

Mandarin L2 Learners' Perception of Korean Obstruents in Different Contexts

Xinran Ren, Peggy Mok
The Chinese University of Hong Kong
renxinr@gmail.com, peggymok@cuhk.edu.hk

ABSTRACT

The current study examined the perceptual patterns of Korean stops, affricates and fricatives by Mandarin L2 learners and the effect of vocalic contexts, tense/lax distinction and obstruent categories on them. The assimilation patterns by L2 learners were compared with published data of naïve Mandarin listeners as well. Results revealed inconsistent effects of vocalic contexts for stops and affricates, while fricatives before /i, o, u/ were poorly discriminated. Additionally, the subjects could not discriminate word-medial lax stops and affricates and the tense ones well. Finally, the assimilation of fricatives diverged from naïve listeners phonologically, showing L2 perception at both phonetic and phonological levels.

1. Introduction

Naïve listeners perceive non-native sounds based on their phonetic features, whereas L2 learners include additional phonological and phonotactic information [1]. Therefore, L2 perception can diverge from naïve listeners' perception with identical language backgrounds. Different sound categories are also expected to influence L2 perception. Besides sound categories, vocalic contexts may also influence obstruent perception since two allophones in one language can lead to different perceptual patterns by L2 learners.

The current study investigated L2 perception of Korean obstruents by Mandarin learners. Korean presents a typologically unusual three-way (lax-tense-aspirated) contrast in stops and affricates while Mandarin only contrasts between aspirated and unaspirated. For fricatives, Korean contrasts lax-aspirated /s^h/ and tense /s*/ while Mandarin unaspirated fricatives only differ in articulatory places. It is predicted that the assimilation patterns of affricates and fricatives will be more complex than stops, since affricates and fricatives show additional Korean-Mandarin non-equivalences: Mandarin affricates and fricatives are restricted by a phonotactic rule that the alveolar and post-alveolar affricates and fricatives can appear before all the Mandarin vowels except /i/ or /y/ and the alveolo-palatal ones only occur before /i/ and /y/. Moreover, Mandarin fricatives are all unaspirated while Korean fricatives contrast between lax-aspirated and tense. It is interesting to examine whether L2 learners' assimilation patterns differ from those of naïve listeners among different categories of Korean obstruents.

Unlike most previous studies only concerning the perception of Korean obstruents in word-initial

positions, the current study included word-medial (intervocalic and after the final consonant of the previous syllable) positions as well. The reason is that the acoustic features of Korean obstruents change along with positions [2], so the effects of vocalic contexts, tense/lax distinction and obstruent category on L2 perception are likely to differ accordingly.

2. Method

2.1. Subjects, materials and procedure

The subjects were eight senior students from the Korean Department in Sun Yat-sen University in China. They were all native speakers of Mandarin and had one-year studying experience in Korea. To provide different contexts where Korean obstruents can occur, disyllabic pseudo-words with vocalic contexts of /a/, /e/, /u/, /i/ and /o/ were used as materials because the positions of the 5 vowels on IPA vowel chart are representative. The possible combinations can be presented as /#_Vla/, /IV_a/ and /laC_a/ in which the target obstruent appeared in the underline position and V varied among the five vowels and C represented the final consonant of the first syllable. The selection of /a/ as control is to reduce vowel-to-vowel coarticulation and /l/ was chosen as the unchanged consonant.

Finally, a total of 76 target words were inserted into a carrier sentence: “순서는 ___ 부터예요. (The order is from ___.)”. A native speaker of Seoul Korean read the sentences and the target words were cut out as stimuli to ensure naturalistic perception. The recording of each word was played for three times. The subjects were instructed to identify the consonant other than /l/ in the target words. Besides, they had to suggest a Mandarin consonant with similar pronunciation and evaluate their level of similarity. A sample answer can be “ㅍ p 3”. The assimilation patterns by L2 learners were compared with those by the naïve listeners in [3].

2.2. Results and discussion

Accuracy rates, error patterns and assimilation patterns which include the percentage of assimilation to each Mandarin category and the average goodness rating were analysed. Concerning the effect of vocalic contexts, only tense fricatives presented obvious effect of vocalic contexts with lower accuracy rates in /i, o, u/ contexts. A possible explanation can be drawn from the perception patterns of Korean fricatives by native speakers. A comprehensive study of the perception of Korean fricatives [4] found that native Korean speakers applied different strategies to perceive /s*/-/s^h/ contrast and the weighting of perceptual cues varies across

individuals. [5] also claimed that young speakers of Korean did not have a robust contrast between the two fricatives. Specifically, in high vowel contexts, the difference of frication duration and aspiration duration between /s*/ and /s^h/ decreases greatly [6] and centroid frequency would be used as the acoustic cue [7] in this case. It is likely that our subjects did not adjust to this cue properly.

