

# Pitch Accent in Korean

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## Summary

Typologically, pitch-accent languages stand between stress languages like Spanish and tone languages like Shona, and share properties of both. In a stress language typically just one syllable per word is accented and bears the major stress (cf. Spanish *sábana* ‘sheet’, *sabána* ‘plain’, *Panamá*). In a tone language the number of distinctions grows geometrically with the size of the word. So in Shona, which contrasts high vs. low tone, trisyllabic words have eight possible pitch patterns. In a canonical pitch-accent language such as Japanese, just one syllable (or mora) per word is singled out as distinctive, as in Spanish. But each syllable in the word is assigned a high or low tone (as in Shona); however, this assignment is predictable based on the location of the accented syllable.

The Korean dialects spoken in the southeast Kyongsang and northeast Hamkyeng regions retain the pitch-accent distinctions that developed in Middle Korean (15<sup>th</sup> – 16<sup>th</sup> centuries). For example, in Hamkyeng a three-syllable word can have one of four possible pitch patterns that are assigned by rules that refer to the accented syllable. The accented syllable has a high tone and following syllables have low tones. Then the high tone of the accented syllable spreads up to the initial syllable, which is low. Thus, /MUCike/ ‘rainbow’ is realized as high-low-low, /aCImi/ ‘aunt’ is realized as low-high-low, and /menaRI/ ‘parsley’ is realized as low-high-high. An atonic word such as /cintalle/ ‘azalea’ has the same low-high-high pitch pattern as ‘parsley’ when realized alone. But the two types are distinguished when combined with a particle such as /MAN/ ‘only’ that bears an underlying accent: /menaRI+MAN/ ‘only parsley’ is realized as low-high-high-low while /cintalle+MAN/ ‘only azelea’ is realized as low-high-high-high. This difference can be explained by saying that the underlying accent on the particle is deleted if the stem bears an accent. The result is that only one syllable per word may bear an accent (similar to Spanish). On the other hand, since the accent is realized with pitch distinctions, tonal assimilation rules are prevalent in pitch-accent languages.

This article begins with a description of the Middle Korean pitch-accent system and its evolution into the modern dialects, with a focus on Kyongsang. Alternative synchronic analyses of the accentual alternations that arise when a stem is combined with inflectional particles are then considered. The discussion proceeds to the phonetic realization of the contrasting accents, their realizations in compounds and phrases, and the adaptation of loanwords. The final sections treat the lexical restructuring and variable distribution of the pitch accents and their emergence from predictable word-final accent in an earlier stage of Proto-Korean.

**Keywords:** tonal accent, diachrony, phonetic realization, compounds, phonological phrases, loanwords, frequency, reconstruction

## 1. Introduction

Lexically contrastive accentual F0 (fundamental frequency) contours are found primarily in the Hamkyeng and Kyengsang dialects located in the north- and south-eastern regions of the Korean peninsula, as well as in areas that border these regions such as the Yanbian dialect in China. (Figure 1).

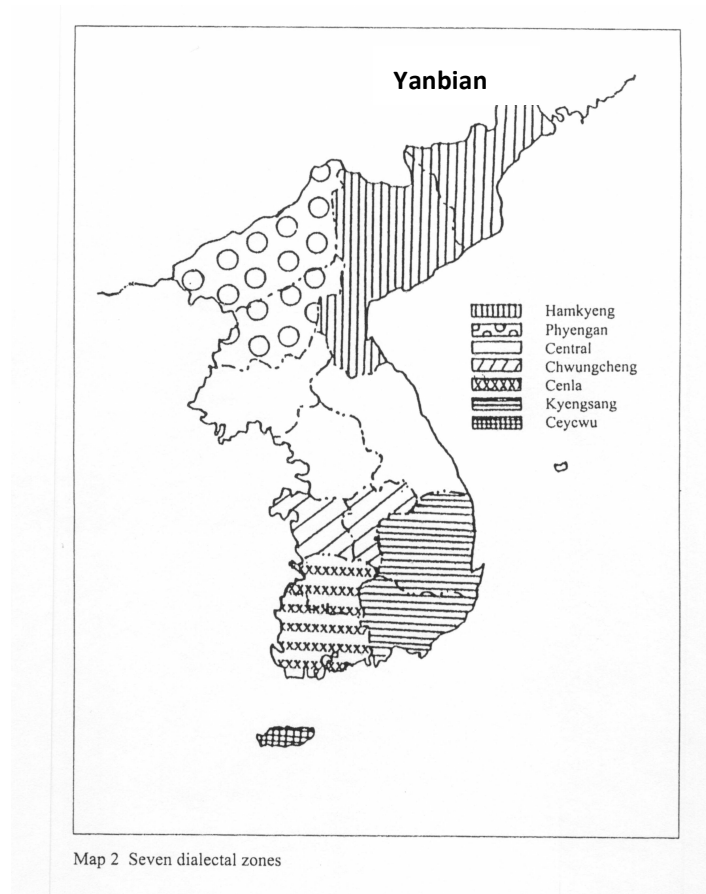


Figure 1: Map of Korean Dialects (Sohn 1999:58)

A well-known minimal triple from the Kyengsang dialect is *káci* ‘type’, *káci* ‘branch’, *kàcí* ‘eggplant’ (Figure 2, the acute accent marks a syllable with high (H) pitch and the grave accent a syllable with low (L) pitch).

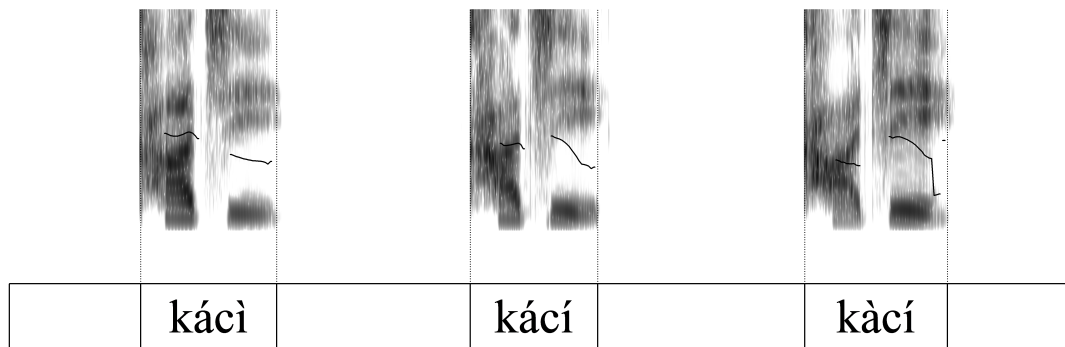


Figure 2: pitch tracks of minimal triple: *káci* ‘type’, *káci* ‘branch’, *káci* ‘eggplant’

Sound file 1:



The pitch contrasts can be traced back to the 15<sup>th</sup>-16<sup>th</sup> c. period of Middle Korean (MK) by regular sound change correspondences. They are relatively understudied compared to other aspects of Korean phonology, undoubtedly because the lexical contrasts have been lost in the standard (Seoul-based) dialect. In the latter, F0 contours are composed of boundary tones that are mapped to the syllables comprising the phonological phrase (Jun 1996). Nevertheless, the lexical accents are an integral part of the phonology of the modern Kyongsang and Hamkyeng dialects, although younger speakers seem to be less certain as to the accent type of infrequently used words, which may change their accent class based on segmental factors and frequency.

In this article we describe the evolution of the accents in the modern dialects compared to Middle Korean and then survey research into how they are realized in inflection, compounding, and sentential contexts. The final sections consider how loanwords are adapted, analogical lexical changes, and reconstructions of Proto-Korean accent.

## 2. Middle Korean and the Historical Development of the Modern Pitch Accents

In 1446 King Seycong announced the invention of the Korean alphabet in the document *Hwunmin cengum* (The correct sounds to educate people). The alphabet shows remarkable insights into the phonological system of Korean (Lee and Ramsey 2011) and used a side-dot notation in order to mark Korean tonal contrasts. The dots were placed at the left side of the syllable block; one dot marked high tone, two dots indicated a rising tone, and no dot stood for the low tone (Figure 3).



