korean have asserted that vowel length has a close relationship with tone assignment; English loanwords that contain a long vowel in the initial syllable must be assigned double high accent. Recently, however, Kim (2018) has shown that vowel length is no longer phonetically distinctive for younger NK speakers. Since vowel length is a crucial cue for double high accent, the present study conducted a production task with two distinct age groups (younger and older) to examine if the loss of long vowels in the production of younger NK speakers has any influence on their loanword tone assignment pattern. The results show that an intergenerational tone change is in progress and younger speakers produce double high accent less frequently than older speakers. The results also exhibit that polysyllabic loanwords are more affected by the tone change, and the newly assigned tone patterns follow the tone assignment patterns of loanwords with a light initial syllable. **(Indiana University, PhD Candidate)**

Keywords: North Kyungsang dialect, intergenerational tone change, vowel length distinction, English loanwords

1. Introduction

The loanword tonology of North Kyungsang (NK) Korean has been well studied in previous literature, such as M. Kim (1997), Kenstowicz and Sohn (2001), Chung (2000, 2002), Kim (2009), Kim (2010), and Davis, Tsujimura and Tu (2012). One of the primary findings that all these studies seem to agree on is that vowel length plays an important role in tone assignment of NK English loanwords. In NK native words, syllable weight plays a minimal role, and double high accent is allowed for both words

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with an initial heavy syllable and those with an initial light syllable (Chung 1991, Kim 1988, N-J Kim 1997, Kenstowicz and Sohn 2001). Yet, unlike NK native words, tone assignment of NK English loanwords is sensitive to syllable weight (M. Kim 1997, Chung 1998-2000-2002, Kenstowicz and Sohn 2001, Kim 2009, Davis 2010, Kim 2010), and double high accent is only able to be assigned to loanwords that contain a heavy initial syllable, either with a long vowel (CVV) or a coda consonant (CVC).

¹ That is, assigning double high accent to English loanwords that contain a light initial syllable (CV) creates a violation to the loanword tone assignment system. If an English loanword has a light initial syllable (CV), it must be assigned single high accent, having high tone either on the penultimate syllable or on the final syllable in general. The examples of double high accented loanwords with a long vowel in the initial syllable are adopted from Kenstowicz and Sohn (2001) and presented in (1).

(1)	Word	Tone	Meaning
	[ró:.má]	HH	‘Rome’
	[tʰá:.gét]	HH	‘target’
	[ká:.dín]	HH	‘garden’
	[há:.mó.ni]	HHL	‘harmony’
	[pí:.ná.s’i]	HHL	‘Venus’
	[má:.gá.rin]	HHL	‘margarine’
	[jú:.tʰó.phi.a]	HHLL	‘utopia’
	[má:.mál.le.i.di]	HHLLL	‘marmalade’

However, recently Kim (2018) has shown that long vowels have been shortened in NK Korean and the vowel length distinction does not exist anymore especially among younger NK speakers. She conducted a production study with ten older NK speakers in their 60s or 70s (mean age=68) and ten younger NK speakers in their 20s, 30s, or 40s (mean age=30). The results reveal that younger NK speakers produce long vowels as short as the corresponding short vowels (1:1.02 in both fast and slow speech rates), whereas older NK speakers still produce long vowels significantly

¹ To be clear, a word-initial CVC syllable sometimes act as light (monomoraic) rather than heavy (bimoraic) depending on what makes for better foot structure, which is contingent on the nature of the following syllable or syllables. See Kim (2009) and Hwang (2020) for specific details and optimality-theoretic analyses that incorporate the notion of contextual coda weight. The elaboration of this is beyond the scope of the current paper.

longer than the corresponding short vowels (1:1.23 in fast speech rate and 1:1.25 in slow speech rate). Based on the results, Kim (2018) asserts that vowel length is no longer phonemically contrastive for younger NK speakers.

