

Emergence of word prosody in (Seoul) Korean

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Abstract

It has been argued that Korean has recently developed an F0 distinction word-initially partially replacing the VOT distinction of the three stop categories, lax, aspirated, tense. This change has been characterized as tonogenesis, but since the contrast is not on all syllables, it seems to be more consistent with a pitch accent language than a tone language. We investigate the prosodic patterns of trisyllabic words to assess a) whether the VOT-to-F0 change is only word-initial or if it also occurs in other syllables, b) if there is evidence of word level prominence on one syllable supporting a pitch accent interpretation. The data from 10 Korean speakers yield conflicting evidence for both tonal and pitch accent prosodic systems.

Key words: tonogenesis, VOT, pitch accent, Korean

Introduction

Korean is considered a language lacking word prosodic properties (i.e., stress or tone). It has recently been shown that a change is in progress, whereby the three-way stop distinction - lax, aspirated, tense - is being reduced to two (Silva 2006, Wright 2008, Kang 2014). Specifically, word-initially, the VOT contrast between aspirated and lax consonants is being replaced by high and low F0 on the following vowel, respectively. This phenomenon is referred to as tonogenesis; however, for a language to have a fully developed tonal system, we would expect tone contrasts to emerge not only word-initially, but also elsewhere in the word, as for example in Vietnamese (Haudricourt 1954, Thurgood 2002).

In the present study, we examine the acoustic properties of CV syllables with the three consonant types in all positions in 3-syllable words to determine, first, if there is a VOT-to-F0 change in Syllable 1, and then, if there is evidence of such a change beyond the first syllable. Thus, the first prediction is that word initially, the Vowels after a Lax onset (LV) would have lower F0 than those after an Aspirated onset (AV), while the Consonants that are considered Lax (LC) and aspirated (AC) would no longer differ in VOT. The second prediction is that if this process is truly tonogenetic, the VOT-to-F0 change will also be found in syllables 2 and 3.

Method

We collected a corpus of 2700 target vowels (/i, o, a/) in initial, medial and final syllables in real trisyllabic words. The vowels appeared in syllables with onsets that varied by consonant type, e.g., lax [p_{ig}ida] ‘draw’, aspirated [p^hibute^hi] ‘relatives’, tense [p*it*agi] ‘skew’. Two types of simple dialogues were used to elicit the target words in focus and non-focus contexts. The target vowels appeared in the responses, as illustrated in Table 2, where “XXX” is the word containing the relevant vowel.

Table 2. The sentences for the two focus contexts; focus = bold; target = XXX.

Focus :	Chelswu-ka ohu-ey "XXX" -lako ha-yss-e. Chelswu afternoon XXX said ‘Chelswu said “XXX” in the afternoon.’
Non-Focus :	Ani. Chelswu-nun ohwu-ey "XXX" -lako malha-yss-ci ku-kes-ul cek-ci-nun ahn-ass-e. No. Chelswu afternoon XXX said it write not did. ‘No. Chelswu said “XXX” in the afternoon, she didn’t write it.’

Data from 10 native Seoul Korean speakers were collected in Seoul by a native speaker. Participants were recorded individually producing the dialogues presented through PowerPoint presentation.

For each target vowel, duration, intensity, F0 (mean and contour) and vowel centralization were measured and Z-normalized for vowel and speaker intrinsic differences. The data were analysed statistically with Binary Logistic Regression (see Vogel, Athanasopoulou and Pincus 2015). We also measured the VOT of the onset stops for two speakers to verify previous claims that the VOT distinction is being lost.

Results

Our findings corroborate the results of previous studies showing that word-initially, F0 has replaced the VOT distinction between aspirated and lax consonants. In both focus conditions, LC and AC had similar VOTs (~50ms), but LV had a lower F0 than AV. Moreover, the tense stop (TC), as expected, had the shortest VOT (20ms) and the vowel after the tense onset (TV) had a mid F0, roughly between the F0 of LV and AV. In addition to the mean F0, it is interesting to note that while the F0 contour of LV and AV is relatively flat, the F0 of TV has a rising contour, a difference probably due to the longer duration of TV (67ms vs. 49-55ms). The F0 and duration properties are presented in Figure 1.

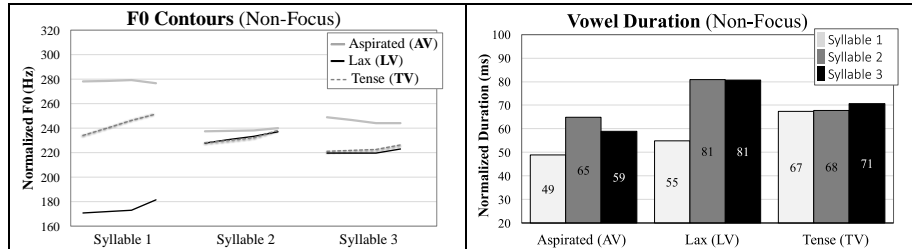


Figure 1. F0 contours and Duration for each onset type and syllable position.

