Strengths and Weaknesses in the Perception of the English Vowel Sounds of Korean University Students

Daekweon Bae
(Andong National University)

Daekweon Bae, Strengths and Weakness in the Perception of the English Vowel Sounds of Korean University Students. ***Modern English Education, 8***(2), 3-18.

Correct perception of speech sounds is essential to language learning and its manipulation in the reception and production of individual phonemes is the key to the successful pronunciation. This paper deals with the strengths and weaknesses in the perception of English vowel sounds, analyzed from the test results of 869 Korean freshmen students. Subjects participated in an Internet-based speech perception test and the data collected were treated electronically and analyzed statistically. The difference of the phoneme inventories of Korean and English gave influence on the average scores of each phonemic contrast. In addition, three independent variables were identified: gender, experience of learning pronunciation with foreign teachers, and time of first pronunciation study.

Keywords: [speech sound perception/vowel phonemes/phoneme inventory/발화음 인식/모음 음소/음소 목록]

1. Introduction

The acquisition of pronunciation skills has often been discussed along with the early-childhood education and the critical period, but Flege (1987) and other researchers argued that children and adult learners alike can improve their pronunciation skills through training. It is noted by the research evidence that the abilities to perceive speech sounds and produce intelligible utterances for

communication are related. In addition, Marron (2000) found out that low-literate adult learners made progress in their reading skills involving code-based instruction through the phonological methods utilizing the phonemic awareness tasks.

The main purpose of this paper is to examine and analyze speech sound perception of the English vowel sounds which the Korean university students have been learning in their campus. Chapter 2 will discuss the theoretical background of the speech sound perception to support the importance of the ability to perceive speech sounds not only for young learners but also for adult learners. The teaching and learning of English speech sound perception will be examined along with the factors of speech sound acquisition.

Chapter 3 will deal with the research design and method, and chapter 4 will analyze the English vowel sound perception of the freshmen students at a university located in Gyeongbuk province in 2006. To analyze correlational factors in their English vowel sound perception, personal data of subjects will be described and the results of an English speech sound perception test will be examined in detail. The independent variables will be analyzed regarding the correlational factors. The perception data of the subjects were examined through an Internet-based speech perception test, which focused on analyzing speech perception problems occurred in the course of the perceiving phonemes and suprasegmental phonemes that they have learned already. Detailed analyses will be conducted on the test results from the vowel section to find out the weaknesses and strengths of the freshmen students in the speech sound perception.

2. Theoretical Background

2.1 Teaching and Learning of Speech Sound Perception

Humans use and manipulate languages by being able to interpret and understand the sounds used in the language. Speech sound perception refers

to the processes of phonetic or phonological treatment to recognize and receive the language verbally expressed. The foreign speech perception might play an important role in the effective acquisition of the target language because languages differ in their inventories of speech sound or phonemes. This difference frequently leads to the difficulties when a foreign language is to be mastered. For example, Korean learners as well as Japanese learners of English have difficulty in distinguishing English sound /l/ from /r/. In addition, some Chinese learners of English have similar problems in distinguishing English sound /l/ from /n/ in the initial position [1]. The distance between English and Korean[2] and the difference in the phoneme inventory of English and Korean are posing difficulties in the acquisition of English as a foreign language.

With regard to the mastery of verbal English skills, the perception and production of intelligible speech sounds, though not accurate, is important. Many language teachers are likely to overlook pronunciation in their language instruction goals, generally more so with regard to adult learners. They tend to assume that the perception and production skills of speech sounds cannot be taught, but must be learned through practice. However, many research evidences reveal that the speech sound perception and production skills of adult and children learners alike can be improved through training (Flege, 1995; Underbakke, 1993) and that speech sound perception plays an important role in the acquisition of speech production skill (Action, 1984; Morley, 1991). If students are able to improve their speech perception and production, they can take responsibility for their own mistakes.

Thus, if perception plays an important role in speech production, and speech sound perception can be improved through training, then language teachers might be interested in the specific problem areas in their learners′ speech sound perception abilities. By identifying the specific areas of learners′ weaknesses,

---

1) In English, /n/ and /l/ are distinct phonemes (night-light) but for many Mandarine speakers, the initial /n/ and /l/ sounds are perceived as allophones.

