

# On the Pitch-Accent System of South Kyungsang Korean: A Phonological Perspective\*

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This paper presents an analysis of the pitch patterns of native nouns of contemporary South Kyungsang Korean. Following DM Lee (2009) we maintain that South Kyungsang Korean has a pitch-accent system that co-exists with an initial tone register. To illustrate this we focus on monomorphemic nouns and the nature of tonal alternations found under suffixation.

**Keywords:** pitch-accent, South Kyungsang Korean, suffixation

## 1. Introduction

Researchers on South Kyungsang Korean (SK) have been divided as to whether SK is a tone language or a pitch-accent language. While traditionally SK Korean has been viewed as a tone language (U Huh 1954, C-G Gim 1994, 1998, H-Y Lee 1994, 1997), there has been an alternative view that SK is a pitch-accent language (Ramsey 1974, 1975, JW Kim 1991, Kubozono 2007, DM Lee 2008). The split between the two views is found in the most recent research on SK. For example, S-E Chang (2007) maintains that SK is a 3-tone language based largely on phonetic criteria while DM Lee (2009) argues both on phonetic and phonological grounds that SK is a pitch-accent language. Likewise, JE Kim and S-A Jun (this volume) posit that SK has a pitch-accent system. There is even a hybrid position proposed by Utsugi (2007, this volume) suggesting that certain kinds of tonal patterns in SK reflect pitch accent while other patterns reflect underlying word melodies (or tones). In this paper we lay out a particular analysis of SK as a pitch-accent system based on the tonal patterns that occur in monomorphemic nouns and on the nature of tonal alternations found under suffixation. In Section 2, we offer a brief discussion and critique of previous work viewing SK as a tone language. Our focus in this paper will be exclusively on SK. We will occasionally make reference to related phe-

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nomena in North Kyungsang Korean, but, in this paper, we will not take a position as to whether North Kyungsang Korean displays a pitch-accent or tone system. We will also not discuss the historical development of tone in Kyungsang Korean, but the interested reader can see Kenstowicz, HS Cho, and JE Kim (2007) for a recent study. In Section 3, we lay out our conception of the pitch-accent nature of the SK tone patterns based on native monomorphemic words. We follow DM Lee (2009) in maintaining that SK nouns manifest a tone register system independent of accent. Specifically, in SK, either the first syllable of the word or the second syllable of the word must have a high (H) tone. If the first syllable of the word has a high tone, then it is in the H tone register class. If, on the other hand, the first syllable does not have a high tone, then it will have a low (L) tone and be in the L tone register class. Once this is understood, there is a clear explanation for SK's well-known 3 way 'tonal' contrast in monosyllabic words: A monosyllabic word can be assigned to the H tone register class, it can be assigned to the L tone register class, or it can be accented (in which case it is not assigned to a tone register class). These monosyllabic classes will display different patterns of tonal alternation when suffixes are added. In Section 4, we further support our claim that SK is a pitch-accent system by examining the affect of suffixation on the tone patterns of nominal forms. We will argue that these patterns reflect a pitch-accent system where some nouns may be unaccented. We also discuss, in this section, suffixal accentuation patterns on loanwords. In doing this, we will show that loanwords are different from native words in that loanwords always have accent. Section 5 concludes the paper. We leave for future work the comparison of our proposed pitch-accent system for SK with the somewhat different one proposed by JE Kim and S-A Jun (this volume).

## **2. SK as a Tone Language – A Critique**

Various researchers on South Kyungsang Korean (SK), such as U Huh (1954), C-G Gim (1994, 1998), H-Y Lee (1994, 1997), and S-E Chang (2007), maintain that SK is a tone language having three distinctive tones: High (H), Mid (M), and Low (L) and these are assigned to each syllable of the word (though S-E Chang 2007 suggests a rising tone instead of L based on her phonetic work). S-E Chang (2007) maintains that these different tone types are manifested on monosyllabic words as exemplified by the minimal triplet: [mal] H 'horse', [mal] M 'a measuring unit', and [mal] L 'language'. Evidence for this division comes from the phonetic difference between these three tones as documented by S-E Chang (2007) and from the fact that each of these words displays different tonal alternation behavior when the nominative suffix [-i] is added, suggesting that the triplet represents different classes. Other researchers,

though, such as K Chung (1980) and MO Choi (1998), have argued that SK is a two tone language having just H and L tones and not a three tone language. The main evidence for this is the observation that there does not seem to be a perceptible difference between the posited H tone of [mal] 'horse' and the posited M tone of [mal] 'a measuring unit'. Thus, we find a disagreement among those who advocate that SK is a tone language as to whether it is a two-tone system or a three-tone system.

In this paper, we will maintain that SK is actually a pitch-accent language, not a traditional tone language. As evidence against a three-tone system, we point to the observation just mentioned above that SK speakers cannot perceptually distinguish between the posited H tone in [mal] 'horse' from the posited M tone in [mal] 'a measuring unit'. Acoustic studies such as Kenstowicz, HS Cho, and JE Kim (2007) and S-E Chang (2007) observe a consistent but slight phonetic pitch difference between these two words, but subjects could not perceptually distinguish the two in neutral contexts. It would be odd to argue that there are two phonemically distinct tones if speakers cannot distinguish between them. On the other hand, one needs to explain the phonetic difference. We will return to this in the next section.

