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Minimal Pair Drills: Are They Always an Effective Way to Practice English Vowel Discrimination?*

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The present study attempted to re-evaluate the effectiveness of minimal pair drills, based on the concept of *markedness* or *typological markedness,* which was adopted by Eckman (1977, 1981a) to account for L2 phonology such as the relative degree of difficulty in L2 acquisition. To this end, the perceptual acquisition of English tense and lax vowels by Korean speakers of English was investigated to see how effective minimal pair drills are in perceiving the differences between similar L2 sounds. The notion of *typological markedness* made it possible to formulate the three different hypotheses about possible treatments for helping Korean learners identify L2 English tense-lax vowels: minimal pair stimulus, tense vowel (unmarked vowels) stimulus, and lax vowel (marked vowels) stimulus. The results showed that lax vowels were a more useful stimulus rather than the other two stimuli - minimal pair and tense vowels, suggesting that presenting only lax vowels or presenting lax vowels earlier might be a more effective way to improve Korean learners' ability to discriminate English tense-lax vowels than using the minimal pair drills, at least in a context in which Korean learners are taught to identify English tense and lax vowels at a word-level.

[minimal pair drills/ tense vowels/lax vowels/markedness/typological markedness/the Markedness Differential Hypothesis/긴장모음/이완모음/ 유표성/유형적 유표성/유표성 차이가설]

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* This paper is based on my master thesis entitled "Markedness and the Perceptual Acquisition of English Tense and Lax Vowels by Korean Native Speakers of English", which was submitted to the University of Texas at Austin in May, 2003. The master thesis was originally focused on the predictive power of the notion of *markedness*, with regard to L2 acquisition of English vowels.

I. INTRODUCTION

Minimal pairs, which are two words that differ in the pronunciation of a single sound, have been employed for L2 sound discrimination drills. As Brown (1995) pointed out, the minimal pair exercises are the technique that L2 teachers usually use especially when they try to present students with new L2 sounds that are very difficult to discriminate. Many textbooks for L2 learning also include discrimination activities using minimal pairs, whether they are given in a word-level or a sentence-level. In fact, the concept of *minimal pairs* was originally employed as one way of discovering phonemes in structural linguistics (Young-Seok Kim, 1983), and the minimal pair practices were usually used in the Audiolingual Method, in which the flawless pronunciation of L2 sounds was emphasized (Celce-Murcia, Brinton & Goodwin, 1996), because the drills were considered to be an effective way to have L2 learners perceive the differences between similar L2 sounds. With the advent of Communicative Approach, however, the drills in which minimal pairs are presented at least without any contexts, have been challenged and criticized[1]. From a linguistic perspective, it seems that the major drawback of the minimal pair drills is to pay more attention to the phonological characteristics of the target language than any other things. Since the difficulties L2 learners might encounter in their L2 phonological acquisition cannot be explained by the characteristics of the target language alone, we might need to take into consideration the similarities and dissimilarities between L1 and L2 to better understand the learners' difficulties and to come up with an appropriate way of teaching confusing L2 sounds. Thus, even the minimal pair drill, which is a simple and basic exercise and sometimes very effective for acquiring L2 vowel or consonant contrasts, might turn out to be ineffective depending on differences or similarities between the target and native languages.

In this regard, the present study made an attempt to re-examine the effectiveness of minimal pair drills, based on the notion of *similarity*, *dissimilarity*, and *markedness* or *typological markedness*, which are related to language transfer that plays an important role in second language or Interlanguage phonology (Major & Kim, 1996). To this end, the perceptual acquisition of English tense and lax vowels by Korean speakers of English was investigated to determine how effective minimal pair drills are in perceiving the differences between two similar L2 sounds. In particular, because many relevant studies have shown that Korean English learners have some difficulties perceiving English tense and lax vowels accurately (Hoy-Son Kim, 2000; Yeon-Woo Lee, 2011; Joo-Hyun Park, 1984; Byung-Gon Yang, 2010), the current study might provide us with an opportunity to re-

[1] For more detailed discussion about the ineffectiveness of minimal pair practices from the perspective of Communicative Approach, see Brown (1995).

evaluate the validity of using the minimal pair drills without considering the difference or similarity between L1 and L2. In other words, English learners with different L1 backgrounds might have different types of learning problems in terms of the perception of English sounds. By seeing if the use of minimal pair is helpful for having Korean English learners perceive English tense and lax vowels, we might find out some criterion for applying minimal pair activities to the phonological acquisition of L2 English – when or how we should present the commonly used drill to Korean English learners in order to enhance L2 learners' ability to perceive L2 sounds.

II. THEORETICAL BACKGROUNDS

As mentioned above, the current study adopted the notion of *markedness* or *typological markedness,* which has been widely utilized in linguistics fields, in order to look into the usefulness of minimal pair drills. Thus, this section will deal with how the concept of *markedness* was employed to explain the second language phonology and will provide a brief summary of characteristics of English and Korean vowels and compare them. Finally, we will deal with how tense and lax vowels shown in English vowel system can be interpreted or identified, within the framework of 'typological markedness' presented in the this section.

