

DOUBLE Accent in Loanwords of North Kyungsang Korean and Variable Syllable Weight*

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This paper provides an analysis of the loanword tone patterns in North Kyungsang Korean (NKK), especially focused on the issue of contextual syllable weight in disyllable words. The loanword tone patterns in NKK is predictable by syllable weight, unlike native words. In particular, according to Kenstowicz and H-S Sohn's (2001) generalization for NKK loanwords, if the initial syllable of the output is heavy, the word falls into the DOUBLE accent class, realized with a sequence of high tones. But this fails to explain the realization of PENULT accent occurring against DOUBLE accent in spite of the presence of an initial heavy syllable. This paper proposes that variable weight of closed syllable occurs as a consequence of the conflict between metrical constraints and the constraints determining the weight of the coda, as in Y-H Chung (2002).

Keywords: loanwords, contextual syllable weight, double accent, North Kyungsang Korean

1. Introduction

This paper provides an analysis of the loanword tone patterns in North Kyungsang Korean, especially focused on the role of contextual syllable weight. Loanword tone assignment in North Kyungsang Korean is sensitive to syllable weight and, in particular, this study shows that the syllable weight of vowels and coda consonants can be determined by the interaction of constraints in the optimality-theoretic approach (Rosenthal & Van der Hulst, 1999). Crucial for the analysis is the view that coda consonants of disyllabic words in loanwords of North Kyungsang Korean are contextually moraic or non-moraic. In addition, we also suggest that the relevant foot structure in loanwords of North Kyungsang Korean is a bimoraic trochaic foot at the right

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edge of a word as posited by Kenstowicz and H-S Sohn (2001) and Y-H Chung (2002). However, unlike previous researchers, we analyze the DOUBLE accent class of loanwords as consisting of two trochaic feet.

1.1. Lexical Tone Patterns

North Kyungsang Korean, which is spoken in the southeast area of Korea, has a pitch accent system. Lexical words of the North Kyungsang dialect contrast in their tone patterns whereby one or two syllables in a word have a pitch peak. The examples in (1) show the lexical tone patterns in three syllable words. Four lexical tone classes are shown in three syllable words, given in (1). The words in (1) were adopted from the previous study about the pitch accent of North Kyungsang Korean (Jun et al., 2006). In the examples, the acute accent marker indicates a high tone accent, unmarked syllables have a low tone.

- (1) Examples of Lexical Tone Pattern
 - a. ANTE-PENULT: /mé.nu.ri/ ‘daughter-in-law’
 - b. PENULT: /ə.mú.i/ ‘mother’
 - c. FINAL: /wə.nə.mín/ ‘native speaker’
 - d. DOUBLE: /ó.ré.pi/ ‘older brother’

For the native words, the accent pattern in (1) is not phonologically predictable and lexicalized. The table in (2) shows the accent types found on the native North Kyungsang Korean nouns and how the accent types are classified depending on the lexical accent location. The display in (2) is based on the research reported in the previous literatures including Y-H Chung (1991), G-R Kim (1988), N-J Kim (1997), Kenstowicz and H-S Sohn (2001), Jun et al. (2006)

(2) Lexical Tone Patterns in North Kyungsang Korean

Lexical Tone Syllable	DOUBLE	ANTE-PENULT	PENULT	FINAL
	Short or Long V (initial syll)			
1 syll	H (+H)			H (+L)
2 syll	HH		HL	LH
3 syll	HHL	HLL	LHL	LLH
4 syll			LLHL	

The lexical tone patterns in (2) can be best described in terms of the location of the high tone with respect to the end of the word. The syllable with a high tone is the accented syllable. A high tone goes on specific syllables: FINAL, PENULT,

ANTE-PENULT, and DOUBLE. In the case of DOUBLE accent, a high tone falls on the first two syllables of a word. Especially, words in which the initial syllable has a long vowel can only appear in the DOUBLE accent class in North Kyungsang Korean. On the other hand, a low tone appears elsewhere in a word (i.e., on non-accented syllables). The tone pattern of monosyllabic words from the table correlates with its following affix. The tone of the affix is indicated in the parenthesis. Especially, in the double accent case, a high tone appears on the two syllables, the monosyllabic-word and its following affix.