While the lack of a perceptual distinction between the posited H and M only argues against SK being a three-tone system, there are also other reasons to argue against the tonal analysis. Most telling is that there are only a limited number of tone patterns on polysyllabic words. For example, if we were to assume the three-way distinction in the SK toneme inventory (H, M, and L tone), then the possible output tone patterns of SK Korean trisyllabic words would ideally be 27 different tone patterns ( $3 \times 3 \times 3 = 27$ ). This does not occur. If we were to assume a two-way high-low tone system for SK then the number of output tone patterns on SK trisyllabic words would be predicted to be 8 ( $2 \times 2 \times 2$ ). Again this does not occur. The tone patterns of SK Korean trisyllabic words are very limited - only four if we assume a two tone based analysis. Therefore, the argument that SK is a tone language with three distinctive tones or even two distinctive tones is not convincing given the limited number of patterns found in SK trisyllabic words. We will argue that the limited number of tonal patterns witnessed in SK is more indicative of a pitch-accent system, especially since the tone patterns on polysyllabic SK words are predictable once the tones on certain syllables are lexically indicated. A further indication that SK displays a pitch-accent system comes from loanword data. In Section 4, we will make reference to DM Lee (2009) who shows that the tone pattern on loanwords in SK reflects a pitch-accent system. In the loanword system, the tone pattern is predictable, largely determined by syllable weight, where H tone is normally associated with a heavy syllable (with predictable exceptions) and where the accented syllable is the rightmost syllable in the word with a high tone. Whether other syllables in the word surface with high tone or low

tone is predictable as well. (See DM Lee 2009 for details and an optimality-theoretic analysis.) The fact that loanwords have a pitch-accent type system is suggestive that native words also reflect a pitch-accent system. In the following section, we present our conception of the pitch-accent nature of the SK tone patterns based on native monomorphemic nouns. We include an analysis of how suffixation affects pitch patterns. While our analysis references optimality-theoretic type constraints along the lines of DM Lee (2009), the precise formulation of such an analysis is left for future research.

### 3. Pitch Accent in South Kyungsang Korean

In this section, we lay out our conception of the pitch-accent nature of the SK tone patterns based on native monomorphemic words. Consider the chart in (1) that shows the possible tone patterns of SK monomorphemic words. We assume a two-tone system (H for high and L for low) given that studies such as S-E Chang (2007) show that speakers do not perceptually distinguish between three tone types. Examples of various polysyllabic words illustrating the tone pattern are given in (a)-(c). Judgments are those of the first author but are also consistent with phonetic studies such as DM Lee (2008) and S-E Chang (2007), but it should be noted that the phonetic studies on SK pitch patterns still have to be interpreted phonologically.

#### (1) Tone Patterns of South Kyungsang Korean

Monosyllabic	Disyllabic	Trisyllabic	Quadrisyllabic
H	HH	HHL	HHLL
L	HL	HLL	LHHL
	LH	LHL	
		LHH	

- a. Disyllabic words: [ku.rim] HH ‘cloud’, [ki.rim] HL ‘oil’, [kə.rim] LH ‘fertilizer’
- b. Trisyllabic words: [mu.ji.ke] HHL ‘rainbow’, [a.ji.me] HLL ‘an aunt’, [ma.rim.mo] LHL ‘rhombus’, [sa.ta.ri] LHH ‘a ladder’
- c. Quadrisyllabic words<sup>1</sup>: [hal.a.pə.ji] HHLL ‘a grandfather’, [a.ju.mə.ni] LHHL ‘an aunt’

<sup>1</sup> We do not provide the examples of compound words and derivational nouns here.

From the tone patterns of the polysyllabic (monomorphemic) words shown in (1), we make the following important observations. The first observation is that either the first or second syllable of the words must have high tone. There are no words that begin with LL, which makes South Kyungsang Korean different from North Kyungsang Korean. (See JS Kim this volume on North Kyungsang Korean.) Second, there is usually (but not always) a low tone following the rightmost high tone. With respect to native lexical items that have a final H tone, a low tone normally appears on the suffix. In cases where it does not, we will maintain that the lexical word is accentless. Third, words cannot begin in a sequence of three high tones nor do they end in a sequence of three high tones (ignoring compounds which are not discussed here). Finally, a prosodic word cannot have two pitch falls. That is, within a word there is only one place where a high is followed by a low.

The above observations are consistent with a pitch-accent system, not tone. (See McCawley (1970, 1978) for the characteristics of Japanese pitch accent system.)<sup>2</sup> From the above four key observations and the results of the acoustic study (DM Lee 2008), we can reinterpret the tone patterns of SK Korean into a pitch-accent system as in (2), where the accented syllable is the high toned syllable immediately before the low tone. That is, the accented syllable occurs immediately before the pitch fall and is indicated by the \* symbol in (2). Moreover, since either the first syllable of the word or the second syllable of the word must have a high (H) tone, we crucially propose, following DM Lee (2009), that SK has an initial tone register. Specifically, in words where the initial syllable is unaccented, if the first syllable of the word has H tone, then it is in the H tone register class, but if the first syllable does not have H tone, then it will have a low (L) tone and be in the L tone register class. Words in the L tone register class will always have a high tone on the second syllable.