2) Lett and O′Mara (1990) categorized relative learning difficulties of foreign languages for native English speakers into four categories. Korean is classified in the most difficult category with Arabic, Chinese, and Japanese.

teachers can assist learners to communicate in the target language more effectively by helping them to overcome the difficulties diagnosed in their speech sound perception. Learners would also need to be aware of their weaknesses in their own speech sound perception so that they may better recognize and monitor mistakes in their perception and production of English speech sounds as well as suprasegmental patterns.

2.2 Factors of Speech Sound Perception

Perception and production of proper speech sound is important in language acquisition of EFL learners. The fear a learner has of being misunderstood because of the poor speech sounds may influence how aggressive the learner is in seeking out opportunities to use the target language. Flege (1995) suggests that awkward speech sound may also encourage native speakers to judge learners' mental and affective state negatively, or cause negative personal evaluation to be passed. Morley (1991) asserts that learners with poor pronunciation have long-term difficulties in becoming effective oral communicators. Poor pronunciation might pose a real problem to the non-native speakers of English who teach English.

Like any other aspect of language acquisition, the level of pronunciation any learner attains may be influenced by many different factors. Some of the more prominent factors include the age of the learner and the native language background from which the learner comes. It has long been noted and commonly believed today that children have the innate ability to learn languages, and specifically acquire a new set of inventory of speech sounds or phonemes without the presence of a foreign accent. Many have debated that the ability to acquire the phonetic system of a non-native language disappears, or is at least significantly reduced, after the age of puberty, so-called the critical period.

Table 1
Pros of critical period hypothesis

Scholars	Arguments
Lenneberg (1967)	There is a period where the functions of the brain with regard to language and language learning are assigned to certain sections within brain. [Lateralization]
Krashen (1973)	Along with the lateralization of the brain comes a reduction of "cerebral plasticity" making it impossible for any learner to achieve native-like pronunciation in a second language.
Walsh & Diller (1981)	Although L2 learners may thoroughly acquire aspects of a foreign language other than pronunciation, complete success in pronouncing L2 is impossible because pronunciation is a "lower order" linguistic function which is genetically specified and consolidated in early development.

On the other hand, Flege (1987) argues against the critical period hypothesis [CPH], citing many good reasons to question whether the critical period for speech learning truly exists. He said that the critical period concept was not originally developed to describe human behaviors, but animal behaviors. He also mentioned that, in certain circumstance, he found out that adult may produce or perceive L2 sounds as well as, or even better than children. MacKain et al. (1981), Kuhl and Iverson (1995) also suggested similar argument against the CPH.

Table 2
Cons of critical period hypothesis

Scholars	Arguments
MacKain *et al.* (1981)	Japanese learners who have had sufficient conversational experience in English learn to label and discriminate the members of synthetic /r/ and /l/ continuum just like English native speakers.
Flege (1995)	No strong correlation between AOL (age of learning) and foreign accented speech was found. Instead, the data show similar correlations for all participants.
Kuhl & Iverson (1995)	The perceptual mindset of adult was influenced by exposure to the stimuli, indicating that adults possess some ability to change the way they perceive sound. Exposure to a particular language alters the phonetic perception of adults and infants alike.

Perhaps the most important reason for caution in accepting the CPH is that it presupposes an overly simple view of the speech learning process. Neurologists claims that a set of new phoneme inventory cannot be learned prefectly once a critical period has been passed (Lenneberg 1967). However, Flege (1987) argues that "Although this may be true, such a conclusion fails to provide insight into how L2 learning differs from L1 acquisition, or what actually causes foreign accent" (p. 234). The speech sound system of children might be more flexible to accept new phonemes than adults whose phonemic categories are established by extensive L1 experience. Nevertheless, it should be believed that the existence of adult-child differences is likely to arise from a variety of factors other than, or in addition to a critical period alone. The age factor of L2 learners inevitably functions together with other conditions, such as developmental factors, L2 input, motivation and affective factors, social factors, and incomplete learning, that co-vary with chronological age (Flege, 1987).

