https://doi.org/10.5392/JKCA.2020.20.11.378

영어 학습자의 중간 언어 단어 수준 강세 비교

Comparison of Word Level Stress Features between Korean, English and the Interlanguage of Korean Learners of English

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요약

영어 강세는 발화된 영어 단어를 이해하는 데 상당히 중요한 역할을 하며 잘못된 강세의 위치는 의사소통의 실패로 이어질 수 있다. 강세가 없는 것으로 알려진 한국어를 모국어로 둔 영어 학습자는 영어 운율체계를 습득하는 데 어려움을 겪을 것으로 예상된다. 본 연구는 한국어가 단어 수준에서 이러한 강세를 실현하는 것이 영어와 어떻게 다른지 그리고 한국인 영어 학습자의 중간언어가 이 두 언어와 어떻게 다른지 연구하였다. 다음절로 이루어진 4개의 영어 외래어와 그들의 영어 원어 4개가 실험단어로 사용되었다. 10명의 영어 원어민이 영어 원어를 읽었으며 10명의 한국인 영어 학습자가 먼저 영어 외래어를 한국어로 그리고 나중에는 영어 원어를 영어로 읽었다. 120개의 발화 샘플을 분석한 결과 한국어에는 모든 강세 자질로 (즉, 조음 길이, 조음 크기, 조음의 높이) 실현되는 두드러진 음절이 없었다. 반면에 영어는 모든 강세 자질에 의해 일관되게 실현되는 상대적으로 두드러진 음절을 가지고 있었다. 흥미롭게도 영어 강세 실현에 있어 한국인 영어 학습자의 중간언어는 모국어보다도 영어와 비슷한 특징을 보여 주었다.

■ 중심어 : | 영어 강세 | 영어 외래어 | 중간언어 | 강세 자질 | 언어 간 비교 |

Abstract

English stress plays such a critical role in understanding spoken English words that its misplacement can lead to a breakdown of communication. Korean learners of English, whose native language is known to lack this feature, are expected to have some difficulty acquiring this English prosodic system. This study explored how Korean is different from English in manifesting prominence at the word level and how the interlanguage of Korean learners of English is dissimilar to both languages in that regard. Four polysyllabic English loanwords in Korean and their English source words were used as stimuli. Ten native English speakers read the English source words while ten Korean learners of English read the English loan words first and then the English source words. The analysis of 120 speech samples revealed that Korean words did not have any salient syllable realized by all stress features: duration, amplitude, and F0. On the contrary, English words had syllables with relative prominence, which was consistently manifested by all the features. Interestingly, in realizing English stress, the interlanguage of the Korean English learners bore more resemblance to that of English than that of their native language.

■ keyword : | English Stress | English Loanwords | Interlanguage | Stress Features | Crosslinguistic Comparison |

접수일자 : 2020년 10월 21일
수정일자 : 2020년 11월 09일
심사완료일 : 2020년 11월 11일
교신저자 : 이윤현, e-mail : poelee84@gmail.com

I. Introduction

Any second language (L2) learners, in one way or another, are affected by their first languages (L1) while acquiring L2 phonetics once their first languages have taken roots in their cognitive systems. In the field of phonetics, the influences of L1s have also been studied in many areas through the approach of the contrastive analysis (CA). To name a few, the cross-linguistic transfer in segments was explored by Kim and David[1]; syllable structure by Eckman & Iverson[2]; rhythm by Christophe, et al.[3]. Narrowing down the focus of CA into the comparative study between Korean and English and further, the study of phonology between the two languages, we still have a large body of literature. However, compared to relatively a large amount of research exploring the acquisition of English segments by Korean English learners, there is a paucity of studies on acquiring English suprasegmentals by Korean learners of English. Furthermore, most of previous studies investigated the differences by comparing target phonetic features of native English speakers and interlinguistic features produced by Korean English learners.