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<sup>2</sup> Hyman (2006, 2009) calls into question the distinction between pitch-accent languages and tone languages. A perspective that emerges from his work is that a so-called pitch-accent language is a type of tone language that has some properties of an accent language. While we do not disagree with this perspective, we will continue to use the term pitch-accent language to indicate a type of language where the tone patterns on words is predictable once a specific syllable in the word is lexically indicated. Tone languages in the traditional sense do not have this predictability. In various Japanese and Korean dialects the lexically indicated syllable is a high tone syllable immediately before a pitch fall. It is typically considered to be the accented syllable in a word. On our view, SK is similar to some of the Western Japanese dialects in having an initial tone register in addition to pitch-accent. (See Yoshida 2009 on Japanese.)

- (2) The Accent Pattern of SK Korean Tones ( $\sigma$  = syllable, tone patterns indicated in parentheses occur in compound or derivational forms, but not in monomorphemic forms)

		1 <sup>st</sup> $\sigma$	1 <sup>st</sup> $\sigma$	2 <sup>nd</sup> $\sigma$	2 <sup>nd</sup> $\sigma$	3 <sup>rd</sup> $\sigma$	4 <sup>th</sup> $\sigma$
		accent	register tone (unaccented)	accent	unaccented	accent	accent
1 $\sigma$ words	Register tones	H	H				
		L	L				
	None	None	<b>H*</b>				
2 $\sigma$ words	Register tones	H		HH*			
		L		LH*	LH		
	None	None	<b>H*L</b>				
3 $\sigma$ words	Register tones	H		HH*L			
		L		LH*L		LHH*	
	None	None	<b>H*LL</b>				
4 $\sigma$ words	Register tones	H		HH*L L			
		L		(LH*LL)		LHH*L	
	None	None	<b>(H*LLL)</b>				

As seen in (2), we interpret the accent type of SK as H\* with two initial register tones: H and L. To be clear, the notion of an initial register is that the first syllable of the native SK word (if unaccented) is arbitrarily assigned a high tone or low tone as a lexical property of that word.<sup>3</sup> If it is assigned a high tone, it is in the H tone register class and if it is assigned low tone, it is in the L tone register class. Further, the assignment of accent is also a lexical property of the word, assigned to a specific syllable indicated by H\*. As we will discuss shortly, some words are not assigned accent, and thus are unaccented. The system is a pitch-accent system since once certain lexical information is known (i.e., the tone register class and the accent location, if accented) then the tone pattern of the rest of the word is predictable. The accented syllable is always high with low tone on the syllables immediately following it. Moreover, the tone height of any preceding (non-initial) syllable is also predictable in that it has high tone. Accentless words have high tone without a pitch fall (even when suffixed), though the initial syllable of an accentless word can have low tone if the word is assigned to the L tone register class. The pitch accent system proposed here for SK is similar to western Japanese (Kansai) dialects<sup>4</sup> that have

<sup>3</sup> We note that while JW Kim (1991) does not mention register tones, he argues that Kyungsang Korean has a prosodic system with one pitch accent as well as two unaccented tones, H and L. Kim argues that *L type words* start with initial L tone and *H type words* start with initial H tone but both types of words do not have a pitch accent. Our proposal is different in that, under our analysis, words with an initial register can have pitch-accent later in the word. We do not provide the details of JW Kim's (1991) analysis here.

<sup>4</sup> See McCawley (1970, 1978) for more discussion of the accent structures of Western Japanese

two register tones as well as a pitch accent.

Striking evidence for the pitch accent system proposed here comes from the behavior of monosyllabic words under suffixation. Recall from Section 2 that a major piece of evidence for claiming that SK is a three way tone language (as, for example, argued by S-E Chang 2007) is that monosyllabic words display three different types of tonal behavior when the nominative suffix [-i]/[-ka] is added. The weakness of this argument is that speakers do not distinguish perceptually the posited M tone words from H tone words. On the other hand, given our analysis as presented in (2), we note that monosyllabic words will fall into one of three classes: accented, unaccented in the H tone register class, and unaccented in the L tone register class. These three types of monosyllabic words display different behavior under suffixation. Consider the data in (3) for the monosyllabic minimal triplet: [mal] ‘horse’, [mal] ‘a measuring unit’, and [mal] ‘language’, shown with various suffixes attached.<sup>5</sup>

(3) Tone Patterns of SK Monosyllabic Native Words with Affixation

a. Accented class

mal	H	‘horse’
mal+i	H+L	‘horse (nom.)’
mal+il	H+L	‘horse (acc.)’
mal+rosə	H+LL	‘as a horse’
mal+cərəm	L+HL	‘like a horse’

b. Unaccented class (H Tone Register)

mal	H	‘a measuring unit’
mal+i	H+H	‘a measuring unit (nom.)’
mal+il	H+H	‘a measuring unit (acc.)’
mal+rosə	H+HL	‘as a measuring unit’
mal+cərəm	H+HL	‘like a measuring unit’

c. Unaccented class (L tone Register)

mal	L	‘language’
mal+i	L+H	‘language (nom.)’
mal+il	L+H	‘language (acc.)’
mal+rosə	L+HH	‘as a language’
mal+cərəm	L+HH	‘like a language’

The above patterns found in the suffixal forms of monosyllabic words are rela-

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dialects.