Since previous studies on the vowel length contrast of Korean mostly focus on Seoul Korean (Lee 1960, Han 1964, Park 1985, Magen and Blumstein 1993, Sohn 1999, Kang, Yoon and Han 2015, Lee and Shin 2016), Kim (2018) has been the only empirical study that examines the loss of long vowels in NK Korean based on acoustic data. However, if Kyungsang Korean is considered in general, including both North and South Kyungsang Korean, there are two more acoustic studies that can be taken into account. Kim and Han (1998) conducted an acoustic analysis of vowel length on Kyungsang Korean with three male speakers in their 20s and report that a ratio between short and long vowels in Kyungsang Korean is 1:1.15 when produced in minimal pairs. Yang (2015) conducted a phonetic study on the vowel length contrast in South Kyungsang Korean with 30 younger speakers (mean age=22 for male; 19.7 for female). The results of his study show that the durations of short and long vowels are not distinctive by the younger South Kyungsang speakers, and a ratio between the average durations of short and long vowels is 1:1.02 when produced in sentences. All in all, the three previous acoustic studies that have examined the vowel length distinction in Kyungsang Korean (Kim 2018, Kim and Han 1998, Yang 2015) are consistent with the findings that Kyungsang Korean has lost the vowel length distinction especially among younger speakers.

The loss of long vowels in the production of younger speakers indicates that younger NK speakers have lost a crucial cue that assigns double high accent to English loanwords. Given that the vowel length distinction plays an important role in the loanword tone assignment system, losing the distinction may change the moraic structure of English loanwords that contained a long vowel and further affect their tone patterns. For instance, English loanwords, which traditionally had double high accent with a word-initial long vowel, now may fall into the single high accent class for younger NK speakers because the initial syllable that traditionally had a long vowel is no longer considered heavy in their new vowel system.

The primary aim of this study is to examine if the loss of long vowels in the production of younger NK speakers has any influence on their tone assignment patterns of English loanwords, creating generational differences. If the results of this study find any intergenerational difference in the tone patterns, the direction of the tone change will also be investigated by looking at how syllable number and syllable

composition affect the change. With the research aims, this study suggests three hypotheses: (1) Younger speakers will produce less double high accent than older speakers in English loanwords with an open initial syllable since they no longer have long vowels, which are crucial cues to attract double high accent; (2) Number of syllables in the word and syllable combination will not affect the pace of the tone change; (3) The newly assigned tone patterns in the production of younger speakers will follow the general tone assignment rules observed from loanwords that have a light initial syllable (CV).

2. Research Methods

2.1 Database

The present study utilizes a database composed of 3,384 English loanwords, which consists of 961 two-syllable words, 1,408 three-syllable words, and 1,015 four-syllable words. Most of the English loanwords in the database are nouns collected from *Korean Loanword Dictionary* published by Orient Books in Kyunggi-do, Korea in 2009 and the loanword database used in Lee (2002), which was collected from *Minjung's Essence Korean-English Dictionary 3rd edition* published by Minjung Seorim in Seoul, Korea in 1997.

2.2 Production task

To check if there is any intergenerational difference in the tone assignment of NK English loanwords, three younger and three older speakers participated in a production task. The younger speakers were in their late teens or early 20s (Mean age: 21.7) and the older speakers were in their late 50s or early 60s (Mean age: 59) at the time of the data collection. Each age group consisted of one male and two female speakers. All the younger speakers were born and raised in Daegu (the biggest city in the NK dialect region), and for the older speakers, one of them was born and raised in Daegu, and the other two were born and raised in other NK regions (Goryeong and Gumi) and moved to Daegu in their early 20s. None of the participants had lived in other dialect regions or outside of Korea for more than one year, and every participant had NK dialect-speaking parents who were born and raised in the NK dialect region. The 3,384 English loanwords were randomly arranged on PowerPoint slides (one word per slide) and presented to each participant individually.

Participants were asked to pronounce the words naturally in their dialect and their productions were recorded with a Zoom H4nSP digital voice recorder using the internal microphone. In total, 20,304 tokens were recorded (3,384 loanwords x 6 participants).