Figure 3: examples of side-dot notation for Middle Korean pitch contrasts (*Hwunmin cengum*, 1446)

Texts of the 15<sup>th</sup> and 16<sup>th</sup> centuries mark the Middle Korean tones with side dots. After this point they dropped out of use, presumably reflecting the loss of the pitch distinctions in the central dialects. According to Ramsey (1975, 1978), in the first half of the 20<sup>th</sup> century Korean linguists interpreted the three Middle Korean accents reflected in the side dots as different degrees of length, on the assumption that the phonological system of the Middle Korean texts was similar to the contemporary Seoul dialect, in spite of the explicit pitch descriptions mentioned in the *Hwunmin cengum*. Later, Kōno (1944) and He (1955) rejected this length interpretation and proposed that the side dots did

indeed mark pitch distinctions after all. The latter noted systematic correspondences between the tones of his native Gimhae dialect (South Kyengsang) and Middle Korean. He also pointed to a puzzling aspect of the correspondences, seen in examples such as Middle Korean *kàri* vs. South Kyengsang *kári* ‘street’ and Middle Korean *pànl* vs. South Kyengsang *pànil* ‘needle’, where Middle Korean high tone corresponds to South Kyengsang low tone and vice versa. Such a tone reversal would be difficult to explain as a normal sound change.

This puzzle was solved by Ramsey (1975, 1978). Investigating the speech of two Hamkyeng speakers living in Seoul, Ramsey worked out the accentual system of this dialect and its correspondences with Middle Korean and the Kyengsang material in He (1955). His study serves as starting point for much of the later research on Korean accent. According to Ramsey’s analysis of Middle Korean, the first high pitch syllable in the phonological phrase was lexically distinctive. Once this accented syllable is determined, the pitch contour of the rest of the phrase can be predicted by general rules. In particular, syllables preceding the distinctive (accented) syllable were low in pitch; following material was somewhat more complex and variable and depended on the phrasing of postpositional inflections and particles. Table 1 illustrates the regular accentual correspondences for the zero (low-tone) and one (high-tone) side dots of Middle Korean with the Hamkyeng and Kyengsang dialects. The monosyllables are shown with the nominative case particle *-i* in order to bring out their accentual properties; when appearing in isolation (citation form), they are both high tone: *súl*, *nún*.

Table 1. Accent Correspondences (adapted from Ramsey 1975, 1978; Number = number of examples for each correspondence set reported in Ramsey 1978)

Middle Korean	Hamkyeng	Kyengsang	gloss	Number
súl	sùr-í	súr-i	‘rice wine’	38
nún	nún-i	nún-i	‘eye’	130
pàrlám	pàrám	pàrám	‘wind’	59
hànlálh	hàníl	háníl	‘sky’	134
káci	káci	káci	‘branch’	40
cìntàlùj	cìntállé	cìntállé	‘azalea’	7
mìnàrí	mènàrí	minári	‘parsley’	29
àcámi	àcìmi	ácìmi	‘aunt’	15
mícikəj	múcikè	múcikè	‘rainbow’	38

Several significant observations can be made when the data are arranged in this fashion. First, the high tone of Middle Korean regularly corresponds with a high-pitched syllable in Hamkyeng, and preceding non-initial syllables assimilate this high tone: cf. Middle Korean *mìnàrí* ‘parsley’ and Hamkyeng *mènàrí*. Second, there is just one distinctive high pitch per stem in Middle Korean. If the high vs. low pitch contrast were tonal, one would expect four contrasting forms for disyllables and up to eight for trisyllables. Instead, only three contrasting patterns are found for disyllables and only four for trisyllables (ignoring the rising tone (R), discussed below, which Ramsey analyzes as a low-high sequence over two moras). This suggests that Middle Korean had a restricted tonal (pitch-accent) system in which every word was marked with at most one high pitch. All other syllables were

redundantly low when they preceded the distinctive high and predictably high or low based on the sentential context when they followed the distinctive high pitch (transcribed without a tone mark in Table 1). Third, in comparison to Middle Korean and Hamkyeng, the distinctive high pitch is realized one syllable earlier in Kyengsang. This correspondence suggests an accent retraction sound change comparable to what is found in some Bantu languages, such as Kinande (Kenstowicz 2009) and, somewhat more controversially, to Kyoto Japanese (Ramsey 1979, De Boer 2010). The accent retraction hypothesis solves the apparent tone reversal problem noted earlier: underlying /kəri/ retracted the distinctive high pitch to yield /kəri/ in Kyengsang and later rules assign a low tone to the unaccented syllables in both dialects to yield Middle Korean *kəri* and Kyengsang *kəri*. Fourth, for words that have a high pitch on their initial syllable in Middle Korean and Hamkyeng, the corresponding Kyengsang forms have high pitch over the first two syllables. Ramsey derives this special accent with the proposal that the high pitch retraction process also applied to Middle Korean words with an initial H to create a class of “pre-accent” words: /káci/ > /káci/. This proposal is supported by the observation that compounds whose second member had initial accent in Middle Korean place the accent on the final syllable of the preceding element in the corresponding Kyengsang form, as in /kasil-’mul/ > /kasíl-mul/ = [kàsíl-mùl] ‘autumn water’. When there was no preceding syllable, Kyengsang developed a double-high pitch accent by a special rule, as in *nún-i* ‘eye, nom.’ and *káci* ‘branch’. Finally, atonic words such *párám* ‘wind’ that lack a distinctive high pitch in Middle Korean have a high pitch on the final syllable in Hamkyeng: *parám*. This high tone is also anticipated by non-initial syllables: cf. Middle Korean *cintálilij* ‘azalea’ and Hamkyeng *cintállé*. In Ramsey’s analysis, case suffixes and particles have a distinctive accent on their first or second syllable. This accent is suppressed by a stem accent and its associated high tone is assimilated by the non-initial syllables of atonic stems: cf. /hanír-í/ ‘sky, nom.’ > hànír-i but /param-í/ ‘wind, nom.’ > pàrám-í. By the accent retraction rule, the high pitch of the suffix will appear on the final syllable of the preceding stem in the corresponding Kyengsang form: *pàrám-i*. Ramsey (1978:94) notes that for disyllables the correspondences between Middle Korean and Kyengsang atonic words like ‘wind’ and final accent words like ‘sky’ are quite regular, while for Middle Korean words with initial high pitch like ‘branch’ the exception rate is about 30%.

Observing that the double-high tone only appears in dialects that evidence the accent retraction, Do et al. (2014a) postulate a push chain development for the evolution of the Kyengsang accents from Middle Korean. In this view, a high pitch was inserted on words lacking a pitch peak (LL > LH). This sound change jeopardized the contrast with the existing LH words. In order to remain distinct, the latter retracted their high pitch (LH > HL). But this in turn threatened a merger with the existing H-initial type. The latter class of words were kept distinct by doubling their high pitch (HX > HH, X = unspecified) and filling a gap in the inventory of pitch patterns, given that LL was no longer possible.

(1) Chain-shift development of Kyengsang accent (Do et al. 2014a)

LL > LH	pòri > pòrí ‘barley’
LH > HL	mèrí > méri ‘head’
HL > HH	káci > káci ‘branch’

As mentioned earlier, Middle Korean had a distinctive rising pitch, marked by two side dots. It was largely confined to the initial syllable of the stem. Table 2 shows the regular correspondences among Middle Korean, Hamkyeng, and Kyengsang, as well as the Seoul dialect, where the Middle Korean rising tone (marked by the circumflex) is reflected as a distinctive long vowel.

