

Historical Development and Analogical Change in Yanbian Korean Accent

Chiyuki Ito

Tokyo University of Foreign Studies

1 Introduction

Yanbian Korean, which is spoken in Yanbian Korean Autonomous Prefecture in northeastern China, has a pitch accent system in which one syllable in every lexical item is the locus of a pitch peak. This accent system is very similar to Hamgyung dialect in North Korea, but rather different from Kyungsang Korean (Ramsey 1978, Umeda 1993, Park 2001, Che 2004, Miyashita 2007). However, the position of high pitch in each word regularly corresponds between Yanbian and Kyungsang in general, which is the result of regular historical development from Middle Korean (15-16th C Korean, MK).

The correlation between analogical change and frequency has been discussed in many literatures (Schuchardt 1885, Hooper 1976, Bybee 1985, 2000, 2002, 2006, Phillips 1984, 2001, and others). In Korean research, many previous researches have examined the analogical change of coronal codas (-t, -t^h, -c, -c^h > -s) which is also reflected in loanword adaptation patterns, and several aspects of this change have been pointed out (Sohn 2001, Kang 2003, Albright 2002, 2005, 2006, Oh 2006, Davis & Kang 2006, and others). However as far as I know, there is no systematic survey of analogical changes in Korean accent.

In this paper we show that variation in the accent class affiliation and historical/analogical change is strongly affected by both type and token frequency, as well as by some other factors such as the Base-Identity effect (Kenstowicz 1996) or syllable number, by examining the accent of Yanbian both synchronically and diachronically. The data of this paper was collected by the author from two native speakers of Yanbian dialect in 2007 and from c. 20 kinds of MK original texts. The consultants were brought up in the same city (Longjing) and are females in the same generation (33 and 31 years old). We call these speakers Y-1 and Y-2 respectively. Yanbian data contains 1-4 syllable nouns and the total is c. 1,730. All items are native/nativised non-compound nouns.

2 Accent class

- (1) Yanbian accent classes. [] indicates the accent of the following suffix.

Monosyllabic: H[L], L[H]
Disyllabic: HL[L], LH[L], LL[H]
Trisyllabic: HLL[L], LHL[L], LLH[L], LLL[H]
Quadrisyllabic: LLHL[L], LLLH[L]

- (1) shows the accent classes in Yanbian non-compound nouns. Each accent class is abbreviated to H class, HL class, etc., by ignoring the accent of the following suffix.

Park 2001 reports that both final accent class and unaccented class appear as

final accent in isolation forms whereas they are distinguished in inflectional forms: the inflectional forms are LH[L], LLH[L], LLLH[L] in final accent class and LL[H], LLL[H], LLLL[H] in unaccented class; the isolation forms are LH, LLH, LLLH in both final and unaccented classes. (Ramsey 1978 observes a similar phenomenon in Hamgyung.) On the other hand, Che 2004 mentions that not only inflectional forms but also isolation forms are phonetically distinguished between these classes as well as between monosyllabic H and L, and says that final accent class LH appears as LF (falling) whereas unaccented class LL appears as Lf (mid-falling) in isolation forms. Thus previous literatures are inconsistent on this point (neutralization or not), although both of them are native speakers of Yanbian: one speaker detects no difference but another one does.

For our data, preliminary analysis of pitch tracks did not detect any consistent difference. This point requires further study, particularly a perceptual experiment. In any case, even if it turns out that there is a difference between the two classes, it is clear that the difference is subtle and therefore it is understandable why it is not a stable contrast both synchronically and diachronically as discussed below. For now we treat the isolation forms of these two classes as identical.

3 Distribution

3.1 Monosyllabic nouns

Monosyllabic nouns have two accent classes: H and L. (2) shows the distribution of each accent class and (3) are the examples.

(2) Distribution of monosyllabic nouns (H/L: speaker accepts both accents.)

| Accent | Numbers | | Ratios (%) | |
|--------|---------|-----|------------|-------|
| | Y-1 | Y-2 | Y-1 | Y-2 |
| H | 296 | 300 | 77.69 | 83.33 |
| L | 82 | 50 | 21.52 | 13.89 |
| H/L | 3 | 10 | 0.79 | 2.78 |
| Totals | 381 | 360 | | |

(3) Examples

- H: án 'inside,' jól 'ten,' c^húm 'saliva,' kíl 'road,' k*úm 'dream,' pám 'night,' mál 'language,' móm 'body,' nún 'eye,' páp 'boiled rice,' pé 'abdomen,' pém 'snake,' sám 'hemp,' sól 'pine,' t*án 'land'...
- L: àp^h 'front,' jəp^h 'side,' jò 'mattress,' hwál 'bow,' k*əm 'hazelnut,' k*òŋ 'pheasant,' k^hòŋ 'bean,' mál 'horse,' mòks 'share,' nàc^h 'face,' nəks 'soul,' pè 'pear; ship,' p*ùl 'horn,' tòk 'earthenware pot,' ...
- H/L: suc^h 'charcoal,' [only Y-1: co 'millet,' ol 'texture'], [only Y-2: nɛ 'stream,' sut^h 'thickness']...