The interlanguage of Korean learners of English inevitably shows the characteristics of both their native language and the target language. Influenced by their native language's prosodic system, Korean learners of English are expected to realize lexical stress differently from their native counterparts who realize prominence on a specific syllable utilizing all stress features: F0, intensity, duration. Comparing learners' interlanguage and English might reveal how differently their lexical stress is realized from native speakers, but it does not explain how they end up showing the interlinguistic characteristics. Hence, comparing and investigating the three languages all at once might lead to a better understanding of how the three languages are different from each other and how learners' native language affects their interlanguage with respect to manifesting syllable prominence.

In the field of second language acquisition, the errors caused by the different phonetic systems between learners' first language and their second language might result in a breakdown of communication or native speakers' prejudice on L2 learners' English proficiency or fluency. This kind of assumption was realized into several studies[4-7] on the role of suprasegmentals in the comprehension of English, the listener's ability to understand the meaning of an utterance in its context [8]. These studies explored international teaching assistants working at universities in the United States, suggesting that deviations from normal suprasegmentals such as pitch accent, syllable duration, loudness, pauses, and intonation, could lead to breakdowns of communication between American students and international teacher assistants (ITAS). Benrabah[9] also insisted that accent or stress plays such a critical role in the comprehension of English in that the digression from normal pronunciation like misplacement of stress could result in the breakdown of communication.

Therefore, this current study aims to examine the difference between Korean, English, and the interlanguage of Korean learners of English in suprasegmentals, especially accent or stress. To be more specific, this study focused on exploring whether there is a real difference in the prosodic features realizing prominence at

the word level between the three languages. To that end, this study explored the following questions:

Question 1. Are the mean F0 difference and the ratios of the mean duration time and amplitude between stressed and unstressed syllables in English words read by native English speakers significantly different from those of the English loan words in Korean read by the Korean learners of English?

Question 2. Are the mean F0 difference and the ratios of the mean duration time and amplitude between stressed and unstressed syllables in English words read by native English speakers different from the ones of the English words spoken by the same Korean learners of English?

Ultimately, this research would contribute to the field of second language acquisition as well as foreign language acquisition in that it could supplement the already shallow literature in the area of acquisition of English suprasegmentals by L2 learners. Besides, the result of this study could help to change the practice of English teaching in Korea. Teaching English prosody in Korea has not garnered much attention as the English teaching community has not developed enough awareness that mastering this skill is crucial in improving students' communicative competence.

II. Literature Review

1. Suprasegmentals

Before digging into the difference in stress between these two languages, a little clarification on the suprasegmentals of English seems to be needed for furthering this study. Fry[10][11] defined suprasegmentals as stress, rhythm, and intonation whereas these suprasegmentals are characterized by somewhat different elements in other studies. Kang, Rubin, and Pickering[12] investigated suprasegmentals represented by rate, pause, stress, pitch, and paratone. Trofimovich and Baker[13] classified suprasegmentals into two groups: speech prosody and speech fluency. The former is characterized by stress timing and tonal peak alignment while the latter is represented by speech rate, pause frequency, and pause duration. Among other elements of suprasegmentals, this study mainly investigated pitch range and syllable duration, all of which are the main characteristics of accent and commonly appear in the studies of English suprasegmentals.

2. Accent or stress

Here again, the term of accent or stress is so elusive it seems to need further elaboration. In his book, Hammond[14] defines stress or accent as "syllables that are more prominent than other syllables." Quite similarly, Giegerich[15] indicated that "stressed syllables in English are produced with a stronger burst in initiatory energy than unstressed syllables are. On the acoustic side, this increased energy results in greater loudness, increased duration and often – mainly in the case of primary stress – a change of pitch."