Table 2. Rising tone correspondences (adapted from Ramsey 1975, 1978)

MK	Hamkyeng	S-Kyengsang	N-Kyengsang	Seoul	gloss	Number
k <sup>◌</sup> om	kóm	kō:m	kó:m-í	ko:m	‘bear’	41
săram	sárám	sărám	sá:rám	sa:ram	‘person’	25

The Middle Korean rising tone merges with high tone in Hamkyeng. The Kyengsang dialect splits into north and south variants based on their reflexes of this tone. In South Kyengsang (centered around the port city of Busan), the distinctive rising tone is retained on monosyllables with a lengthened vowel; but in disyllables the rising tone decomposed into a low tone on the first syllable and high on the second. In North Kyengsang (centered around the city of Daegu), the rising tone lengthened the vowel, and then merged with the word-initial accentual H and underwent the high-tone doubling rule seen above in *káci* ‘branch’: /sărám/ > /să:ram/ > /sá:ram/ > *sá:rám*. Thus, North Kyengsang shares the vowel lengthening reflex of the Middle Korean rising tone with the Seoul dialect; but like South Kyengsang, it maintains the lexical pitch contrasts and the retraction of the distinctive accent, when compared with Middle Korean and Hamkyeng.

### 3. Synchronic Pitch-Accent Systems and Their Analyses

The diachronic developments discussed in section 2 have created a synchronic situation with several lexically contrastive accent patterns for stems (nouns and verbs). Phonological alternations occur when stems are inflected with case and tense-aspect markers and other particle-like elements. Complex rules of accent reduction and modification apply in compounding and when words are combined to form phonological phrases. All of these topics have been investigated since Ramsey’s pioneering study. In the following sections, we sketch the major tonal alternations and distributions at the word and phrasal levels for the Kyengsang dialects.

The Middle Korean N+2 inventory of pitch patterns (where N = number of syllables and the word-initial rising tone counts as a separate accent class) is carried forward in Kyengsang; but due to the accent retraction, their realization is more complex. Table 3 shows the possibilities for monosyllabic and disyllabic stems followed by the particles *-mánk<sup>h</sup>im* ‘as far as’ and *-imjə̀n* ‘if’ for the South Kyengsang variety. The first shows the effect of an accented particle and the second the behavior of an atonic particle. Monosyllables display three possible pitch patterns and disyllables display four. The analytic challenge posed by these contrasts is that there are more distinctions than a classic N+1 pitch-accent system can accommodate. On the other hand, if South Kyengsang had a simple high vs. low tonal contrast comparable to what is found in many African languages such as Shona, one would expect stems composed of all low tones, as in Middle Korean. But such structures are systematically absent: every word must have at least one pitch peak. Furthermore, there cannot be two separate pitch peaks in a word, ruling out a HLH structure. A final problem is how to treat the contrast between

stems like *nún* ‘eye’ and *sàráam* ‘person’, which require a high tone on the following syllable, versus *mún* ‘door’ and *pàráam* ‘wind’, which are followed by low tone.

Table 3. Inflectional accent alternations in South Kyengsang (based on Lee and Zhang 2014)

citation	nominative	N-‘as far as’	N-‘if’	gloss
<i>mún</i>	<i>mún-i</i>	<i>mùn-mánk<sup>h</sup>im</i>	<i>mún-imjèn</i>	‘door’
<i>nún</i>	<i>nún-i</i>	<i>nún-mánk<sup>h</sup>im</i>	<i>nún-imjèn</i>	‘eye’
<i>nùn</i>	<i>nùn-i</i>	<i>nùn-mánk<sup>h</sup>im</i>	<i>nùn-imjèn</i>	‘snow’
<i>kə̀ùl</i>	<i>kə̀ùr-i</i>	<i>kə̀ùl-mànk<sup>h</sup>im</i>	<i>kə̀ùr-imjèn</i>	‘mirror’
<i>kíníl</i>	<i>kínír-i</i>	<i>kíníl-mànk<sup>h</sup>im</i>	<i>kínír-imjèn</i>	‘shade’
<i>pàráam</i>	<i>pàráam-i</i>	<i>pàráam-mánk<sup>h</sup>im</i>	<i>pàráam-imjèn</i>	‘wind’
<i>sàráam</i>	<i>sàráam-i</i>	<i>sàráam-mánk<sup>h</sup>im</i>	<i>sàráam-imjèn</i>	‘person’

There have been a variety of proposals to solve these problems and no consensus exists. We review a few of them here. In their analysis of North Kyengsang, Kenstowicz and Sohn (1997) postulate H\*L vs. H\*H pitch accents for the *kə̀ùl* ‘mirror’ vs. *kíníl* ‘shade’ and *mún* ‘door’ vs. *nún* ‘eye’ contrasts (where H\* is associated with the distinctive accented syllable). When the final syllable of the stem is accented, the trailing tones of the pitch accent will attach to the following suffix to produce *mún-i* ‘door, nom.’ vs. *nún-i* ‘eye, nom.’ When no syllable follows, the trailing tones are deleted and neutralize the underlying H\*L vs. H\*H contrast. Lee and Zhang (2014) draw the distinction between these two stem types with a diacritic H<sup>+</sup> that triggers/optimizes for a long high pitch spread over two syllables in contrast to the plain H, which does not do so: *nún* (H<sup>+</sup>) vs. *mún* (H). Otherwise, unaccented syllables are assigned a low tone in their analysis. Idsardi and Kim (1997) treat the contrast in terms of tonally interpreted metrical constituents represented with left vs. right facing parentheses: *kə̀ul* vs. (*kíníl* > (*kíníl*). Finally, comparable to some analyses of Kansai Japanese, Lee and Davis (2009) break the South Kyengsang tonal structures into two components: a word-initial register contrast (high vs. low) and an accent, marked by a H\*L pitch contour. In this analysis, *kə̀ùl* and *mún* have initial accents (H\*L), *pàráam* has an initial register L and a final accent (H\*L), and *kíníl* has an initial register H and a final accent (H\*L). The Middle Korean rising tone reflexes are treated as having an initial register L and no accent in the analysis of Lee and Davis (2009). A constraint against words starting with two low-tone syllables (\*#LL) forces the insertion of a high tone on the second syllable, which spreads to the right since it is not blocked by the trailing low tone of the pitch accent. A further constraint against HHH sequences limits the spread of the high tone to two syllables: /sàram-imjən/ > /sàráam-imjən/ > /sàram-imjən/ > *sàráam-imjèn*.

#### 4. Phonetics

A number of studies have investigated whether the tonal distinctions and mergers implied by the transcriptions in Table 3 can be quantitatively verified. One issue concerns the Kyengsang *súl* ‘wine’ vs. *múl* ‘water’ vs. *tôn* ‘money’ reflexes of the Middle Korean low vs. high vs. rising pitch contrasts in monosyllables. Ramsey (1975, 1978:74) quotes He’s (1955) claim that they are realized as a high vs.

mid vs. low pitch distinction, while also observing that according to Kim (1966:25) “high-high and mid-mid are the same tone and definitely are not distinguished”. In an effort to shed light on this question, Kenstowicz, Cho and Kim (2007) investigated the speech of one female South Kyengsang speaker and found no consistent difference in the falling contour citation forms of the H(L) *súl* vs. H(H) *múl* class for the parameters of F0 maxima and minima, peak location, and vowel/syllable rime duration. On the other hand, the LH rising tone class of *tǒn* had lower peaks, a small F0 rise of c. 20 Hz, and much longer duration. Nevertheless, despite the mergers in their citation forms, the *súl* vs. *múl* stem types were consistently distinguished in their inflected forms as H-L vs. H-H. They also found no reliable differences in the citation forms of the *parám* vs. *sarám* classes, but a consistent distinction in their inflected forms. Later, Lee and Zhang (2014) confirmed these mergers and distinctions in an instrumental study of four male South Kyengsang speakers.

Several other researchers have examined the scaling of the peaks and valleys of the Kyengsang pitch curves as well as their timing with respect to the segmental and prosodic structure of the word with more speakers and better instrumentation. The results basically confirm the more impressionistic earlier studies. In an investigation of six South Kyengsang speakers, Chang (2007) reports the curves schematized in Figure 4. The pitch peak is anchored to the first syllable in the H(L) *súl* class (the middle panel), while it aligns with the onset of the suffixal vowel for the H(H) *múl* class (the left panel). The LH rising *tǒn* class is distinguished by low F0 on the stem and delayed peaks that align with the middle and endpoints, respectively, of the initial syllable of monosyllabic and disyllabic suffixes. Also the peak of the rising tone is lower than the H(L) and H(H) contours.