Basic distributional patterns are the same between the two speakers: in monosyllabic nouns, the accent is strongly biased to H (c. 80 %). The percentages of each accent class is slightly different between Y-1 and Y-2: the percentage of H is higher in Y-2 (83.33 %) than in Y-1 (77.69 %), whereas the percentage of L is higher in Y-1 (21.52 %) than in Y-2 (13.89 %). This suggests that most words belong to the same accent class in both speakers but that some

words belong to H in Y-2 and L in Y-1.

In fact this is what is observed. (4) shows the correspondences between Y-1 and Y-2. Bold numbers indicate that the two speakers agree in their accents.

(4) Correspondences between Y-1 and Y-2 in monosyllabic nouns

| Y-1 \ Y-2 | H | L | H/L | Totals |
|-----------|------------|-----------|----------|--------|
| H | 268 | | 3 | 271 |
| L | 23 | 49 | 5 | 77 |
| H/L | 2 | | 1 | 3 |
| Totals | 293 | 49 | 9 | 351 |

As a whole, the agreement rate is 90.60 % (= (268+49+1)/351*100). The most striking disagreement is L (Y-1) ~ H (Y-2): 23 words belong to this type. The opposite case, H (Y-1) ~ L (Y-2), is not observed at all. That is, all L words in Y-2 belong to L class in Y-1 without exception. This distribution could be interpreted in two ways: suppose that both speakers originally had totally identical accent class affiliation in each lexical item, (a) some members of H changed to L in Y-1, or (b) some members of L changed to H in Y-2. Given the strong bias to H in Yanbian, the latter hypothesis is more plausible. In fact, historical evidences show that (b) is true. We will discuss this problem below.

3.2 Disyllabic nouns

(5) Accent distribution in disyllabic nouns

| Accent | Numbers | | Ratios (%) | |
|--------|---------|-----|------------|-------|
| | Y-1 | Y-2 | Y-1 | Y-2 |
| LH | 593 | 562 | 66.93 | 66.98 |
| HL | 206 | 204 | 23.25 | 24.31 |
| LL | 82 | 45 | 9.26 | 5.36 |
| LH/LL | 3 | 20 | 0.34 | 2.38 |
| HL/LH | | 5 | | 0.60 |
| HL/LL | 2 | 3 | 0.23 | 0.36 |
| Totals | 886 | 839 | | |

(6) Examples

- HL: ánkè 'fog,' jómci 'leek,' cánc^hi 'party,' cinè 'centipede,' kámè 'whirl of hair,' kól^hi 'head,' kúrám 'cloud,' méki 'catfish,' nài 'age,' nálkè 'wings,' téjà 'basin,' sárám 'person'...
- LH: àk*é 'shoulder,' ilkúp 'seven,' círá 'oil,' cimc^hi 'kimchi,' hàníl 'sky,' kàsé 'scissors,' kúnkí 'hole,' mēmí 'cicada,' pāsís 'mushroom,' p*úri 'root,' tōnmú 'friend'...
- LL: àntàk 'hill,' cimsīn 'beast,' kāsìl 'autumn,' kīnsim 'worries,' mùr^hp 'knee,' mùtàm 'grave,' pāk*at^h 'outside,' pàrà 'wind,' sòkòm 'salt,' tàám 'next,' tótòk 'thief'...

Disyllabic nouns have three accent classes: HL, LH, and LL. In both speakers, the type frequency is LH >> HL >> LL. LL is quite small, especially in Y-2 (Y-1: 9.26 %, Y-2: 5.36 %); but Y-2 has many LH/LL variations, which is

probably due to the Base-Identity effect: LH and LL have the identical isolation form LH which may serve as the base for the accent of the inflected form, resulting in the variations between LH and LL classes.

(7) Correspondences between Y-1 and Y-2 in disyllabic nouns

| Y-1 \ Y-2 | HL | LH | LL | HL/LH | HL/LL | LH/LL | Totals |
|-----------|------------|------------|-----------|-------|----------|-------|--------|
| HL | 158 | 26 | 3 | 3 | | 1 | 191 |
| LH | 36 | 478 | 12 | 2 | 1 | 13 | 542 |
| LL | 3 | 36 | 29 | | | 6 | 74 |
| HL/LH | | | | | | | 0 |
| HL/LL | | | | | 2 | | 2 |
| LH/LL | | 2 | 1 | | | | 3 |
| Totals | 197 | 542 | 45 | 5 | 3 | 20 | 812 |

The agreement rate between Y-1 and Y-2 is 82.14 %. Disagreement between Y-1 and Y-2 mainly appears in HL ~ LH and LH ~ LL, and the disagreement in HL ~ LL is relatively rare. This means that most variations are between the dominant accent class (LH) and other accent classes. In LH ~ LL disagreement, LL (Y-1) ~ LH (Y-2) is much bigger than LH (Y-1) ~ LL (Y-2) (36 vs. 12). This coincides with the fact that the percentage of LL is higher in Y-1 than in Y-2. Given all of this data (distribution, correspondences, and LH/LL variation in Y-2), we could assume that LL is gradually changing to LH, especially in Y-2. In fact, consultants sometimes changed their judgments in data elicitation from LL to LH but not vice versa, which suggests a higher confidence in LH than LL.