In looking at the arguments presented so far by many research results, the findings of these studies do provide some evidence as to the potentiality for adult learners to train speech sound perception skills. If this is true then the question is what can be done to help improve speech sound perception, and in turn the production ability, of L2 adult learners of English. The identification of the problem areas of speech sound perception could provide the learners with useful information on the areas for improvement regarding the speech sound perception skills.

3. Research Design

3.1 Subjects

Out of the total subjects of 869 students, there were 474 male subjects (45.4%) and 395 female subjects (45.5%). On the question about the length of private English study in addition to the official school education, the majority of them answered "none" (287 students, 33.0%). Those with more than 6 months were 234 students (26.9%) and the polarity in the study of English was identified. The average self study time turned out also to be mostly "none" by 509 students (58.6%). The overseas experience of the subjects was nearly none with 787 students (90.6%).

Table 3
Personal data of the subjects

Question items		No. of student	%	Question items		No. of student	%
Gender	Male	474	54.5	Learning pronunciation with foreign teachers	none	553	63.6
	Female	395	45.5		under 1	90	10.4
Year of birth	before 1985	83	9.6		under 3	90	10.4
	1986	57	6.6		3~6	61	7.0
	1987	588	67.7		over 6	75	8.6
	1988	139	16.0	Self study time per day	none	509	58.6
	after 1989	2	0.2		30 m.	243	28.0
Place of high school	Gyeongnam	62	7.1		1 hr.	93	10.7
	Gyeongbuk	583	67.1		2 hrs.	20	2.3
	Daegu	97	11.2		over 2 hrs.	4	0.5
	Gangwon	20	2.3	Overseas experience	none	787	90.6
	Gyeongki	45	5.2		under 1	66	7.6
	Chungchong	45	5.2		under 3	8	0.9
	Jeolla	6	0.7		3~6	3	0.3
	Seoul	9	1.0		over 6	5	0.6
	Jeju	2	0.2	Time of first pronunciation study	preschool	16	1.8
Private study	none	287	33.0		before 3	71	8.2
	under 1	105	12.1		el. 3-6	256	29.5
	under 3	148	17.0		middle s.	456	52.5
	3~6	95	10.9		high s.	70	8.1
	over 6	234	26.9				

3.2 Research Methods

The areas for improvement in the speech sound perception of freshmen students in a local university were analyzed through an Internet-based test that had a focus on diagnosing problems in the perception of vowels, consonants, word stress, intonation, and sentence stress. The test, labelled as the Perception

Of Spoken English [POSE] Test, is designed by Shewell (2005b) to be flexible as to how and when students can access the test. Students may have the option of completing all sections at once or each section individually and separately from the other sections.

The test was conducted during the Freshmen English Conversation classes with the support of 13 foreign teachers, which took about two months: one month for the preparation, planning, and preliminary instruction and the other month for the actual implementation of the vowel test. First, there was a workshop for the 13 foreign teachers at the beginning of the data collection to explain how the test should be implemented. The test format and the procedure were explained in detail and latent problems that might be expected to arise while conducting the data collection process were treated. In addition, the planning for the effective utilization of the existing Internet facilities and material preparation were taken into careful consideration. Finally, preliminary instruction of the test questions was agreed to be implemented so that the students would not experience any unnecessary and additional confusion when they encountered new vocabulary from the test. The ignorance of the word meaning along with the correct articulation presented in the test might override the speech sound perception problems.

The questions are presented in sentence pairs with illustrative pictures to help the students understand what the test sentences specifically mean. The sentences are the same except one minimal pair of words that are related to the speech sound pairs under investigation. There are 38 vowel question pairs that can be given to the students on a random sampling method. Students are supposed to give answers to 11 vowel questions in a test format. As a result, 869 students completed the vowel section test with personal data information.

4. Result Analysis

4.1 Vowel Perception

The vowel section that contains 38 items of minimal pair sentences diagnosed speech sound perception problems in 11 different vowel contrasts, of which original structure and final average scores are shown in the following table.