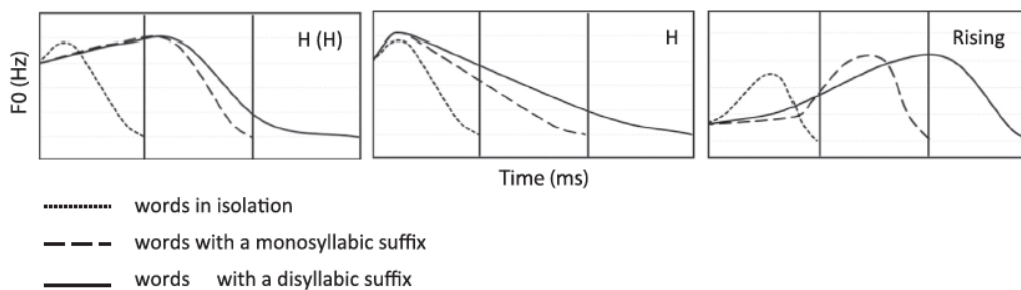
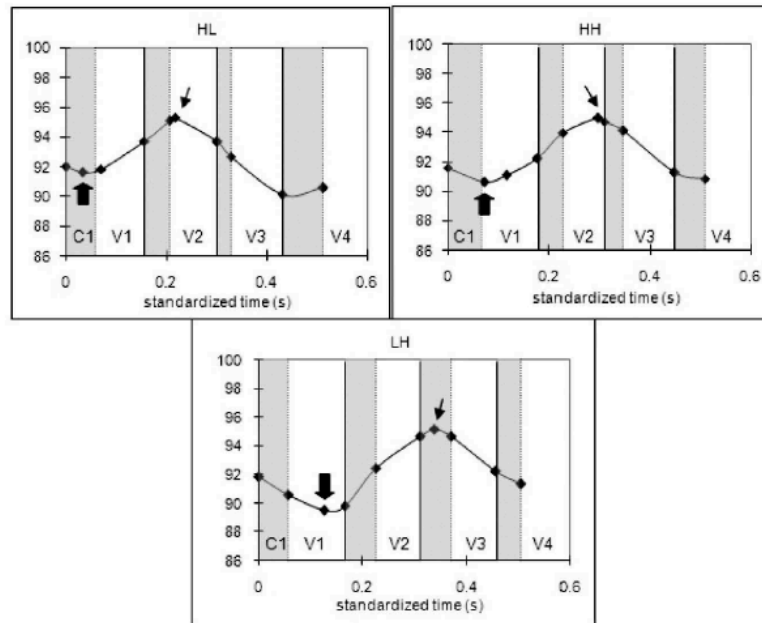


Figure 4: Schematized F0 contours for H(H), H(L), and Rising tone monosyllables based on Chang (2007) (taken from Lee and Jongman 2015)

A striking peak delay phenomenon is found in the North Kyengsang dialect (schematized in Figure 5). In a study of five young female speakers from Andong, H-S. Lee (2010) found that when a CVCV(C) stem was suffixed with the quotative particle *-rako*, the pitch peak was located near the onset of the stem-final vowel for a HL stem like *nárà* ‘country’, at the offset of the stem-final vowel for a HH stem like *Mánún* (placename), and in the initial consonant of the suffix for the LH stem *nàmú* ‘tree’. Thus, for the younger generation of North Kyengsang speakers, the three accent classes are still reliably distinguished, but the F0 peaks are aligned with the following syllables in the order HL < HH < LH. When compared with the results of Chang’s (2007) study, they dramatically illustrate how the same underlying ternary phonological contrast is realized in a systematically different fashion in the two dialects.





**Figure 5.** Mean contours of the target phrases, with three lexical tones HL, HH and LH on the first two syllables: Consonant portions shaded, and F0 Peaks and Mins marked with thin and thick arrows, respectively.

Lee and Jongman (2015) also investigated the timing of the pitch curves in their study of the speech of 10 younger (mean 21 years) and 10 older (mean 66 years) female South Kyengsang speakers. See Figure 6. For the older speakers, the peak alignments match Chang's (2007) results. But for the younger speakers, there was a marked shift of the pitch peak to the second syllable for the HL class and, more generally, a compression of the pitch curves across both syllables that might be interpreted as an incipient merger of the accent class distinctions. Lee and Jongman (2015) attribute this finding to interference from the standard Seoul dialect, which has a LH rising pitch contour across the first two syllables of the phonological phrase (unless the onset consonant is tense or aspirated).

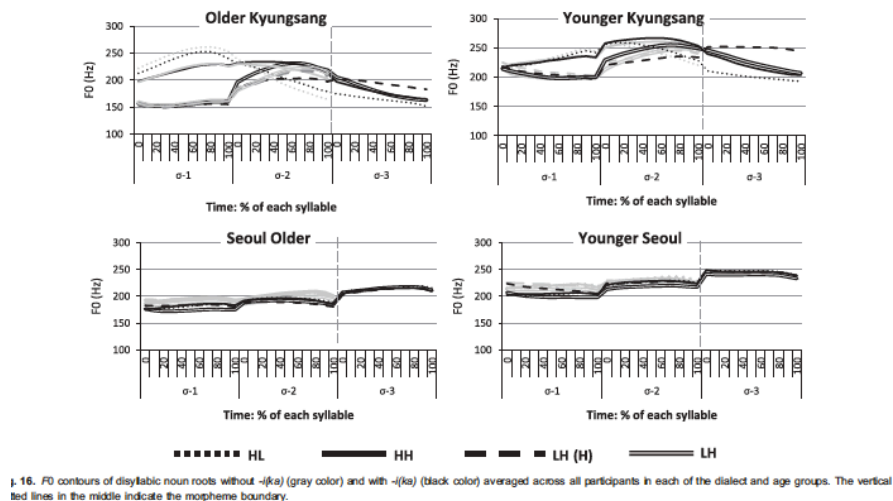


Figure 6: Pitch curves of South Kyengsang compared with Seoul (Lee and Jongman 2015)

Although more study is needed to confirm this point, we have the impression that the peak delay phenomenon is more pronounced in North Kyengsang compared to South Kyengsang. Another difference between the two dialects is that in South Kyengsang a downstream high tone that appears towards the right edge of the word is anticipated by spreading the high pitch backwards until the penultimate syllable: /k<sup>h</sup>ɛllip<sup>h</sup>onía/ ‘California’ -> [k<sup>h</sup>ɛllip<sup>h</sup>ónià]. North Kyengsang seems to lack this process. If this is true in general, then in the north the accented syllable may be cued by the rise in pitch from the immediately preceding syllable, which in turn could allow the pitch peak to drift to the right and still be identified with the accented syllable.

## 5. Compounds

According to Ramsey (1975, 1978:131), in Middle Korean each member of a compound generally retained its side-dot notation, suggesting that there was no accentual subordination. On the other hand, in the modern Hamkyeng and Kyengsang dialects just one pitch peak may appear in a compound, indicating that the components combine to form a single phonological word. But the rules of accent resolution in compounds differ from noun plus enclitic particle constructions. In the latter, the accent of the stem predominates, as in Hamkyeng /p<sup>h</sup>iri ‘flute’ + mán ‘only’/ > /p<sup>h</sup>iri-man/, vs. /pori ‘barley’ + c<sup>h</sup>ǎrǎm ‘like’/ > /pori-c<sup>h</sup>ǎrǎm/. In Hamkyeng compounds, the accent of the second element generally prevails (2a). If the second member lacks an underlying accent, the default rule inserting an accent on the final syllable of an accentless word applies (2b). The only systematic exceptions to faithfulness to the second element occur with compounds whose first member is a tonic monosyllable and whose second member has initial accent. In this case (2c), the accent of the first member generally prevails (a type of clash resolution), although even here there are exceptions (2d).