1. Typological Markedness

Second language researchers have suggested numerous theories to account for why some L2 forms are more difficult to acquire than others or why some individuals have greater difficulty in acquiring some target sounds than others. So far the best-known explanation of acquisition of L2 forms is the Contrastive Analysis Hypothesis (CAH, Lado 1957), which employs as a basic tool the notion of *contrasts* between forms in L1 and L2 and predicts that those forms that are similar in the two languages will be easier to learn than those forms that are different. However, this hypothesis has been criticized, mainly because differences between L1 and L2 do not always lead to learning difficulty. Consequently, new or revised theoretical frameworks of L2 acquisition have since been proposed to predict learning difficulty more accurately and to better understand learners' language: Error Analysis (Banathy & Madarasz, 1969), Interlanguage Hypothesis (Selinker, 1972), Markedness Differential Hypothesis (hereafter, MDH, Eckman, 1977), etc. Among them, the Markedness Differential Hypothesis was the first theoretical framework to incorporate the notion of *markedness* to explain developmental stages in L2 phonological acquisition.

Originally, the term *markedness* can be traced back to the Prague School linguist Trubetzkoy (1969), who first proposed the notion of *markedness* to account for a phonological opposition like /p/ and /b/. In other words, one member of any pair of opposite sounds is unmarked (/p/) and the other one is marked (/b/), since the former lacks a phonetic feature [voice], whereas the latter carries the feature. After his first work, such scholars as Jakobson (1968), Greenberg (1962), Chomsky and Halle (1968), and Eckman (1977) have developed and elaborated the notion of *markedness*, and have adopted it to explain some linguistic phenomena. Generally, linguists adopt the term *markedness* when they try to handle the notion of ease or simplicity shown in linguistic forms. While it is assumed that language forms that are simple and common in human languages are unmarked, forms that are complex and less common are assumed to be marked (Archibald, 1998). For instance, a sound which occurs in relatively few languages, e.g. /ð/ as in *they,* is marked, while vowels like /i, a, u/ are regarded as unmarked in the sense that they are found in many other languages.

With respect to second language phonological acquisition, Eckman (1977) claimed that the notion of *markedness* (specifically 'typological markedness') should be incorporated into the CAH in order to predict the area of difficulty for second language learners and the relative degree of difficulty accurately. According to Eckman (1977), the term of *typological markedness* can be defined as follows.

Typological Markedness

A phenomenon A in some language is more marked than B if the presence of A in a language implies the presence of B; but the presence of B does not imply the presence of A. (Eckman, 1977, p.320).

That is, the concept of *markedness* may be represented by 'typological or implicational language universals', as shown in 'If a language has x, it will also have y'. For example, if a language has nasal vowels (e.g. [ã]), then it will also have oral vowels (e.g. [a]). However, it does not necessarily mean that the presence of oral vowels implies the presence of nasal vowels. Following the definition given above, we can identify [ã] as more marked than [a].

Based on the notion of *typological markedness,* Eckman proposed the following Markedness Differential Hypothesis in order to give an explanation for why some differences between L1 and L2 result in learning difficulty while others do not.

Markedness Differential Hypothesis (Eckman, 1977, 1981a)

Those areas of the TL (target language) which will be difficult are those areas which are

(1) different from the NL (native language)
(2) relatively more marked than the NL

Voicing contrasts in English and German were provided as an example of how the MDH works together with the 'typological markedness'. While in English, both voiced and voiceless stop consonants (/p, t, k/ and /b, d, g/) can occur in word-initial, -medial, and -final position, German allows such voicing contrasts only in initial and medial position, and in word-final position only voiceless consonants can appear, as shown in Table 1.

Table 1
Voicing Contrast in English and German (Archibald, 1998, p.54)

	English	**German**
Word-initially	coat, goat	Kasse(cash register), Gasse(alley)
Word-medially	backing, bagging	Haken(hook), Hagen(German town)
Word-finally	sack, sag	n/a (e.g. Tag [tak])

In the case of English, the presence of a word-final voicing contrast implies the presence of a voicing contrast in word-initial and -medial position, while in German the presence of a word-initial and -medial voicing contrast does not imply the presence of a voicing contrast in final position. In other words, this relationship indicates that the presence of word-final voicing contrasts implies the presence of word-medial contrasts, which, in turn, implies word-initial contrasts, but the presence of word-initial contrast does not always imply the presence of either medial contrasts or final contrasts. This can be illustrated hierarchically as follows.

Table 2
Voice Contrast Hierarchy (Eckman, 1977, p. 322)

Position	***Degree of Markedness***
Initial	**Least Marked**
|	**·**
Medial	**·**
|	**·**
Final	**Most Marked**

This hierarchy also shows that the maintenance of a voice contrast in word-final position is more marked than the maintenance of a voice contrast in either word-medial or word-initial position. Consequently, the word-final position in English is more marked with respect to a voice contrast than the corresponding position in German. Given the MDH

assuming that "those areas of the target language which differ from the native language and are more marked than the native language will be difficult" (Eckman, 1977, p.321), it can be correctly predicted that German speakers will experience greater difficulty in pronouncing English word-final voiced consonants than English speakers have in producing German word-final voiceless consonants, since English differs with respect to a word-final voicing contrast from German, and is more marked than German. That is, the MDH correctly predicts the directionality of difficulty or the degree of difficulty for L2 learners, but the previous CAH cannot make any prediction of the directionality, because it can only claim that forms that are different will be difficult.