<sup>5</sup> The suffixes shown here should be viewed as representative. Inflectional suffixes such as the nominative and the accusative tend to be accentless. Certain other suffixes such as [-cərəm] ‘like’ can be viewed as accented. A fuller analysis of the accentual properties of the suffixal system is left for future research.

tively straightforward under our analysis and under the assumption that the suffix [-cəɾəm] is an accented suffix (having the tone pattern HL) with the accent on its initial syllable; the other suffixes shown in (3) are unaccented and so should normally surface with low tone. For the first four forms in (3a) where the monosyllabic word is underlyingly accented, there is low pitch on the suffix as would be expected. However, for the last form in (3a), [mal+cəɾəm] LHL ‘like a horse’, one can understand the output as reflecting a rule of deaccentuation that deletes the first of two consecutive accents. Since the accent on [mal] ‘horse’ is immediately before the accent on the suffix, it deaccents and surfaces as low tone.<sup>6</sup> In the example of (3b), [mal] H ‘a measuring unit’, the word is unaccented and in the High tone register class. Since the word is unaccented we do not expect to find a pitch fall on the suffix. This is clearly seen in the nominative and accusative forms in (3b) where there is no pitch fall and these forms surface as accentless. The last example in (3b) has the accented suffix /-cəɾəm/ and so the output surfaces with the accent on the suffix [mal+cəɾəm] HHL ‘like a measuring unit’ as would be expected. On the other hand, the expectation for the form in (3b) [mal+rosə] HHL ‘as a measuring unit’ is for it to surface without a pitch fall given that the suffix /-rosə/ is unaccented as seen by its behavior in (3a). However, as observed earlier, there is a general constraint in SK against words beginning (or ending) in a sequence of three high tones. As a consequence, the last tone becomes low in order to satisfy the constraint. (It is important to note that it is only the tone on the last syllable that can change. The tone on the monosyllabic root word cannot change since it is a register tone. We observe that, under our analysis, the register tone that is lexically assigned never changes under suffixation. Further, the tone on the initial suffix syllable cannot change to low since that would result in the form [mal+rosə] ‘as a measuring unit’ having the tone pattern HLH which is an impossible tone pattern for a single prosodic word in SK as can be observed in (1). Consequently, in order to avoid a sequence of three high tones in [mal+rosə] HHL ‘as a measuring unit’ only the final tone can change to low.) Finally, in (3c) we see suffixes added to the unaccented L tone register word /mal/ L ‘language’. The first four examples in (3c) are straightforward. The word is unaccented and the suffixes are unaccented so there is no pitch fall. The suffixes cannot be assigned low tone since SK does not allow words to begin with consecutive low tone syllables. The last example in (3c) is unexpected. Since /-cəɾəm/ is an accented suffix the expectation is that [mal+cəɾəm] ‘like a language’ should surface with the tone pattern LHL with accent

<sup>6</sup> We note that GR Kim (1988) has proposed a similar rule for North Kyungsang Korean where it is referred to as “Pre-linked H-deletion”. This rule deletes a pre-linked high tone before another pre-linked high tone. The delinked tone surfaces with low tone. It is possible that one can interpret this rule as one of deaccentuation, though the analysis of the North Kyungsang tonal system is beyond the scope of the present paper.

on the initial syllable of the suffix. Instead [mal+cəɾəm] ‘like a language’ surfaces as unaccented, LHH. We suggest that unaccented words in the L tone register class are deaccenting. That is, they will deaccent any suffixal accent as long as it does not create an impermissible tone sequence. The last form in (3c) reflects deaccentuation.

The analysis presented here distinguishes a high tone accented monosyllabic word ([mal] ‘horse’ in 3a) from a high tone unaccented monosyllabic word ([mal] ‘a measuring unit’). As noted by S-E Chang (2007), these two words are perceptually indistinguishable when unsuffixed, despite the fact that there is a slight phonetic difference between the two in terms of their pitch (with the unaccented H having a slightly higher pitch than the accented H). However, this slight phonetic difference can be seen as reflecting the difference between an accented high tone and an unaccented high tone.<sup>7</sup> It should not be seen as strong evidence for a third tonal type. The suffixal patterns can be clearly understood in terms of accentuation properties and not in terms of positing a phonemic mid tone as in some previous analyses such as S-E Chang (2007). Further, we note that our analysis presented here avoids resorting to the hybrid view of Utsugi (2007, this volume) who suggests that, in SK, certain words (specifically those with one high tone) reflect pitch-accent while other type of words (most words with sequential high tones) reflect underlying tonal melodies. However, once the initial tone register system is recognized as proposed in DM Lee (2009) and in this paper, then the SK system can be seen more straightforwardly as reflecting a pitch-accent system including having words that are unaccented. The coexistence of a pitch-accent system with tone register is very similar to western Japanese dialects. (See Yoshida 2009 for a recent study.)

#### 4. Pitch Accent and Suffixal Patterns in South Kyungsang Korean

In the previous section we have argued that the pitch patterns of SK nouns reflect the coexistence of a pitch-accent system with an initial tone register. In this section we will further support our claim by examining suffixal patterns of polysyllabic native SK words and loanwords.

In Section 3, we showed by an examination of suffixal tone patterns that certain monosyllabic words in SK are unaccented. An essential characteristic of accentless words is that they do not have a pitch fall. Compare, for example, the Japanese word in (4a) with that in (4b) taken from Haraguchi (1999).

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<sup>7</sup> If accent is associated with H\*L as proposed by DM Lee (2009), then the slightly lower pitch of an accented H can be viewed as a phonetic effect of the following L. We leave the details of this matter to future research.