1.2. Loanword Tone Patterns

Unlike native words which have a lexical tone pattern, the tone assignment of loanwords of North Kyungsang Korean to the different tone classes is phonologically predictable in terms of syllable weight (Kenstowicz & Sohn 2001). Loanword tone patterns are also divided into the four tone classes shown in the table of (3) and this displays the different tone patterns in comparison to the lexical tone patterns.

(3) Loanword Tone Patterns in North Kyungsang Korean (Revised from Kenstowicz & H-S Sohn 2001)

Loan word Tone Syllable	DOUBLE		ANTE-PENULT	PENULT	FINAL
	Short V	Long V or CVC (initial syll)			
1 syll					H(+L)
2 syll		HH		HL	LH
3 syll		HHL	HLL ¹	LHL	LLH
4 syll		HHLL		LLHL	LLLH

The shaded part in the table shows the difference between lexical and loanword tone patterns. In the lexical tone pattern, four syllable-words have only the LLHL tone pattern, whereas in loanwords, HHLL and LLLH are also observed. What is more interesting is that in native words there is no evidence that the initial closed syllables are targeted by DOUBLE accent pattern, but in loanwords (as will be seen in section 2), DOUBLE accent is extended to the closed syllable. Also, short vowels in loanwords do not trigger DOUBLE accent, though initial long vowels trigger DOUBLE accent. Additionally, in monosyl-

¹ According to Kenstowicz and H-S Sohn (2001), the antepenult tone pattern appears in cases where the foreign source ends in an /st/ or/ft/ cluster. Two vowels are inserted. That is, one is realized with the fricative in an onset and the other is realized with the preceding stop (e.g. t^hos±t^h± 'toast', kíp^h±t^h± 'gift'). This suggests that epenthetic vowels may be avoided as bearers of accent in favor of underlying vowels.

labic loanwords, unlike monosyllabic native words, even if the monosyllabic word has a long vowel, the high tone is never assigned to the following affix. These are the main differences between lexical and loanword tone patterns. The focus of this paper will be on the DOUBLE accent patterns in loanwords, and especially on the assignment of DOUBLE accent on disyllabic words with an initial closed syllable. These tone patterns are indicated by boldface in the table of (3).

This paper is organized as follows. Section 2 provides data on loanwords depending on different accent types. Section 3 offers the discussion about the previous study of Kenstowicz and H-S Sohn (2001) and Y-H Chung (2002). Section 4 analyzes the loanword data within the framework of Optimality Theory. It will be shown that the assignment of DOUBLE accent especially to bisyllabic loanwords can be understood crucially through the notion of contextually determined coda weight (Rosenthal & Van der Hulst 1999). Section 5 concludes the paper.

2. Data

The data presented in this section show the DOUBLE accent versus NON-DOUBLE accent class with words containing an initial closed syllable or long vowel, and the general tone patterns of the FINAL and PENULT accent class in loanwords of North Kyungsang Korean. The data presented here expands on the data presented in Kenstowicz and H-S Sohn (2001).

First, let us consider the data in (4), which shows the assignment of DOUBLE accent versus NON-DOUBLE accent with words beginning with an initial closed syllable.

- (4) a. DOUBLE accent (with initial CVC)
 2 syll *réndén* ‘London’, *éncín* ‘engine’, *rénkín* ‘ranking’
 3 syll *syámp^héin* ‘champagne’, *ínténet* ‘internet’,
céntílmén ‘gentleman’, *k^hémp^hékt^hí* ‘compact’
- b. NON-DOUBLE accent (with initial CVC)
 2 syll *t^hémp^ho* ‘tempo’, *t^héksi* ‘taxi’, *syámp^hu* ‘sampoo’,
mém^bə ‘member’, *píng^o* ‘bingo’, *mílk^hí* ‘milk’, *dénsí* ‘dance’

As seen in (4a), in disyllabic loanwords, if the initial syllable is CVC, the second syllable of a word should be heavy (CVC) to have the doubled-accent. But in three syllabic-words with initial CVC, the word falls into the DOUBLE accent regardless of the weight of the second syllable. Y-H Chung (2002) has proposed that the closed syllable in the word-initial and final position of North

Kyungsang Korean loanwords attracts a high tone, but others do not. In disyllabic-words with a second light syllable as in (4b), even though the words have an initial closed syllable, the words do not fall into the DOUBLE accent class. The accent falls on the initial syllable. In other words, PENULT accent appears. Thus (4) shows the two different tone patterns of DOUBLE and NON-DOUBLE (PENULT) accent that occur on disyllabic loanwords with an initial closed syllable.