In summary, the Markedness Differential Hypothesis, which incorporates the degree of difficulty of L2 acquisition on the basis of markedness considerations, has been invoked to account for the directionality of difficulty in L2 acquisition which could not be explained by the previous Contrastive Analysis Hypothesis. The MDH holds that the forms in the target language which are different from the native language and are more marked than the native language will be difficult to learn, whereas those forms that are different but relatively less marked will be less difficult to acquire. The MDH appears to be a natural and highly plausible explanation of learning difficulty in the sense that humans learn to do things that are less complex before they learn to do things that are more complex.[2]

2. English and Korean Vowels

Based on four main factors for vowel classification - the tongue height and position in the mouth, lip roundness, and tenseness, English vowels can be systematically arranged as shown in Table 3. English vowels are composed of seven simple vowels and four vowels with an adjacent glide. Simple vowels refer to vowels without a following glide movement, as in *fit* /fɪt/ or *put* /pʊt/, and four vowels with an adjacent glide (/iy, ey, uw, ow/) are vowel sounds followed by a glide /y/ or /w/, as seen in *pain* /peyn/ and *boat* /bowt/. In the case of /iy/ or /ey/ as in *leave* and *pain*, each vowel starts with /i/ and /e/, and then glides towards /y/. Likewise, the vowels like /uw/ and /ow/ begin to articulate with /u/ and /o/, respectively, and then end up with a glide /w/.

[2] Since Eckman's first work, a number of investigations concerning the MDH have been devoted to the learning difficulty that L2 learners might experience and the nature of Interlanguage phonology (Carlisle, 1997, 1998; Eckman, 1981a, 1981b; Major, 1987; Major & Kim, 1996; Major & Faudree, 1996), even though the hypothesis has been either challenged or modified by a number of investigations (Cichicki et al., 1993; Eckman, 1991; Edge, 1991). For more detailed discussions about the modification of the MDH, see Eckman (2008).

Table 3
English Vowel System (Prator and Robinett, 1985, p.13)

	Front-Unrounded	Back-Unrounded	Back-Rounded
High	**iy** ɪ		**uw** ʊ
Mid	**ey** ɛ	**ʌ**	**ow**
Low	æ	**a**	**ɔ**

* Boldface phonetic alphabets represent tense vowels.

On the other hand, the vowel system of standard Korean is composed of ten simple vowels and twelve diphthongs. Table 4 shows the simple vowels of modern standard Korean. First, among Korean front vowels /i, e, **ɛ**/, the Korean /i/ is classified as a high, front, unrounded vowel, and /e/ is a mid, front, unrounded vowel. The Korean /**ɛ**/ is classified as a low-front, unrounded vowel. It is also the lowest of the Korean front vowel series. However, the distance between two front vowels, /e/ and /**ɛ**/, is so close that many Koreans may not distinguish them from each other. Second, the Korean /u/ is a high-back, rounded vowel. It is also the highest of the back vowels. The Korean /o/ is classified as a mid-back, rounded vowel. It is produced in the same way as English /ow/ without gliding toward /w/. Third, the Korean /**ɨ**/ is a high-central, tense, unrounded vowel, and /**ʌ**/ is classified as a mid-central, unrounded vowel. The Korean /a/ is a low-central, unrounded vowel. It is made with the relaxed tongue lying almost flat in the oral cavity and mouth is most open of any of the vowels.

Table 4
Korean Vowel System (Ik-Seop Lee, 1986, p.49)

	Front-Unrounded	Front-Rounded	Central-Unrounded	Back-Round
High	**i**	**ü**	**ɨ**	**u**
Mid	**e**	**ö**	**ʌ**	**o**
Low	**ɛ**		**a**	

3. Tense and Lax Vowels in English: Degree of Markedness

Tenseness, which refers to muscular tension of tongue body in the production of some vowels, is regarded as one of major factors for classifying vowels, along with other factors such as tongue height, tongue position, and lip rounding. According to the degree of the

tenseness of tongue body, vowel sounds are divided into so-called lax and tense vowels as shown in Table 5. English has a phonemic distinction between tense and lax vowels, which is associated with variations in height and backness and a difference in vowel length (Ladefoged & Maddieson, 1996). In English, /iy, ey, ɑ, ɔ, ow, uw/ are referred to as tense vowels, which are produced with greater tension of tongue muscle than the lax vowels /ɪ, ɛ, æ, ʌ, ʊ/. Due to this articulatory difference between tense and lax vowels, i.e., muscular tension, tense vowels are produced in more "extreme" position in the mouth than lax vowels, both vertically and horizontally (Cele-Murcia et al.,1996). Thus, tense vowels tend to have the position of the tongue body slightly higher and be longer than the corresponding lax vowels, whereas lax vowels tend to be more centralized and be shorter than the corresponding tense vowels. On the other hand, this study assumes that two Korean vowels /i/ and /u/ are tense (Hoy-Son Kim, 2000; Hyouk-Keun Kim, 2000; Yeo-Beom Yoon, 2002), even though there is no tense-lax distinction in Korean vowel system.

Table 5
English Tense and Lax Vowels (Schane, 1973, p.13)

		Tense	**Lax**
Front-Unrounded	**High**	/iy/ as in beat	/ɪ/ as in bit
	Mid	/ey/ as in bait	/ɛ/ as in bet
	Low		/æ/ as bat
Back-Rounded	**High**	/uw/ as in boot	/ʊ/ as in book
	Mid	/ow/ as in boat	
	Low	/ɔ/ as in bought	
Back-Unrounded	**High**		
	Mid		/ʌ/ as in but
	Low	/a/ as in father	

When it comes to the degree of markedness that English tense and lax vowels might show, if we apply the notion of *typological markedness* to them, we might determine which is a more marked form of two kinds of vowels. According to the so-called *typological markedness*, it is claimed that a certain form A is more marked than B if the presence of A implies the presence of B, but not vice versa. In this respect, English lax vowels can be considered more marked than tense vowels, since, if a language has lax vowels, then the language has also the corresponding tense vowels (e.g. *English* and *German*), but not vice versa (e.g. *Korean*); the presence of tense vowels does not

necessarily imply the presence of lax vowels, and there seems to be no language which has only lax vowels without tense vowels.