For the perception of Korean stops, the L2 learners had a generally accurate perception pattern with an average accuracy rate of 76.3% for word-initial lax, 62.5% for medial lax, 84.6% for tense and 92.5% for aspirated stops. However, they still could not discriminate the lax-aspirated contrast like the naive listeners do. They assimilated all the initial lax and aspirated stops onto the Mandarin aspirated /t^h/, except for /te/ and /to/ with only 80% of them assimilated onto /t^h/. Moreover, they seemed to have difficulty discriminating word-medial lax and tense stops (both medial lax and tense stops were 100% assimilated to Mandarin unaspirated category), which reflects that they mostly depended on VOT to perceive Korean stops since word-medial lax and tense stops can have similar VOTs in that word-initial lax stops become unaspirated in medial positions.

As for Korean affricates, overall, the subjects perceived Korean affricates at a relatively high accuracy rate like stops (80% for word-initial lax, 75.5% for medial lax, 65% for tense and 100% for aspirated). Also, in both lax stop and affricate perception, the subjects performed better in word-initial than word-medial positions. Though the difference of affricates (average accuracy rate for word-initial and medial: 80% and 75.5%) was not as apparent as stops (76.3% and 62.5%), it also showed such a trend. As for Korean-Mandarin mappings, each Korean tense and lax medial affricate was assimilated to Mandarin unaspirated affricates except 17% of the Korean lax affricate /tɕ/ in /lutɕa/ which was assimilated to the aspirated Mandarin affricate /tɕ^h/. This showed a poor discrimination between word-medial and tense affricates. Besides, only aspiration appeared to be considered by the L2 learners in Korean affricate perception, regardless of the Mandarin phonotactic restriction because the fact that affricates before low vowels were sometimes assimilated to Mandarin alveolo-palatal affricates violated the Mandarin phonotactic rule.

Concerning the assimilation patterns, those of stops and affricates remained generally similar to naïve listeners in [3]: Korean categories were still assimilated to the same Mandarin sounds but with slightly different assimilation rates. However, the assimilation patterns of fricatives differed from naïve listeners in that the naïve listeners in [3] assimilated lax-aspirated fricatives mostly to Mandarin aspirated affricates whereas our subjects only varied their responses among the three Mandarin unaspirated fricatives, leading to a Korean (lax-aspirated) – Mandarin (unaspirated) assimilation

pattern. The results indicated no extra phonological information interacted with the acquisition of Korean stops and affricates by Mandarin L2 learners while phonological besides phonetic information was also included in L2 fricative assimilation. In terms of distinctive features, the fact that Korean three-way contrast was partially unacquirable (e.g., the lax-aspirated contrast) could be related to the unavailability of the [tense] feature in Mandarin. On the other hand, perceptual learning happened in the perception of fricatives which may be because the distinctive feature [aspirated] in Mandarin was accessible to the subjects during L2 development. However, this suggestion should be examined further.

4. Conclusion

The current study addressed the question of whether L2 Mandarin learners perceived Korean obstruents differently in different vocalic contexts, positions (word-initial and medial) among the three obstruent categories. Results showed that tense fricatives were obviously influenced by vocalic contexts due to the flexibility of perceptual cue selection by speakers. In stop and affricate perception, the subjects misperceived tense and word-medial lax obstruents, revealing significant weighting of VOT. Finally, comparing the assimilation patterns between L2 learners and naïve listeners, it was found that the fricative patterns diverged in that the Korean aspiration contrast was all accommodated within Mandarin unaspirated fricatives, which demonstrated L2 perception at both phonetic and phonological levels.

References

- [1] Best, C. T., & Tyler, M. D. (2007). Nonnative and second-language speech perception: Commonalities and complementarities. *Language experience in second language speech learning: In honor of James Emil Flege*, 13-34.
- [2] Sin, C. Y., Shin, J., Kiaer, J., & Cha, J. (2012). *The sounds of Korean*. Cambridge University Press.
- [3] Holliday, J. J. (2014). The perceptual assimilation of Korean obstruents by native Mandarin listeners. *The Journal of the Acoustical Society of America*, 135(3), 1585-1595.
- [4] Holliday, J. J. (2012). *The emergence of L2 phonological contrast in perception: The case of Korean sibilant fricatives* (Doctoral dissertation, The Ohio State University).
- [5] Lee, I., & Ramsey, S. R. (2000). *The Korean Language*. Suny Press.
- [6] Chang, C. B. (2007). Korean fricatives: Production, perception, and laryngeal typology. *UC Berkeley Phonology Lab Annual Report*, 2007, 20-70.
- [7] Kim, S. (2001). The interaction between prosodic domain and segmental properties: domain-initial strengthening of fricatives and Post Obstruent Tensing rule in Korean. *Unpublished MA thesis, University of California, Los Angeles*.