Another emergence of tonal contrast in Seoul Korean: the case of /i/

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ISSUE: Seoul Korean (SK) is known to show LHLH or HHLH tonal patterns in Accentual Phrases (Jun 1993, 2000). Unless an Accentual Phrase (AP) starts with an aspirated or tensed consonant, the tonal pattern of the AP used to be realized as LHLH. However, a new sound change is now being reported in SK: an AP-initial /i/ sometimes shows a H tone when its coda consonant is /l/ (Jun & Cha 2011). Jun & Cha suggest two possible causes for this phenomenon: i) the High-on [il] in SK may have started because of dialectal influence from Kyungsang Korean (KK), or ii) it may have emerged in order to clarify the difference between [il] 'one' and [i] 'two'. This study examines the two possible causes through a production test comparing Seoul speakers to Kyungsang speakers.

METHOD: 7 Seoul speakers (F: 4/ M: 3) and 5 Kyungsang speakers (F: 3/ M: 2) participated in the experiment. To examine whether the coda /l/ is the only environment where a H tone occurs, 63 words were employed: 35 words starting with [il], 24 words starting with /i/ followed by six other coda consonants (/iC/), and 4 words with no coda (/i/). Among the 35 words starting with [il], [il] means 'one' in 12 words, 'day' in 8 words, 'work' in another 8 words, and other things in the last 7 words. The subjects were asked to read each sentence twice and a carrier sentence twice, inserting each target word into the carrier sentence. Obtained F0 values of the target syllables were normalized into z-scores.

RESULT: The results show that the normalized mean F0 value of [il] in SK is significantly different from that of /i(C)/ ($F(7, 1694) = 54.37$, $p < .0001$ for all pair-wise comparisons) (Fig. 1). Also, the percentage of H tones in SK, defined as higher than a third quartile of the z-scores in this study, is higher for [il] (41%) than /i(C)/ (less than 7%) (Fig. 2). Moreover, the normalized mean F0 of [il] meaning 'one' and 'work' in SK are found to be significantly different from their counterparts in KK ($p < .0001$ for 'one', $p = .002$ for 'work') (Fig. 3). Lastly, [il] meaning 'one' in SK tends to be H-toned more frequently (78.3%) than the counterpart in KK (27.8%) ($\chi^2 = 121.32$, $p < .0001$).

DISCUSSION & CONCLUSION: First of all, based on the result that the mean F0 value and the percentage of /il/s with a H tone in SK are different from those in KK, I reject Jun & Cha's suggestion that the dialectal influence from KK is a possible cause of the High-on [il] in SK. Next, I confirm that only AP-initial /i/ followed by /l/ is subject to be H-toned. Also, given that the other meanings of [il] show higher mean F0 values and higher percentages of a H tone than /i(C)/ ($p < .0001$ for [il] 'day' and /i(C)/; $p = .001$ for [il] 'work' and /i(C)/; $p < .0001$ for other meanings of [il] and /i(C)/), I support Jun & Cha's finding that the High-on [il] has started from [il] 'one' and that a H tone is spreading to other meanings of [il].

Considering these results, I finally propose that SK is developing another tonal contrast in /i/ along with voiceless stops. The emergence of tonal contrast in the voiceless stops is well studied (see Silva 2002, 2006), where the [constricted glottis] and [spread glottis] features of tensed/aspirated stops are considered to be redundant phonetic features and interpreted as a tonal contrast by learners (Kingston 2011). I argue that the same process is involved in the occurrence of a H tone in [il]. Fig. 5 demonstrates the schematic process I propose for the development of the High-on [il] in SK. The first step seems to be the general loss of vowel length contrast in SK. This made it difficult for speakers to distinguish between [il] 'one' and [i:] 'two'. Thus, speakers started to insert a glottal stop before [il] to enhance the contrast between 'one' and 'two'. At the same time, the [constricted glottis] feature of voiceless stops was being analyzed as a H tone in SK. By analogy, learners seem to have interpreted the inserted glottal stop before [il] as a H tone because of the [constricted glottis] feature of [ʔ]. The insertion of a partial glottal stop before [il] in SK is borne out in the production test (Fig. 6). If a glottal stop were not inserted before [il], we would expect to see the same degree of creak in [il] and /i(C)/. However, the beginning part of [il] 'one' turns out to be the creakiest, and it suggests that a partial glottal stop is inserted before [il] ($p = .002$ for the pairwise comparison between [il] 'one' and /i(C)/). Lastly, the concurrent occurrence of the two similar sound changes are supported by Jun & Cha's result that the generation (born in the 1970s or later) who started to induce the tonal contrast of voiceless stops are the ones who started to produce a H tone on [il] as well. This, in turn, suggests that the emergence of tonal contrast in /i/ is a regular sound change triggered by another sound change: [constricted glottis] linked to a H tone in voiceless stops induces a H tone on [ʔil] meaning 'one', and the H tone on [ʔìl] 'one' spreads to other meanings of [il], which has the same phonetic environment.