(2) Accent of compound nouns in Hamkyeng (Ramsey 1975, 1978)

a.	móki ‘mosquito’ + sóri ‘sound’	>	moki-sóri	‘mosquito sound’
	só ‘cow’ + kökí ‘meat’		sö-kökí	‘beef’
	cumáni ‘pocket’ + k <sup>h</sup> ál ‘knife’		cumáni-k <sup>h</sup> ál	‘pocket knife’
b.	ké ‘dog’ + kunjəŋ ‘hole’		kɛ-kunjəŋ	‘doghole’
	c <sup>h</sup> óka ‘thatch’ + cip ‘house’		c <sup>h</sup> oka-cíp	‘thatched house’
	k <sup>h</sup> ál ‘knife’ + cip ‘house’		k <sup>h</sup> al-cíp	‘scabbard’
c.	nún ‘eye’ + múl ‘water’		nún-mul	‘tears’
	sé ‘bird’ + sóri ‘sound’		sé-sori	‘sound of birds’
d.	pí ‘rain’ + úsan ‘umbrella’		pi-úsan	‘rain umbrella’
	múl ‘water’ + ál ‘egg’		mur-ál	‘blister’

In the Kyengsang dialects, compounds fall into right-dominant and left-dominant types. Building on the discussion in Chung (1991), N-J. Kim (1997) documents and analyzes this distinction for North Kyengsang in considerable detail. Some examples of right-dominant compounds appear in (3a). When the first element has final accent and the second element has the double-high accent, the pitch peak of the compound appears on the final syllable of the preceding element (3b). This synchronic alternation reflects the diachronic Kyengsang accent retraction mentioned in section 2, since the double-high pitch derives from word-initial accent at an earlier stage.

(3) Right-dominant compound nouns in North Kyengsang (N-J. Kim 1997), *s* = syntactic marker

a.	namú ‘wood’ + tarí ‘bridge’	>	namu-tarí	‘wooden bridge’
	kasíl ‘autumn’ + hánəl ‘sky’		kasil-hánəl	‘autumn sky’
	súl ‘wine’ + cíp ‘house’		sul-cíp	‘bar’ (cf. súr-i, cíp-i)
b.	sán ‘mountain’ + s + púl ‘fire’		sán-p*ul	‘mountain fire’ (cf. sán-i, púr-i)
	súl ‘wine’ + s + táncí ‘jar’		súl-t*anci	‘wine-jar’ (cf. súr-i)

In left-dominant compounds, the accent of the initial member prevails. This accent resolution strategy parallels the treatment of words composing a phonological phrase (see below). Some examples appear in (4). When the first element belongs to the double-high class, the pitch peak arches over the morpheme juncture in the case of a monosyllable, as in *k<sup>h</sup>ón-nóre*.

(4) Left-dominant compound nouns in North Kyengsang (N-J. Kim 1997), *s* = syntactic marker

nápi ‘butterfly’ + nekt <sup>h</sup> ái ‘necktie’	nápi-nekt <sup>h</sup> ai	‘bowtie’
k <sup>h</sup> ó ‘nose’ + s + nóre ‘song’	k <sup>h</sup> ón-nóre	‘hummed song’ (cf. k <sup>h</sup> ó-ká)
cóŋi ‘paper’ + pɛ ‘boat’	cóŋi-pɛ	‘paper boat’ (cf. pé-ká)

N-J. Kim (1997) observes that it is not possible to predict with complete accuracy whether a compound will follow the right- or left-dominant pattern. He cites minimal pairs such as *páp-cíp* ‘restaurant’, where the double-high of *páp* ‘rice’ (cf. *páp-i*) prevails, versus *k<sup>h</sup>al-cíp* ‘sheath’, where the double-high of *k<sup>h</sup>ál* ‘knife’ (cf. *k<sup>h</sup>ár-i*) is suppressed. Nevertheless, left-dominant resolution seems to be the default strategy. N-J. Kim (1997) states that right-dominant compounds are restricted to just

two components, while more complex compounds are uniformly left-dominant. Also, he finds that left-dominant structures tend to be more semantically transparent and productive, citing the observation of Chung (1991) that in a construction such as *X+sá:nsú* ‘player’, any word designating a sport may substitute for X and the resultant word retains the accent of X.

## 6. Phonological Phrasing

Several studies have investigated how the various Kyengsang lexical accents are realized in sentential contexts, where the words are organized into phonological phrases. When two independent words are combined into a phrase, the accent of one generally predominates. G-R. Kim (1988) and Chung (1991) postulated rules to delete one of the accents, comparable to what is found in compounds. But in an instrumental study of the North Kyengsang speech of the second author, Kenstowicz and Sohn (1997) found that when the F0 lowering effect of pause is controlled for, the pitch contours in the second word of a phrase, while lowered and compressed, still remain distinct from one another. Their study also found striking differences in the phonetic implementation of words drawn from the different Kyengsang accent classes. They propose that when the first word of the phrase has a nonfinal accent like *mánil* ‘garlic’, then it is marked with a H\*L pitch accent and the trailing L tone downsteps (lowers) a following pitch peak. This analysis is modeled on the one proposed for Tokyo Japanese by Pierrehumbert and Beckman (1988). A surprising finding was that when first word belongs to the final accent class like *namúl* ‘vegetable’, then rather than deleting, its pitch peak is retained but the peak of the following word is upstepped compared to the first word. According to Kenstowicz and Sohn’s (1997) analysis, the trailing L tone of the H\*L pitch accent in *namúl* is deleted in the word-level phonology, since there is no following syllable to bear it. In the postlexical phrasal phonology, the H spreads its tone up to the peak in the following word, which is then upstepped (raised). The displays in (5) illustrate the different effects of these two accent types on the following verb *mək-sipní-ta* ‘eats, polite’.

(5) Downstep and upstep in phonological phrases of North Kyengsang (Kenstowicz and Sohn 1997)

<i>mánil</i> <i>mək-sipní-ta</i>                    H L            H L	→	<i>mánil</i> <i>mək-sipní-ta</i>                    H L            ' H L
<i>namúl</i> <i>mək-sipní-ta</i>                  H            H L		<i>namúl</i> <i>mək-sipní-ta</i>   / /     H            ' H L

The downstep and upstep effects of the nonfinal and final accents were subsequently confirmed by Jun et al. (2006) in a study of six North Kyengsang speakers that utilized more extensive measurements and statistical analyses. In addition, they found that each phonological word began with a low pitch target and so postulate a word-level %L boundary tone. In their analysis, the upstep process raises the %L as well as the pitch peak of the following word. Moreover, when a phrase is composed of two successive

final accent words, each one upsteps the following word in a cascade of pitch raising. The pitch tracks in Figure 7 illustrate this remarkable finding. The first shows a downstep chain in which the peak of each successive word is lowered. In the second track, the final accent class word *norú* ‘deer’ raises both the initial %L (evident in the small dip in the pitch track) and the peak of *əlkül* ‘face’, which in turn raises the double-high peaks of *kírí-* ‘draw’, the third link in the upstep chain.