## (4) Japanese Accented vs. Unaccented Class

- |                           |                               |
|---------------------------|-------------------------------|
| a. kaki+ga ‘fence (nom.)’ | b. kaki+ga ‘persimmon (nom.)’ |
| L H L                     | L H H                         |

The word in (4b) is accentless since there is no pitch fall even when the suffix is added. On the other hand, the word in (4a) is considered final-accented since the word witnesses a pitch fall once a suffix is added. South Kyungsang Korean has disyllabic words exactly like the Japanese words in (4) where disyllabic nouns that are LH have different suffixal tone patterns. This is seen by the SK data in (5) where the nominative case marker is added so as to make clear the two different classes.

(5) Tone Patterns of SK Native Words<sup>8</sup>

- |                     |                 |
|---------------------|-----------------|
| a. kə.rim+i         | b. na.mu+ka     |
| L H L               | L H L           |
| ‘fertilizer (nom.)’ | ‘tree (nom.)’   |
| c. sa.ram+i         | d. ne.mo+ka     |
| L H H               | L H H           |
| ‘human (nom.)’      | ‘square (nom.)’ |

The SK words in (5a-b) resemble the Japanese word in (4a) in that they seem to be final accented on the base noun (the presence of a pitch fall on the nominative suffix [-i]) while the SK words in (5c-d) resembles the Japanese word in (4b) in that they seem to be unaccented on the base noun (no pitch fall on the suffix). These forms support our proposal that SK is a pitch-accent system where words can be unaccented. We now turn to a more detailed consideration of the tonal patterns on polysyllabic words with suffixes.

In considering polysyllabic forms it is useful to consider the pitch accent chart in (2) showing the SK patterns. This is repeated below.

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<sup>8</sup> These words are also discussed by S-E Chang (2007) who views these disyllabic words as having different underlying tonal patterns even though they are not perceptually distinct. We maintain that their difference reflects final accented vs. unaccented.

(2) The Accent Pattern of SK Korean Tones ( $\sigma$  = syllable)

			1 <sup>st</sup> $\sigma$ accent	1 <sup>st</sup> $\sigma$ register tone (unaccented)	2 <sup>nd</sup> $\sigma$ accent	2 <sup>nd</sup> $\sigma$ unaccented	3 <sup>rd</sup> $\sigma$ accent	4 <sup>th</sup> $\sigma$ accent
1 $\sigma$ words	Register tones	H		H				
		L		L				
	None	None	H*					
2 $\sigma$ words	Register tones	H			HH*			
		L			LH*	LH		
	None	None	H*L					
3 $\sigma$ words	Register tones	H			HH*L			
		L			LH*L		LHH*	
	None	None	H*LL					
4 $\sigma$ words	Register tones	H			HH*L L			
		L			(LH*LL)		LH H*L	
	None	None	(H*LLL)					

We will focus on disyllabic and trisyllabic forms. One matter to note is that, with trisyllabic forms, there are no unaccented words though there are final accented words. This is unlike Japanese. We also note that in disyllabic words there are no unaccented words for words of the H register tone class. Both of these observations can be explained by the constraint in SK mentioned earlier that words cannot end in three consecutive syllables with high tone. As a consequence of this, unaccented words will either be monosyllabic or disyllabic of the L register class as in (5c-d).

Let us now consider a fuller range of data in (6) of native SK disyllabic nouns with some representative suffixes added.

(6) Tone Patterns of SK Disyllabic Words with Suffixation

a. Initial accent

ki.rim	HL	‘oil’
ki.rim+i	HL+L	‘oil (nom.)’
ki.rim+il	HL+L	‘oil (acc.)’
ki.rim+irosə	HL+LLL	‘as oil’
ki.rim+cərəm	HL+LL	‘like oil’

b. Final accent; H tone initial register

ku.rim	HH	‘cloud’
ku.rim+i	HH+L	‘cloud (nom.)’
ku.rim+il	HH+L	‘cloud (acc.)’
ku.rim+irosə	HH+LLL	‘as cloud’
ku.rim+cərəm	HH+LL	‘like cloud’

## c. Final accent; L tone initial register

kə.rim	LH	‘fertilizer’
kə.rim+i	LH+L	‘fertilizer (nom.)’
kə.rim+il	LH+L	‘fertilizer (acc.)’
kə.rim+irosə	LH+LLL	‘as fertilizer’
kə.rim+cərəm	LH+HL	‘like fertilizer’

## d. Accentless; L tone initial register

sa.ram	LH	‘human’
sa.ram+i	LH+H	‘human (nom.)’
sa.ram+il	LH+H	‘human (acc.)’
sa.ram+irosə	LH+HHL	‘as a human’
sa.ram+cərəm	LH+HL	‘like a human’