3.3 Trisyllabic nouns

(8) Accent distribution in trisyllabic nouns

| Accent | Numbers | | Ratios (%) | |
|---------|---------|-----|------------|-------|
| | Y-1 | Y-2 | Y-1 | Y-2 |
| LLH | 248 | 246 | 73.16 | 74.55 |
| LHL | 58 | 57 | 17.11 | 17.27 |
| LLL | 21 | 8 | 6.19 | 2.42 |
| HLL | 12 | 13 | 3.54 | 3.94 |
| HLL/LLH | | 3 | | 0.91 |
| LLH/LLL | | 2 | | 0.61 |
| LHL/LLH | | 1 | | 0.30 |
| Totals | 339 | 330 | | |

(9) Examples

HLL: ářìsìn ‘esteemed elder,’ íjàkì ‘talk,’ kómàrì ‘leech,’ múcìkè ‘rainbow,’ sàmàkwì ‘mole; praying mantis’...
 LHL: àpúci ‘father,’ écák*é ‘yesterday,’ còkcépì ‘weasel,’ màktéki ‘stick,’ p*ák*úki ‘cuckoo’...
 LLH: òmèní ‘mother,’ cìrènjí ‘earthworm,’ kòsàrì ‘bracken,’ nòlkàcì ‘deer,’ tòkàní ‘melting pot’...
 LLL: òllimàk ‘uprise,’ kjəřrəŋ ‘armpit,’ màcimàk ‘last,’ pùsìrəm ‘ulcer,’ simpùřim ‘errand’...

Trisyllabic nouns have four accent classes: HLL, LHL, LLH, and LLL. In both speakers, LLH is the largest class, followed by penultimate accent class (LHL), whereas initial accent class (HLL) and unaccented class (LLL) are much smaller. The percentage of LLL is lower in Y-2 (2.42 %) than in Y-1 (6.19 %). The rarity of unaccented class in Y-2 coincides with the distribution in monosyllabic/disyllabic nouns.

(10) Correspondences between Y-1 and Y-2 in trisyllabic nouns

| Y-1 \ Y-2 | HLL | LHL | LLH | LLL | HLL/LLH | LHL/LLH | LLH/LLL | Totals |
|-----------|----------|-----------|------------|----------|---------|---------|---------|--------|
| HLL | 9 | 1 | 2 | | | | | 12 |
| LHL | 1 | 38 | 15 | | 1 | | | 55 |
| LLH | 2 | 15 | 202 | | 2 | 1 | 1 | 223 |
| LLL | | 1 | 10 | 8 | | | 1 | 20 |
| Totals | 12 | 55 | 229 | 8 | 3 | 1 | 2 | 310 |

The agreement rate between Y-1 and Y-2 is 82.90 %. The main disagreements are LHL (Y-1) ~ LLH (Y-2), LLH (Y-1) ~ LHL (Y-2), and LLL (Y-1) ~ LLH (Y-2). That is, LHL/LLH varies bidirectionally whereas LLH/LLL is unidirectional in that there is almost no example of LLH (Y-1) ~ LLL (Y-2). This again suggest that LLL is changing to LLH in Y-2, and probably the Base-Identity effect is one of the factors.

3.4 Quadrisyllabic nouns

In general, Korean has few non-compound nouns of more than three syllables, and hence our Yanbian data of quadrisyllabic nouns is small.

Theoretically, five accent patterns are possible in Yanbian: HLLL, LHLL, LLHL, LLLH, and LLLL. However in reality, the accent patterns which can appear in quadrisyllabic non-compound nouns are only LHLL, LLHL, and LLLH. Furthermore, the example of LHLL is only 1 in Y-2. Given this, it is safe to say that only two classes (LLHL and LLLH) are distinguished in Yanbian quadrisyllabic non-compound nouns. This is a magnified distribution of trisyllabic nouns which disprefer initial accent class (HLL) and unaccented class (LLL). We could conclude that in Yanbian the location of high pitch is basically restricted to final/penultimate two syllable window, and that other classes tend to be excluded.

(11) Accent distribution in quadrisyllabic nouns

| Accent | Numbers | | Ratios (%) | |
|-----------|---------|-----|------------|-------|
| | Y-1 | Y-2 | Y-1 | Y-2 |
| LLLH | 38 | 35 | 69.09 | 52.24 |
| LLHL | 17 | 29 | 30.91 | 43.28 |
| LLHL/LLLH | | 2 | | 2.99 |
| LHLL | | 1 | | 1.49 |
| Totals | 55 | 67 | | |

(12) Examples

LLHL: àcì mái ‘aunt,’ kèkùrákci ‘frog,’ hòrìrékì ‘whistle,’ kòsàmtóc^hi ‘hedgehog,’
mìk*ùráci ‘loach,’ sùsùk*ék*ì ‘puzzle,’ tùrùmáki ‘overcoat’...
LLLH: àcùmèní ‘aunt,’ cìnrè mí ‘fin,’ kàlkòràní ‘hook,’ k*òràksèní ‘condition,’
mùsìntàllé ‘dandelion,’ nàñt*èrècí ‘cliff,’ pùcìk*èñí ‘poker’...