Second, the data in (5a) shows the assignment of DOUBLE accent to words with initial long vowels; (5b) shows exceptional monosyllables which are not assigned DOUBLE accent.

- (5) a. DOUBLE accent (with initial V):²
 2 syll ó:t^hó ‘auto’, ró:má ‘Rome’, pyú:t^hi ‘beauty’,
 3 syll p̄i:nés̄i ‘venus’, r̄i:p̄ia ‘Libya’, k^há:néki ‘Carnegie’
 4 syll yú:t^hóp^hia ‘utopia’, rú:mánia ‘Romania’
- b. Monosyllabic words with initial V: (the suffix *-i* marks the nominative)
 1 syll t^hi:m-i ‘team’, pú:m-i ‘boom’, t^hi:p-i ‘tip’

In (5a), if the initial syllable has a long vowel, the word always falls into the doubled-accent class. In a disyllabic-word with an initial long vowel, the word falls into the doubled-accent class even if the second syllable is light (compare with 4b). Three or four syllable-words with an initial long vowel have the same tone pattern. The examples in (5b) are monosyllabic-loanwords containing a long vowel with the native affix ‘*t*’. In such monosyllabic-words, the word does not fall into the DOUBLE accent even if the affix ‘*t*’ is added, since the monosyllabic word is English and the affix is native. This shows that loanword tone is an independent pattern compared to the lexical tone pattern (e.g., pá:m-í ‘chestnut-NOM’) with DOUBLE accent.

Third, the data in (6) show that if the final syllable is heavy, FINAL accent is regular.

- (6) FINAL accent
 2 syll ribón ‘ribbon’, modél ‘model’
 3 syll amajón ‘amazon’, pit^hamín ‘vitamin’
 4 syll modənjíəm ‘modernism’, res̄it^horǎŋ ‘restaurant’

Finally, as seen in (7), penult accent predominates either when the penultimate

² Kenstowicz and H-S Sohn suggested that when the English tense vowel is adapted in North Kyungsang Korean, a tense vowel in an initial syllable is interpreted as long and is assigned to the DOUBLE accent class. However, some of these words are assigned to the PENULT accent class with a short vowel (e.g. hómō ‘homo’, k^hóta ‘coda’, p^hyuma ‘puma’). This suggests that the long vowel is part of the underlying representation. I leave the details of this matter for future research.

syllable is heavy with a final light syllable or when both the final and the penult are light syllables. As Kenstowicz and H-S Sohn (2001) observe, syllables closed with a geminate /l/ do not function as heavy.

- (7) PENULT accent
- 3 syll orénci ‘orange’, k^harénta, ‘calendar’, t^henísɨ ‘tennis’, sinéma ‘cinema’,
- 4 syll amefíka ‘America’, hirośíma ‘Hiroshima’,
hellik^hópt^ha ‘helicopter’, anaúnse ‘announcer’
- 5 syll k^hellip^honía ‘california’, parɨsellóna ‘Barcelona’, inp^hulluénca ‘influenza’

From these loanword tone patterns in (4)-(7), loanword tone assignment can be stated with the following generalization in (8).

- (8) Generalization of Loanword Tone Assignment
(Revised from Kenstowicz & H-S Sohn 2001)
- a. If the initial syllable of the output contains a long vowel, then the word falls into the doubled-accent class;
 - b. if the initial syllable of the output is CVC, then the word falls into the doubled-accent class unless it is a disyllabic-word with a final CV syllable.
 - c. Otherwise, if the final syllable is heavy, the word falls into the final-accent class;
 - d. Otherwise, the word falls into the penult-accent class.

For the following sections, I briefly comment in section 3 on the previous studies of Kenstowicz and H-S Sohn (2001) and Y-H Chung (2002), and in section 4, I develop an optimality-theoretic analysis of the loanword tone pattern.