The examples in (6a) exemplify the suffixal tone patterns of disyllabic words with initial accent. As seen, all suffixes take low tone. The only somewhat unexpected pattern is the last example in (6a), [ki.rim+cərəm] ‘like oil’, which has the tone pattern HLLL. Given, as discussed in Section 3, that the suffix /-cərəm/ is underlyingly accented on the first syllable, we might expect the surfacing tone pattern for [ki.rim+cərəm] to be HLHL with accent both on the word-initial syllable and on the initial syllable of the suffix. However, as noted earlier, SK does not allow for two pitch falls in a single prosodic word. This means that one of the accents should be deleted resulting in a low tone. The accent on the initial syllable of [ki.rim+cərəm] has to be maintained since if it were lost the word would begin with two low tones, which is strictly prevented in SK. Consequently, the accent on /-cərəm/ deaccents in [ki.rim+cərəm] ‘like oil’ resulting in the tone pattern HLLL with initial accent. Similarly, in the last form of (6b) which involves a final-accented noun in the H tone register class, [ku.rim+cərəm] ‘like cloud’, the accent of the suffix deletes, resulting in the tone pattern HHLL. Given our discussion in Section 3 regarding monosyllabic roots that are accented [mal] H ‘horse’ where it is the root that deaccents under suffixation with /-cərəm/, [mal+cərəm] LHL ‘like a horse’, one might expect root deaccentuation /ku.rim+cərəm / ‘like cloud’ which in this case would result in [ku.rim+cərəm] HHHH. But this is not possible since the resulting form would begin with a sequence of three syllables with high tone; such is not permitted in SK. Consequently, the suffix must deaccent in [ku.rim+cərəm] resulting in the tone pattern HHLL preserving the root-final accent. This should be compared with the last form in (6c) which involves a final-accented noun in the L tone register class. Here the accent is kept on the suffix [kə.rim+cərəm] LHHL ‘like fertilizer’ and the root-final accent is lost. The root-final syllable cannot acquire low tone because of the constraint against SK words begin-

ning in a sequence of low tones.<sup>9</sup> It stays as a high tone, but it is not accented since it does not occur before the pitch fall. Finally, the forms in (6d) reflect the accentless nature of the nominal root. The first three forms in (6d) have no pitch fall and thus are unaccented. The last two forms in (6d) may seem somewhat problematic given the discussion regarding (3c) in the previous section that accentless words of the initial L tone register class are deaccenting. Thus, it might be expected that the last two words in (6d) should not have a pitch fall (i.e., their surface tone patterns should end in a sequence of high tones). However, in these words there is a penultimate high tone (accent) with low tone on the last syllable. These last two forms in (6d), though, can be understood given the constraint against SK words ending in three consecutive syllables with high tone. It is only the final syllable that becomes low in these forms and not one of the other syllables since, if a different syllable became low, the result would be an impossible tone pattern (e.g., #LL or HLHL) on a single prosodic word. We, thus, argue that the suffixal tone patterns of disyllabic forms as seen in (6) is readily accounted for under the view that SK is a pitch-accent system.

Now let us consider the data in (7). These words are disyllabic loanwords from English representing three different tonal classes.

(7) Tone Patterns of Disyllabic Loanwords with Affixation

a. Initial accent

kol.p <sup>h</sup> i	HL	‘golf’
kol.p <sup>h</sup> i+ka	HL+L	‘golf (nom.)’
kol.p <sup>h</sup> i+rɪl	HL+L	‘golf (acc.)’
kol.p <sup>h</sup> i+rosə	HL+LL	‘as golf’
kol.p <sup>h</sup> i+cəɾəm	HL+LL	‘like golf’

b. Final accent; H tone initial register

men.ʃən	HH	‘a mansion’
men.ʃən+i	HH+L	‘a mansion (nom.)’
men.ʃən+il	HH+L	‘a mansion (acc.)’
men.ʃən+irosə	HH+LLL	‘as a mansion’
men.ʃən+cəɾəm	HH+LL	‘like a mansion’

c. Final accent; L tone initial register

ti.rim	LH	‘dream’
ti.rim+i	LH+L	‘dream (nom.)’

<sup>9</sup> While we do not formalize this and other constraints, we note that Zoll (2003) has formalized several of the constraints that are relevant for Kyungsang Korean, though her article focuses on African tone systems. For example, Zoll proposes a constraint that prohibits a sequence of low tones. In SK this constraint is active preventing words from beginning in a sequence of low tone syllables. We can refer to this constraint as an initial lapse constraint using Zoll’s terminology.

ti.rim+il	LH+L	‘dream (acc.)’
ti.rim+irosə	LH+LLL	‘as dream’
ti.rim+cərəm	LH+LL	‘like dream’

In loanwords, the suffixes always take low tone regardless of the root accentuation. This is most apparent in the comparison of (7c) with (6c) where the words both appear to be final-accented with an initial low tone. However, in the final form in (6c) the accent is on the suffix while in the final form in (7c), the accent is preserved on the root noun with the suffix deaccented. In order to understand the loanword pattern, we must consider some important differences that distinguish loanword tone patterns from native SK words. As shown in detail by DM Lee (2009), the loanword accentuation pattern in SK is almost entirely predictable with tone assignment being sensitive to syllable weight. The role of syllable weight is perhaps most clearly seen in the assignment of tonal register. Consider the difference between the loanwords in (7b) and (7c) where both words end in a closed syllable and thus are final-accented. The word in (7b) is assigned to the H tone initial register class because its initial syllable is closed (or heavy) while the word in (7c) is assigned to the L tone initial register class since its initial syllable is light. (See DM Lee 2009 for an optimality-theoretic analysis.) This is very different from native SK words where there is little connection between syllable type and tone.