Table 4
Vowel contrasts and average scores

Phonemic contrast	Minimal Pair example	Average scores
/ɛ/-/æ/	bet/bat	2.10
/i/-/ɪ/	beet/bit	2.33
/ɑ/-/ʌ/	cot/cut	2.35
/ɑ/-/ɑr/	cot/cart	2.52
/ɑ/-/oʊ/	cot/coat	2.69
/ʊ/-/u/	pull/pool	2.72
/ʌ/-/ʊ/	putt/put	2.94
/ʌ/-/ər/	cut/curt	3.40
/æ/-/ɑ/	cat/cot	3.41
/ɛ/-/eɪ/	bet/bait	3.44
/ɛ/-/ɪ/	bit/bet	3.51

Vowel /ɛ/ was included in three phonemic contrasts of /ɪ/-/ɛ/, /ɛ/-/eɪ/, and /ɛ/-/æ/. The average score of /ɪ/-/ɛ/ was the highest and it may have been the easiest phonemic contrast to the Korean students. The average score of /ɛ/-/eɪ/ contrast was 3.44 and that of /ɛ/-/æ/ was 2.10, which is the lowest.

Table 5
Test result of vowel /ɛ/

Contrast	Correct answer (%)					M (SD)
	0	1	2	3	4	
/ɛ/-/ɪ/	1 (0.1%)	17 (2.0%)	85 (9.8%)	200 (23.0%)	566 (65.0%)	3.51 (0.760)
/ɛ/-/eɪ/	1 (0.1%)	22 (2.5%)	87 (10.0%)	245 (28.2%)	514 (59.1%)	3.44 (0.783)
/ɛ/-/æ/	47 (5.4%)	199 (22.9%)	322 (37.1%)	222 (25.2%)	79 (9.1%)	2.10 (1.027)

In the distinction of /ɛ/-involved contrast, students had the biggest difficulty against the vowel /æ/ and the smallest difficulty against the vowel /ɪ/. It is interesting to see two extremes under the same vowel /æ/. This vowel /ɛ/ can be transcribed as /ㅔ/, /ɪ/ as /ㅣ/, and /æ/ as /ㅐ/ in Korean. The contrast of /ㅣ/-/ㅔ/ becomes more obvious by Korean native speakers and this could have made the distinction of a similar set of English vowel /ɪ/-/ɛ/ an easy task for Korean students.

In the argument of Korean vowel system by shin (2000, p. 104), she consolidates /ㅔ(e)/ and /ㅐ(ɛ)/ into one Korean vowel. She explains that the discrimination of /ㅔ/ and /ㅐ/ does not exist any more in verbal communication, especially for young people in Seoul. The contrast of /e/ and /ɛ/ does not produce any oral and aural minimal pairs in Korean spoken language. The phonemic contrast of two similar Korean vowels /ㅔ/ and /ㅐ/ becomes more obscure and sometimes cause confusion in the spelling. Therefore, they are not contrasted any more in the phonology of Korean language.

On the contrary, the phonemic distinction of those two Korean vowels /ㅔ/ and /ㅣ/ becomes more frequent and obvious. Korean vowel /ㅔ/ is sometimes pronunciated as /ㅣ/, for example to distinguish first and second person pronoun, /n ɛ/ and /ne/ (Shin, 2000, p. 105). The first person pronoun 'nae' and the second person pronoun 'ne' are recognized as similar ones in the spoken Korean. Many of young Korean speakers, including the citizens of Seoul who use standard Korean language, use 'ni' instead of 'ne' in the place of the second person pronoun. This phenomenon can be easily recognized to many Korean native speakers in their everyday life and it can be assumed that this phenomenon

caused the difference in the average score of two English phonemic contrasts of /ɪ/-/ɛ/ and /ɛ/-/æ/ tested by a mass of university freshmen learners.