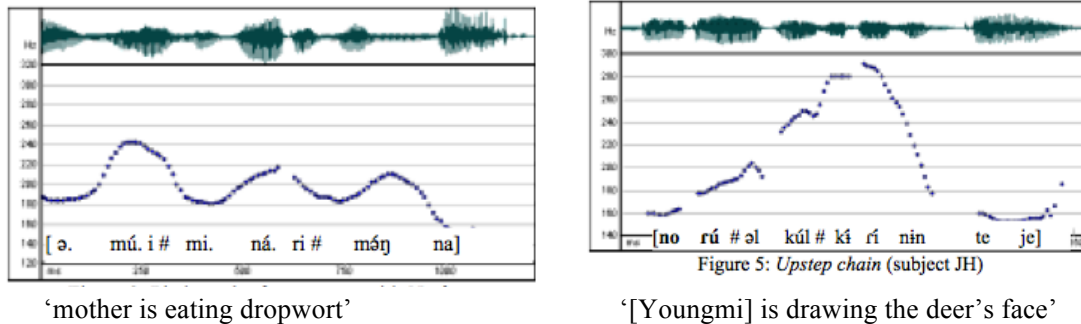


Figure 7: Downstep and upstep chains in North Kyengsang (Jun et al. 2006)

Another notable finding from Kenstowicz and Sohn’s (1997) study was a systematic exception to the upstep that occurred when the second word in the phrase is drawn from the double-high class, as in underlying /*norú* əŋtəŋi/ ‘deer’s haunch’. In this situation, the double-high peak of the second word is downstepped (an observation also made by G-R. Kim 1988 and Chung 1991): [*norú* <sup>1</sup>əŋtəŋi]. This phenomenon is reminiscent of the diachronic retraction from Middle Korean initial-accent words in compounds that was noted in section 5. The speakers investigated by Jun et al. (2006) did not display this effect and upstepped the word following a final-accent word, regardless of its accent type.

Various studies have investigated the parameters determining how words are organized into phonological phrases. In Kenstowicz and Sohn’s (1997) analysis, the left edge of an XP aligns with a phonological phrase and thus in a simple subject-object-verb sentence, the phrasing will be (NP) (NP V) and the downstep and upstep effects will be found within a phrase. In Jun et al.’s (2006) study of such structures, an internal phrase-break was not found and the downstep and upstep processes occurred across the entire clause. The latter also show that the pitch range of a focused word is expanded compared to a neutral control. Both studies propose that focus initiates a new phonological phrase, thus separating a focused word from preceding material. When the focused word belongs to the final accent class, its pitch peak is not raised relative to a neutral control. Rather, the F0 enhancement appears to fall on the site of upstepping in the following word. For example, even when the object *namúl* ‘vegetable’ bears contrastive focus, the high tone of the following verb *məknínta* ‘eats’ is upstepped in the sentence [átir-i namúl məknínta] ‘son eats *vegetable*’ (Kenstowicz and Sohn 1997). The North Kyengsang data thus show that the effects of focus are situated within the phonological and phonetic grammars, which can override F0 enhancement of the contrastively focused word that might otherwise be expected in a model of grammar where semantic/pragmatic factors directly control phonetic implementation.

## 7. The Accent of Loanwords

In the adaptation of a loanword, a phonological distinction in the donor language will typically be maintained if the recipient grammar has the resources to express it. For example, Korean has one liquid phoneme that appears as a lateral in the coda and as a flap/tap intervocally: *múl* ‘water’, *múr-i* nominative. In word-medial position, the English lateral vs. rhotic distinction can be expressed in the loanword by geminating the lateral so that it appears in the coda: cf. *p<sup>h</sup>íránsì* ‘France’ vs. *p<sup>h</sup>íllòrità* ‘Florida’. Since a high pitch can appear contrastively on any syllable in a tri- or quadri-syllabic native word in North Kyengsang, one might therefore expect a more or less faithful adaption of the English stress. But a number of studies of the Kyengsang dialects have instead found that a default accent is assigned to the loan, ignoring the locus of accent in the English source word. For the North Kyengsang dialect, Kenstowicz and Sohn (2001) report that if the initial syllable is adapted with a long vowel then the double-high accent is regularly assigned, in accordance with the native phonotactic constraint that reflects the development of the Middle Korean rising tone with a long vowel seen earlier in Table 2. Examples appear in (6a). Otherwise, a final heavy (closed) syllable is accented (6b). If both the initial and final syllables in the loan are light, then the accent falls on the penult (6c). Lastly, the double accent is assigned variably if the initial syllable is closed (6d).

### (6) Loanwords in North Kyengsang (Kenstowicz and Sohn 2001)

- |    |                       |           |
|----|-----------------------|-----------|
| a. | ó:t <sup>h</sup> ó    | ‘auto’    |
|    | pjú:t <sup>h</sup> í  | ‘beauty’  |
|    | pá:kén                | ‘bargain’ |
| b. | k <sup>h</sup> èpinés | ‘cabinet’ |
|    | ticit <sup>h</sup> ál | ‘digital’ |
|    | c <sup>h</sup> èná1   | ‘channel’ |
| c. | àmèrík <sup>h</sup> à | ‘America’ |
|    | hwèmíri               | ‘family’  |
|    | sinémà                | ‘cinema’  |
| d. | k <sup>h</sup> óntó   | ‘condo’   |
|    | p <sup>h</sup> ápsón  | ‘popsong’ |
|    | nèpk <sup>h</sup> ín  | ‘napkin’  |

In the South Kyengsang dialect, there are no phonemic long vowels and hence the motivation for the double-high accent with an initial closed syllable is absent. Thus, D-M. Lee (2008) reports that words with a CVC.CV structure are uniformly adapted with HL: *nám<sup>h</sup>pà* ‘number’. Loanwords with two successive high tones do occur in South Kyengsang. But in D-M. Lee’s analysis, they arise from the combination of two separate factors: a compulsion to accent a heavy CVC syllable plus the avoidance of a lapse of two successive low-tones. Hence, CVC.CV.CV loans have the first two syllables high: *répsóti* ‘rhapsody’. Successive high pitch syllables also arise from the South Kyengsang process of high-tone anticipation: *rimúcin* ‘limousine’, *sináriò* ‘scenario’, *séntwíc<sup>h</sup>i* ‘sandwich’.

In the Kyengsang dialects, loanwords form a special class vis a vis native words in that they fail to trigger or undergo the normal rules of tonal inflection. Recall that South Kyengsang words with a final high tone are ambiguous as to whether or not they double their high tone onto the inflectional suffix: *pàrám*, *pàrám-ì* ‘wind’ vs. *sàrám*, *sàrám-ì* ‘person’. Loanwords with a final accent systematically fall into the first group. They also differ from native words by blocking the accent of a following particle such as *-c<sup>h</sup>ərəm* ‘like’ from appearing in the output.

(7) Inflection of word-final accents in native vs. loanwords in South Kyengsang (D-M. Lee 2008)

native	mál	‘horse’	már-ì	mâl-c <sup>h</sup> ərəm
loan	pél	‘bell’	pér-ì	pél-c <sup>h</sup> ərəm
loan	k <sup>h</sup> áp	‘cup’	k <sup>h</sup> áp-ì	k <sup>h</sup> áp-c <sup>h</sup> ərəm
native	pàrám	‘wind’	pàrám-ì	pàrám-c <sup>h</sup> ərəm
loan	rémón	‘lemon’	rémón-ì	rémón-c <sup>h</sup> ərəm

A number of studies have addressed the question of from where the default accent pattern assigned to loanwords originates. Kenstowicz and Sohn (2001) propose that it reflects, in part, the universal grammar (UG) option of accenting a final heavy syllable and otherwise a default to the penultimate syllable in order to make sure that the loan has an accented syllable. H-J. Kim (2012) investigated the distribution of the pitch accents in the North Kyengsang native lexical class and found that a heavy CVC syllable attracted the high tone in a statistically reliable fashion. On this basis, she suggests that loanword adaptation arises from the native speaker’s knowledge of trends in the native lexicon rather than via a universal grammar default. A similar proposal was made by Kubozono (2006) for loanword adaptation in Japanese. H-J. Kim (2012) formalizes this knowledge with a stochastic OT grammar whose constraints are weighted as a function of the statistical trends observed in the lexicon. She also reports novel word experiments that replicate the preferences for final accent for words ending in a heavy syllable and otherwise penultimate accent. There is thus a co-linearity problem, in that both the lexical statistics and the UG markedness bias coincide in the accent patterns they prefer. Consequently, it is difficult to tell which is responsible for the native speaker’s response to the task of assigning an accent in novel words, be they loanwords or wug words.