By the same token, in his definition, Schane [16] noted that "prominence is manifested as intensity, pitch, duration, and/or through vowel quality. In English, a combination of these features is responsible for the perceptual unit of prominence known as stress." A distinction between accent and stress is also provided by

Van der Hulst[17]. He suggests that accent is an abstract conception, citing Abercrombie's view [18] that "an accented syllable may be realized as stress with various features of pitch, of syllable length and segment length, of loudness." Common in the above definitions is the fact accent and stress are used interchangeably, and pitch and syllable duration are included in most of the definitions. In this current study, stress would be used as a term indicating relative prominence in a syllable realized by higher F0, larger amplitude, and longer duration than in other syllables.

3. Stress-timed vs. syllable-timed languages

In the contrastive analysis of the prosodic systems of the two languages, the essential conception we should take note of is the typological classification of languages by Pike's dichotomy[19]: syllable-timed vs. stress-timed languages. Later, no one made this distinction clearer than Abercrombie[20], who wrote that "every language in the world is spoken with one kind of rhythm or the other" and French belongs to syllable-timed languages while English and Russian are classified into stress-timed languages. According to Bertran[21], these two types of languages are "characterized by the recurrence of a given element at regular intervals. However, in certain languages, the element is a stressed vowel (accentuated feet of greater or lesser duration) whereas, in other languages, the element is the limit of the syllable (syllables of greater or lesser duration)."

Accordingly, several studies comparing the prosodic systems of English and Korean have been conducted based on this classification by which English is characterized as a stress-timed language and Korean as a syllable-timed language[13][22-23]. Lying at the base of these studies is the assumption that Korean, being a syllable-timed language, does not possess stress. Therefore, unlike English where the duration of syllables of a word is uneven because stressed syllables get longer and other unstressed syllables get shortened at the word level, Korean words are expected to have roughly even durations among syllables.

4. Korean word-level stress

However, aside from the controversy surrounding the classification of the world languages according to this dichotomy, there are some Korean phonologists who disagree with the position that Korean is devoid of stress. One of them is Jun[24-25], who insists that Korean also is a language with stress, and stress is realized by longer duration of the stressed syllable as well as a little bit higher pitch. She proposes that while stress falls on a prominent syllable at a lexical level in English, Korean has stress in the accentual phrase. According to her, stress exists in Korean because a certain syllable in the Accentual Phrase shows higher fundamental frequency and greater amplitude.

One of the previous studies that examined Korean prosody at the word level was conducted by Lim[26]. He investigated the production and perception of Korean word-level prosody. Its results show that in trisyllabic words, second syllables are perceived as prominent, and English speakers take cues such as syllable duration and pitch maximum in prominence perception. Another study[23] compared utterances by Americans and Koreans and found out that the difference of durations between stressed syllables and

unstressed syllables in English words by Korean speakers was smaller than the ones by American subjects, which supports the view that English learners' L1 prosodic system interferes with the acquisition of L2 prosodic system.

Guion[22] studied the effects of age and different prosodic systems on the acquisition of English stress patterns and discovered that age really matters in acquiring English stress patterns, and the prosodic system of L1 has an impact on the acquisition of the equivalent system of L2. Therefore, he reasons that Korean English learners exposed to a predictable phrase-level prosodic system might have difficulties in learning word level prosodic patterns.

The previous studies concerning the acquisition of the English prosodic system by Korean learners of English are summarized as follows:

1) the terms of stress and accent are used interchangeably in the studies;

2) while there is still a controversy as to whether or not the Korean language has stress, Korean has a different prosodic system from the English one, in which stress in Korean is not realized in the same way as in English;

3) the Korean prosodic system has an influence on the acquisition of the English one by Korean English learners one way or another;

4) suprasegmental elements play a crucial role in the comprehension of English;

5) suprasegmental features are able to be acquired or learned by L2 learners though being native-like largely depends on the age at which learners are first exposed to natural L2 inputs.