2.3 Annotation and classification

After the production task, the author of this study, a native speaker of NK Korean, listened to the recordings and annotated the tone patterns of each token to extract the data used for this study. Then, the consistency of tone patterns among participants in each group was analyzed in order to exclude words that show inconsistent tone pattern production as they would not allow for easy comparison between generations. In the younger group, out of 3,384 loanwords, 2,476 words (73.2%) showed consensus being produced with identical tone patterns by the three younger speakers. In 852 words (25.1%) there was one speaker who displayed a different tone pattern from the other two, and in 56 words (1.7%) no two speakers produced the same pattern. In the older group, all three participants showed consensus having the same tone patterns in 2,115 words (62.5%), while in 1,147 words (33.9%) there was one speaker who displayed a different tone pattern from the other two, and in 122 words (3.6%) all three speakers produced different tone patterns. In total, 178 words (56+122) were found to have inconsistent tone patterns among the three participants of each group, and thus were excluded from the analysis of generational tone change.² Then, for each remaining word, a representative tone pattern was chosen for each group (younger and older)—where two out of three participants of a group agreed on a tone pattern, the tone pattern was selected as representative for this analysis, otherwise the consensus tone pattern was chosen. The representative tone patterns derived from each group will be used for the analysis of this study.

² 17 two-syllable words, 70 three-syllable words, and 91 four-syllable words were excluded. The differences among these words may be interesting to examine for future analysis.

3. Results

Before we focus on tone patterns of double high accented English loanwords with an open initial syllable, the representative tone patterns of the younger and older groups were first compared in order to examine similarities and differences in their tone assignment pattern of NK English loanwords. The two distinct age groups exhibited the same tone patterns for 2,666 (83.2%) loanwords out of 3,206 loanwords. When the results of each group were divided by number of syllables, the tone patterns of the two groups matched in 816 (86.4%) out of 944 two-syllable loanwords, 1,121 (83.8%) out of 1,338 three-syllable loanwords, and 729 (78.9%) out of 924 four-syllable loanwords. The results show that the difference in the tone patterns between the younger and older groups becomes larger as the number of syllables increases.

To see the intergenerational difference in more detail, the annotation results of the two-, three-, and four-syllable loanwords in each age group were further divided by tone pattern. Table 1 presents the tone patterns used by the younger and older speakers in order of frequency, sorted by syllable number.

Table 1. Accent frequency for each age group sorted by syllable number

		Most frequent	2nd most frequent	3rd most frequent	4th most frequent	5th most frequent
2 syllable words	O	HL 506/951 (53%)	LH 239/951 (25%)	HH 206/951 (22%)		
	Y	HL 512/954 (54%)	LH 243/954 (25%)	HH 199/954 (21%)		
3 syllable words	O	LHL 772/1363 (57%)	LLH 284/1363 (21%)	HHL 211/1363 (15%)	HLL 96/1363 (7%)	
	Y	LHL 726/1383 (52%)	LLH 355/1383 (26%)	HHL 239/1383 (17%)	HLL 63/1383 (5%)	
4 syllable words	O	LLHL 626/948 (66%)	HHLL 164/948 (17%)	LLLH 79/948 (8%)	LHLL 64/948 (7%)	HLLL 15/948 (2%)
	Y	LLHL 707/991 (71%)	LLLH 183/991 (18%)	HHLL 58/991 (6%)	LHLL 32/991 (3%)	HLLL 11/991 (1%)

The results in Table 1 reveal that for two- and three-syllable English loanwords there is no difference between the younger and older groups in the order of accent frequency. For two-syllable English loanwords, penultimate accent appears most frequently in both groups (e.g. [kʰó.tʰi] HL ‘coat’; [rí.dʌ] HL ‘leader’), followed by final accent (e.g. [re.món] LH ‘lemon’; [tʰi.kʰét] LH ‘ticket’) and double high accent (e.g. [ká:.éip] HH ‘gossip’; [jú:.rʌp] HH ‘Europe’). In three-syllable English loanwords, penultimate accent (e.g. [kʰe.ná.da] LHL ‘Canada’; [mo.ní.tʰʌ] LHL ‘monitor’) appears most frequently, followed by final accent (e.g. [ti.tea.in] LLH ‘design’; [si.na.món] LLH ‘cinnamon’), then double high accent (e.g. [pó:.nʌ.s’i] HHL ‘bonus’; [pó:.dí.kʰa] HHL ‘vodka’), then antepenultimate accent (e.g. [ké.sí.tʰi] HLL ‘guest’; [kí.pʰi.tʰi] HLL ‘gift’) in both groups. Yet, the results of four-syllable English loanwords exhibit differences between the two generations in the order of accent frequency. The shaded part of Table 1 indicates the differences between the younger and older groups. For both groups, the most frequent tone pattern for four-syllable loanwords is penultimate accent (e.g. [mi.sí.tʰé.ri] LLHL ‘mystery’; [ta.i.á.ri] LLHL ‘diary’). However, the second-most frequent tone pattern for the younger group is final accent (e.g. [ma.gi.ne.ejúm] LLLH ‘magnesium’; [a.sí.pʰi.rín] LLLH ‘aspirin’), whereas double high accent (e.g. [kʰjú:.ré.i.tʰʌ] HHLL ‘curator’; [rí.ál.li.teim] HHLL ‘realism’) appears second-most frequently for the older group.