3. Previous Study

In this section, I discuss two previous studies of the North Kyungsang loanword tone pattern: Kenstowicz and H-S Sohn (2001) and Y-H Chung (2002). The analysis I offer in the following section can be seen as a revised analysis of these previous works. According to the generalization of Kenstowicz and H-S Sohn, regarding loanwords of North Kyungsang Korean, if a loanword lacks an initial heavy syllable, it would not fall into the DOUBLE accent class; it would be assigned a bimoraic trochaic foot at its right edge. They do not discuss the specific foot structure of words of the DOUBLE accent class. Further, their generalization does not include the realization of PENULT accent occur-

ring against DOUBLE accent. That is, even if the initial syllable of a word contains a long vowel or is closed, in monosyllabic and disyllabic words, PENULT accent can appear, not DOUBLE accent (e.g., [tʰempʰo] ‘tempo’ in (4b)). In the disyllabic word, they consider [tʰempʰo] ‘tempo’ as PENULT accent class with an initial heavy syllable, and do not explain why DOUBLE accent is not assigned, even though the initial syllable is a closed syllable. In other words, Kenstowicz and H-S Sohn (2001) do not focus on distinguishing between DOUBLE accent and PENULT accent. From this point of a view, they fail to provide a general connection between particular contexts and weight assignment, and they leave the analysis of foot structure on words with DOUBLE accent.

Y-H Chung’s (2002) analysis overlaps with Kenstowicz and H-S Sohn’s in that it maintains that in North Kyungsang loanwords that are not in the DOUBLE accent class, a bimoraic trochaic foot would be assigned at the right edge of the word. Y-H Chung’s analysis differs from Kenstowicz and H-S Sohn by offering an explicit analysis of variable coda weight. However, Y-H Chung does not discuss the distinction found in bisyllabic words with initial closed syllables as exemplified by [rén.dén] ‘London’ versus [tʰempʰo] ‘tempo’ where there is a difference in tone class assignment depending on whether the second syllable is open or closed. Moreover, in Y-H Chung’s analysis, words with double accent do not reflect trochaic foot structure, but simply a double linking of a high tone to two syllables. Given that trochaic foot structure is required for all the other accent classes in loanwords, it would be preferable if trochaic foot structure could also account for the DOUBLE accent class.

4. An Optimality Theoretic Analysis

In this section we propose an optimality-theoretic analysis of DOUBLE accent and other general tone patterns in loanwords of North Kyungsang Korean. DOUBLE accent only appears on the first two syllables of a word when the initial syllable is heavy. This analysis begins with a question about what are the factors, which determine syllable weight. The analysis will be focused on the analysis for codas with variable syllable weight and DOUBLE accent with two trochaic feet.

Based on the previous approaches on variable syllable weight, the syllable weight has been explained in terms of the interaction of constraints that determine the difference of the weight of vowels and coda consonants (Rosenthal & Van der Hulst 1999). Within the framework of moraic theory, it is generally accepted that coda consonants are contextually moraic or non-moraic (Sherer 1994, Zec 1995, Rosenthal & Van der Hulst 1999, Morén 2000), whereas vowels are moraic in the underlying representation (Hyman 1985,

Hayes 1989, Pulleyblank 1994). In loanwords of North Kyungsang Korean, the weight of a closed syllable varies depending on context as is evidenced by the data in (4a) and (4b). The conflict between metrical constraints and the constraint determining the weight of the coda will account for the variability of the syllable weight of close syllables (Rosenthal & Van der Hulst 1999).

4.1. DOUBLE vs. NON-DOUBLE Accent with Initial CVC

Considering the contextual heaviness of closed syllables in loanwords of North Kyungsang Korean, an initial closed syllable preceding a light syllable in disyllabic words is contextually light (4b), whereas an initial closed syllable preceding a heavy syllable in disyllabic words is contextually heavy (4a). As for the disyllabic words, in the comparison of DOUBLE accent and PENULT accent, when a contextually initial light closed syllable commonly occurs with the second light syllable, the PENULT accent appears as in (4b). However, when a contextually initial heavy closed syllable occurs with the second heavy syllable, the DOUBLE accent appears as in (4a). A question arises from the comparison of these data for an optimality theoretic approach. What constraints are responsible for DOUBLE accent versus PENULT accent with initial CVC?

Firstly, to account for the heavy closed syllable in loanword tone patterns, let us consider the possible candidates. First, consider two candidates for the borrowing of 'London' in (4a). They are the candidate (rén)(dén) with moraic codas and (rén.dən) with non-moraic codas from /rəndən/. The fact that the output form has a moraic coda is provided by the constraints in (9) and an argument for the crucial ranking of WEIGHT-BY-POSITION above DEP- μ_C is demonstrated in (10).