III. Method

The quantitative approach was taken in this study because acoustic data were mainly collected and analyzed. The studies in phonetics that do not rely on acoustic data make use of the perception test, in which usually native speakers rate recorded outputs produced by L2 speakers. This method using the perception test cannot be free of its inherent weaknesses. Inter-rater reliability can be an issue in designing an experiment because raters are not dealing with fixed, stable texts but transient, unstable human sounds. Concrete statistics brought out by the objective medium might present the audience with more objective and perceptible pictures of study results.

1. Participants

The participants were comprised of 10 native English speakers and 10 Korean English learners. The ratio of males to females was controlled to be the same in both groups because fundamental frequencies of males are deemed to be lower than of females[27]. The subjects in both groups were recruited from a university in the southeastern United States. The native group consisted of undergraduate students, while the participants in the Korean group were learners at the beginners level in a language institute affiliated with the university. The Korean participants were expected to be low in English proficiency because the students proficient enough to be admitted would have attended the university as a full-time student. The English speakers were born and had been raised in America. The Korean speakers were born and had been living in Seoul. They spoke the standard Seoul dialect and their mean

residency period in America was less than three months. Korean participants who were not from Seoul were excluded because some regional dialects use pitch accents in manifesting prosodic prominence [28]. All the participants were in their early twenties and reported no hearing and speaking disorders.

2. Stimuli

All the Korean loan stimulus words were selected from the Grand Korean Dictionary[29]. Stimuli are composed of four English words and four corresponding English loanwords in Korean. Primarily, the words in English and the corresponding English loan words have the same number of syllables. The same number of syllables in the pair words is a critical condition in this study because acoustic data would be analyzed by the unit of a syllable. Monosyllabic words were not included in the stimuli because the experiment requires at least two syllables to compare the discrepancies between the stressed syllables and unstressed syllables. The following table is showing the stimulus words utilized for the experiment.

Table 1. Stimulus words

syllables	languages	stimulus
2	English	cof*fee [kɔ́:fi]
	English loan words	커*피
3	English	vic*to*ry [víktəri]
	English Loan words	빅*토*리
4	English	te*le*vi*sion [téləvìʒən]
	English loan words	텔*레*비*전
5	English	u*ni*ver*si*ty [jù:nəvə́:rsəti]
	English loan words	유*니*버*시*티

* indicates a syllable boundary

3. Procedures

The recording, which was digitized at 116 kHz, was made in a quiet room using a cell-phone recording application. All of the stimuli were presented on a piece of paper with written texts in each language. All the Korean stimuli were shown without corresponding English translations because English might influence the Korean participants to pronounce them in an English way. The participants were asked to read each stimulus slowly and clearly. The Korean participants read the stimulus Korean words and then the Korean carrier sentence including the stimulus words (나는 이 단어를 안다, _____). After a week of the first test, they were again asked to read the stimulus words in English. The interval time would prevent the participants from being influenced by the previous test. When the two tests are conducted at the same time, the chances that the preceding test affects the following test cannot be completely controlled.

In all, 40 recordings from American participants and 80 recordings from Korean participants were obtained. Praat (Ver. 5.3.53), computer software for the analysis of speech sounds, was used in analyzing the collected recordings. For every measurement, a syllable was used as a unit. That is, a syllable of a pair with a consonant and a vowel or a vowel was measured for pitch, duration, and intensity. In addition, the mean value of a syllable was calculated for F0 and amplitude. The duration was denominated by seconds, the amplitude or intensity by decibel, and the fundamental frequency (F0) by Hertz.

The researcher did the analysis of all the data including manually segmenting syllables on the spectrogram. Because segmenting is a crucial part gravely impacting on the reliability of this study, the researcher rechecked the segmenting with an interval of a week after the first

segment job. The researcher also asked a trained researcher who had experiences of segmenting syllables to segment a set of sound samples and adjusted segment points on which they disagree. Then, all the measurements were loaded into SPSS (Ver. 25) for the purpose of statistical analysis of the data.

