

## An OT analysis of consonant-tone interaction in Korean

**Introduction** The aim of this paper is to propose a constraint-based analysis of consonant-tone interaction based on Kim & Duanmu's (2004, K&D) proposal on Korean stops. The OT analysis accounts for the Korean data without relying on representational requirements on segments and tone, as is the case in K&D. We adopt Lee (in prep.), in which tone associated to consonants is only restricted by markedness constraints in the absence of faithfulness constraints targeting such an association.

**Previous studies** Since Kim (1965), the three-way stop contrasts in (1) are analyzed as in (2a): phonologically underlying lax stops are voiceless, tense stops have a tense feature, and aspirates have an aspirate feature. By contrast, K&D (2004) argue that lax stops are underlyingly voiced, tense stops are voiceless unaspirated, and aspirated stops are voiceless aspirated as in (2b). The reinterpretation of tense stops as voiceless unaspirated stops is confirmed in a cross-linguistic perceptual study by Chang (2007), which shows that speakers do not distinguish Korean tense stops from voiceless unaspirated stops in languages such as Hindi and Mandarin Chinese.

**Questions** In Korean, phrase-initial lax stops are voiceless. Moreover, phrase-initial lax stops surface with low pitch on a following vowel, while phrase-initial tense and aspirates surface with high pitch on a following vowel (Jun 1998). K&D's analysis is that low tone is introduced by lax stops as in (3a). The low tone spreads to the following vowel as in (3b), and then phrase-initial voiced stops become devoiced as in (3c) (though not obvious in K&D, the low tone delinks from the consonant as in (4)).

Consonant-tone interaction is representational in K&D. Tone is associated with consonants in the input, and with vowels in the output. However, K&D fail to address why phrase-initial tones are not introduced by vowels. No motivation is provided for the delinking of tone (associated to consonants) in (4).

**Proposal** We adopt K&D's insight concerning consonant-tone interaction, however we will derive this via constraint interaction. As in Lee (in prep.), we propose tone can directly associate with consonants (as K&D's input representation does). Such a direct association of tone is only restricted by markedness constraints. Crucially, there are no faithfulness constraints that preserve tone directly associated to consonants. As a result, tone cannot be contrastive on consonants, but tone on adjacent vowels can be affected by consonants.

**Analysis** An input with low tone is shown in (5). The candidate in (5b) violates the constraint  $\text{ROOTNODE} \rightarrow \text{T}$ , which forces all root nodes (including the consonants) to be associated with tone in the output. In (5c), the candidate violates  $*[+\text{VOICE}]_{-\text{WD}}$ , which forces phrase-initial devoicing. The candidate in (5d) satisfies the markedness constraint  $*\text{VOICELESS/L}$  because the devoiced [b] is associated with high tone. However, (5d) crucially violates higher ranked  $\text{IDENT-T}$  because the input tone changes from L to H. The optimal candidate in (5a) devoices the phrase-initial lax stops ([b]) and it surfaces faithfully with a low tone, even though it violates the  $*\text{VOICELESS/L}$  constraint.

**Conclusion** In this paper, we have proposed a constraint-based analysis of consonant-tone interaction in Korean, in which the tonal faithfulness constraint ( $\text{IDENT-T}$ ) crucially outranks the markedness constraint  $*\text{VOICELESS/L}$ . The current analysis also accounts for the presence of H tone in phrase-initial aspirates and tense stops as in (1b-c) if  $\text{IDENT-T}$  is outranked by the constraint  $*[+\text{SPREAD GLOTTIS}]/\text{L}$ , which bans aspirated consonants associated with L tone. This paper adopts the crucial role of tonal feature in Korean stops (Silva 2006, Wright 2007). It also shows that tone associated to consonants is only restricted by markedness constraints in the absence of faithfulness constraints.

## (1) Data

				<i>tone</i>
a.	<i>lax</i>	[tal] [pul]	‘moon’ ‘fire’	low
b.	<i>tense</i>	[t*al] [p*ul]	‘daughter’ ‘horn’	high
c.	<i>aspirated</i>	[t <sup>h</sup> al] [p <sup>h</sup> ul]	‘mask’ ‘grass’	high

## (2) Underlying representation

	a. Kim (1965)	b. Kim&Duanmu (2004)
<i>lax</i>	/-voice/	/+voice/
<i>tense</i>	/-voice, +tense/	/-voice, -aspirated/
<i>aspirated</i>	/-voice, +aspirated/	/-voice, +aspirated/

## (3) Devoicing in Korean in Kim&amp;Duanmu (2004)

a.	b. tone spreading	c. devoicing
L	L	L
	↘	
/ba/	b a	[b̥ a]

## (4) tone delinking

a.	b.
L	L
≠	≠
b a	b̥ a

cf. or

## (5) OT analysis of consonant-tone interaction in Korean

	L   /b a/	ROOTNODE→T	*[+VOICE]-wd[	IDENT-T	*VOICELESS/L	IDENT-LAR
a.	L ^ [b a]				*	*
b.	L   [b a]	W *			L	*
c.	L ^ [b a]		W *		L	L
d.	H ^ [b a]			W *	L	*

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