(9) **WEIGHT-BY-POSITION (W-BY-P)** (Kager 1999)

Coda consonants are moraic.

DEP- μ_C (Revised from Kager 1999)

An output mora on a consonant has an input moraic correspondent.

The constraint WEIGHT-BY-POSITION militates against a non-moraic coda, and DEP- μ_C militates against a moraic consonant. In (10), the boldface type letter is a moraic coda. The winning candidate is marked with the symbol “√” in this and subsequent tableaux.

(10) /rəndən/ → [rén.dén] ‘London’ (4a)³

/rəndən/	W-BY-P	DEP-μ _C
√ a. (rén)(dén)		**
b. (rén.dən)	**!	

The winning candidate with moraic codas in (10a) respects WEIGHT-BY-POSITION but violates DEP-μ_C, since the output moraic consonants have no input moraic correspondents. The losing candidate with non-moraic codas in (10b) violates the higher-ranked constraint WEIGHT-BY-POSITION. The winning candidate provides crucial evidence that the foot structure in loanword of North Kyungsang Korean is a moraic trochaic foot. We assume that the foot head is realized with a high tone. That is why candidate (10a) falls within the DOUBLE accent class. There are two feet and each foot has a head with a high tone. The DOUBLE accent class consists of those words having two feet. A possible candidate such as rən.(dén) with the first syllable not parsed into a foot would lose out since still violates WEIGHT-BY-POSITION.⁴

Secondly, to account for the data where the coda does not act as moraic, the following possible candidates from /t^hemp^ho/ ‘tempo’ in (4b) are considered in (11).

(11) a. (t^hém.p^ho) b. (t^hém)(p^ho) c. (t^hém) p^ho

The candidate in (11a) is the actual output form of /t^hemp^ho/. The coda consonant in (11a) is not moraic in the initial syllable of a word. As shown by the tableau in (13), this candidate respects the constraint DEP-μ_C. The possible candidate in (11b) will violate FOOT BINARITY [Moraic Trochee] in (12a) since the structure of the second foot of this candidate is (L) with one mora. (11c) will violate ALIGN-R (Wd, Ft) in (12b) since the right edge of the word is not aligned with the right edge of a foot.

(12) a. **FOOT BINARITY [Moraic Trochee] (FT-BIN): (LL), (H) > (L) > (HL)**
 (Kager 1999)
 (where L = light syllable and H = heavy syllable)
 Prosodic feet are binary under moraic analysis.

³ In three syllable words of (4a), DOUBLE accent with C^hVC.C^hV.CVC or C^hVC.C^hVC.CV is evaluated by this constraint ranking of (10). The candidate, (ín)(ténét) or (cén)(tílmén), is the optimal output with satisfying WEIGHT-BY POSITION, though it violates DEP-μ_C. The candidate, (ín.tə)(nét) or (cén.tíł)(mén) can be considered, but it cannot appear since two high tones in a word must be adjacent. This is clear from the table in (2).

⁴ The candidate, (rén) dən ‘London’, is ruled out because of its violation of ALIGN-R (Wd, Ft).

b. **ALIGN-R (Wd, Ft)** (Kager 1999)

The right edge of the word is aligned with the right edge of a foot

The constraint FOOT BINARITY [MORAIC TROCHEE] means that the foot types (LL) and (H) with two moras are preferred to a monomoraic foot (L) with one mora, and then (L) is preferred to the foot type to (HL) with three moras.⁵ The fact that an initial closed syllable preceding a light syllable in a disyllabic word is contextually light in (4b) provides an argument for the crucial ranking of FOOT BINARITY [MORAIC TROCHEE] and ALIGN-R (Wd, Ft) above WEIGHT-BY-POSITION. There is not ranking argument between FOOT BINARITY [MORAIC TROCHEE] and ALIGN-R (Wd, Ft) for (4b). The ranking of these constraints is illustrated in (13).