IV. Results & Discussion

1. F0 comparison between Korean and American groups

As indicated in Babel & Bulatov's study [27], there was a noticeable difference in F0s between males and females. In the current study, the same number of males and females were included in both groups. So, the difference in F0 due to gender was not taken into consideration in the data analysis. In terms of fundamental frequencies, the results in [Table 2] contradict the assumption that the difference of F0 among the syllables by American participants would be bigger than that by Korean participants.

Table 2. Mean F0s

	syllables F0(Hz)				
	1st n=40 SD=71.1	2nd n=40 SD=72.8	3rd n=30 SD=56.8	4th n=20 SD=54.6	5th n=10 SD=9.5
Ko_male (n=5)	135.57	128.27	115.32	114.15	96.31
Ko_female (n=5)	245.99	234.3	225.21	225.19	215.76
Korean mean	190.78	181.29	170.27	165.4	156.04
Am_male (n=5)	156.66	137.16	130.51	132.35	122.25
Am_female (n=5)	206.53	218.91	208.2	213.11	199.29
American mean	181.60	178.03	169.36	172.73	160.77

On the contrary, the difference of mean F0 in English loanwords spoken by the Korean learners of English was much larger than that in English words. This fact is aligned with Jun's assertion[30] that the prominence of the Korean language is manifested by tonal features. She continued to mention that in an Accentual Phrase (AP), the phrasal tones are primarily characterized by two patterns: LHLHa and HHLHa. When the initial syllable begins with a tense phoneme or an aspirated sound, /h/, or /s/, the AP takes the pattern, HHLHa or LHLHa otherwise. Even with three or fewer syllables, APs demonstrate similar patterns: these patterns are reduced to LHa, LLHa, or LHHa with the initial L and HHa, HHLa, or HLHa with the initial H. Though these rules apply to the Accentual Phrase, these can also apply to single words because a word can perform as a whole entity in both the AP and IP levels.

As shown in [Table 3], the first three English loanwords out of four stimulus words begin with tense sounds or Hs, so the F0s of these are larger than those of other syllables. By contrast, the beginning phoneme of the last word, university, is lax, which led to smaller F0 smaller than those of other syllables. Conversely, differences of F0s among the syllables by the American subjects were less visible compared to those by the Korean subjects.

Table 3. F0s of English loanwords and English words

		F0-syllables (Hz)						
En_loan	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	커피	217.95	199.82				18.13	
	빅토리	210.59	197.97	182.88			37.99	
	텔레비전	220.77	189.48	198.94	166.31		31.30	32.63
	유니버시티	175.41	189.41	185.20	213.79	194.86	-14.00	-9.66
Am_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D

coffee	194.12 190.61		3.50	
victory	180.85 175.92 169.39		16.89	
television	181.76 179.34 172.52 173.96		4.08	−1.44
university	169.66 166.26 166.16 171.50 160.77		3.40	6.03

* M indicates mean with D standing for difference.

An independent *t*-test was carried out to compare frequencies between the first and second syllable of *coffee* by the American subjects. There was no significant difference in the frequencies for the first syllable (M = 194.12, SD = 35.84) and the second syllable (M = 190.62, SD = 76.29) conditions; t (10) =.102, p = 0.921. These results show that while the frequencies of the first syllables by the American subjects are slightly larger than those of the second syllables, the differences do not necessarily mean that the frequencies of a stressed syllable are higher than those of an unstressed syllable. That is, as far as the results of this study are concerned, the fundamental frequency is not considered to be a critical element deciding on the prominence of the stressed syllable. Two one-way analyses of variance (ANOVA) were conducted on the differences of frequencies among the syllables for the words, *television* and *university*. The analyses showed no significant difference among the syllables in both words, F (3, 20) = 0.99 for *television* and F (4, 25) = 0.99 for *university*. These results of F0s by American participants demonstrate that the F0 does not play a significant role as a crucial acoustic cue influencing prominence of stressed syllables. On the contrary, the analysis of the Korean data indicated that F0s are considered to be a more influential element when it comes to the relative prominence of a syllable compared to other syllables in a word.