The results of the four-syllable English loanwords indicate that the older group displays almost three times as many double high accented words than the younger group. Instead, younger speakers exhibit more penultimate and final accented words than older speakers. This provides evidence that some intergenerational tone change is going on especially in four-syllable English loanwords. Since previously long vowels are considered short for younger NK speakers (Kim 2018), double high accented loanwords in the past as seen in the production of older speakers now seem to be changing their tone patterns in the production of younger speakers, at least in four-syllable loanwords, assigning either penultimate accent or final accent.

Since the aim of this study is to examine how the loss of long vowels has an impact on tone patterns of NK English loanwords in the production of younger speakers, the analyses in the following sections will focus on the tone change happening in double high accented loanwords with an initial open syllable, which are closely related to long vowels.

3.1 Intergenerational tone changes in double high accented English loanwords

In order to have more detailed analysis on how the loss of long vowels affects the tone patterns of younger NK speakers, double high accented English loanwords that have an open initial syllable were collected from each age group and classified by syllable number. Figure 1 presents the number of two-, three-, and four-syllable double high accented loanwords with an initial open syllable observed from each age group.

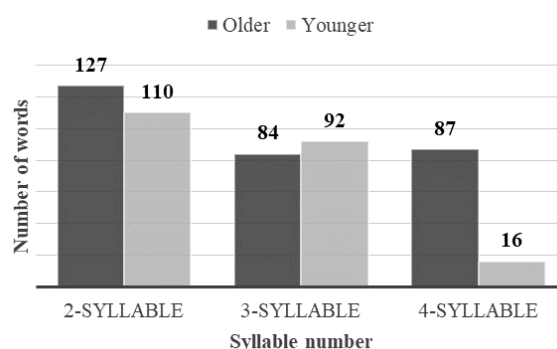


Figure 1. Number of double high accented loanwords in each age group

The results in Figure 1 reveal that the number of double high accented loanwords with an open initial syllable do not differ greatly between the two age groups in two- and three-syllable English loanwords. It seems that double high accent is still maintained in two- and three-syllable English loanwords for both younger and older speakers, even though vowel length is no longer distinctive for younger NK speakers (Kim 2018). Yet, in the results of four-syllable English loanwords, a dramatic difference is observed between the two different generations. For the older group, double high accent is still well maintained in four-syllable English loanwords just like two- and three-syllable English loanwords. In the younger group, however, double high accent is retained only in a small number of four-syllable English loanwords. This shows that double high accent is being lost especially from four-syllable English loanwords in the production of younger speakers.

To check whether the pace of the tone change differs among distinct syllable combinations or not, the annotation results of the two-, three- and four-syllable

English loanwords of each age group were subdivided by syllable composition. Figure 2 presents the proportion of double high accented loanwords in each syllable composition.

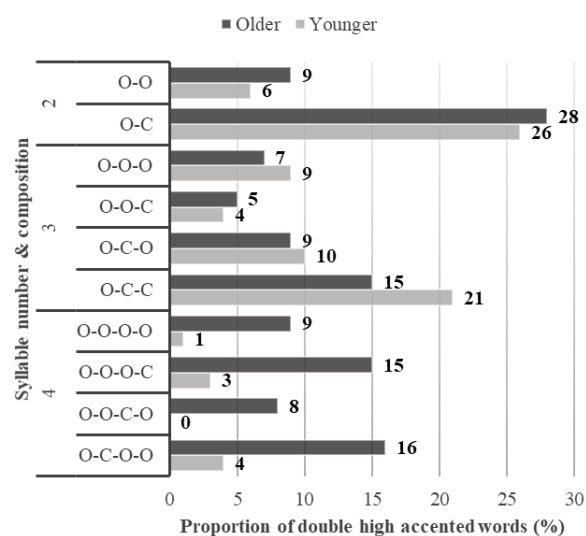


Figure 2. Proportion of double high accented loanwords with an open initial syllable in each syllable composition (O = open syllable, C = closed syllable)

The results in Figure 2 show that loanwords with the same number of syllables are experiencing similar tone change, regardless of the difference in syllable combination. In the results of two- and three-syllable English loanwords, there is very little difference in the proportions of double high accented loanwords between the older and younger groups. However, the results of four-syllable English loanwords exhibit that the proportions of double high accented loanwords for the younger group are much smaller than those of the older group.