(13) /t^hemp^ho/ → [t^hém.p^ho] ‘tempo’ (4b)

/t ^h emp ^h o/	ALIGN-R (Wd,Ft)	FT-BIN [Moraic Troch]	W-BY-P	DEP-μ _C
√ a. (t ^h ém.p ^h o)			*	
b. (t ^h em)(p ^h o)		*!(L)		*
c. (t ^h em)p ^h o	*!			*

In the tableau of (13), the candidates (13b) and (13c) have moraic codas in the first syllable; the candidate (13b) with light foot structure with one mora in the second syllable violates the higher-ranked constraint FT-BIN [Moraic Troch] while candidate (13c) without a foot for the second syllable violates the higher-ranked constraint ALIGN-R. But the candidate (13a) with a non-moraic coda respects these constraints, even if WEIGHT-BY-POSITION is violated. So the candidate (13a) is the optimal output.

The final ranking accounting for DOUBLE vs. PENULT accent with initial CVC in North Kyungsang Korean is provided below.

(14) Constraint Ranking: DOUBLE vs. NON-DOUBLE accent (with initial CVC)

ALIGN-R (Wd, Ft), FOOT BINARITY [Moraic Trochee] >> WEIGHT-BY-POSITION >> DEP-μ_C

⁵ The avoidance of the foot type (HL) can be seen in the comparison of the winning candidate (t^há:)(gét) with the competitor (t^há:.get) ‘target’. The latter is eliminated due to its (HL) foot structure.

4.2. DOUBLE vs. NON-DOUBLE Accent with Initial V:

With respect to the data in (5a) with DOUBLE accent and (5b) with NON-DOUBLE accent, the initial long vowel of a word triggers DOUBLE accent in (5a), but PENULT accent in (5b). Let us consider one of the examples of the DOUBLE accent class with an initial long vowel in (5a). The possible candidate for /ro:ma/ ‘Rome’ may be suggested as follows.

- (15) a. (ró:)(má) b. (ró: ma) c. (ró:) ma

The possible candidate in (15c) will be ruled out by the constraint ranking of ALIGN-R (Wd, Ft) over FOOT BINARITY [Moraic Trochee]. The conflict between the possible candidates in (15a) and (15b) provides crucial evidence that there is a preference among moraic trochaic foot structures in the constraint FOOT BINARITY [Moraic Trochee]. That is, we can observe a preference for (LL), (H) over (L), and then for (L) over (HL) from the candidates in (15a) and (15b). The possible output candidate in (15a) is preferred as the optimal output over the candidate in (15b), since the candidate with the foot structure (HL) in (15b) has the least preference. This is demonstrated in the tableau (16).

(16) /ro:ma/ → [ró:.má] ‘Rome’ (5a)⁶

/ro:ma/	ALIGN-R (Wd,Ft)	FT-BIN [Moraic Troch]
√ a. (ró:)(má)		* (L)
b. (ró: ma)		*! (HL)
c. (ró:) ma	*!	!

In the tableau of (16), the candidate (16c) without a foot in the second syllable violates higher-ranked ALIGN-R. The candidates, (16a) and (16b), violate FT-BIN [Moraic Troch], but since the candidate (16a) with a second foot of one mora is preferred to the candidate (16b) with a heavy, light foot of three moras, the candidate (16a) is the optimal output.

To account for the examples of the NON-DOUBLE accent class with an initial long vowel (5b), the following possible candidates for /ti:m/ are considered in (17). We assume here a theory of morphology in which inflectional endings are not part of the underlying input.

⁶ The candidate, (róma), can also be considered. It will be ruled out by the undominated constraint, WEIGHT-IDENTITY-VOWEL, in (23), since a vowel’s mora is part of the underlying representation. Specifically, the long /o:/ of /ro:ma/ underlyingly has two moras while the [o] of candidate [roma] has only one mora thus violating WT-IDENTITY-V.

- (17) a. (tʰi:)mi b. (tʰi:)(mí)

The candidate in (17a) is the actual output form of [ti:m-i]. (17a) provides evidence that there is a constraint requiring a head-identity between the input and output. The head vowel of the second foot of the candidate in (17b) does not have a correspondent in the input. It thus suggests the constraint in (18) and the constraint ranking of HEAD DEP I-O over ALIGN-R (Wd, Ft), illustrated in (19). The constraint HEAD DEP I-O plays a crucial role in the competition between DOUBLE and PENULT accent with a long vowel. That is, this accounts for why the high tone of the first vowel in (tʰi:) m-i does not spread to the native affix, 'i'.

- (18) **HEAD DEP I-O** (Revised from Kager 1999)
 A footed vowel in the output has a correspondent in the input.

