

## **Production and perception of English vowel length depending on the following consonant voicing by Korean learners of English**

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A vowel followed by a voiced consonant is consistently longer than that followed by a voiceless consonant in native English productions (Flege & Hillenbrand [1], de Jong [2]). Previous studies of ESL learners indicate that learners from various language backgrounds do not show English-like patterns in these vowel duration differences. Complicating the durational effects of voicing, some studies of second language learners demonstrate that learners from languages that have no tense/lax distinction have been shown to have problems with the English tense/lax pair, in which part of the phonemic identity has a strong durational component (Flege, Bohn & Jang [3], Ingram & Park [4], Kim [5]). These studies suggest that ESL learners might have transferred the phonetic difference from their L1 to L2 English performance.

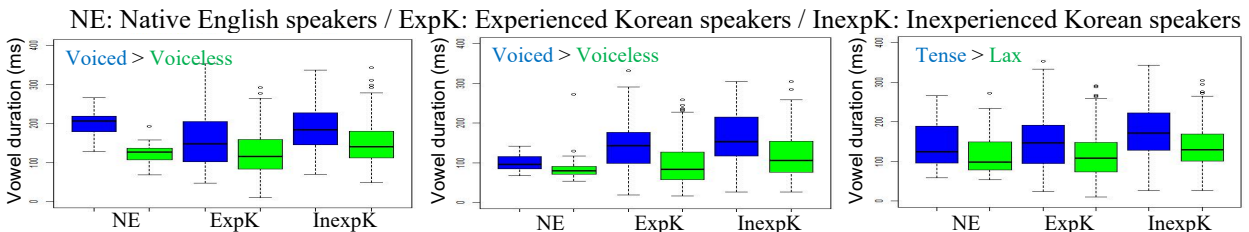
This paper investigates how L2 Korean learners of English produce and perceive English vowel duration associated with different voicing contexts and quality differences (tense vs. lax). It was expected that they will show different patterns when the triggering consonant is in different positions (medial vs. final), since Korean has no coda consonant voicing contrast in final position, but does preserve the voicing contrast in medial position. Also, it was expected that quality differences will affect subjects' vowel duration production and perception since Korean does not have tense/lax contrast. The stimuli included nonce words of /bVC/ and /bVCa/ containing /i, ɪ, u, ʊ, e, ε/ preceding (/p, b/, /t, d/, /k, g/), which were spoken by two American Midwest speakers. The vowels chosen for the experiment are English tense/lax vowel pairs that cause high confusion to Korean learners of English because Korean has no tense/lax distinction. The consonants selected for the experiment consist of sets of plosives contrasting in voicing. The nonce words were chosen to avoid lexical effects.

16 Participants who were from the regions of Seoul and Gyeonggi province participated in the experiment. 8 of them were recruited from universities in Korea and had less than 6 months of exposure to an English speaking country. The other 8 were recruited from a university in the U.S. and had more than three years of exposure to English speaking environment. The subjects' average duration of studying English at school in Korea was around 16 years. The Korean native speakers' year of birth ranged from 1973 to 1991.

Each subject was recorded digitally using Audacity on a laptop in a sound-dampened room, individually. In the production task, the target English nonce words including 36 monosyllabic words and 36 disyllabic words (2 structures x 6 vowels x 6 consonants = 72 tokens) were randomized and presented to the subjects in a reading list. English samples of real words were given at the right side of the target words that they could refer to. The participants were asked to read the target words in a carrier sentence, "say soon" once. In an ABX discrimination task, the subjects were asked to identify the different words from among minimal triples. The target words were excised from the carrier sentences and they were presented to subjects aurally. First two tokens were spoken by one speaker and the third token was spoken by another speaker.

For the production task, preceding vowel duration was measured using Praat software and the vowel length was submitted to an ANOVA in which the amount of L2 exposure to English speaking country (more experienced group vs. less experienced group) was a between-subjects factor and final consonant voicing (voiced vs. voiceless) and prosodic structure (monosyllabic vs. disyllabic) were within-subjects factors. A series of independent t-tests was run on tense/lax vowel duration for each group, respectively. For the perception task, accuracy was calculated, and a regression was run to test for a correlation across subject between vowel length differences in production and perception scores.