Consequently, if we consider the different degrees of markedness shown in English tense and lax vowels and the differences between English and Korean vowels, the MDH can make the following prediction about learning difficulty which Korean learners of English may encounter when acquiring English tense and lax vowels. Korean has no tense-lax vowel distinction, while English has tense and lax vowels. Given this difference between the two languages, the MDH will predict that Korean learners will have difficulty acquiring English lax vowels, since the hypothesis claims that the difficult areas of the target language (English) are those areas which are (1) different from the native language (Korean), i.e., lax vowels, and (2) relatively more marked than the NL, i.e., lax vowels. In fact, it should be noted that this prediction is consistent with the results from many empirical studies on the perception of English tense and lax vowels by Korean learners: Korean English learners are found to have some difficulties discriminating between English tense and lax vowels, as in *leave* vs. *live* (Hoy-Son Kim, 2000; Yeon-Woo Lee, 2011; Joo-Hyun Park, 1984; Byung-Gon Yang, 2010).[3] On the other hand, the MDH also predicts that English native speakers learning Korean will not have difficulties perceiving Korean vowels, especially a high front vowel and a high back round vowel, because English vowel system has a lax-tense distinction, while Korean vowels do not have such a distinction. This prediction also seems to be supported by Eun-Kyung Yoon's (2010) findings that English native speakers tends to perceive Korean high vowels such as /i/ and /u/ to be similar to English high tense vowels like /iy/ and /uw/, rather than high lax vowels (/ɪ/ and /ʊ/) or any other English vowels. In summary, it is assumed that English lax vowels are more marked than their corresponding tense vowels, and that Korean learners of English will have more difficulty in identifying English lax vowels, since Korean has no lax vowels.

Based on the degree of markedness shown in English tense and lax vowels and the prediction about the perception of the vowel contrast, we can formulate the following hypotheses about the usefulness and appropriateness of minimal pair drills in a context in

[3] In fact, this kind of identification difficulty occurs only in a closed syllable – syllables with a final consonant. Since stressed lax vowels can appear only in a closed syllable, the word with a closed syllable can show a tense-lax distinction (Ladefoged, 1993; Schane, 1973). On the other hand, it should be also noted that English tense and lax vowels show a distributional contrast, in that stressed lax vowel can occur only in a closed syllable, whereas stressed tense vowels appear in both closed and open syllables - *syllables without a final consonant.* It seems that this restriction on the distribution of lax vowels might give a hint that lax vowels may be more marked than tense vowels, if we recall general characteristics that marked linguistic forms might have, i.e., less frequent and more limited.

which Korean English learners practice discriminating between English tense and lax vowels:

> **Hypothesis 1**: Regardless of their degrees of markedness, if two English high vowels (e.g. /iy/ vs. /ɪ/ or /uw/ vs. /ʊ/) are presented in the form of minimal pair drill, Korean English learners will be able to discriminate between tense and lax vowels more accurately.

> **Hypothesis 2:** If unmarked forms (tense vowels) are given to learners earlier than marked forms (lax vowels), Korean English learners will be able to discriminate between tense and lax vowels more accurately.

> **Hypothesis 3:** If marked forms (lax vowels) are presented to learners earlier than unmarked forms (tense vowels), it will be easy for Korean English learners to discriminate between tense and lax vowels more accurately.

III. RESEARCH METHOD

1. Participants

In order to test the hypotheses regarding the effectiveness of minimal pair practices in the perceptual acquisition of English tense and lax vowels by Korean native speakers, 21 Korean native speakers between the ages of 26 and 37 (mean age: 32.24) participated in this study (10 males and 11 females). The participants were chosen among either Korean graduate students attending an American university or their spouses. They had resided in the United States for a period ranging from 10 months to 7 years 9 months (mean: 43.7 months). Although most of the participants had studied English in Korea for 8 - 10 years prior to arriving in the U.S., their English courses had been mainly focused on English reading and grammar, rather than all skills in language learning. In particular, they had received little or no pronunciation practice in their English courses and had no contact with native speakers of English in Korea. In addition, most of the participants reported that they had greater difficulty in identifying some English vowel sounds like /iy, ɪ, ɛ, æ, ʊ, uw, ow, ɔ/ (e.g. *beat, bid, bed, bad, boot, book, boat, bought*), even though they had been exposed to the English language for a considerable amount of time.