- (19) /tʰi:m/ → [tʰi:.mi] 'team' (5b)

/ti:m/	HEAD DEP I-O	ALIGN-R (Wd,Ft)	FT-BIN [Moraic Troch]
√ a. (tʰi:)mi		*	
b. (tʰi:)(mí)	*!		*(L)

In the tableau of (19), the vowel of the second foot in the candidate (19b) does not have a correspondent in the input, and HEAD DEP I-O is violated. But the candidate (19a) respects this constraint. So the candidate (19a) is an optimal output.

The final ranking for DOUBLE vs. NON-DOUBLE accent with initial CVC in North Kyungsang Korean is provided below.

- (20) Constraint Ranking: DOUBLE vs. NON-DOUBLE accent (with initial V):
 HEAD DEP I-O >> ALIGN-R (Wd, Ft) >> FOOT BINARITY [Moraic Trochee] >> WEIGHT-BY-POSITION >> DEP-μ_C

4.3. FINAL Accent

As for the FINAL accent, the data in (6) shows that if the final syllable is heavy, the final accent is regular. The established constraint ranking so far accounts for the data in (6), but the constraint, PARSE-SYL, in (21) for the candidate, ri (bón) or (ri) (bón) determines the foot distribution with FOOT BINARITY [Moraic Trochee]. A tableau showing the possible output candidates from /ribon/ 'ribbon' in (6) is shown in (22).

- (21) **PARSE-SYL** (Kager 1999)
Syllables are parsed by feet.

- (22) /riboŋ/ → [ri.bón] ‘ribbon’ (6)

/riboŋ/	HEAD DEP I-O	ALIGN-R (Wd,Ft)	FT-BIN [Moraic Troch]	W-BY-P	DEP-μ _C	PARSE- SYL
√ a. ri (bón)					*	*
b. (rí.bon)				*!		
c. (rí. bon)			*!(LH)		*	
d. (rí)(bón)			*!(L)		*	

The winning candidate in (22a) violates DEP-μ_C since the final coda consonant is moraic and violates PARSE-SYL because the initial syllable is not incorporated into a foot; however, it respects higher-ranked constraints compared to the other candidates. The losing candidate in (22b) respects DEP-μ_C but violates the higher-ranked constraints WEIGHT-BY-POSITION, since the final coda is non-moraic. The losing candidates in (22c) and (22d) violate DEP-μ_C and the higher-ranked constraint FOOT BINARITY [Moraic Trochee]. The optimal output is the candidate in (22a). Note that the winning candidate (22a) violates the constraint PARSE-SYL since the initial syllable is not part of the foot. This constraint is low-ranked, at least lower than WEIGHT-BY-POSITION, otherwise (22b) would be the winning candidate. Further, it has to be lower-ranked than FOOT BINARITY [Moraic Trochee] in order to rule out the candidate (rí)(bón). Finally, because of high-ranked ALIGN-R (Wd, Ft), an unparsed syllable can not occur at the end of the word.

4.4. PENULT Accent

Now consider the PENULT accent. The data in (7) shows that if the penult is heavy, PENULT accent is regular, and PENULT accent predominates when both the final and the penult are light syllables. A possible output candidate that we should also consider here is an output form determining whether a vowel’s mora is part of the underlying representation or not. That is, with respect to this view, for an input like /sinema/ in (7), the possible output forms to consider include the candidate si (né.ma) with an initial short vowel and the candidate (sí:)(né.ma) with an initial long vowel. According to Rosenthal and Van der Hulst (1999), since a vowel’s mora is part of the underlying representation, it is evaluated for input and output faithfulness in terms of Correspondence (McCarthy and Prince 1995, McCarthy 2002). It is assumed that the distribution of weight in the output corresponds as faithfully as possible to the distribu-

tion in the input. The weight Correspondence constraint is shown in (23). The fact that the candidate with an initial short vowel from /sinema/ ‘cinema’ in (7) is the optimal output provides evidence regarding the constraint ranking of WT-IDENTITY-VOWEL over PARSE-SYL.

- (23) **WT-IDENTITY-VOWEL (WT-IDEN-V)** (Revised from McCarthy 1995)
 Monomoraic input vowels are monomoraic in the output. Bimoraic input vowels are bimoraic in the output.