In contrast, as can also be seen by examining the contours in Figure 1, we found essentially no F0 differences between the vowels following the three stop types in Syllable 2, where the VOT distinction between lax and aspirated stops is maintained. This was the case for both focus conditions. In Syllable 3, on the other hand, even though the VOT distinction is also maintained, there were differences in the F0 of the vowels, but smaller than those in Syllable 1. Specifically, the AV had higher F0 (by ~ 20Hz) than LV or TV. In Syllable 3, LV does not have lower F0 than TV and it is much higher than in Syllable 1. In addition, the F0 of AV, although higher than the other two, it is lower than the F0 of the AV in syllable 1. Thus, the slightly higher F0 that we see in the AV of syllable 3 appears to be due to the effect of aspiration on the F0 of the following vowel (e.g., Hombert 1975), and not the replacement of VOT with F0. We can also see this in Syllable 2 but the difference is even smaller. While this may be evidence of the beginning of a tonal difference in syllable positions beyond the first one, such an interpretation requires caution due to the small differences.

As seen above in Figure 1, we additionally found only minimal acoustic evidence of focus, with the strongest distinction between the non-focus vs. focus contexts appearing in Syllable 3. The focused vowels are slightly longer than those without focus (by 10-20ms) in Syllable 3, and F0 is either lower than in the focused Syllable 2 or with a falling contour. Given the combination of somewhat increased duration and the F0 difference on Syllable 3, however, the pattern of these properties appears to be more an indication of a final boundary marker (IP boundary tone in ToBI terms (Jun 2005)) as opposed to evidence of a word prosodic property in that position.

Discussion and conclusions

Our findings are consistent with previous studies of Korean with regard to initial F0 patterns. That is, there is clearly some development of an F0 contrast word-initially, and we may thus conclude that there is indeed evidence that the language is undergoing a change from one that lacks

word prosodic phenomena to one that has such a phenomenon. The limitation of this phenomenon to word-initial position, however, suggests that “tonogenesis” is not the appropriate characterization of the change at this point, if a tonal language is one that exhibits tone contrasts in different positions throughout a word. Instead, what may be emerging is a restrictive type of lexical stress system with prominence predictably on the first syllable (i.e., as in Hungarian, where the primary cue is also F0 (Vogel, Athanasopoulou and Pincus 2015)). Nevertheless, the Korean system is also not yet a full-fledged stress system since we found no evidence of enhancement of the prosodic properties of the first (or any other) syllable under focus, as would be expected on the stressed syllable of a word in a stress language. Finally, it is possible that what is emerging in Korean is a “so-called” pitch-accent system, as in Japanese, where not all words need to bear an accent. This would be consistent with the fact that while the innovative F0 property distinguishes High vs. Low in place of aspirated vs. lax, there remains a non-contrasting pattern in syllables beginning with a tense consonant. Moreover, since the tonal property is not observed with other onsets and on other syllables, there are numerous words that could be considered accentless, as in Japanese.

References

- Haudricourt, André-Georges. 1954. “De l'origine des tons en vietnamien.” *Journal Asiatique* 242: 69-82.
- Hombert, Jean-Marie. 1975. Towards a Theory of Tonogenesis: an Empirical, Physiologically and Perceptually based Account of the Development of Tonal Contrasts in Language. Doctoral Dissertation: University of California, Berkeley.
- Jun, Sun-Ah. 2005. “Korean intonational phonology and prosodic transcription.” In *Prosodic Typology: The Phonology of Intonation and Phrasing*, by Sun-Ah Jun, 201-229. Oxford University Press.
- Kang, Yoonjung. 2014. “Voice Onset Time merger and development of tonal contrast in Seoul Korean stops: a corpus study.” *Journal of Phonetics* 45: 76-90.
- Silva, David. 2006. “Acoustic evidence for the emergence of tonal contrast in Contemporary Korean.” *Phonology* 23: 287-308.
- Thurgood, Graham. 2002. “Vietnamese and tonogenesis: revising the model and the analysis.” *Diacronica* 19 (2): 333-363.
- Vogel, Irene, Angeliki Athanasopoulou, and Nadya Pincus. 2015. “Acoustic properties of prominence in Hungarian and the Functional Load Hypothesis.” In *Approaches to Hungarian 14*, by Katalin Kiss, Balázs Surányi and Éva Dékány, 267-292. Amsterdam: John Benjamins.
- Wright, Jonathan. 2008. *The phonetic contrast of Korean obstruents*. Doctoral dissertation: University of Pennsylvania.