2. Materials and Method

In this study, two tests - a pretest and a posttest - were administered to the participants in order to investigate the usefulness of the minimal pair drills in the perceptual acquisition of English tense and lax vowels by Korean speakers of English. In both tests, the perceptual ability to identify L2 sounds was measured by having the participants identify English tense or lax vowels or discriminate between them after hearing a series of words containing English tense or lax vowels. 21 participants were randomly assigned to three groups, in which each group consisted of 7 participants. The first task as a pretest was administered to all the groups to measure their perceptual ability to identify English tense and lax vowels. This pretest was supposed to provide a basis for testing research hypotheses. In the pretest, each participant was asked to listen carefully to a word containing tense or lax vowels such as /iy, ɪ, uw, ʊ/[4] *(e.g. leave, live, pool, pull)*, and then to choose an appropriate one out of two words given for the word. The two words were either written in the answer sheet (type A - 20 questions) or spoken via a headphone (type B - 20 questions). The test consisted of 20 questions about a tense vowel and 20 questions about a lax vowel, and the participants could hear each question two times. (The complete list of words used in this test and the answer sheet appear in Appendix A & B). This test was preceded by a preliminary exercise that contained different items from the actual test in order to ensure that the participants understand the directions of this test, to follow the directions without any mistake, and to familiarize themselves with this test. In addition to this exercise, before beginning the actual test, the participants were asked to look over the words on the answer sheet and mention any words the meaning or pronunciation of which they did not know. In these cases, the participants were informed of the pronunciation and meaning of the unfamiliar words through a CD-ROM English dictionary installed in the laptop computer used for this test. The words for this test were recorded by using *Audacity 1.1*, computer software for recording and editing sounds, and I utilized sound files provided by Cambridge English Dictionary (CD-Rom) as the source of sound stimuli for this test. Before beginning the second task as a posttest, different experimental treatments were administered to each group in order to test the research hypotheses as follows.

[4] In this study, two types of a tense and lax distinction (/iy/ vs./ɪ/ and /uw/ vs./ʊ/) were tested since it has been reported that those vowels are difficult for Korean English learners to identify (Hoy-Son Kim, 2000; Yeon-Woo Lee, 2011; Joo-Hyun Park, 1984). Even though vowel contrasts like /ɛ/ vs. /æ/, /ow/ vs. /ɔ/ are also considered difficult for Korean learners, they do not show a tense-lax distinction. /ɛ, æ/ and /ow, ɔ/ are lax and tense vowels, respectively.

- ***1st Group (M-Group)*:** They are asked to hear a series of minimal pairs containing a tense and lax distinction before the posttest.
- ***2nd Group (T-Group)***: They are asked to hear a series of words containing only a tense vowel before the posttest
- ***3rd Group (L-Group)***: They are asked to hear a series of words containing only a lax vowel before the posttest.

These treatments were given to each group to decide whether or not the minimal pair drills are effective in helping Korean learners identify English tense and lax vowels and if not, which method - presenting marked or unmarked forms - would be more effective in making Korean English learners more aware of the difference between English tense and lax vowels. The first group (M-group) was given a series of minimal pairs showing a tense and lax distinction. On the other hand, T-group and L-group heard a series of words having only one type of vowel, i.e., tense or lax. The tense vowel stimuli involved 57 one-syllable words with tense vowels (e.g. *leave, pool).* The lax vowel stimuli used here contained 56 words, which were all one‐syllable words having lax vowels (e.g. *live, pull*). (The full list of each stimulus appears in Appendix C). Consequently, each group was given different experimental treatments in order to make each group more aware of a particular vowel sound ‐ lax or tense, or both sounds. After each group was given different types of vowel stimuli, the participants from each group were asked to perform the same test as the pretest. Then the mean differences between the two tests in each group were compared to decide which treatment – minimal pair, tense vowel, or lax vowel – effective in helping Korean English learners identify English tense and lax vowels.

3. Results

The results of the perception test of English tense and lax vowels by Korean native speakers are presented in Table 6. In the pretest, it was found that three groups performed similarly in both tense and lax questions. The mean total scores also showed that there was no difference in the capacity to identify both English tense and lax vowels (M-Group: 26.57, T-Group: 26.86, L-Group: 26.43).

Table 6

The Perception Test of English Tense and Lax Vowels /iy, ɪ, uw, ʊ/ by Korean Native Speakers of English

	T-Group				L-Group				M-Group			
	Pretest		Posttest		Pretest		Posttest		Pretest		Posttest	
	m	*SD*	*m*	*SD*	*m*	*SD*	*m*	*SD*	*m*	*SD*	*m*	*SD*
Tense Vowel (20 Questions)	14.43	2.94	16.71	2.5	13.71	2.63	13.86	2.67	14.00	3.06	16.14	2.67
Lax Vowel (20 Questions)	12.43	2.3	11.00	3.7	12.71	2.14	15.29	1.7	12.57	1.27	11.86	1.46
Total (40 Questions)	26.86	4.06	27.71	4.86	26.43	4.31	29.14	3.8	26.57	3.6	28.00	3.56

m=*mean* ***SD***=*standard deviation*

On the other hand, the difference between the mean scores in the perception of English tense and lax vowels by all the participants was significant at $p < 0.05$ on a *t*-test analysis (Table 7), suggesting that Korean speakers might show some differences in the perceptual acquisition of English tense and lax vowels, that is, lax vowels seem to be more difficult for Korean native speakers to perceive than tense vowels. This result seems to be consistent with many relevant studies and the prediction from the MDH.

Table 7

Mean Scores of Tense and Lax Vowel Questions (Pretest)

	Tense Vowel Q.	***Lax Vowel Q.***	***Total***
m	14.05	12.57	26.62
SD	2.75	1.86	2.43

In the posttest conducted after different treatments were administered to each group, the results indicated as shown in Figure 1 that the overall mean scores were improved slightly, regardless of whatever treatment was given to each group (T-Group: 67.1% → 69.3%, L-Group: 66.1% → 72.9%, M-Group: 66.4% → 70.0%), even though the mean differences between the pretest and the posttest were not significant.