2. Duration comparison between Korean and American groups

With respect to duration, one salient feature was that duration of the last syllables was longer than that of other preceding syllables in all the stimulus words in both groups. It is compatible with the finding by Turk and Shattuck-Hufnagel[31] that the lengthening of boundary syllables is not relevant in American English.

As seen in [Table 4], the patterns of duration among syllables appear contrastive in English and Korean. In Korean, the odd number syllables tend to be shorter than the following syllables while in English, these syllables seem slightly longer than the next syllables. In comparison, the longer duration in stressed syllables in English resonates with the previous studies (Fry [10], out of many) that stressed syllables are longer than unstressed syllables because the unstressed vowels are reduced. However, statistically, an independent-samples t-test showed that there was no significant difference in the duration between the stressed first syllable (M = 0.28, SD = 0.23) and the unstressed second syllable conditions; t (10)=1.34, p = 0.211.

Table 4. Duration of English loanwords and English words

		Duration-syllables (Seconds)						
En_loan	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	커피	0.26	0.30				−0.04	
	빅토리	0.16	0.20	0.25			−0.04	
	텔레비전	0.18	0.17	0.16	0.32		0.02	−0.16
	유니버시티	0.13	0.14	0.14	0.18	0.27	−0.01	−0.04
Am_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	0.28	0.26				0.03	
	victory	0.19	0.16	0.24			0.04	
	television	0.19	0.09	0.14	0.28		0.1	−0.14
	university	0.13	0.11	0.17	0.17	0.23	0.02	0.00

* M indicates mean with D standing for difference. The shaded areas indicated the stressed syllables

As for duration in Korean words, there seems to be a tendency for lengthening boundary

syllables. The last syllables in the Korean words are noticeably longer than other previous syllables, which confirms the previous assertion by Lee & Seoung[32] that the final syllables in Korean nonsense words were 60 percent longer than the initial syllables. The analysis also reiterated the assumption that syllable-timed languages to which the Korean language is claimed to belong have approximately similar length among syllables. In this study, except for the last syllables, the syllables exhibit roughly equal duration among them. Although this study did not present the contrastive ratios of stressed and unstressed syllables in the English words spoken by American participants in terms of duration, it clearly revealed that unstressed weak vowels reduced to schwa as in the second syllables in *victory*, *television*, and *university*. It also resonates with the claim made by the researchers of the dichotomy of stress and syllable-timed languages. In stressed timed-languages, stressed syllables alternate with unstressed syllables of which length is reduced. The difference in duration between stressed and unstressed syllables usually results in positive numbers.

3. Amplitude comparison between Korean and American groups

The factor of amplitude displayed similar patterns as duration. The Korean data showed contrasting results from the American counterparts. As expected, the stressed English syllables were articulated with more intensity than unstressed syllables as shown in [Table 5]. By contrast, the difference in the same pairs in the Korean stimulus words takes on negativity, which signifies the first and third syllables were pronounced with less intensity than the following syllables. This fact indicates that no distinguishable patterns are revealed in regard to intensity in the Korean words. It also suggests that unlike English, the different amplitude in Korean syllables does not contribute to the prominence of stressed syllables.

Table 5. Amplitude of English loanwords and English words

		Amplitude-syllables (dB)						
En_loan	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	커피	73.70	98.93				-25.23	
	빅토리	67.76	78.33	75.16			-7.28	
	텔레비전	75.87	79.08	75.10	71.81		-3.21	3.29
	유니버시티	74.85	76.53	74.91	64.52	69.39	-1.69	10.62
Am_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	71.38	62.74				8.64	
	victory	67.53	61.45	63.00			7.54	
	television	70.62	69.07	66.81	62.83		1.55	3.99
	university	64.89	66.26	68.14	60.81	60.81	-1.36	9.6