In booth speakers LLLH is bigger than LLHL, especially in Y-1. Based on this, we assume that most disparities are between LLHL (Y-2) and LLLH (Y-1): in fact, this is what is observed as in (13). The agreement rate between Y-1 and Y-2 is again very high (82.00 %).

(13) Correspondences between Y-1 and Y-2 in quadrisyllabic nouns

| Y-1 \ Y-2 | LLHL | LLLH | LLHL/LLLH | LHLL | Totals |
|-----------|------|------|-----------|------|--------|
| LLHL | 14 | 1 | 1 | | 16 |
| LLLH | 6 | 27 | | 1 | 34 |
| Totals | 20 | 28 | 1 | 1 | 50 |

3.5 Summary

(14) shows the most frequent accent class in each syllable structure, along with the ratios.

(14) Most frequent accent classes and the ratios

| | Monosyllabic | Disyllabic | Trisyllabic | Quadrisyllabic |
|-----------|--------------|--------------|---------------|----------------|
| Y-1 | H (77.69 %) | LH (66.93 %) | LLH (73.16 %) | LLLH (69.09 %) |
| Y-2 | H (83.33 %) | LH (66.98 %) | LLH (74.55 %) | LLLH (52.24 %) |
| Agreement | 90.60 % | 82.14 % | 82.90 % | 82.00 % |

In Yanbian, final accent is the largest default class in every syllable structure (cf. Ramsey 1978, Park 2001). The agreement rate between the two speakers is highest in monosyllabic nouns, which suggests that the distinctiveness of accent is highest in monosyllabic nouns due to the most restricted segmental information. That is, monosyllabic nouns have only three segmental information sites (onset, nucleus, coda) whereas disyllabic nouns have six, trisyllabic nouns have nine, etc., and hence the role of accent for lexical distinctions is most important and effective in monosyllabic nouns (Kenstowicz & Sohn 2001). Thus the accent in monosyllabic nouns tends to be retained more faithfully, which resulted in the high agreement rate between the two speakers. Other than monosyllabic nouns, the agreement rate is more or less the same between the two speakers.

4 Historical development

4.1 MK accent

Middle Korean (15-16th C, MK) had distinctive accents, which were represented by three kinds of side dots in the texts: one dot indicated H (high), two dots R (rising), and no dot L (low). Thus we know the accentual classes of MK words,

as far as they are attested.

- (15) MK accent classes in native non-compound nouns. ‘-’ indicates an unspecified accent.

Monosyllabic: H, R, L
 Disyllabic: H-, R-, LH, LL
 Trisyllabic: H--, R--, LHL, LLH, LLL
 Quadrisyllabic: H---, LH--, LLH-, LLLH

In MK, the first high pitch was distinctive and the pitch patterns after the first high pitch were variable between H and L, since in MK, R did not appear morpheme-internally as a rule (Kadowaki 1976, Fukui 1985, Martin 1992, Lee & Ramsey 2000). For example, monosyllabic nouns of H-class + monosyllabic suffix appeared as either H[H] or H[L] depending on the suffix and other factors.

R is phonologically composed of L+H. For this reason, the accent of the suffix following R was variable as in H class. That is, R + monosyllabic suffix appeared either as R[H] or R[L]. On the other hand, L + monosyllabic suffix appeared only as L[H] as a rule.

Disyllabic nouns had four classes: H[-], R[-], LH[-], and LL[H]. We indicate these classes by ignoring the accent of suffix, as H-, R-, LH, LL. Similarly, trisyllabic nouns had five accent classes: H--, R--, LH-, LLH, and LLL. In quadrisyllabic nouns, theoretically six accent classes can be distinguished (H---, R---, LH--, LLH-, LLLH, LLLL), but in reality only four classes are attested: H---, LH--, LLH-, LLLH (*LLLL, *R---). The dispreference for an unaccented class coincides with Yanbian.

As far as the attested data is concerned, H, LH, and LLH (final accent classes) are the largest classes in MK (Ramsey 1978), as in (16).

- (16) Accent distribution in MK (monosyllabic/disyllabic/trisyllabic)

| Accent | # | Ratios (%) | Accent | # | Ratios (%) | Accent | # | Ratios (%) |
|-------------------|------------|--------------|-------------------|------------|-------------|-------------------|-----------|--------------|
| H | 234 | 54.93 | H- | 87 | 12.66 | H-- | 18 | 9.73 |
| R | 79 | 18.54 | R- | 51 | 7.42 | R-- | 14 | 7.57 |
| L | 113 | 26.53 | LH | 384 | 55.9 | LH- | 54 | 29.19 |
| | | | LL | 165 | 24.02 | LLH | 82 | 44.32 |
| | | | | | | LLL | 17 | 9.19 |
| Totals 426 | | | Totals 687 | | | Totals 185 | | |

4.2 Monosyllabic nouns

4.2.1 Basic patterns and type frequency

(17) shows the basic correspondences between MK and Yanbian: MK H and R merged to H in Yanbian, whereas MK L corresponds with Yanbian L.