The second important difference between loanwords and native words discussed by DM Lee (2009) is that the domain of tone is the mora in loanwords but the syllable in native words. The strongest evidence for this comes from the comparison of (7c) with (6c) involving final accented words with an initial low tone register. The last root syllables in both these words are similar in that they are closed (heavy) syllables that have H tone. Nonetheless, there is a striking difference when the accented suffix /-cərəm/ is added to these words. In (6c), the root loses its accent as expected so [kə.rim+cərəm] ‘like fertilizer’ surfaces with the tone pattern LHHL. On the other hand, the form [ti.rim+cərəm] ‘like a dream’ surfaces with the tone pattern LHLL with the suffix deaccented. This can be understood if the tonal domain is different in loanwords. Studies such as that by Kubozono (2007) show that phonetically SK words that end in a closed syllable with high tone are actually realized with a falling tone (HL) on the final syllable. Thus, both a native word such as [kə.rim] LH ‘fertilizer’ and a loanword such as [ti.rim] LH ‘dream’ phonetically have falling tone on the final syllable when unsuffixed in phrase-final position. Our claim is that this final falling tone is just phonetic on native words (i.e., such words phonologically end in a high tone), but is phonological on loanwords. That is, the loanword [ti.rim] ‘dream’ phonologically has the tone pattern LHL where the tone is associated with each mora of the word. This means that [ti.rim] actually ends in a low tone. Consequently, the suffix pattern for [ti.rim] would be like

that seen in (7a) where the noun ends in a low tone. Further evidence for this difference between the tonal domain of native words and loanwords is the observation that a final light syllable can be accented in native words as exemplified in (5b), but a final light syllable never takes a high tone in loanwords. This means that loanwords always have a pitch fall within the word and thus are always accented, and hence, never belong to the unaccented class.<sup>10</sup> Suffixes will always show up with low tone on loanwords even if underlyingly accented as seen by the last example in (7c). Loanwords, thus, reference the mora in two ways: The word-final mora always has low tone and the assignment of the initial register is sensitive to the heavy-light syllable weight distinction. With respect to the latter, words beginning with a bimoraic (closed) syllables are assigned to the H tone register class while those beginning with a light syllables are assigned to the L tone register class. We do not think these differences between native words and loanwords have been recognized by other researchers.

Although we will not discuss in detail the specifics of SK loanword tonology, DM Lee (2009) shows that the tone pattern of SK loanwords is consistent with a pitch-accent system where tone assignment is entirely predictable on most loanwords. We mentioned that words that begin with a closed syllable are assigned a high tone. Words that begin with an initial light syllable have low tone on the first syllable and high tone on the second syllable (except if the word consists of two light syllables such as [k'a.ʃi] 'gas' which predictably has the HL tone pattern). High tones then appear on all subsequent moras except the final one, which always has low tone. The accent on the loanword would be immediately before the pitch fall just as in native words. We suggest that the fact that loanwords reflect a pitch-accent system is supportive of the view that native SK words have pitch accent. Loanword tonology can be viewed as the realization of a default pitch-accent system for SK. The default nature of the pitch-accent system is not apparent on native words because native words have lexical accent and tone register. Loanwords do not carry such lexical information and thus reflect a default assignment. We leave for further research whether the default pitch accent system seen in loanwords is found in other areas of SK such as with tone assignment on innovative words.

Finally, in this section, we consider the suffixing patterns on SK trisyllabic words. The detailed patterns are shown in (8).

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<sup>10</sup> As DM Lee (2009) shows, source accent patterns are ignored in the assignment of pitch accent on loanwords into SK. This is true of both English loanwords and Japanese loanwords. This is despite the fact that Korean listeners are very accurate at perceiving English stress-accent location (see, for example, Altmann 2006).

## (8) Tone Patterns of SK Trisyllabic Words with Suffixation

## a. Initial accent class

ajime	HLL	'an aunt'
ajime+ka	HLL+L	'an aunt (nom.)'
ajime+ril	HLL+L	'an aunt (acc.)'
ajime+rosə	HLL+LL	'as an aunt'
ajime+cəɾəm	HLL+LL	'like an aunt'

## b. Penultimate accent; H tone initial register

orepi	HHL	'an elder brother'
orepi+ka	HHL+L	'an elder brother (nom.)'
orepi+ril	HHL+L	'an elder brother (acc.)'
orepi+rosə	HHL+LL	'as an elder brother'
orepi+cəɾəm	HHL+LL	'like an elder brother'

## c. Penultimate accent; L tone initial register

maŋaji	LHL	'a colt'
maŋaji+ka	LHL+L	'a colt (nom.)'
maŋaji+ril	LHL+L	'a colt (acc.)'
maŋaji+rosə	LHL+LL	'as a colt'
maŋaji+cəɾəm	LHL+LL	'like a colt'

## d. Final accent; L tone initial register

puk'urum	LHH	'shyness'
puk'urum+i	LHH+L	'shyness (nom.)'
puk'urum+il	LHH+L	'shyness (acc.)'
puk'urum+irosə	LHH+LLL	'as shyness'
puk'urum+cəɾəm	LHH+HL	'like shyness'

The accentuation patterns of the trisyllabic words in (8) are for the most part similar to that for disyllabic accented words in (6a-c). Low tones appear on all suffixes when the accent is non-final (8a-c). Even the accented suffix [-cəɾəm] surfaces with low tone since it cannot appear with high tone given the constraint against two pitch falls (or two accents) within a single prosodic domain. However, with the final accented word in (8d), the accent on [-cəɾəm] does surface and thus can be analyzed in a way similar to the last form in (6c) where it is the final accent on the root noun that deaccents.