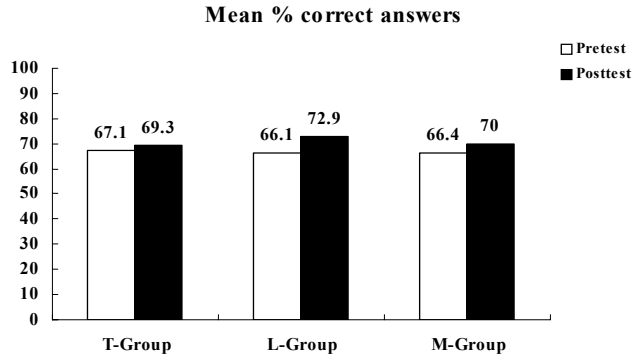
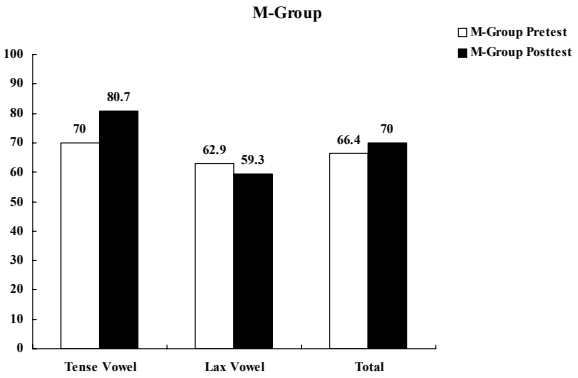


Figure 1. Mean % correct answers in the pretest and the posttest.

Furthermore, when only lax vowel stimuli were presented to the participants, the difference between the pretest and posttest was greater than when two other different types of stimuli - tense vowels and minimal pairs - were given to them (L-Group: 6.8% vs. T-Group 2.2% & M-Group: 3.6%).

Figure 2 indicated the mean percent scores that both M-Group and T-Group obtained in the two tests. Both groups performed worse for the perception of lax vowels in the posttest than in the pretest (M-Group: *lax vowel*: 62.9 > 59.3, T-Group: *lax vowel* 62.1 > 55.0), whereas the perception of tense vowels was enhanced in the posttest (M-Group: *tense vowel*: 70.0 < 80.7, T-Group: *tense vowel*: 72.1 < 83.6). The two groups' overall mean percent scores in the posttest increased slightly (M-Group: 66.4 < 70.0, T-Group: 67.1 < 69.3). However, the improvement of the overall mean percent scores and the tense vowel perception scores that M- and T- Group showed did not prove significant.



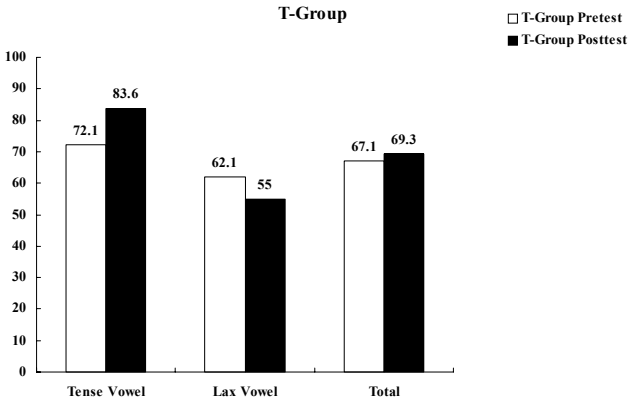


Figure 2. M-Group & T-Group: Mean % correct answers in the pretest and the posttest according to tense and lax vowel questions.

Finally, the L-Group to which a lax vowel treatment was administered prior to the posttest indicated somewhat different results from the previous two groups (Figure 3). In the posttest the L-Group participants showed a similar or better perception of tense and lax vowels, resulting in an increase in the overall mean percent scores (*tense vowel*: 68.6 < 69.3, *lax vowel:* 63.6 < 76.4*, total:* 66.1 < 72.9*).* In particular, unlike the results from other groups, the difference between the pretest and the posttest in the perception of lax vowels proved significant by a *t*-test analysis (p=0.0294).

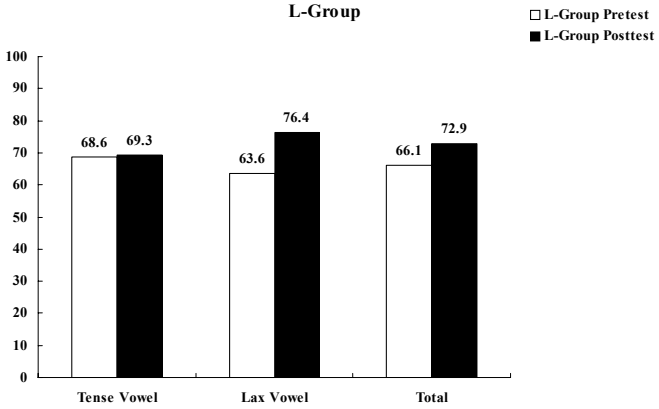


Figure 3. L-Group: Mean % correct answers in the pretest and the posttest according to tense and lax vowel questions.