- (17) Basic correspondences between MK and Yanbian in monosyllabic nouns

| | | | |
|---------|---|---|---|
| MK | H | R | L |
| Yanbian | H | H | L |

To what extent are these correspondences regular? (18) shows the actual

historical development in our data.¹ Bold numbers are the regular correspondences. “Regularity” indicates the rate of regular development, such as MK H/R > Yanbian H, MK L > Yanbian L.

(18) Historical development in monosyllabic nouns

| | | Y-1 | | | | Y-2 | | | |
|------------|-----|------------|-----------|-----------|--------|------------|-----------|-----------|--------|
| MK | | H | R | L | Totals | H | R | L | Totals |
| Yanbian | H | 162 | 50 | 9 | 221 | 162 | 46 | 15 | 223 |
| | L | 3 | | 48 | 51 | 2 | | 35 | 37 |
| | H/L | | 1 | 2 | 3 | | 1 | 4 | 5 |
| Totals | | 165 | 51 | 59 | 275 | 164 | 47 | 54 | 265 |
| Regularity | | 98.18 | 98.04 | 81.36 | 94.55 | 98.78 | 97.87 | 64.81 | 91.70 |

(19) Examples which agree for the two speakers

Regular examples

H > H: íp > íp ‘mouth,’ c^hám > c^hám ‘truth,’ kílh > kíl ‘road,’ míl > múl ‘water,’
 nác > nác ‘daytime,’ pál > pál ‘foot,’ sím > t^{*}ím ‘moxa cauterly,’ tál >
 tál ‘moon’...

R > H: kóm > kóm ‘bear,’ nīm > nīm ‘dear,’ nūn > nún ‘snow,’ pēt > pās
 ‘friend,’ sāj > sé ‘bird,’ sīl > sīl ‘thread,’ tūjh > twí ‘rear’...

L > L: àlp^h > àp^h ‘front,’ cip > cip ‘house,’ hālk > hālk ‘soil,’ kùk > kùk ‘soup,’
 mò > mò ‘rice plant,’ pāsk > pāk* ‘outside,’ tāk > tāk ‘chicken’...

Irregular examples

H > L: pāj > pè ‘ship,’ spíl > p*úl ‘horn’

L > H: c^hjāŋ > c^hāj ‘sole,’ kà > kí ‘he, that,’ t^həj > t^hé ‘hoop’

The overall regularity rate, which is calculated by {total of all regular correspondences}/total, is slightly higher in Y-1 than in Y-2 (94.55 % vs. 91.70 %). That is, Y-1 is more conservative than Y-2 although they are from the same city and in the same generation.

In both speakers, the regularity rates of MK H and R are much higher than MK L (98.18 %, 98.04 % vs. 81.36 % in Y-1 and 98.78 %, 97.87 % vs. 64.81 % in Y-2). This means that many words of MK L class changed to H irregularly, but not vice versa. The differences in regularity rate and the directionality of the change coincide with the distributional bias in Yanbian monosyllabic nouns (H c. 80% vs. L c. 20%), as well as in MK (H+R c. 73 % vs. L c. 27 %). Given this, we can assume that stronger class (MK H+R, Yanbian H) attracts members of the weaker class (MK/Yanbian L) in historical/analogical change, and that the attractor is defined by type frequency of the accent class itself.

4.2.2 Token frequency

In our data, we expect that low-frequency words tend to change accent class, in particular from MK L to Yanbian H, whereas high-frequency words tend to

¹ Similar historical correspondences and development are observed by Ramsey 1978 for Hamgyung and by Kawasuzaki 2000, 2006 for the Korean dialects spoken in China.

maintain MK L. In fact, this is what is observed. A good example is the nouns which have coronal codas. Compared to other Korean dialects, Yanbian is quite conservative in the coda preservation, but still some analogical changes appear. More interestingly, accent and coda changes are working together: low-frequency words changed the accent/coda to a default class which is defined by type frequency in the category.

(20) shows the accent, coda, and frequency of the nouns which belonged to MK L class and have coda -c, -c^h, -t, -t^h. “Coda” shows what codas are used by the consultants before a vowel-initial suffix, such as nominative -i, accusative -il, and locative -e. “Frequency” is based on KAIST Concordance Program (<http://morph.kaist.ac.kr/kcp/>) and the Google searches (April 2007).

