

## English front vowel perception by Korean and Japanese learners of English

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### 1. Introduction

Recently, one of the greatest concerns in association with adults' foreign language (L2) pronunciation acquisition is whether or not native language (L1)'s phonological system is influential. Also another concern is that, if there is any influence of the L1's phonological system, how much and how it influences L2 sound acquisition. To resolve this problem it is basically necessary to secure target language(s) (L2) and a native language (L1) which was already acquired by L1 speakers for the experiment of L2 sound acquisition. However experiments using only an L1 and an L2 may elicit results and interpretations upon which debates can arise among scholars (For detailed discussion see Dissosway-Huff et al., 1982; Henry & Sheldon, 1986; Park & Ingram, 1995; Park, 1996). For this reason, the author opted for an L2 (English) and two L1s (Korean and Japanese) to carry out the experiment. In this paper the author restricted the scope of their experiment to the front vowels of Australian English to make clear discussion.

Standard Korean possesses four front vowels(/i/ 'ㅣ', /e/ 'ㅔ', /ɛ/ 'ㅚ', /a/ 'ㅏ')<sup>1)</sup>. Recently, however, it is reported from several scholars that a merger between Korean vowels /e/ and /ɛ/ is now arising among young Koreans under their 40s (Hong, 1991; Lee, 1989). Another reported phenomenon in Korean vocalic phonology is that the distinction of length of vowels is now disappearing among young Koreans (Lee, 1989; Huh, 1983). This phenomenon seems to be quite related to the Korean orthographic system where no diacritics of length

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1) For the purpose of the experiment, namely for making the identical set in both perception and production experiments, the author included /a/, 'ㅏ', 'ㅑ' as a front vowel.

distinction can be found whereas Japanese orthographic system possesses diacritics of length difference. Three front vowels /i, e, a/ are found in Japanese vowel system. Australian English has five front vowels /i, ɪ, ε, æ, a/. As can be seen, the three languages possess different number of front vowels. Therefore it can be predicted that Korean and Japanese learners of English will show different types of perception and production of English front vowels. Next section will treat the prediction upon the experiment.

## 2. Front vowel systems of Korean, Japanese and Australian English and Prediction on the experiment

Firstly, Australian English possesses a total of 12 monophthongs. These are divided into tense and lax vowels. The criteria of tense and lax vowels are not only quality difference of the monophthongs but also length difference of them. Table 1 shows the difference of distinctive features of the vowels which will be treated in this paper. A point in association with Australian English front vowels can be found from a controversial monophthong /æ/. This vowel can be classified as a long (tense) vowel in terms of longer length of /æ/ than /ε/ from the phonetic point of view (Flecher & McVeigh, 1992). However the absolute length of the vowel /æ/ is close to a short vowel. Also, the vowel /æ/ can not be located at an open syllable of one-syllable words from the phonological viewpoint. Therefore this fact shows that the vowel /æ/ possesses a characteristic of the short (lax) vowels<sup>2)</sup>.

<Table 1> Comparison of features of Australian English front vowels

	/i/	/ɪ/	/ε/	/æ/	/a/
High	+	+	-	-	-
Low	-	-	-	+	+
Front	+	+	+	+	-
Long (Tense)	+	-	-	?	+

2) For further reference, formant and duration of Australian English front vowels produced by the two Australian Speakers who participated in the experiment, KE, KI, JE, and JI groups were presented in the Appendices section.

As described, Korean possesses four front vowels. However, young speakers of standard Korean (younger than 50s) recently show a phenomenon of a merger between Korean vowels /ɨ/ and /ɪ/. Therefore it should be considered that three and four front vowel system of Korean depending upon the range of age of Korean native speakers. In addition the destruction of long/short distinction in Korean vowel system might cause the difficulty of length distinction of Australian English vowels.

In case of Japanese it possesses three front vowels (/i, e, a/). However Japanese speakers can distinguish six different vowels (/i, i:, e, e:, a, a:/), since Japanese phonology possesses length distinction as one of its characteristics.