The test on the 11 vowel contrast has been conducted to find out the problem areas of the vowel sound perception by freshmen students. The most difficult vowel contrast pair was /ɛ/-/æ/ of which average score was 2.1 out of 4.0, which was followed by the contrast of /i/-/ɪ/ and /ɑ/-/ʌ/. The perception of these sound pairs should be given more focus in teaching and learners should seek for more opportunities to practice the perception of these speech sound pairs. The easiest contrast was the pair of /ɪ/-/ɛ/, which was followed by the contrast of /ɛ/-/eɪ/.

4.2 Independent Variables

As shown in the Table 3 above, 8 questions were presented to the students to collect personal data. Those factors were computed with test results by the t-test method to see what items might serve as independent variables, showing statistically meaningful differences. As a result gender, learning pronunciation with foreign teacher, and time of first pronunciation study was determined to be meaningful independent variables.

There were 474 male students (54.5%) and 395 female students (45.5%) in the population of test takers. The scores of vowel perception were analyzed in comparison with gender factor and an obvious trend was identified that female students are much better in the speech sound perception than male students. Male students were better only in the contrasts of /i/-/ ɪ/ and /ɛ/-/æ/, which were not meaningful statistically. In all other contrasts, female students were better. Especially, in the contrasts of /ɪ/-/ɛ/, /æ/-/ɑ/, /ɑ/-/ɑr/, /ɑ/-/oʊ/, /ʌ/-/ər/, /ʌ/-/ʊ/, /ʊ/-/u/, the superiority of female students were meaningful statistically as shown in the following table.

Table 6
Gender and vowel test result

		M	SD	t	p
/i/-/ɪ/	Male	2.33	1.035	0.141	0.888
	Female	2.32	0.985		
/ɪ/-/ɛ/	Male	3.39	0.819	-5.016	0.000**
	Female	3.65	0.656		
/ɛ/-/eɪ/	Male	3.40	0.817	-1.504	0.133
	Female	3.48	0.738		
/ɛ/-/æ/	Male	2.14	1.017	1.097	0.273
	Female	2.06	1.039		
/æ/-/ɑ/	Male	3.33	0.770	-3.506	0.000**
	Female	3.51	0.707		
/ɑ/-/ɑr/	Male	2.42	0.981	-3.554	0.000**
	Female	2.65	0.981		
/ɑ/-/ʌ/	Male	2.30	0.967	-1.597	0.111
	Female	2.41	0.931		
/ɑ/-/oʊ/	Male	2.62	0.984	-2.473	0.014*
	Female	2.78	0.963		
/ʌ/-/ər/	Male	1.62	0.560	-4.936	0.000**
	Female	1.79	0.461		
/ʌ/-/ʊ/	Male	1.42	0.566	-2.581	0.010*
	Female	1.52	0.539		
/ʊ/-/u/	Male	1.32	0.651	-2.254	0.024*
	Female	1.42	0.633		

** $p < 0.05$, * $p < 0.5$

There are 4 most statistically meaningful contrast and three of them are found in the group of easier vowel contrasts with relatively higher average scores. The contrast of /ɪ/-/ɛ/ was the highest and the contrast of /æ/-/ɑ/ was the third highest. The contrast of /ʌ/-/ər/ was the fourth highest and only the contrast of /ɑ/-/ɑr/ was located in the lower group at the fourth lowest. Explicit higher ability to perceive English phoneme contrasts by female students was identified mainly from the relatively easier group of contrasts.

Another analysis showed that those without the learning experience with foreign teachers scored slightly better in the contrasts of /i/-/ɪ/ (p>0.05, 0.874) and /ɛ/-/æ/ (p>0.05, 0.30), but they were not meaningful statistically. On the other hand, those with the experience showed higher scores in the other nine cases and three cases showed statistically meaningful differences.