A serious challenge to both proposals is posed by Ito’s (2014) study of accentual adaptation in the Yanbian dialect of Korean (spoken in the regions of China that border the Hamkyeng speaking area). As in Hamkyeng, the locus of accent in Yanbian reflects the accented syllable of Middle Korean. Also, the Middle Korean rising tone merged with high tone without any vowel lengthening in both dialects. For the vast majority of Yanbian words, the high pitch accent falls contrastively on either the final or the penultimate syllable (in contrast to Kyengsang where accent on an earlier syllable in the word is possible due to the diachronic retraction process). Ito finds that native words have a three-to-one preference for final accent, while western (mostly English) loanwords are adapted with a four-to-one bias for penultimate accent. Thus, in Yanbian the loanword adaptation directly contradicts the native lexicon bias to final accent. Ito (2014) proposes that the penult bias for loanwords in Yanbian reflects the adapter’s conception of the accentual locus in English. She reports that there is a high agreement rate between the stress patterns of the English source words and the corresponding penult vs. final locus of accent in the Yanbian adaptations. For example, for English disyllables, the stressed-

unstressed pattern outnumbers unstressed-stressed by 92% vs. 8% in her corpus. The ratio of penult vs. final in the corresponding Yanbian adaptations is 88% vs. 12%. A similar close match holds for Japanese loans as well. Ito (2014:587) hypothesizes that since stress is not orthographically indicated in English, and because most Yanbian speakers had little opportunity to interact with English speakers, “at some point Yanbian people started to generalize the adaptation patterns based on their limited understanding and available data”, resulting in a loanword grammar that accents a final heavy syllable and otherwise the penult. It remains to be seen to what extent the stress contours of English source words correlate with the loanword adaptations in the Kyengsang dialect.

Yanbian has recently borrowed many words from Mandarin Chinese. They follow an adaptation strategy that differs from the default-based one apparently practiced in Kyengsang. Instead of consistently assigning Mandarin loans to the penult or final accent categories as a default, the adaptation depends on the tonal shape of the Mandarin input word. Since Mandarin has four lexical tones (cf. the well-known suite of Tone 1 *mā* [55] ‘mother’ vs. Tone 2 *má* [35] ‘hemp’ vs. Tone 3 *mǎ* [214] ‘horse’ vs. Tone 4 *mà* [51] ‘scold’), there are fifteen possible disyllabic combinations. (The first of two successive [214] tones is modified to [35] by the well-known Tone-3 sandhi rule.) In a study of 250 recent loans, Ito and Kenstowicz (2009) find that the choice between HL vs. LH adaptations in Yanbian is determined by the overall pitch trajectory of the Mandarin source word at the point of transition between the penult and final syllables. When the final syllable has Tone 1 or 4 in Mandarin and thus begins with high F0, then the LH adaptation is chosen in Yanbian. When the final syllable is Tone 2 or 3 in Mandarin and thus begins with lower pitch, then the HL adaptation is selected for Yanbian. Some examples appear in Table 4.

Table 4. Mandarin loanwords in Yanbian (Ito and Kenstowicz 2009)

Mandarin	Yanbian	gloss
duan <sup>3</sup> ku <sup>4</sup>	twàn.kú	‘short pants’
bai <sup>2</sup> ganr <sup>1</sup>	p*è.kál	‘liquor’
pi <sup>2</sup> jiu <sup>3</sup>	p <sup>h</sup> i.cjù	‘beer’
feng <sup>1</sup> tian <sup>2</sup>	fǽŋ.t <sup>h</sup> èn	‘Toyota’

It is interesting that due to the extensive carryover co-articulation of F0 in Mandarin (Xu 2007), the initial portion of the second syllable of these words is a zone of transition for the Mandarin speaker that must be filtered out for proper identification of the lexical tone. But from the perspective of the tonal adapter, the trans-syllabic F0 contour is the best approximation to the Yanbian HL vs. LH categories to which any lexical item must be assigned. “Thus, the same phonetic object can be interpreted quite differently depending on the grammar involved” (Ito and Kenstowicz 2009:99)

## 8. Lexical Restructuring and Analogical Changes

A number of studies have investigated to what extent particular lexical items shift from one Korean pitch-accent class to another and the factors that play a role in this phenomenon. Previous research on this general question (Phillips 1984, 2006, Bybee 2001, Albright and Hayes 2002) established three



general principles. First, there is a *type frequency* effect whereby lexical items belonging to smaller classes tend to be attracted to larger classes. For example, in English, many strong verbs such as *creep-crept* have developed weak verb alternants *creep-creeped*. Changes in the opposite direction are much less common. Second, there is a *token frequency* effect in which less commonly used words are more likely to change before more commonly used ones (cf. *crept* > *creeped* but *slept* > *\*slepped*). Finally, membership in a given lexical category may be tied to a particular sound or sound sequence; words can be attracted to a smaller class if they bear that property, termed an *island of reliability* (Albright 2002).

Do et al. (2014a) investigated these various frequency effects with respect to accent class membership in the evolution from Middle Korean to South Kyengsang. In their study, five speakers were polled for the accent types they assigned to c. 1,900 native nouns. We mention here a few of their more notable findings. First, recall from section 2 that Middle Korean had three accent types for monosyllables: H, L, and R. Their regular correspondences in South Kyengsang are H(H), H(L), and R. As indicated in Table 5, these three accent types occur in the proportions of 56%, 26%, and 18% in the Middle Korean lexicon.

Table 5. Proportions of three accent types in monosyllables

Middle Korean			South Kyengsang		
H	míl	56%	H(H)	múl, múr-í	‘water’
L	sùl	26%	H(L)	súl, súr-ì	‘wine’
R	tõn	18%	R ≈ L(H)	tõn, tòn-ì	‘money’

The following table shows the distribution of correspondences for the monosyllables aggregated across all five speakers from Do et al. (2014a). The regular correspondences run along the diagonal (shaded).

Table 6. Accent correspondences for South Kyengsang monosyllabic native nouns (Do et al. 2014a)

MK \ SK	H(H)	H(L)	R	Totals
H	720 (83%)	90 (10%)	55 (6%)	865
L	81 (24%)	239 (70%)	22 (6%)	342
R	69 (23%)	33 (11%)	192 (65%)	294
Totals	870	362	269	1,501

The type frequency effect is evident at a number of places in this table. First, the degree of regularity reflects the relative sizes of the three accent classes: H(H) > H(L) > R. In the irregular developments, more items from the Rising tone class have been attracted to the larger H(H) class (23%) than to the smaller H(L) class (11%). The H(H) and H(L) stems are neutralized to H in the citation form and are thus ambiguous as to the tonal pattern of the inflected form and hence are particularly susceptible to restructuring. The data reveal that proportionately, more words have shifted from the H(L) class to H(H) than vice versa (24% vs. 10%). Do et al. (2014a) also found that the coda consonant type had an

effect on the evolution of accent. Most words in the Middle Korean Rising tone class with an obstruent coda have been reassigned to either H(H) or H(L): e.g. Middle Korean *pət* ‘friend’ > South Kyengsang *pəs*, *pəs-i~pəs-i* (cf. Seoul *pə:s*) and Middle Korean *ciz* ‘gesture’ > South Kyengsang *cis*, *cis-i~cis-i* (cf. Seoul *ci:s*). More interestingly, several Middle Korean words from the H or L class have entered the South Kyengsang Rising tone category (at least for some speakers), swimming against the more general trend in the opposite direction. They all end in a sonorant consonant: e.g. Middle Korean *sól* ‘pine’ > South Kyengsang *sól* (cf. Seoul *sol*), Middle Korean *cóm* ‘moth’ > South Kyengsang *cóm* (cf. Seoul *com*), Middle Korean *hjuŋ* ‘scar’ > South Kyengsang *hjuŋ* (cf. Seoul *hjuŋ*). A sonorant consonant is able to carry F0 distinctions and so this evolution makes sense phonetically as well.