IV. DISCUSSIONS AND PEDAGOGICAL IMPLICAIONS

In this study, the three hypotheses were formulated to explore the usefulness and appropriateness of minimal pairs in the English tense-lax vowel discrimination drills. The data obtained from this study clearly support the Hypothesis 3, implying that the use of minimal pair drills might be less effective in Korean speakers' identification of English tense-lax vowels than any other ways, in particular, a way of presenting only lax vowels. This result seems to be contrary to the prevailing tendency to use the minimal pair practices for teaching English tense-lax vowel discrimination, at least, at the beginning level.

On the other hand, note that the hypothesis 2 places emphasis on the order of acquisition that actually corresponds to the degree of markedness. Thus, it is postulated that presenting less marked forms i.e., a tense vowel, earlier than more marked forms i.e., a lax vowel will be more effective to ultimately master the two L2 sounds. That is, this hypothesis claims that following the acquisition order, which is determined by the degree of markedness, would be more helpful in learning English tense and lax vowels. On the other hand, the hypothesis 3 predicts that if more marked forms are presented before less marked forms are given, it would be more conducive to learning two opposite items. Note that this prediction is based on the notion of an 'implicational language universal' or 'typological language universal.' Since, according to this language universal, the existence of marked features implies the existence of the corresponding less marked features, if a language learner acquires more marked forms first or earlier, then the learner would be expected to learn the corresponding less marked forms automatically.

To test the above hypotheses, different types of vowel stimuli as treatments were administered to each group (M-Group, T-Group, and L-group) before conducting the posttest. When comparing the mean percent correct answers from the pretest and the posttest, the result showed that the overall performances of three groups were improved slightly (M-Group: 66.4 < 70.0, T-group: 67.1 < 69.3, L-Group: 66.1 < 72.9). In particular, L-Group, which received only lax vowel stimuli prior to the posttest, showed a larger increase in the mean percent score than other groups such as M-Group and T-group, which were presented with minimal pair stimuli and tense vowel stimuli, respectively (L-Group: 6.8% vs. M-Group: 3.6% & T-Group 2.2%). However, since the differences that all groups showed in the two tests did not prove to be statistically significant, it seems to be impossible to determine which group performed better than other groups.

However, if we look at the data collected from the two tests in more detail, we may find out how the different treatments influenced the perception of English vowels by Korean speakers. First, in the case of both M-Group and T-Group, it was found that the perception of tense vowels was improved in the posttest, whereas the mean percent scores of lax

vowels decreased (M-Group: tense vowel: 70.0 < 80.7, lax vowel: 62.9 > 59.3 T-Group: tense vowel: 72.1 < 83.6, lax vowel 62.1 > 55.0). That is to say, when only tense vowel stimuli were given to the participants, the result showed the same pattern as when minimal pair stimuli were provided as a treatment. This suggests that the two methods for helping Korean learner identify English tense and lax vowels - presenting tense vowels earlier than lax vowels and using minimal pairs - may produce a similar result, and furthermore, they might reduce the perception of lax vowels, even if they may enhance the perceptual ability of tense vowels. Second, the results from L-Group indicated that lax vowel stimuli had a positive effect on the perception of English tense and lax vowels by Korean native speakers. It was found that the L-Group participants showed a similar or better perception of tense and lax vowels in the posttest, resulting in the increase in the overall scores (tense vowel: 68.6 < 69.3, lax vowel: 63.6 < 76.4, total: 66.1 < 72.9). In particular, unlike other two groups, the difference between the pretest and the posttest in the perception of lax vowels proved significant by a *t*-test analysis (p=0.0294). This means that lax vowel stimuli improved the perception of lax vowels without reducing the perception of the tense vowel, contrary to other stimuli - tense or minimal pair stimuli. Consequently, this may clearly support the hypothesis 3 claiming that more marked forms - lax vowels - should be taught first so that Korean learners of English can identify marked forms and unmarked forms more accurately.

Although this study did not deal with the production of English tense and lax vowels by Korean native speakers, this result suggests that teaching a lax vowel (a more marked element) earlier than a tense vowel would help Korean learners to discriminate between tense and lax vowels more accurately, compared with a traditional minimal pair method which has been commonly used in pronunciation practice. This also means that we might consider not only differences between L1 and L2 forms but also their degrees of markedness to have L2 learners acquire different L2 items at least in L2 pronunciation education. Since it is assumed that L2 learners have already received sufficient L1 stimuli from their native languages and they have already internalized L1 sounds, it may be more important to compare L1 and L2 sounds, and to determine the degree of markedness, as proposed in the MDH, in order to develop and create more effective pronunciation teaching methods.

V. CONCLUSION

In L2 pronunciation education, minimal pair drills have served as a basic activity or exercise for helping L2 learners discriminate similar L2 sounds. Even though their role in L2 learning has been de-emphasized within the context of the Communicative Approach,

which places language functions over language forms, the drills are still being used as one of the effective ways to make L2 learners at the beginning level aware of the difference between L2 sounds. The present study attempted to re-evaluate the usefulness of the minimal pair drills through the concept of *markedness* or *typological markedness,* which was adopted by Eckman (1977) to account for L2 phonology such as the relative degree of difficulty in L2 acquisition. According to his Markedness Differential Hypothesis, it is predicted that Korean English learners might have some difficulty perceiving English tense-lax vowels, while English speakers might not have any problem with the identification of Korean tense vowels. In particular, with regard to the effectiveness of minimal pair drills in L2 acquisition of English tense-lax vowels by Korean speakers, the notion of *typological markedness* made it possible to construct the three different hypotheses about possible treatments for helping Korean learners identify L2 English tense-lax vowels: minimal pair stimulus, tense vowel stimulus (unmarked vowels), and lax vowel stimulus (marked vowels). The results from the study revealed that lax vowels turned out to serve as the most effective stimulus rather than the other two stimuli - minimal pair and tense vowels, suggesting that presenting only lax vowels (marked vowels) or presenting lax vowels (marked vowels) earlier might be a more effective way to improve Korean learners' ability to discriminate English tense-lax vowels than using the minimal pair drills, at least in a situation where Korean learners are taught to perceive difference between English tense and lax vowels. Although the current study does not focus on Korean learners' ability to produce English vowels precisely, it might be noteworthy that this study provides some insight into how and when we should use the minimal pair drills.