* M indicates mean with D standing for difference. The shaded areas indicated the stressed syllables

4. Comparison of interlanguage by Korean English learners to Korean and English

The comparison of F0s of the English words by Korean participants to those of English words by American participants and of English loanwords by Korean participants in [Table 6] shows that its F0 pattern by Korean participants takes more similarity to English loanword samples than to English samples. First, the difference of F0s between stressed and unstressed syllables of English words by Korean learners of English was larger than by American participants. In English words, the F0s of stressed syllables read by American participants were higher than those of unstressed syllables;

yet, the difference was not significant enough statistically, and the ratio between these measurements was not large compared to those in the English loanwords in Korean and English words read by Korean learners. On the contrary, the difference of F0s between stressed and unstressed syllables in English loanwords and English words by Korean learners was more remarkable than in English words though the significance of the difference was not verified by a statistical test.

Table 6. F0 comparison of English loanwords and English words by Americans and Koreans

		F0-syllables (Hz)						
En_loan	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	커피	217.95	199.82				18.13	
	빅토리	210.59	197.97	182.88			37.99	
	텔레비전	220.77	189.48	198.94	166.31		31.30	32.63
	유니버시티	175.41	189.41	185.20	213.79	194.86	-14.00	-9.66
Am_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	194.12	190.61				3.50	
	victory	180.85	175.92	169.39			16.89	
	television	181.76	179.34	172.52	173.96		4.08	-1.44
	university	169.66	166.26	166.16	171.50	160.77	3.40	6.03
Ko_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	212.50	172.86				39.64	
	victory	184.86	186.44	163.57	108.33		27.23	
	television	196.90	189.31	165.10	162.98		7.58	2.12
	university	168.86	176.55	182.14	177.33	156.03	-7.69	29.16

In both duration and amplitude [see Table 7-8], the features by Korean learners indicate the characteristics of interlanguage. So to speak, they are showing some of the features peculiar to native speakers of English; however, they are not still able to emulate all the features of their counterparts. As with American participants, the duration of stressed syllables by Korean learners is longer than that of unstressed syllables while the difference between them is not as large as that by American participants. In the same vein, the amplitude of stressed syllables by Korean learners is larger than that of unstressed syllables.

Table 7. Duration comparison of English loanwords and English words by Americans and Koreans

		Duration-syllables (seconds)						
En_loan	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	커피	0.26	0.30				-0.04	
	빅토리	0.16	0.20	0.25			-0.04	
	텔레비전	0.18	0.17	0.16	0.32		0.02	-0.16
	유니버시티	0.13	0.14	0.14	0.18	0.27	-0.01	-0.04
Am_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	0.28	0.26				0.03	
	victory	0.19	0.16	0.24			0.04	
	television	0.19	0.09	0.14	0.28		0.1	-0.14
	university	0.13	0.11	0.17	0.17	0.23	0.02	0.00
Ko_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	0.32	0.30				0.02	
	victory	0.20	0.14	0.26	0.24		0.06	
	television	0.19	0.11	0.15	0.26		0.08	-0.11
	university	0.15	0.12	0.15	0.16	0.27	0.03	-0.01

Table 8. Amplitude comparison of English loanwords and English words by Americans and Koreans

		Amplitude-syllables (dB)						
En_loan	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	커피	73.70	98.93				-25.23	
	빅토리	67.76	78.33	75.16			-7.28	
	텔레비전	75.87	79.08	75.10	71.81		-3.21	3.29
	유니버시티	74.85	76.53	74.91	64.52	69.39	-1.69	10.62
Am_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	71.38	62.74				8.64	
	victory	67.53	61.45	63.00			7.54	
	television	70.62	69.07	66.81	62.83		1.55	3.99
	university	64.89	66.26	68.14	60.81	60.81	-1.36	9.6
Ko_Eng	word	1st M	2nd M	3rd M	4th M	5th M	1-2 D	3-4 D
	coffee	74.38	72.29				2.083	
	victory	69.13	72.78	73.71			-2.62	
	television	75.30	74.24	69.57	70.37		1.06	-0.80
	university	73.93	74.76	77.38	64.49	67.43	-0.84	13.63