(20) Correlation between accent/coda changes and frequency

| Nouns | Y-1 | | Y-2 | | Frequency | |
|--|------------|----------------------------------|-----------------|----------------------------------|-----------|------------|
| | Accent | Coda | Accent | Coda | KAIST | Google |
| mit ^h ‘bottom’ | L | -c ^h , t ^h | L | -c ^h , t ^h | 2,418 | 2,440,000 |
| kjət ^h ‘side’ | L | -c ^h , t ^h | L | -c ^h , t ^h | 1,278 | 566,000 |
| k’oc ^h ‘flower’ | L | -c ^h | L | -c ^h | 846 | 32,500,000 |
| kət ^h ‘surface’ | L | -c ^h , t ^h | L | -c ^h , t ^h | 389 | 495,000 |
| pat ^h ‘field’ | L | -c ^h , t ^h | L | -c ^h , t ^h | 358 | 1,800,000 |
| pic ‘debt’ (< MK pit) | L | -c, t | L | -c, t | 171 | 1,330,000 |
| nac ^h ‘face’ | L | -c ^h | L | -c ^h | 170 | 368,000 |
| sot ^h ‘iron pot’ | L | -c ^h , t ^h | H/L | -c ^h , t ^h | 79 | 316,000 |
| tac ^h ‘anchor’ | L | -c ^h | H | -s | 44 | 164,000 |
| toc ^h ‘sail’ | L | -c ^h | H | -s | 43 | 177,000 |
| suc ^h ‘charcoal’ | H/L | -c ^h , t ^h | H/L | -c ^h , t ^h | 31 | 794,000 |
| pjət ^h ‘sunshine’ | L | -c ^h , t ^h | H | -c ^h , t ^h | 19 | 151,000 |
| mut ^h ‘land’ | H | -c ^h , t ^h | Not used | | 15 | 305,000 |
| juc ^h ‘the Four-Stick Game’ | L | -c ^h | H | -s | 1 | 121,000 |
| oc ^h ‘lacquer poison’ | H/L | -c ^h | H | -s | 0 | 117,000 |

Y-1 quite regularly maintains MK L class, whereas Y-2 changed it to H more often. As a whole, the higher the frequency is, the more MK L is maintained, and the lower the frequency is, the more MK L changed to H. Some words are especially infrequent in this dialect. For example, mut^h ‘land’ is not often used in Yanbian, because this region is in inland areas and hence not only this word but also many ocean words are almost obsolete. Similarly, suc^h ‘charcoal’ is no longer used in their daily lives, which may affect the frequency of use.

The same is true for coda changes: the lower the frequency is, the more the codas change irregularly (mainly to -s). Unlike in standard South Korean, -t^h is not obligatorily palatalized before i/j in Yanbian, and hence it can appear not only as -c^{hi} but also as -t^{hi} before nominative -i. (-c^{hi} is a standard form and -t^{hi} is a dialectal form.) As a rule, underlying /-t^h/ appears as both -c^h and -t^h, whereas underlying /-c^h/ appears only as -c^h. The only exception suc^h ‘charcoal,’ which appears as both -c^h and -t^h for both speakers, may be also due to a specific infrequency of this word.

Thus frequency effect is observed in Yanbian, where accent and coda changes are working together.

4.3 Disyllabic nouns

(21) Basic correspondences between MK and Yanbian in disyllabic nouns

| | | | | |
|---------|----|----|----|----|
| MK | H- | R- | LH | LL |
| Yanbian | HL | HL | LH | LL |

(21) shows the basic correspondences between MK and Yanbian in disyllabic nouns. The correspondences are again very straightforward except for the merger MK H- and R- > Yanbian HL. Still in reality, there are many irregular innovations in our Yanbian data.

(22) Historical development in Yanbian disyllabic nouns

| | | Y-1 | | | | | Y-2 | | | | |
|------------|-------|-----------|-----------|------------|-----------|--------|-----------|-----------|------------|-----------|--------|
| MK | | H- | R- | LH | LL | Totals | H- | R- | LH | LL | Totals |
| Yanbian | HL | 33 | 29 | 12 | 10 | 84 | 34 | 26 | 31 | 11 | 102 |
| | LH | 23 | 9 | 221 | 60 | 313 | 24 | 10 | 196 | 60 | 290 |
| | LL | 4 | 5 | 9 | 33 | 51 | 1 | 2 | 7 | 14 | 24 |
| | HL/LH | | | | | 0 | 1 | | | | 1 |
| | HL/LL | 2 | | | | 2 | 2 | | 1 | | 3 |
| | LH/LL | | 1 | | | 1 | | | 3 | 12 | 15 |
| Totals | | 62 | 44 | 242 | 103 | 451 | 62 | 38 | 238 | 97 | 435 |
| Regularity | | 53.23 | 65.91 | 91.32 | 32.04 | 70.07 | 54.84 | 68.42 | 82.35 | 14.43 | 62.07 |

(23) Examples which agree for the two speakers

Regular examples

H- > HL: áki > áki 'baby,' ólhi > óri 'duck,' káci > káci 'branch,' kúrum > kúrəm 'cloud,' p^hári > p^hári 'fly,' t^hóski > t^hók*í 'rabbit'...

R- > HL: ānkaj > ānkè 'fog,' pāŋkuj > pāŋkwi 'wind, gas,' cīnci > cīnci 'meal,' kǎc^hi > k*ác^hi 'magpie,' mūtāŋ > mūtāŋ 'shaman,' sārām > sārām 'person'...