Although two- and three-syllable English loanwords exhibit little generational difference in their tone patterns, the results in Figure 1 and Figure 2 show that double high accent is being lost from four-syllable loanwords in the production of younger speakers, and this can be considered to be the beginning of the change. The generational tone change observed from four-syllable English loanwords suggests that the loss of long vowels in the production of younger speakers has started to

modify the moraic structures of English loanwords and change their tone assignment patterns. In addition, from the results in Figure 1 and Figure 2, it can be further inferred that polysyllabic loanwords are more affected by the loss of the vowel length distinction.

The results of this section support the first hypothesis of this study, exhibiting that the intergenerational tone change is happening in English loanwords with an open initial syllable and younger speakers assign double high accent to these loanwords less frequently than older speakers. However, the second hypothesis of this study was rejected. Even though double high accent is being lost in the production of younger speakers, the tone change is happening first from four-syllable loanwords before two- and three-syllable loanwords. This exhibits that the pace of the tone change is affected by number of syllables. Yet, the results in Figure 2 show that syllable composition does not affect the pace of tone change and loanwords with the same number of syllables are experiencing similar tone change.

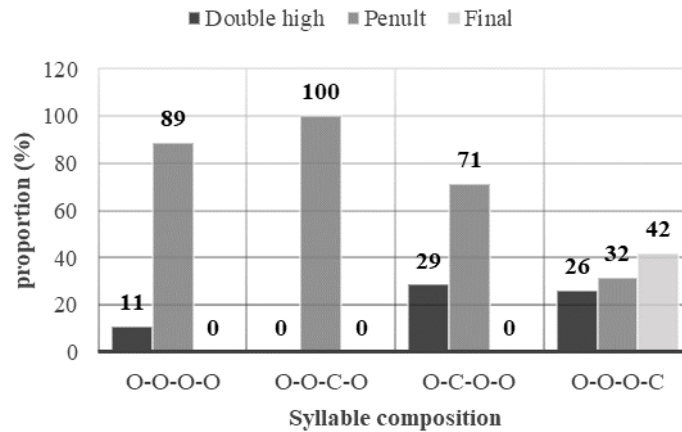
3.2 Newly assigned tone patterns

In the previous section 3.1, it was reported that double high accent is becoming less frequent in the production of younger NK speakers especially in four-syllable English loanwords with an open initial syllable. This means that English loanwords that were assigned double high accent now fall into the single high accent class for younger speakers. Thus, this section will examine their new tone assignment pattern is predictable. To check younger speakers' new tone assignment pattern, four-syllable English loanwords that were assigned double high accent by older speakers were collected. Then, their new tone patterns by younger speakers were examined.

In four-syllable English loanwords, there were seven distinct syllable compositions that contain an open initial syllable. Among them, four compositions displayed the generational tone changes: open-open-open-open, open-open-open-closed, open-open-closed-open, and open-closed-open-open. Table 2 shows the number of double high accented loanwords observed from the older group in each syllable composition and the distribution of their new tone patterns observed from the younger group. For better understanding, Figure 3 presents the proportion of each tone pattern observed from the younger group in each syllable composition of the four-syllable loanwords.