In examining the pitch patterns of native trisyllabic words in (2) there are two types of patterns under our proposed system that cannot occur. These would be final-accented nouns in the H tone register class (HHH\*) and unaccented nouns (either HHH or LHH). While we note that there are final-accented nouns in the L tone register class as in (8d), there cannot be any final-accented nouns in the H tone register class since such nouns would consist of

three syllables all with high tone. This violates the constraint on SK nouns beginning with three high tone syllables. A similar explanation can be given for the second observation that there are no unaccented nouns of three syllables (or more). First, it would be impossible to have a three syllable unaccented noun assigned to the initial H tone register class since such nouns would begin with three consecutive syllables with high tone. Second, hypothetically, a noun like that in (8d) could be interpreted as being unaccented in the initial L tone register class. However, since nouns cannot end in three consecutive syllables with high tone, low tone would have to surface on any unaccented suffix, just as we see in (8). Thus, while it is hypothetically possible for there to be a trisyllabic unaccented word with initial L tone register, its affixation pattern would be for the most part indistinguishable from a final accented form.<sup>11</sup>

Finally, we should comment on the limited number of monomorphemic tone patterns in quadrisyllabic monomorphemic words as shown in the tone chart in (2). The only quadrisyllabic tone patterns in SK are HHLL and LHHL as exemplified by the words in (1c), [ha.l.a.pə.ji] HHLL ‘a grandfather’ and [a.ju.mə.ni] LHHL ‘an aunt’. What is clear is that there is an avoidance of initial accent in quadrisyllabic words; such words are assigned either to the H tone initial register or the L tone initial register and do not have initial accent. If the word is in the H tone register class then the only possible tone pattern is HHLL (exemplified by the word [ha.l.a.pə.ji] HHLL ‘a grandfather’) since SK words cannot begin in three consecutive syllables with H tone. If the word is in the initial L tone register class there should be two possible tone patterns: LHHL as in [a.ju.mə.ni] ‘an aunt’ and LHLL which does not occur in monomorphemic words. We suggest that the preference for LHHL reflects the default pattern (as also reflected in loanwords as discussed above). Note that these words have penultimate accent with the final syllable having low tone. This is the pattern that is assigned to loanwords that have four light syllables such as [a.me.ri.k<sup>h</sup>a] ‘America’, which has the tone pattern LHHL where the accent would be penultimate. Given the rarity of monomorphemic quadrisyllabic words in SK, it is not surprising that they will tend toward a default pattern. For quadrisyllabic nouns of the H tone register class, the default pattern has to be HHLL and for nouns of the L tone register class the default pattern

<sup>11</sup> Utsugi (this volume) notes that for older speakers of the Masan/Changwon dialect of SK, a word like that in (8d) would be distinguished from [horangi+cəɾəm] LHH+LL ‘like a tiger’ with the suffix deaccented. This also seems to be the pattern in the SK dialect under consideration in the present paper. The difference between [horangi] LHH ‘tiger’ and [p’ukurum] LHH ‘shyness’ is that the former is unaccented while the latter is accented. The deaccentuation of [+cəɾəm] found in [horangi+cəɾəm] LHH+LL ‘like a tiger’ lends further support for the observation based on (3c), [mal+cəɾəm] L+HH ‘like a language’, that unaccented words belonging to the initial Low tone register class are deaccenting. Also, it may be the case that there is a phonetic difference between LHH words that are final accented and those that are unaccented. We leave the exploration of these matters for future research.

is LHHL. We, thus, conclude that the tonal patterns of quadrisyllabic nouns as well as the range of data on suffixal patterns discussed in this section is supportive of a pitch-accent system for SK as proposed in this paper.

## 5. Conclusion

In this paper, we have argued that SK has a pitch-accent system and we have offered a particular analysis of it based on the tonal patterns that occur in monomorphemic words and on the nature of tonal alternations found under suffixation. We argued in Section 2 against SK being a tone language in the traditional sense as has been proposed by some researchers. In Section 3, we presented our conception of the pitch-accent nature of the SK tone patterns based on native monomorphemic words. Crucial to the understanding of the pitch-accent system of SK is that SK also displays an initial tone register that is coexistent with the accent system as proposed in DM Lee (2009). Specifically, in SK, either the first syllable of the word or the second syllable of the word must have a high (H) tone. If the first syllable of the word has high tone, then it is in the H tone register class. If, on the other hand, the first syllable does not have high tone, then it will have a low (L) tone and be in the L tone register class. Given this, we are able to account for SK's well-known 3-way "tonal" contrast in monosyllabic words within the pitch-accent system: A monosyllabic word can be assigned to the H tone register class, it can be assigned to the L tone register class, or it can be accented (in which case it is not assigned to a tone register class). These monosyllabic classes display different patterns of tonal alternation when suffixes are added. In Section 4, we further supported our claim that SK is a pitch-accent system by examining the effect of suffixation on the tone patterns of nominal forms. We argued that these patterns reflect a pitch-accent system and that nouns in SK may be unaccented. We also discussed the suffixal accentuation patterns on loanwords, which can be different than on native words. We argued that this difference is due to the domain of tone being the mora in loanwords but the syllable in native words. In conclusion, SK is a pitch-accent language that has accentless nouns and an initial tone register system.

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