Figure 1. Normalized mean F0 values of the target syllables in SK

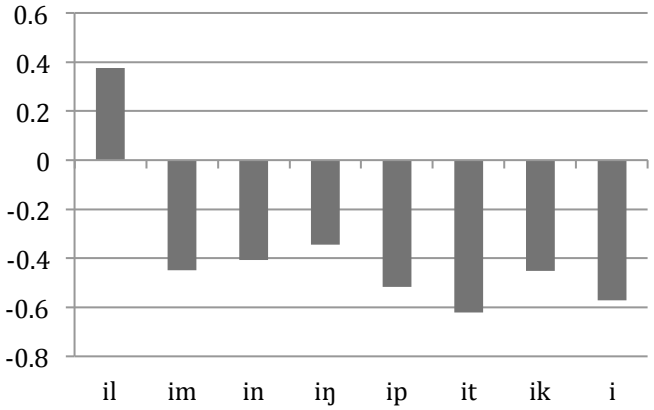


Figure 2. Percentage of H tone (z-score > 3rd quartile) in SK

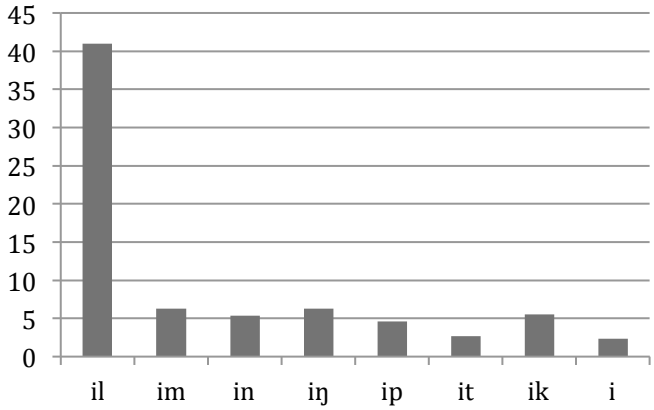


Figure 3. Normalized mean F0 values of [il]

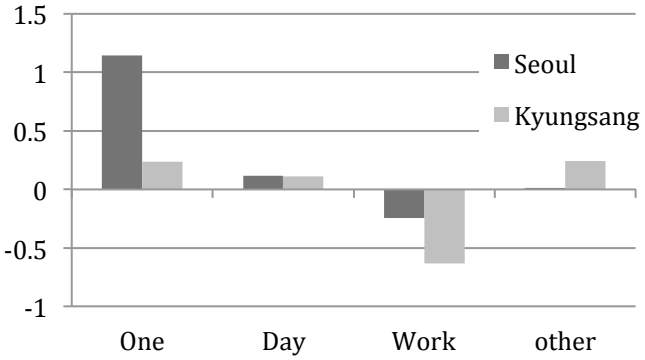


Figure 4. Percentage of H tone on [il] (z-score > 3rd quartile)

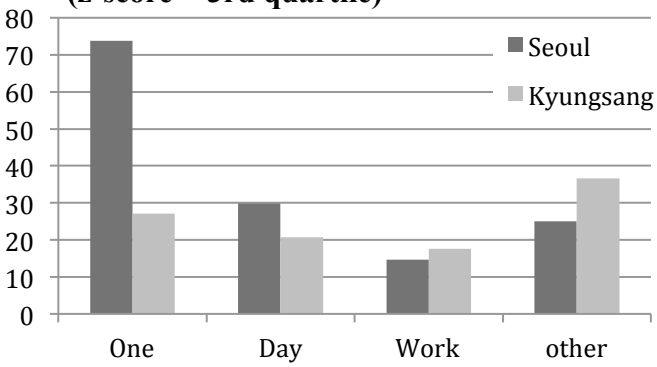


Figure 5. Process of the emergence of tonal contrast in /i/

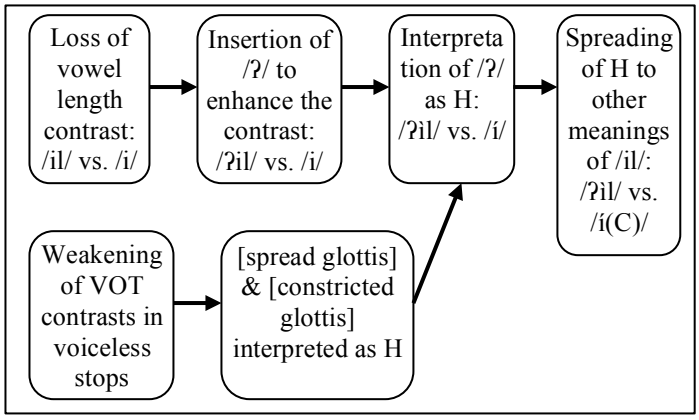
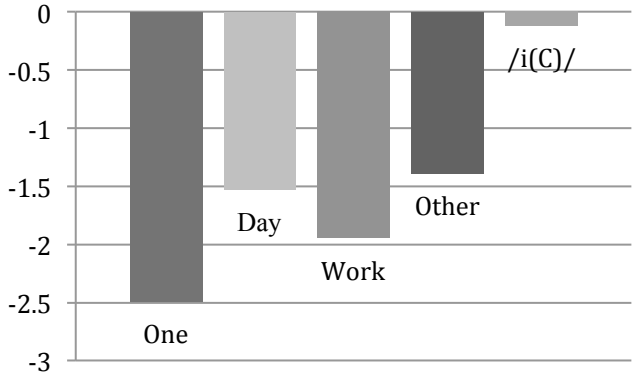


Figure 6. Values of H1 - H2 at the beginning of [il] and /i(C)/



Selected references: **[1]** Jun, S.-A. 1993. *The Phonetics and Phonology of Korean Prosody*. Ph.D. dissertation. The Ohio State University. **[2]** Jun, S. -A. & J. Cha. 2011. High-toned [il] in Seoul Korean. Proceedings of the 17th ICPhS, Hong Kong, China. **[3]** Kingston, J. 2011. Tonogenesis. In M. van Oostendorp, C. J. Ewen, E. Hume, & K. Rice (Eds.), *The Blackwell Companion to Phonology*. Blackwell Publishing. **[4]** Silva, D. 2006. Acoustic evidence for the emergence of tonal contrast in contemporary Korean. *Phonology* 23, 287-308.