LH > LH: ònāl > ònāl 'today,' cjārāŋ > cārāŋ 'self-praise,' kēmíj > kēmí 'spider,' skòri > k*òri 'tail,' nòlyáj > nòré 'song,' pānāl > pānāl 'needle,' sālko > sālki 'apricot'...

LL > LL: èntək > èntək 'hill,' kàzəl/kàzəl^h > kàsəl 'autumn,' mùrùp^h > mùrùp^h 'knee,' pàrām > pàrām 'wind,' pìzəp/pìzək > pùək 'kitchen,' sòkòm > sòkòm 'salt'...

Some irregular examples

H- > LH: ílhi > íri 'wolf,' móroj > mòré 'day after tomorrow,' pjókaj > pèké 'pillow,' sóra > sòré 'small washbowl,' tánti > tàncí 'jar'...

R- > LH: kākaj > kàké 'store,' mūmjəŋ > mūmjóŋ 'cotton (cloth),' pūc^haj > pūc^hú 'leek,' pūri > pūri 'beek,' sīnaj/sīnaj^h > siné 'brook'...

LH > HL: cinój > ciné 'centipede,' kácáj > kácè 'crayfish,' kámá > kámè 'whirl of hair,' kəri > kəri 'street,' tǎjá > tǎjá 'basin'...

LL > HL: àzà > àu 'younger brother,' cjārāj > cārà 'softshell turtle,' hànsàj > hwáŋsè 'stork,' sísìŋ > sísìŋ 'teacher,' fítkəl > t^hík*il 'dust'...

LL > LH: jəzəl > jəsi 'fox,' cākòk > cākúk 'trace,' káci > k*áci 'eggplant,' kəpcil > k*əpcil 'skin,' pìnhjə > piné 'hairpin'...

The overall regularity rate is higher in Y-1 (70.07 %) than in Y-2 (62.07 %), which coincides with the tendency in monosyllabic nouns.

It is clearly observed that largest class (LH) strongly attracted words from other classes, but not vice versa. The regularity rate is highest in MK LH in both speakers (Y-1: 91.32 %, Y-2: 82.35 %), whereas the regularity of MK LL class is worst (Y-1: 32.04 %, Y-2: 14.43 %). The high regularity rate of MK LH is the accumulated results of regular sound change and analogical change to a stronger default class (= LH). This is most evident in MK LL: 60 out of 103 nouns changed to LH in Y-1, and 60 out of 97 changed to LH in Y-2. One of the factors in this bias is probably the Base-Identity effect: in Yanbian LH and LL classes have the identical isolation form LH which can result in the confusion between the two classes, and hence contradict the historically expected accent class.

4.4 Trisyllabic nouns

(24) shows the basic correspondences between MK and Yanbian in trisyllabic nouns and (25) shows the actual correspondences seen in our data.

(24) Basic correspondences between MK and Yanbian in trisyllabic nouns

| | | | | | |
|---------|-----|-----|-----|-----|-----|
| MK | H-- | R-- | LH- | LLH | LLL |
| Yanbian | HLL | HLL | LHL | LLH | LLL |

(25) Historical development in trisyllabic nouns

| | | Y-1 | | | | | | Y-2 | | | | | |
|------------|---------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|--------|
| | | H-- | R-- | LH- | LLH | LLL | Totals | H-- | R-- | LH- | LLH | LLL | Totals |
| Yanbian | MK | | | | | | | | | | | | |
| | HLL | 3 | 3 | | 1 | | 7 | 3 | 3 | | | | 6 |
| | LHL | 1 | | 20 | 2 | 1 | 24 | 1 | | 20 | 4 | 2 | 27 |
| | LLH | 8 | 3 | 10 | 30 | 3 | 54 | 8 | 3 | 11 | 26 | 2 | 50 |
| | LLL | | | 1 | | 3 | 4 | | | | | 1 | 1 |
| | HLL/LLH | | | | | | | | | | 2 | | 2 |
| | LLH/LLL | | | | | | | | | | | | 1 |
| Totals | | 12 | 6 | 31 | 33 | 7 | 89 | 12 | 6 | 31 | 32 | 6 | 87 |
| Regularity | | 25.00 | 50.00 | 64.52 | 90.91 | 42.86 | 66.29 | 25.00 | 50.00 | 64.52 | 81.25 | 16.67 | 60.92 |

(26) Examples which agree for the two speakers

Regular examples

- H-- > HLL: mícikəj > múcikè ‘rainbow,’ tóskapi > tók*èpi/tókk*èpi ‘goblin’
 R-- > HLL: kǎməri > kómari ‘leech,’ kícikəj > kícikè ‘stretching,’ sámakoj > sámakwi ‘mole’
 LH- > LHL: kǎβántəj > kǎuntè ‘center,’ mjə̀nəri > mjə̀nəri ‘daughter-in-law,’ nǎkánaj > nǎkínè ‘traveler,’ síkinc^həj > síkinc^hi ‘spinach,’ tót^hóri > tót^hóri ‘acorn’...
 LLH > LLH: cùmèni > cùmèni ‘moneybag,’ kámakój > k*ámakwí ‘raven,’ minári > minári ‘dropwort,’ pǎkóni > pǎkúni ‘basket,’ sǒjnákí > sǒnákí ‘shower’...
 LLL > LLL: pǐzǐrəm > pǐsǐrəm ‘ulcer’