Do et al.’s (2014a) data also illustrate the effect of token frequency. Table 7 shows the correspondence figures of Table 6 broken down into low-frequency vs. high-frequency groups based on the distribution of words in the King Seycong speech corpus (Kim and Kang 2000). The shaded cells again show the regular correspondences between Middle Korean and South Kyengsang. In each case, high-frequency words are more likely to display the regular correspondence compared to low-frequency words. The irregular developments show the opposite effect and accord with the thesis that less commonly used words are more likely to change their lexical classification compared to more commonly used words.

Table 7. High vs. low token frequency in South Kyengsang accent correspondences (Do et al. 2014a)

MK \ SK	H(H)	H(L)	R	Totals
H (Low)	290 (74%)	59 (15%)	45 (11%)	394
H (High)	421 (93%)	28 (6%)	6 (1%)	455
L (Low)	60 (32%)	115 (62%)	11 (6%)	186
L (High)	21 (15%)	113 (80%)	7 (5%)	141
R (Low)	41 (33%)	20 (16%)	63 (51%)	124
R (High)	24 (16%)	9 (6%)	117 (78%)	150

Korean nouns have witnessed a couple of analogical changes in their inflection that can be explained by saying that the citation form, which is equivalent to the stem spoken in isolation, is the base for the inflectional paradigm. The best-studied one concerns stems ending in a coronal obstruent. Due to the fact that a coda consonant is produced with an oral closure, the contrast among /s/, /t/, /t<sup>h</sup>/, /c/, and /c<sup>h</sup>/ is neutralized to [t̃], evident in the paradigms of (8) below.

(8) Neutralization of coronal obstruent codas

Citation	nat̃	nat̃	nat̃	nat̃	na:t̃
Nominative	nas-i	nac <sup>h</sup> -i	nac-i	nac <sup>h</sup> -i	na:c-i
Accusative	nas-ɪl	nat <sup>h</sup> -ɪl	nac-ɪl	nac <sup>h</sup> -ɪl	na:t-ɪl
gloss	‘sickle’	‘piece’	‘day’	‘face’	‘grain’

For many speakers, stems ending in a coronal obstruent are inflected with a consonant that differs from the one that is etymologically expected and typically reflected in the orthography. The most common change is to /s/: e.g. /pjət<sup>h</sup>/ ‘sunshine’ inflects variably as *pjət̃*, *pjət<sup>h</sup>-il* or *pjət̃*, *pjəs-il*. Albright (2008) explained this restructuring of the underlying form with the hypothesis that the surface representation of the citation form serves as the base for the construction of the rest of the paradigm. Given that this form is a neutralization site, the learner must reason probabilistically as to which variant among /s, t, t<sup>h</sup>, c, c<sup>h</sup>/ will appear when the stem is inflected. The continuant /s/ was the most frequent of these consonants in stem-final position in Middle Korean; consequently, this is the consonant that is most likely to lead to a correct hit if the speaker/learner has not yet encountered or has forgotten the inflected form for a particular stem. Thus, this factor could explain the otherwise unexpected change to inflection with [s].

Since the H(H) and H(L) accent types are neutralized to H in the citation form in Kyengsang, the speaker/learner faces a comparable dilemma when deciding whether to inflect a stem as H(H) or H(L). Moreover, as indicated in Table 5 above, the Middle Korean H class was over twice as large as the L class and so inflecting the stem with H(H) is a safer choice than H(L). One would therefore predict that such stems should tend to adopt the H(H) inflection. Do et al. (2014b) investigated this point by polling 12 South Kyengsang speakers for the accent they assign to monosyllabic noun stems ending in a coronal obstruent. The hypothesis was that if the stem was inflected with the innovating -s variant then it should also be likely to change its accent from H(L) to H(H). They polled their speakers for 15 such nouns and found that when the stem was inflected with the etymologically expected consonant indicated in the orthography, then 85% retained the H(L) inflection: e.g. *pjət̃*, *pjət<sup>h</sup>-il*. On the other hand, when inflected with the innovative, nonetymological consonant (typically -s), then 73% of the nouns changed their accent from H(L) to H(H): e.g. *pjət̃*, *pjəs-il*. This finding shows a significant correlation between the innovative segmental and accentual restructurings. However, it is not conclusive evidence that the citation form serves as the base for the assignment of the inflectional accent. Due to the idiosyncrasies of the Korean lexicon, most Middle Korean stems ending in -s belonged to the H class and this regularity has been passed down to South Kyengsang. As a result, the accent change from *pjət<sup>h</sup>-il* to *pjəs-il* could be due to a lexical schema (redundancy rule) that stems ending in -s belong to the H(H) accent class.

## 9. Internal Reconstruction

Ramsey (1991) called attention to a number of asymmetries in the distribution of the accentual contrasts in Middle Korean that motivate an earlier stage of the language in which accent was predictably on the final syllable. For nouns, he notes that the majority of monosyllables and disyllables have final accent. Many exceptions are possible borrowings. In verbs there is more evidence available based on phonological alternations in the inflection. Table 8 illustrates the three most common verb types in several suffixal contexts.

Table 8. Middle Korean verb stem types (Ramsey 1991, N = number of examples)

class	‘it’s V’	‘and-V’	‘so that V’	‘if V’	gloss	Number	reconstruction
-------	----------	---------	-------------	--------	-------	--------	----------------

1	kùptá	kùpkó	kùpíni	kùpímjón	‘be bent’	152	*kùpí
2	psítá		psíni		‘use’	96	*písí
6	küptá	küpkó	küβíni	küβímjón	‘bake’	96	*kùbí

In class 1, the second consonant of the stem is largely restricted to voiceless obstruents, while in class 6, it is primarily a voiced obstruent or sonorant. Ramsey (1991) proposes that the verb stems were uniformly disyllabic at an earlier stage of Proto-Korean and so reconstructs a final minimal vowel that was the locus of predicable final accent. The Middle Korean forms arise from a syncope of minimal vowels between two consonants when the second was voiceless. If the preceding consonant was voiced, then the first stem vowel was compensatorily lengthened by attachment of the high-pitched mora of the elided vowel to produce a rising tone: \*kùbíta > kùúbta > (kùptá). The majority of class 2 stems end in a vowel and begin with a consonant cluster (which develops into a tense consonant in Modern Korean) or aspirated consonant. Ramsey also reconstructs this class as disyllabic, with a minimal vowel in the first syllable. This vowel elides between voiceless consonants, blocking deletion of the second vowel: \*písítá > psítá (cf. Hamkyeng *s\*íta*).

Whitman (1994) extends Ramsey’s verbal accent reconstruction to Middle Korean nouns (Table 9). He observes that the majority of monosyllabic atonic nouns end in a voiceless obstruent, while rising tone nouns end primarily in a voiced consonant. Comparable to Ramsey’s verbal classes 1 and 6, Whitman reconstructs final weak vowels, which will take the predictable final accent: \*kòcá ‘flower’ and \*kòrá ‘valley’. For disyllables, Whitman (1994) reconstructs an accentual contrast, while Ito (2013) elaborates Ramsey’s hypothesis of predictable final accent here as well.

Table 9. Reconstruction of Middle Korean nominal accent (Whitman 1994)

class	noun	gloss	reconstruction
1.0	kòc	‘flower’	*kòcá
1.1	kóh	‘nose’	*kóh
2.2	kòl [kòól]	‘valley’	*kòrá
2.0	kàzàlh	‘autumn’	*kàzàlh
2.1	kúrim	‘cloud’	*kúrim
2.2	kòkí	‘meat’	*kòkí

## 10. Summary and Conclusion

This article has surveyed the research into how the pitch-accent contrasts of Middle Korean have developed in the modern Kyengsang and Hamkyeng dialects and the ways they are realized in inflection, compounding, and phrasal contexts. We also considered how loanwords are assigned an accent and the factors biasing a given word to one of the accent types. The most critical task for further research is to document the pitch-accent contrasts for a greater range of dialects within the Kyengsang and Hamkyeng regions as well as in neighboring zones where the contrasts are less robust and direct. This is particularly important since the pitch-accent classification for particular lexical items appears to be weakening for many speakers of the younger generation.

## Further Reading

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