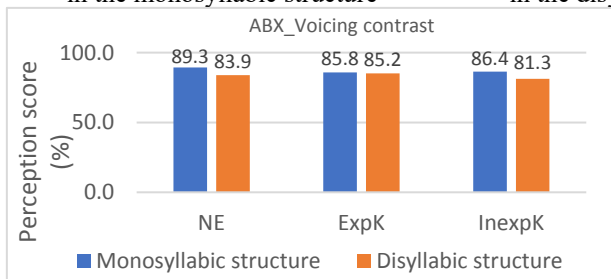
According to the results, none of the speakers exhibited different patterns in monosyllabic and disyllabic structures in productions or perceptions. All speakers did exhibit durational correlates to the voicing contrast, and to the tense-lax distinction. Formant frequency differences were found for both voicing and the tense-lax distinction. The effect of L2 English experience was expected, but inexperienced Korean speakers showed better performance than experienced Korean speakers on discriminating final consonant voicing contrasts in /bVC/ structure in perception task, but there was no statistically significant difference between the two groups. Overall, there was no correlation between vowel length differences in production and perception scores.



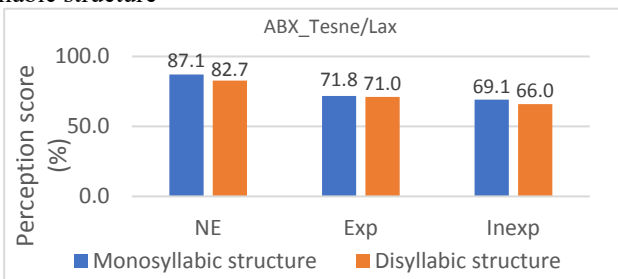
**Fig.1** Vowel duration depending on the following consonant voicing in the monosyllabic structure

**Fig.2** Vowel duration depending on the following consonant voicing in the disyllabic structure

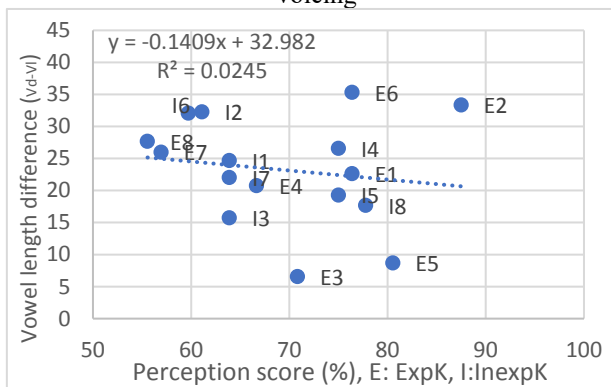
**Fig.3** Vowel duration depending on tense/lax



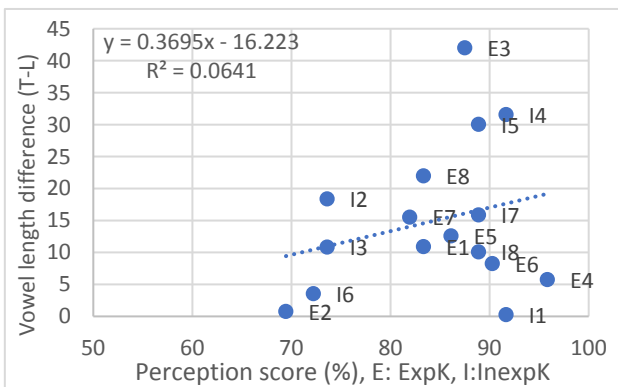
**Fig.4** Scores of ABX task of discriminating vowel duration depending on the following consonant voicing



**Fig.5** Scores of ABX task of discriminating tense/lax vowel



**Fig 6.** Correlation between vowel length differences (Vd-Vl) in production and perception scores



**Fig 7.** Correlation between vowel length differences (Tense-Lax) in production and perception scores

References

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