Table 2. Number of double high accented loanwords of the older group and the distribution of new tone patterns of the younger group in each syllable composition

Syllable composition	Older	Younger			
	Double high	Double high	Penult	Final	Deleted tokens ³
open-open-open-open	48	5	40	0	3
open-open-closed-open	5	0	5	0	0
open-closed-open-open	7	2	5	0	0
open-open-open-closed	24	5	6	8	5

**Figure 3. Proportions of the younger group's tone patterns in each syllable composition**

In the traditional understanding of tone assignment to NK English loanwords, if the initial syllable is light (CV), high tone is generally assigned to either the penultimate syllable or the final syllable (single high accent) (Kenstowicz and Sohn 2001). Yet, if the initial syllable is heavy (CVV or CVC), high tone is generally assigned to the first two syllables (double high accent) (Kenstowicz and Sohn 2001, Kim 2009). The results in Table 2 and Figure 3 reveal that double high accent is rarely maintained in the younger speakers' production of four-syllable English loanwords, which are assigned double high accent by older speakers. Instead, they

³ These tokens were excluded from the analyses of this study because each younger speaker assigned different accent to these words so that the representative tone pattern could not be generated.

are now assigned either penultimate accent or final accent. This shows that the word-initial open syllables are now considered light (CV) for younger speakers, whereas they are still considered heavy (CVV) for older speakers. In addition, the results show that the newly assigned tone patterns of younger speakers seem to be closely related to the moraic structure of the loanwords and thus largely predictable. That is, they generally follow the accentuation pattern of single high accent; loanwords with a light final syllable (CV) are assigned penultimate accent, while those with a heavy final syllable (CVC) are assigned final accent (Kenstowicz and Sohn 2001). However, this is different from four-syllable NK native (monomorphemic) words, which are always assigned penultimate accent.

To detail Table 2, first, for four-syllable English loanwords with the open-open-open-open syllable combination, the older group displayed 48 double high accented loanwords. Among them, only five (11%) retained double high accent in the younger group, and all the other loanwords (89%), except for the deleted ones, were assigned penultimate accent. Since the word-initial open syllables are now considered light for younger speakers, those words are assigned single high accent instead of double high accent; they are assigned penultimate accent because the final syllable is light. The example loanwords that displayed the generational difference on the tone pattern are presented in (2).

(2) Loanwords with the open-open-open-open syllable composition

English word	Older group (HHLL)	Younger group (LLHL)
Virginia	pá:.deí.ni.a	pʌ.dei.ní.a
rosemary	ró:.deí.ma.ri	ro.dei.má.ri
utopia	jú:.tʰó.pʰi.a	ju.tʰo.pʰí.a

Four-syllable English loanwords with the open-open-closed-open and open-closed-open-open syllable compositions also exhibited similar tone changes. For words with the open-open-closed-open syllable combination, the older group assigned double high accent to five words, but all these words (100%) fell into the penultimate accent class for the younger group. For words with the open-closed-open-open syllable composition, seven words were assigned double high accent in the older group, but only two (29%) showed the same tone pattern in the younger group and the other five words (71%) were assigned penultimate accent instead. That is, in both the syllable compositions, younger speakers generally assigned penultimate accent to the words

that older speakers assigned double high accent. The example words that displayed the generational difference are presented in (3) and (4).

(3) Loanwords with the open-open-closed-open syllable composition

English word	Older group (HHLL)	Younger group (LLHL)
Roosevelt	rú:.dɛɪ.bel.tʰi	ru.dɛi.bél.tʰi
Portland	pʰó:.tʰɨl.len.di	pʰo.tʰil.lén.di
tournament	tʰó:.nʌ.mʌn.tʰi	tʰo.nʌ.mʌn.tʰi

(4) Loanwords with the open-closed-open-open syllable composition

English word	Older group (HHLL)	Younger group (LLHL)
raincoat	ré:.ín.kʰo.tʰi	re.in.kʰó.tʰi
percentage	pʰʌ:.sén.tʰi.dɛi	pʰʌ.sen.tʰí.dɛi

The new tone patterns of the younger group observed from the three distinct syllable compositions mentioned above did not show much variation. Except for the seven words that maintained double high accent, all the other words fell into the penultimate accent class. Yet, loanwords with the open-open-open-closed syllable composition displayed more variation on the tone assignment. Among the 24 English loanwords to which the older group assigned double high accent, the younger group assigned five of them (26%) to the double high accent class, six (32%) to the penultimate accent class, and eight (42%) to the final accent class. It seems that final accent, which appears most frequently, is the main tone pattern for the younger group in the open-open-open-closed syllable composition, and the example loanwords that exhibit the generational difference are presented in (5).