Some irregular examples

- H-- > LLH: ámanim > əmən̩i ‘mother,’ ólc^həŋi > òlc^hɛŋi ‘tadpole,’ púhəŋi > pùəŋi ‘owl,’ tálp^həŋi > tàlp^hɛŋi ‘snail,’ túrumi > tùrúmi ‘crane’...
- R-- > LLH: kǎjnari > kènàri ‘forsythia,’ kǔmpəŋi > kùmpèŋi ‘maggot,’ mǎnora > mǎnùrà ‘wife’
- LH- > LLH: cǎncári > cǎmcàri ‘dragonfly,’ kǎlmjókí > kǎlmèkí ‘seagull,’ nòrikǎj > nòriké ‘ornament,’ pəwəri > pəŋəri ‘dumb person,’ tǎlkócí > tǎlkúcí ‘cart’...
- LLL > LLH: kúcirám/kúcirəm > k*úcirám ‘scolding,’ pòksjəŋhwà > pòksúnǎ ‘peach’

Trisyllabic nouns have more innovations than monosyllabic/disyllabic nouns. The overall regularity rate is 66.29 % for Y-1 and 60.92 % for Y-2. Again Y-1 is more conservative than Y-2.

The largest class (LLH) attracted words from other classes strikingly, and changes in the opposite directions are rarely observed. The regularity rate is highest in MK LLH (Y-1: 90.91 %, Y-2: 81.25 %), due to the accumulated results of both regular sound change and analogical change to a default class (LLH), as in disyllabic nouns.

4.5 Quadrisyllabic nouns

As mentioned above, Korean does not have many quadrisyllabic native non-compound nouns in general, and the same is true for MK. Only 17 words are attested in our MK data, and among them 6 words are allomorphs. The distribution in which allomorphs are aggregated is: H--- (3), LH-- (5), LLH- (3), LLLH (3). As far as our attested data is concerned, a strong bias to some accent class is not observed.

Then what correspondences are seen between MK and Yanbian? In reality, most words which are attested in MK texts are obsolete in Yanbian and only five words are still used. MK kǔjstòrámi/kǔjstòlwámi/kǔjstòlyámi ‘cricket’ (LLH-) corresponds with Yanbian kwit*úrámí (LLHL) probably regularly, whereas skǎjtǎŋkari ‘snakeroot’(H---) > k*icə̀lkári (LLHL in Y-2), tǔtǎrəki (LH--) ‘nettle rash’ > tutǎrəki (LLLH in Y-1 and LLHL in Y-2), and mòc^hlǎrǎkí ‘quail’ (LLLH) > mèc^húrǎkí (LLHL in Y-1) do not. Thus we cannot find regular/clear corresponding patterns between MK and Yanbian. Given the merger from MK four classes (H---, LH--, LLH-, LLLH) to Yanbian two classes (LLHL, LLLH) and the low attestation of quadrisyllabic nouns which suggests the low-frequency of these words, we assume that at a certain stage accentual reassignment took place in Yanbian quadrisyllabic nouns. One possible strategy in accentual reassignment could be using the same rule as loanword accentuation (Kenstowicz & Sohn 2001), but analyzing this problem is a task for future research.

4.6 Summary

(27) The overall regularity rates in monosyllabic/disyllabic/ trisyllabic nouns

| | Monosyllabic | Disyllabic | Trisyllabic |
|-----|--------------|------------|-------------|
| Y-1 | 94.55 % | 70.07 % | 66.29 % |
| Y-2 | 91.70 % | 62.07 % | 60.92 % |

The higher the syllable number is, the lower the regularity rate is. This is again due to the higher informativeness of the accent in shorter nouns than in longer nouns.

The attractor in analogical change is final accent as a rule, which is the largest class. That is, the accent class affiliation in analogical change is determined by a default pattern, which is defined by type frequency.

As a whole, the historical changes in Yanbian have tried to extinguish the accent classes other than penultimate/final accent classes, which suggests that Yanbian is in the process of evolution towards a two-way accentual system.

5 Conclusion

Both synchronic and diachronic study of Yanbian accent in this paper has revealed mechanisms and general tendencies in analogical change: a) The agreement rate is highest in shortest (= monosyllabic) nouns; b) The agreement rate is quite low when the Base-Identity effect works; c) The higher the syllable number is, the lower the regularity rate is; d) A default class, which is defined by type frequency in a certain category, attracts words from other classes; e) The regularity rate is highest in a default class, due to the accumulated result of regular sound change and analogical change; f) Words of low token frequency show analogical changes more often; g) Various analogical changes such as accent and coda can work together.

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Research Institute for Languages and Cultures of Asia and Africa
 Tokyo University of Foreign Studies
 3-11-1 Asahi-cho, Fuchu-shi, Tokyo 183-8534, Japan
 e-mail: chiยุกit@aa.tufs.ac.jp