

Effects of L1 and L2 experience on the perception of Korean three-way stop contrast: evidence from Chinese and Korean listeners

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Cross-linguistic studies on the perception of Korean stops have demonstrated that listeners' perceptual strategies for the three-way contrast are modulated by their language experiences. For example, Seoul Korean listeners used both VOT and F0 as perceptual cues, while Kyungsang Korean listeners rely less on the F0 cue (e.g. Lee & Jongman, 2012; Lee et al., 2013). Likewise, English listeners used VOT as a reliable cue for Korean stops, but they were not sensitive to F0 changes (e.g. Kim & Lotto, 2002).

However, few studies have investigated the cue weighting strategies on Korean stops by tone language (e.g. Mandarin) listeners. Based on a perceptual assimilation task, Holliday (2014) demonstrated naïve Mandarin listeners were able to use VOT as a reliable cue for the Korean obstruents, but fail to use F0 effectively. Holliday (2015) further indicated that, with more L2 experience, some Mandarin learners were able to use F0 as a cue more effectively. These results suggested the perception of a non-native contrast was affected by both L1 and L2 experience.

In this study, we investigated how Korean three-way stops are perceived by Mandarin listeners with varied L2 experiences (elementary learner vs. advanced learner) using stimuli with manipulated F0 and VOT. Both VOT and F0 are reliable cues in Mandarin, but they play different roles in maintaining phonological contrasts (i.e. F0 for lexical tones and VOT for stops), thus it would be interesting to discuss Mandarin listeners' performance in perceiving Korean stops.

45 Chinese subjects (native Mandarin speakers) were recruited. 22 of them are elementary learners of Korean (about 8 months of leaning experience), 23 of them are advanced learners (4-5 years of experience). 22 Seoul Korean subjects were recruited as a control group. A speech continuum was created by manipulating F0 and VOT of the base token "phada". The VOT duration ranged from 86 ms to 6 ms in 10 ms steps. The F0 ranged from 260 Hz to 180 Hz in the step of 10 Hz. A total of 81 stimuli were created (9 levels of VOT * 9 levels of F0). In total 243 stimuli (81 stimuli * 3 repetitions) were randomly presented to listeners in Eprime. Subjects were instructed to identify the stimuli from three options (lenis, fortis, aspirated).

As Figure 1 showed, the Chinese and Korean groups used different perceptual strategies for the three-way stop contrast. Korean listeners relied on F0 to perceive lenis stops, and primarily on VOT for fortis responses, and F0 and VOT for aspirated responses, which are in line with previous studies. While for Chinese listeners, F0 plays a less important role in the perception of the fortis and aspirated stops. What's more, Chinese listeners relied more on VOT in distinguishing the aspirated from the lenis than Korean listeners did. For the long VOT stimuli (e.g. above 46 ms), Chinese listeners preferred aspirated responses than lenis responses, but this pattern was less salient for Korean listeners.

Figure 2 indicates that the cue weighting strategies were basically the same across the two groups of Chinese listeners (elementary learner vs. advanced learner). However, the two groups showed inter-level differences in terms of categorical perception of the three-way stop contrast. Comparing to the elementary group, the advanced group showed more salient categorical perception for two contrasts (aspirated vs. fortis, aspirated vs. lenis), indicated by the steeper identification curve across the categorical boundaries.

In this study, we observed both cross-linguistic and inter-level differences for the perception

of three-way stop distinction. We argued that the performance of the Chinese group is affected not by L1 phonology, rather by their L1 experience on cue weightings for stops. First, the lexical tone status in Mandarin does not help them in distinguishing stops by F0, because F0 does not serve as a reliable cue for stop laryngeal distinction. Second, the Chinese listeners' dependency on VOT for the two-way stop distinction in L1 has been transferred to the perception of non-native stop contrast.

On the other hand, listeners' L2 experience does not affect the cue weighting for the Korean stops but play a role in the enhancement of non-native contrasts. The Chinese advanced learners demonstrated more salient categorical patterns for the Korean stop contrasts than the elementary learners. Specifically, for the advanced learners, the fortis and aspirated stops were better categorized by VOT dimension, and the lenis and aspirated stops by F0 dimension.

Taken together, this study demonstrated the different roles of L1 and L2 experience in modulating the perception of non-native contrasts.

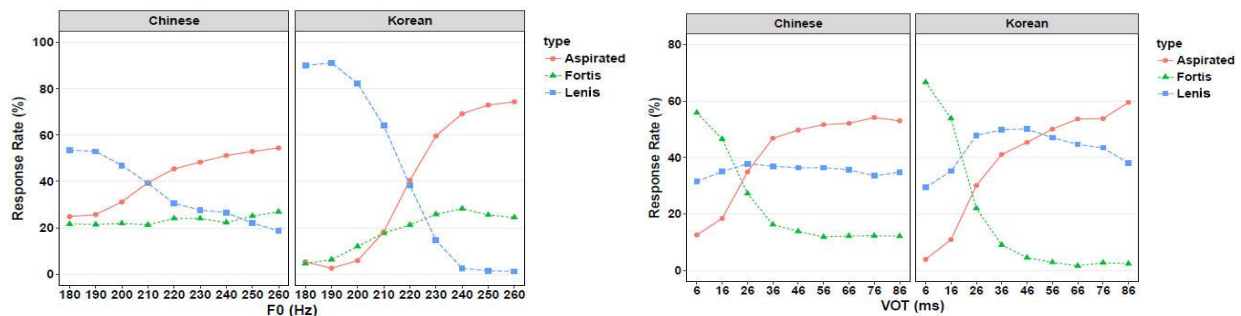


Fig. 1 Identification rate for the three-way distinction as a function of F0 (left) and VOT (right) for the Chinese and Korean group

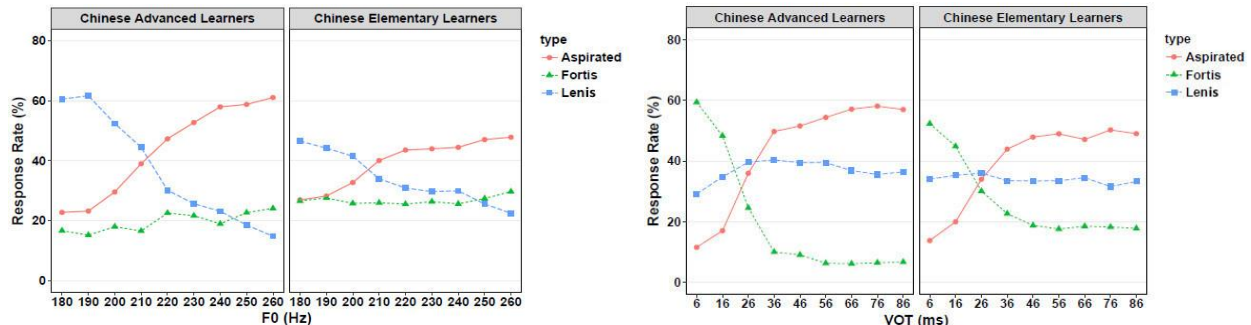


Fig. 2 Identification rate for the three-way distinction as a function of F0 (left) and VOT (right) for the Chinese advanced and elementary learners

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