- (24) /sinema/ → [si.né.ma] ‘cinema’ (7)

/sinema/	WT-IDEN-V	HEAD DEP I-O	ALIGN-R (Wd,Ft)	FT-BIN [Moraic Troch]	PARSE-SYL
√ a.si (né.ma)					*
b.(sí.ne) ma			*!		*
c.(sí:)(né.ma)	*!				

In the tableau of (24), the example of penult accent with an initial short vowel, si. (né.ma), is considered. The fact that the candidate (24a) with an initial short vowel is the optimal output provides evidence regarding WT-IDENTITY-VOWEL. The candidate (24c) with an initial long vowel violates WT-IDENTITY-VOWEL constraint and is ruled out. This suggests the length of the initial vowel is a critical part of the loanwords’ underlying representation.

Finally, to examine whether the bimoraic trochaic foot in North Kyungsang Korean is at the right edge of a word or not, we should consider four syllable words in (7). The winning output candidate from /amerika/ ‘America’ in (7) is a.me (rí.ka). If we compare this to the other possible candidates, such as a (me.rí) ka, we can observe that in the winning candidate the bimoraic trochaic foot is at the right edge of a word as demonstrated in (25).

- (25) /amerika/ → [ameŕíka] ‘America’ (7)⁷

/amerika/	WT-IDEN-V	HEAD DEP I-O	ALIGN-R (Wd,Ft)	FT-BIN [Moraic Troch]	PARSE-SYL
√ a. a.me (rí.ka)					**
b. a (mé.ri) ka			*!		**
c.(á:)(mé.ri)ka	*!		*		*

⁷ The candidate, (á.me)(rí.ka), can be also considered, but since two non-adjacent high accents in a word do not appear in the tone pattern of North Kyungsang Korean, it is not included in the tableau of (25). That is, in the DOUBLE accent class of North Kyungsang Korean, the two high accents in a word can appear, but must be adjacent. Another way of expressing this is that North Kyungsang Korean has a constraint against two pitch falls occurring in a word. This is true of both native and loanword as seen in (2) and (3).

In the tableau of (25), the four-syllabic word, a.me (rí.ka), with PENULT accent is considered. When the candidate (25a) with a bimoraic trochaic foot at the right edge of a word is compared with the candidate (25b) not having foot structure from the right edge of a word, the candidate (25a) is the optimal output, since the candidate (25b) violates ALIGN-R. The optimal output (25a) provides evidence that the foot structure in loanwords of North Kyungsang Korean is a bimoraic trochaic foot at the right edge of a word. The candidate (25c) violates the undominated constraint WT-IDENTITY-VOWEL and is ruled out.

The final ranking for PENULT accent in North Kyungsang Korean is provided below.

- (26) Constraint Ranking: PENULT Accent
 WT-IDENTITY-VOWEL, HEAD DEP I-O >> ALIGN-R (Wd, Ft) >>
 FOOT BINARITY [Moraic Trochee] >> WEIGHT-BY-POSITION >>
 DEP- μ_C , PARSE-SYL

5. Conclusion

This paper has proposed the optimality-theoretic analysis of the status of DOUBLE accent and other general tone patterns in loanwords of North Kyungsang Korean with the final ranking of the constraints as in (26).

Crucial for the analysis is the view that coda consonants in loanwords of North Kyungsang Korean are contextually moraic or non-moraic. This has implications for Korean more generally with respect to the controversial issue of the moraic status of coda consonants. Furthermore, this also suggests that the foot structure in North Kyungsang Korean is a bimoraic trochaic foot at the right edge of a word as posited by N-J Kim (1997), Kenstowicz and H-S Sohn (2001) and Y-H Chung (2002). However, in the analysis proposed here, DOUBLE accent is also accounted for by a trochaic foot structure. Words of the DOUBLE accent class have two trochaic feet. Loanword tone patterns in North Kyungsang Korean are assigned by Markedness constraints higher ranked than tone faithfulness constraints in loanwords. Thus source accent plays no role in North Kyungsang Korean loanwords. This suggests the implication that the loanword tone pattern of North Kyungsang Korean reflects the emergence of the unmarked (McCarthy & Prince 1994). The markedness constraints that assign loanword tone patterns play a minor role in native words, because in native words, the tone faithfulness constraints (i.e., faithfulness to the lexical or underlying tone) are high-ranked. One possible place where these constraints may play a role in native words is in accounting for the observation in (2), that quadrisyllable native words always have penult accent.

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