

Individual Variation in Pre-/ɪ/ Stop Retraction in L2 English

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Background: It is widely acknowledged that in English coronal obstruents preceding /ɪ/ undergo various phonological processes, exemplified by /s/ retraction as in *street* [1] and /t/ retraction (also referred to as retroflexion or affrication) as in *tree* [2]. These variable processes exhibit highly individualized patterns among native speakers [1,3], partly because they do not exist as obligatory phonological rules. Of our special interest is how these speaker-specific patterns are learned by L2 speakers and articulatorily manifested in L2 speech. Non-obligatory phonological processes are produced and perceived by L2 English speakers [4,5], and often evinced in loanword phonology. For instance, *tree*, as a loanword in Korean, is phonetically realized as [tʰiri], [tʰuri] and [tʰjuri] in L1 Korean speakers' production, with the latter two variants representing /t/ retraction and affrication, and some are also reflected in Korean orthography. The existence of such loans in Korean suggests that 1) L2 English speakers are subconsciously aware of /t/ retraction or affrication after /ɪ/, and 2) non-obligatory phonological processes create substantial variation among L2 speakers as well as L1 speakers. Using ultrasound imaging, this study investigates the articulation of coronal stops followed by /ɪ/ (henceforth pre-/ɪ/ stops) produced by Korean-English speakers and examines the inter-speaker variation in L2 English.

Methods: Ten L1 Korean speakers who are in their 20s and have learned English as their L2 participated in this. Tongue images were collected using the Articulate Assistant Advanced (AAA) software [6] and the Micro system with the stabilization headset [7]. Pre-/ɪ/ stops in moderately frequent words and phrases in various phonological and morphological contexts were produced by speakers, as illustrated in Table 1. /t/ retraction preceding /ɪ/ has only been reported within a morpheme and not across a morpheme or word boundary, when retraction takes place [2]. For this reason, *tree* and *street* are expected to yield gestural retraction, while *actress* and *night reading* are not.

Word/Phrase	Condition
tree	word-initial, monomorphemic
street	s-following, monomorphemic
actress	word-medial, across morphemes
night reading	word-final, across words

Table 1: Examples of Stimuli

Results and discussion: Preliminary analyses (Figure 1) show that L2 speakers produce retraction for pre-/ɪ/ stops in various contexts, represented by the highest point of the tongue closer to the palate. The articulation of pre-/ɪ/ stops exhibits inter-speaker variation among L2 speakers. When a speaker produces /t/ retraction, they tend to differentiate /t/s in within-word (i.e., *tree*, *street*, *actress*) and across-word (i.e., *night reading*) contexts, and the way the contrast is made is not uniform across speakers (as previously found in L1 English speakers [3]). As illustrated in Figure 1, some speakers (left column) produce more retraction

within words than across words, while others (right column) show the opposite trend. In addition, similar tongue shapes are made among monomorphemic words within each speaker, showing L2 speakers' awareness of morphological boundaries. The gestural patterns here offer new insights into covert articulatory patterns that emerge from L2 speakers, and add to the growing evidence of inter-speaker variation in L2 speech as well as in L1.

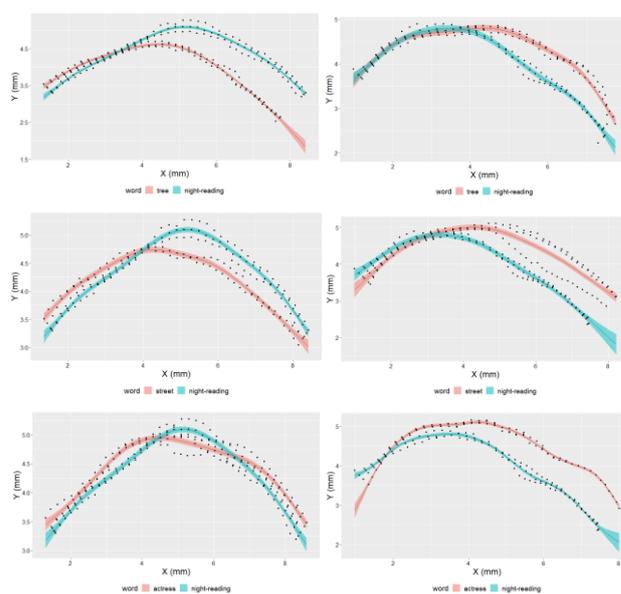


Figure 1: Two-way comparisons for /t/ in *tree*, *street*, *actress*, and *night reading* (from top to bottom) produced by two speakers; tongue tip is to the left, and tongue back is to the right; tongue roof serves as a reference; data points are in mm.

References

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