(5) Loanwords with the open-open-open-closed syllable composition

English word	Older group (HHLL)	Younger group (LLLH)
layout	ré:.í.a.ut	re.i.a.út
humanism	hjú:.mʌ.ni.dɛim	hju.mʌ.ni.dɛɪm
hurricane	hʌ:.rí.kʰe.in	hʌ.rí.kʰe.ín

English loanwords with the open-open-open-closed syllable composition were assigned final accent most frequently by younger speakers due to the heavy final syllable. However, there were a few loanwords that unexpectedly fell into the

penultimate accent class. To find out which factors affect the variation of the tone patterns, the loanwords that were assigned penultimate accent were examined, and it was noticed that most of them end with [ɛjʌn]. The example English loanwords that end with [ɛjʌn], which exhibited the generational difference on the tone patterns, are presented in (6).

(6) Generational difference on loanwords that end with [ɛjʌn]

English word	Older group (HHLL)	Younger group (LLHL)
rotation	ro:.tʰɛ.i.ɛjʌn	ro:.tʰe.i.ɛjʌn
formation	pʰó:.mé.i.ɛjʌn	pʰo.me.i.ɛjʌn
carnation	kʰá:.né.i.ɛjʌn	kʰa.ne.i.ɛjʌn

According to Hwang (2020), [ɛjʌn] in the final syllable of NK English loanwords is pre-accenting and assigns high tone to the preceding syllable unless the initial syllable is heavy. This pattern invariantly applied to all two-, three-, and four-syllable loanwords in her corpus (e.g. [pʰík.ɛjʌn] HL ‘fiction’; [ri.s’ép.ɛjʌn] LHL ‘reception’; [na.re.i.ɛjʌn] LLHL ‘narration’). The generational difference observed in (6) from the tone patterns of the English loanwords that end with [ɛjʌn] provides additional evidence that long vowels do not exist anymore in the production of younger speakers especially in four-syllable English loanwords. That is, for older NK speakers, these loanwords are assigned double high accent, regardless of having [ɛjʌn] in the final syllable, because the initial syllable is heavy with a long vowel. Yet, for younger NK speakers, these loanwords are assigned penultimate accent instead of double high accent because the initial syllable is no longer considered heavy in their new vowel system.

The results of this section support the third hypothesis of this study, showing that the newly assigned tone patterns observed from the younger group mostly follow the general tone assignment rules of single high accent and thus are largely predictable.

4. Summary and discussion

The results of this study demonstrate that the loss of the vowel length contrast has an impact on tone patterns of English loanwords and double high accent is becoming less frequent in the production of younger speakers. Since the vowel length distinction has been lost among younger speakers, all their English loanwords with

an open initial syllable were expected not to be assigned double high accent. However, the results of this study showed that not all English loanwords that had double high accent are experiencing the tone change in the production of younger NK speakers. The expected tone change (losing double high accent) has been occurring only in four-syllable loanwords, and two- and three-syllable English loanwords have not exhibited any noticeable generational difference in their tone patterns. Since younger NK speakers no longer have the cues (long vowels) to assign double high accent to loanwords with an open initial syllable, double high accent observed from their two- and three-syllable loanwords seems to be a historical tone pattern that is influenced by the production of older NK speakers.

Then why do the historical tone patterns (double high accent) persist longer in two- and three-syllable English loanwords in the production of younger NK speakers? There can be two possible answers for the question. First, the two- and three-syllable loanwords may have a lexical double high accent in the input just like NK native words, due to the frequency effect. According to Haspelmath and Sims (2010), frequent words are more easily remembered and are retrieved faster than rare words, and this makes irregularities persist in frequent words. Since shorter words are generally more frequent than longer words (Haspelmath and Sims 2010), younger speakers may hear two- and three-syllable loanwords more frequently than four-syllable loanwords. This seems to imply that younger speakers consider the tone patterns as part of the lexical representation, and this can explain why tone patterns of two- and three-syllable English loanwords do not reflect the moraic changes happening in NK loanwords.

Yet, four-syllable English loanwords are less frequent than two- and three-syllable loanwords, and thus they seem to be less influenced by the production of older speakers. Since words with low frequency are more subject to analogical levelling (Haspelmath and Sims 2010), this makes them to follow the regular tone assignment patterns, experiencing the tone change as expected. With the assumption, it can be further inferred that newly adapted English loanwords and low frequency English loanwords may be the first targets of the tone change and rarely assigned double high accent in the production of younger speakers since they are less influenced by the historical tone patterns produced by older speakers.