The prediction of Korean speakers' perception and production of Australian English front vowels can be elicited from the differences of the three languages' front vowels' quality and length. Young Koreans (younger than 50s) may confuse Australian English /i/ with /ɪ/ and /ɛ/ with /æ/ because these two pairs possess pair members sharing similar quality. However, there will be no problem to distinguish Australian English vowel /a/. Old Koreans (older than 50s) may not confuse /ɛ/ with /æ/ since they possess /ɨ/ and /ɪ/ corresponding /ɛ/ and /æ/ in their Korean vowel inventory. However, they may still have some problem to distinguish Australian English vowel /ɪ/.

Japanese listeners may face difficulty in distinguishing /ɪ/ and /æ/ as in the cases of Koreans unless length feature makes a strong influence in Japanese phonology. However if length distinction makes an important role, Japanese listeners will not face any difficulty in distinguishing five Australian English front vowels.

### **3. Experiment (Perception)**

#### **3.1. Subjects**

An experiment was carried out to solve the questions introduced above. Five groups participated in this experiment. Four were composed of Koreans and Japanese living in Australia and the fifth group was composed of Koreans living in Korea. The fifth group (Korean Old group : KO) possessed five subjects in their fifties who received regular education of English but never

lived English speaking countries (three announcers, two professors). The experiment for the subjects of the fifth group (KO) was carried out in Korea. The remaining four groups were divided into two Korean (Korean Experienced (KE), Korean Inexperienced (KI)) and two Japanese (Japanese Experienced (JE), Japanese Inexperienced (JI)) groups. Each group was composed of five members. Korean and Japanese groups were divided into experienced (KE, JE: the subjects living in Australia more than 5 years) and inexperienced (KI, JI: the subjects living in Australia less than one year) groups.

The members of inexperienced groups (KI, JI) were all students learning English in Australian universities and the average of their ages was early twenties. On the other hand, the experienced groups (KE, JE) were composed of eight professors teaching Korean and Japanese to Australian university students and two workers in Australian companies and the average of their ages was early thirties. The difference of English proficiency between the experienced and inexperienced groups was great. The main purpose of putting emphasis on the factor of experience was knowing the influence of English speaking experience in L2 learners' improvement of L2 sound pronunciation. The experiments for these four groups were carried out in Australia.

### 3.2. Experiment words and procedure

Two male Australian speakers in their 40s recorded their voices with five English words 'heed, hid, head, had, hard' as citation forms. These recorded words were digitized at the sampling rate of 20,000 Hz using a sound analyzing program, 'Speech Station<sup>TM</sup>', and saved into a personal computer in the type of sound files. Later, these saved words were received to make an experiment type for a perception experiment. The total number of items in the experiment was 50 (5 words X 2 speakers X 5 repetitions). The order of items was decided randomly. Each item was given twice. The interval between the first stimulus and second stimulus of the item was 1.5 seconds and the interval between item and item was 5 seconds.

The subjects circled one of five examples for each item in the answer sheet after listening to each item from the experiment tape. The subjects were forced to select one although they thought that several examples were correct or nothing was correct. The subjects in Australia did not have any problem in taking this experiment and the subjects in KO group who did not have any

experience of living in English speaking countries, did not face any problem with the experiment either, because they had learned English as a regular subject in high schools and universities.

### 3.3. Results

Table 2 shows the results of the perception experiment of each group. The vowels in the column show the target vowels and those in the row are perceived vowels by the subjects for the target vowels<sup>3)</sup>.

<Table 2> Matrices of perception results by Korean and Japanese subject groups

((R) = Response, (T) = Target)

#### Korean Experienced n=5

		i	ɪ	ɛ	æ	a (R)
(T) i		50				
ɪ		14	36			
ɛ				45	5	
æ				12	38	
a						50

#### Korean Inexperienced n=5

		i	ɪ	ɛ	æ	a (R)
(T) i		50				
ɪ		8	41	1		
ɛ		1		25	24	
æ				23	27	
a				1		49

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3) Inter-speaker variation was not great in identical groups.