In general, the results of this study showed that English speakers attain the prominence of stressed syllables with the combination of all acoustic cues. By contrast, in the areas of the amplitude of syllables, the measurements of sounds by Korean speakers demonstrated so inconsistent a pattern of producing syllables in words. The independent t-test conducted for comparing the difference of duration between two groups noted that there was a significant difference in the difference of duration among syllables in the English loanwords (M = 0.046, SD = 0.1) and the English words (M = -0.02, SD = 0.1) conditions; t (46) = 4.67, p = 0.00. The same test for amplitude also showed a significant difference between the difference of amplitude among the syllables of English loanwords (M = - 9.35, SD = 6.14) and of the English words (M = 4.09, SD = 6.31) conditions; t (46) = -2.14, p = 0.04. With regard to F0, the ratios of stressed and unstressed syllables of the stimulus English words happen to concur to those of the stimulus English loanwords, which is attributable to the Korean prosodic rule putting higher F0s on the tense syllable. The position of tense syllables of three loan words was overlapped with that of stressed syllables of English words, bringing out higher F0s on the same syllables.

In short, as posited in question 1, the amplitude and intensity were differently manifested in the English loanwords and English words. Though not showing a statistically significant difference between the stressed and unstressed syllables, native English speakers still manifested salience in the stressed syllable consistently with longer duration, higher pitch, and larger amplitude. However, as for Korean, it did not have any salient syllables manifested by all the stress features. Each syllable gets prominence, if any, through different features. That is, the first syllables are deemed to get prominent by F0, the second syllables by intensity, and the last syllables by duration. Accordingly, as far as Korean is concerned, any single feature cannot be picked to be most responsible for syllable prominence at the word level.

In addition, the acoustic features of English words by Korean learners were more similar to those by English native speakers but still different from them. Even though the statistical analysis showed a meaningful difference in amplitude and duration between two groups of the English words and Korean loanwords, its results are only significant in statistical terms. That is, the actual degree of prominence of stressed syllables should be measured by an intelligibility test by human raters.

V. Conclusion

The English loanwords in Korean are borrowed from English words; so, they tend to maintain the segmental features of English except for suprasegmental features. This study was intended to explore whether different prosodic features are used in manifesting the words comprised of the same combinations of similar segmental sounds. As expected, its results showed that there is a significant difference in manifesting prosodic features by Korean and English speakers. This study demonstrated that Korean English learners used all the prosodic features in a similar way as native English speakers, but there is still a difference between them. In addition, the

results of this study also indicate that out of F0, duration, and intensity, F0 is the most salient factor deciding prominence of a syllable relative to other syllables in Korean words. In comparison, native speakers of English utilized all the prosodic features in manifesting relative prominence in stressed syllables.

This study also has some limitations, one of which is the basic unit of analysis: a syllable. By analyzing the samples by a unit of a syllable, this study did not take into consideration a chance that after being adapting to the Korean language system, the consonant sounds undergo changes and are manifested differently from their original sounds. This might have an impact on the overall values of a syllable. For example, if plosives are transferred, and their Voice Onset Time is lengthened, the entire length of a syllable is influenced by the changed features of the consonants, not by the prosodic system of Korean. Another thing is the stimuli, which were just four English words and English loanwords. In the future study, using still a larger number of stimulus words with more diverse syllable structures might produce more reliable and meaningful results, providing a broader and concrete picture into this issue. Lastly, determining the difference using statistical tests is not sufficient because the human hearing system might catch the difference even when the test decides that there is no significant difference among syllables. Therefore, in order to scaffold the study, the human rating should be also employed.

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■ 2019년 3월 ~ 현재 : 대전반석고등학교 교사

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