Second, the other way of explaining the differences between the tone patterns of shorter and longer loanwords is that the tones are not part of the underlying representation, but the initial syllables of two- and three-syllable English loanwords

may still have covert long vowels. Although long vowels have been lost in the production of younger NK speakers phonetically (Kim 2018), the length distinction may still exist phonologically. That is, the initial syllables that had a long vowel in the past may be still phonologically bimoraic, though speakers do not perceive the length difference since they are not phonetically long. The discrepancy between phonology and phonetic representations are often found in languages. For instance, in Hungarian (Vago 1973), there is a vowel harmony with front vowels and back vowels. In this language, the high front vowel [i] generally behaves as a front vowel. However, for some words it behaves as a back vowel, triggering back harmony, and this has a historical reason: those words where the high front vowel triggers back harmony originally had the high central vowel [ɨ]. That is, Hungarian originally had two different vowels [i] and [ɨ], but they were neutralized and fell together as [i]. Nonetheless, phonologically the difference still has an effect and those words that historically had the vowel [ɨ] exhibit back harmony. That is, phonetically it is just one vowel [i], but phonologically it acts as two different types of vowels.

As seen in the Hungarian example, even if the vowel length is no longer phonetically contrastive in the production of younger NK speakers, their two- and three-syllable English loanwords that had an initial long vowel in the past still act as they have a bimoraic initial syllable, falling into the double high accent class. Then, we can ask why the bimoraicity has been lost from four-syllable English loanwords, exhibiting the tone change. This could be due to a word length effect—if the vowel length in longer words is generally shorter than vowel length in shorter words. That is, in two-syllable words, the absolute length of the vowel in the first syllable is probably quite a bit longer than that in four-syllable words. Since the initial long vowels in four-syllable English loanwords may be inherently short, this might cause four-syllable loanwords to lose the bimoraicity before shorter loanwords.

In addition, another possibility comes from the observation that no four-syllable (monomorphemic) NK native word begins with double high accent. This may influence four-syllable loanwords preventing them from occurring with double high accent among the younger generation of speakers. Nonetheless, while all native monomorphemic four-syllable words have penultimate accent, the loanword tone pattern for the younger speakers is still weight sensitive as seen in (5) where four-syllable loanwords with final (bimoraic) closed syllables are assigned final accent.

Even though double high accent is still maintained in shorter loanwords, the results of this study reveal that the tone change has already been started in four-syllable

loanwords and this can be considered to be the beginning of the change in progress. The loss of the vowel length distinction from younger speakers seems to affect the loanword accentuation system in patterned way with respect to double high accent. Since the tone change has already been started from longer loanwords, this study expects that the tone change will be continued and, in the future, double high accent will also become less frequent in two- and three-syllable English loanwords. That is, ultimately English loanwords with an initial open syllable will not retain double high accent.

In the past when there was a clear vowel length distinction, it would not be confusing for NK speakers to assign double high accent to English loanwords with an open initial syllable because loanwords that had a long vowel in the initial syllable always attracted double high accent, whereas those that contained a short vowel in the initial syllable never fell into the double high accent class. However, as long vowels have disappeared from the production of younger NK speakers, younger speakers are becoming less certain about which English loanwords should be assigned double high accent when the initial syllable is open. That is, the tone change happening in the production of younger speakers makes the accentuation of NK loanwords more predictable in their new vowel system. Importantly, the NK loanword accentuation system still maintains a degree of weight sensitivity (i.e. coda weight) distinguishing it from the lexical accent system of native words.

5. Conclusion and future direction

The results of this study revealed that the loss of the vowel length contrast in the production of younger speakers has an impact on their tone patterns, and double high accent is becoming less frequent in English loanwords with an initial long vowel. However, the tone change was observed only from four-syllable English loanwords in the results of this study, and it is assumed that the change is in the initial stage. Thus, future research is necessary to track the progress of the tone change in NK English loanwords. There are several directions in which this study can be extended. The observation here is limited to two groups of generations with three participants in a group. Therefore, a further examination with younger and older generations of NK Korean would allow us to track the tonal change more clearly. In addition, with the loss of long vowels, NK Korean has lost an important element of a moraic language. This might lead to a future change in the tone assignment patterns of NK

English loanwords. Thus, future research should keep track the tone changes in NK Korean.

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