**Korean Old** n=5

	i	ɪ	ɛ	æ	a (R)
(T) i	49		1		
ɪ	10	39	1		
ɛ		9	40	1	
æ			15	35	
a					50

**Japanese Experienced** n=5

	i	ɪ	ɛ	æ	a (R)
(T) i	50				
ɪ		50			
ɛ			50		
æ			1	49	
a					50

**Japanese Inexperienced** n=5

	i	ɪ	ɛ	æ	a (R)
(T) i	49		1		
ɪ		49	1		
ɛ		1	48	1	
æ			4	46	
a					50

Table 3 shows the results of statistical analysis for the errors of the subjects' perception for each target vowel appeared in Table 2. A series of one-way ANOVAs (Analysis of Variances) were carried out where the number of errors was dependent variable and respective groups were independent variables. The perceptions of Australian English front vowels of Japanese subjects were more accurate than those of Korean subjects. JE group members hardly made any errors in the perception. JI group made some errors for /ɛ-æ/ distinction.

<Table 3> Summary of ANOVAs : Perception of each vowel and the relations between respective groups

Dep. Var.	mean square	F-ratio	P-level	Comparisons
Total Errors	104.06	12.13	0.00004**	KI>KE,KO>JI,JE
Errors on [i]	0.05	1.32	0.29	
Errors on [ɪ]	6.97	3.49	0.027*	KE,KO,KI>JI,JE
Errors on [ɛ]	20.08	10.90	0.00009**	KI>KO,KE>JI,JE
Errors on [æ]	15.11	4.42	0.01**	KI>KO,KE>JI,JE
Errors on [a]	0.04	0.46	0.46	

Here, \* $p < 0.05$ ; \*\* $p < 0.01$

The members of KO group who did not have any experience of living in English speaking countries made similar perceptions of the five Australian English vowels to those of KE group members who had lived more than five years in Australia and had fluent English ability. However, the subjects of KI group made the worst perception results among the Korean groups. The distinction between /ɛ/ and /æ/, in particular, by the KI group was almost at the chance level. This means that KI subjects could not distinguish these two vowels in their perception. The outcome of ANOVAs shows that the main reason of perception differences of respective groups is differing difficulties for the distinction of /ɛ/ and /æ/. Also, Korean subjects revealed the difficulties of /i/ and /ɪ/ distinction. /i/ was preferred to /ɪ/ by the Korean subjects.

### 3.4. Discussion

KO group's better result than KI group in the perception of /ɛ/ and /æ/ seems to result from the fact that KO group members possess the distinction of /ɨ/ and /ɦ/ in Korean vowel system. It is because the existence of /ɨ/ and /ɦ/ in Korean vowel system might have given the KO subjects phonetic basis for the distinction of /ɛ/ and /æ/ in English. However, the perception results of KO group for Australian English /ɛ/ and /æ/ could not match the results of the two Japanese groups (JE, JI) although KO group's results were better than those of KI group members.

This outcome seems to show that there was another feature, as well as vowel quality, which played an important role in L2 learners' perceiving Australian

English front vowels. For the Japanese subjects, it would be the vowel length in Japanese phonology that plays an important role in perceiving Australian English vowels. Japanese subjects' almost perfect perception of /i/ and /ɪ/ seems to support our analysis.

On the other hand, KE group's better results than those of KI group in perceiving /ɛ/ and /æ/ vowels seems to show that the experience in English speaking countries plays an important role in the perception of English vowels. However, the two Japanese groups' (JE, JI) better results than those of KE group in perception of /ɪ/, /ɛ/, /æ/ seems to strongly support the importance of L1 phonology in L2 vowel perception.

#### 4. Conclusions

Thus far, we observed the differences of Korean and Japanese subjects through the experiment of perception of Australian English front vowels. The experiment results proved that L1 vowel system strongly influenced L2 learners' L2 vowel acquisition. Also, the merger of Korean vowels /e/ and /ɛ/ and disappearance of length distinction in Korean vowel system gave bad influence to Korean learners' acquisition of English vowels. Most studies of vowel acquisition predicted L2 learners' acquisition of L2 vowels on the basis of L2 vowel quality. But our experiment showed that vowel length also played an important role as another main factor as well as vowel quality in the field of L2 vowel acquisition. The further studies should treat the topics of which factor is more important between vowel length and quality and the relationship between these two factors in L2 vowel acquisition.

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