

Development of pitch contrast in Korean prosody: A corpus study

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This study investigates the development of a phrase-initial pitch contrast in Seoul Korean (SK) and also its effect on Korean prosody. SK is known to show a pitch contrast phrase-initially, depending on the initial onset consonant of Accentual Phrases (AP), due to a recent tonogenesis-like sound change. If an AP starts with an aspirated or tensed consonant, it shows a H pitch; otherwise, it shows a L pitch [1, 3, 4, 6, 7, 9]. While most previous studies focus on the trade-off between VOT and pitch contrast among voiceless stops, none of them has asked how this sound change affects the overall pitch pattern within APs. We draw from a large-scale speech corpus published by the National Institute of the Korean Language [6] to provide a dynamic picture of how the AP-initial pitch contrast has been developed within APs over time.

The corpus is based on the read speech of 60 male and 60 female speakers of SK, whose year of birth (YOB) ranges from 1932 to 1984. Our preliminary results include 116 out of the 120 speakers and 15 selected sentences, which contain at least two APs starting with a tensed or aspirated consonant. The selected sentences include 98 APs per speaker and 344 syllables per speaker (11368 APs and 39432 syllables in total). The mean f_0 value of each syllable is obtained using Praat, and the obtained f_0 is either converted to semitones ($st = \log_2(\text{Hz}/100) * 12$) or to ratio to mean f_0 (Hz/mean Hz) for each speaker to compare different age x gender groups.

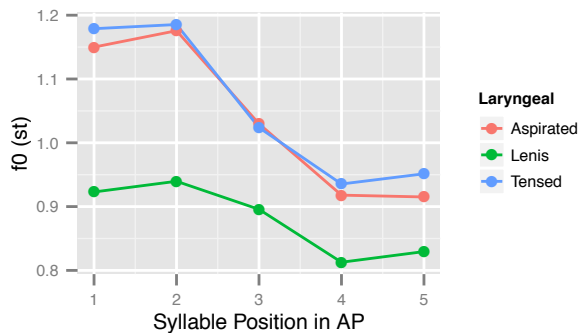


Fig.1 f_0 contours of 5-syll. APs by laryngeal categories

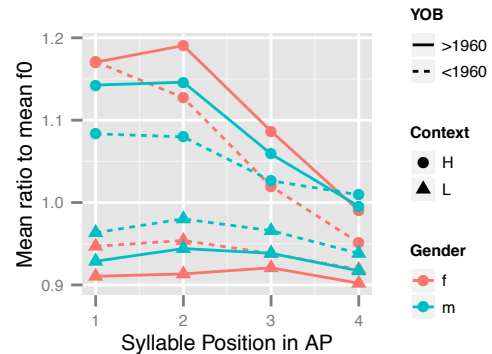


Fig.2 f_0 contours (in ratio to mean) by YOB x sex

The most important finding of this study is that the effect of the AP-initial H pitch is still retained even at later syllables of the same AP (Fig.1). The pitch difference between H-pitch inducing segments and L-pitch inducing segments is the largest at the AP-initial and AP-second syllables (about 5 st), but the difference is still maintained at the later syllables (2 st at the AP-fourth syllable). Also, we find that the AP-initial pitch contrast is modulated by the interaction of YOB and gender (Fig. 2). The AP-initial pitch difference is the smallest for older male speakers (born before 1960) and the largest for younger female speakers (born in or after 1960). Older female speakers show about the same pitch height to younger female speakers, but their pitch slope decreases more steeply, suggesting that the effect of the AP-initial H is less retained at later syllables for older female speakers. Based on the results, we propose that the tonogenesis-like sound change is likely to split the existing intonational melody (TH-LH) into two diverging pitch patterns (H-APs and L-APs), which is in line with other tonogenesis studies [2, 5]. Our full paper also compares the pitch contours of stop-initial APs to fricative-initial APs and to affricate-initial APs, and provides statistical analyses on all comparisons with several mixed-effects models.

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