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APPENDIX A

Tense-Lax Vowel Discrimination Test

Directions: *you will hear the word spoken twice. After listening carefully to each word, choose the word you hear.*

(1) peak / pick	(2) dean / din	(3) fool /full	(4) suit / soot
(5) sleep / slip	(6) pool / pull	(7) Luke / look	(8) heat / hit
(9) cooed / could	(10) green / grin	(11) who'd/hood	(12) read / rid
(13) feet / fit	(14) fool / full	(15) feel/fill	(16) Luke / look
(17) pool / pull	(18) seek / sick	(19) least/list	(20) shoed/should

Directions: *You will hear the word spoken two times. Choose one word that has the same vowel sound out of two vowels you hear.*

(21)	A	B	(22)	A	B	(23)	A	B
(24)	A	B	(25)	A	B	(26)	A	B
(27)	A	B	(28)	A	B	(29)	A	B
(30)	A	B	(31)	A	B	(32)	A	B
(33)	A	B	(34)	A	B	(35)	A	B
(36)	A	B	(37)	A	B	(38)	A	B
(39)	A	B	(40)	A	B			

Thank you very much for your cooperation!!

APPENDIX B

Words used in the test

(1) peak	(2) din	(3) fool	(4) soot
(5) sleep	(6) pull	(7) Luke	(8) hit
(9) cooed	(10) green	(11) hood	(12) read
(13) fit	(14) full	(15) feel	(16) look
(17) pull	(18) seek	(19) list	(20) shoed
(21) foot / good / food	(22) boot / pull / tooth	(23) bid / deed / did	(24) beat / least / bid
(25) *push / bull / boot*	(26) *cool / wolf / true*	(27) *rich / feet / din*	(28) *each / did / deep*
(29) *look / cube / full*	(30) *truth / root / book*	(31) *fill / this / we*	(32) *scene / sin/ beef*
(33) *good/goose/would*	(34) *stool / move /stood*	(35) *pig / seat / sit*	(36) *speak / teeth / hill*
(37) *took / tool / put*	(38) *root / fruit / foot*	(39) *lid / street / gym*	(40) *need / leap / lip*

APPENDIX C

Words used in the tense, lax, and minimal pair stimuli

LAX VOWEL STIMULI

(1) pick	(2) din	(3) full	(4) soot
(5) slip	(6) pull	(7) look	(8) hit
(9) could	(10) grin	(11) hood	(12) rid
(13) fit	(14) fill	(15) sick	(16) list
(17) should	(18) foot	(19) good	(20) could
(21) pull	(22) did	(23) pick	(24) bid
(25) wool	(26) push	(27) bull	(28) wolf
(29) rich	(30) din	(31) mill	(32) did
(33) look	(34) hood	(35) full	(36) book
(37) fill	(38) this	(39) big	(40) sin
(41) good	(42) would	(43) full	(44) stood

(45) pig	(46) pick	(47) sit	(48) hill
(49) took	(50) put	(51) bush	(52) foot
(53) lid	(54) gym	(55) him	(56) lip

TENSE VOWEL STIMULI

(1) peak	(2) dean	(3) fool	(4) suit
(5) sleep	(6) pool	(7) Luke	(8) heat
(9) cooed	(10) green	(11) who'd	(12) read
(13) feet	(14) feel	(15) seek	(16) least
(17) shoed	(18) food	(19) boot	(20) tooth
(21) soup	(22) deed	(23) beat	(24) least
(25) sheep	(26) boot	(27) cool	(28) true
(29) blue	(30) feet	(31) deep	(32) each
(33) peak	(34) cube	(35) truth	(36) root
(37) proof	(38) we	(39) scene	(40) beef
(41) peach	(42) goose	(43) stool	(44) move
(45) stew	(46) seat	(47) teeth	(48) speak
(49) teach	(50) tool	(51) flu	(52) fruit
(53) root	(54) street	(55) leap	(56) need
(57) please			

TENSE & LAX VOWEL STIMULI (Minimal Pairs)

(1) peak /pick	(2) dean/din	(3) fool/full	(4) suit/soot
(5) sleep/slip	(6) pool/pull	(7) Luke/look	(8) heat/hit
(9) cooed / could	(10) green/grin	(11) who'd/hood	(12) read/rid
(13) feet / fit	(14) feel / fill	(15) seek / sick	(16) least /list
(17)shoed / should	(18) deed / did	(19) bead / bid	(20) beat / bit
(21) sheep / ship	(22) reach / rich	(23) meal / mill	(24) deep / dip
(25) each / itch	(26) these / this	(27) scene / sin	(28) peach / pitch
(29) wooed / would	(30) seat / sit	(31) tool / took	(32) lead / lid
(33) leap / lip			

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