Table 7
Experience of learning pronunciation with foreign teachers and test results

		M	SD	t	p
/i/-/ɪ/	With	2.32	1.009	0.158	0.874
	Without	2.33	0.015		
/ɪ/-/ɛ/	With	3.61	0.702	-2.941	0.003**
	Without	3.45	0.786		
/ɛ/-/eɪ/	With	3.48	0.795	-1.245	0.213
	Without	3.41	0.776		
/ɛ/-/æ/	With	2.03	1.050	0.936	0.30
	Without	2.12	1.015		
/æ/-/ɑ/	With	3.49	0.710	-2.323	0.020*
	Without	3.37	0.764		
/ɑ/-/ɑr/	With	2.62	1.015	-2.186	0.029*
	Without	2.47	0.968		
/ɑ/-/ʌ/	With	2.37	0.911	-0.505	0.614
	Without	2.34	0.974		
/ɑ/-/oʊ/	With	2.77	0.945	-1.813	0.070
	Without	2.65	0.993		
/ʌ/-/ər/	With	1.73	0.497	-1.666	0.096
	Without	1.67	0.538		
/ʌ/-/ʊ/	With	1.49	0.543	-0.888	0.375
	Without	1.46	0.563		
/ʊ/-/u/	With	1.39	0.650	-0.965	0.335
	Without	1.35	0.641		

** $p < 0.05$, * $p < 0.5$

The analysis also showed that the students who started their English pronunciation learning before middle school marked better scores than those who started after middle school, as shown in the following table.

Table 8
Time of first pronunciation study and test results

		M	SD	t	p
/i/-/ɪ/	Before	2.36	1.030	0.816	0.415
	After	2.30	1.000		
/ɪ/-/ɛ/	Before	3.54	0.752	0.890	0.373
	After	3.49	0.765		
/ɛ/-/eɪ/	Before	3.44	0.788	0.001	0.999
	After	3.44	0.780		
/ɛ/-/æ/	Before	2.11	1.007	0.315	0.753
	After	2.09	1.042		
/æ/-/ɑ/	Before	3.46	0.740	1.533	0.126
	After	3.38	0.751		
/ɑ/-/ɑr/	Before	2.59	0.996	1.505	0.133
	After	2.48	0.981		
/ɑ/-/ʌ/	Before	2.34	0.945	-0.116	0.907
	After	2.35	0.956		
/ɑ/-/oʊ/	Before	2.75	0.981	1.306	0.192
	After	2.66	0.974		
/ʌ/-/ər/	Before	1.75	0.503	2.471	0.014*
	After	1.66	0.535		
/ʌ/-/ʊ/	Before	1.50	0.551	1.543	0.123
	After	1.44	0.559		
/ʊ/-/u/	Before	1.38	0.643	0.868	0.386
	After	1.35	0.646		

* $p < 0.5$

There was just one contrast of /ɑ/-/ʌ/ in the reversed situation with a slight difference. In addition, when the results are regarded in terms of statistics, there was one contrast of /ʌ/-/ər/ ($p<0.05$, 0.014) of which difference was meaningful statistically.

5. Conclusion

The acquisition of pronunciation skills is involved with the correct perception of speech sounds and its manipulation in the reception and production of phonemes. Though there has been a controversy over the CPH, it was revealed that the pronunciation skills could be improved through training not only for the children but also adult learners. Considering the relationship of perception and production of the speech sounds, the identification of the areas for improvement in the perception of speech sounds would be beneficial for the learners to compensate for their weaknesses and to improve their pronunciation skills effectively.

English vowel sound perception of the freshmen students in a university located in Gyeongbuk province was treated and their strengths and weakness was discussed. A total of 869 freshmen subjects submitted valid vowel test results by taking an Internet-based test and the data collected were treated electronically and analyzed statistically. The English phonemic contrasts in the minimal pairs that are considered as allophones in the phoneme inventory of Korean showed lower average scores. The subjects had more difficulty in the distinction of those contrasts. The lowest score was found in the contrast of / ɛ/-/æ/ and the second lowest was from the contrast of /i/-/ɪ/. The highest score, which is the easiest, was produced from the contrast of /ɪ/-/ɛ/.

In addition, there were three meaningful independent variables: gender, experience of learning English pronunciation with native English speaking teachers, and the time of first pronunciation study. Female subjects showed higher discriminative ability than male subjects. The experience with foreign teachers and the earliness of the pronunciation learning had a positive relationship to the performance of discriminative function. Though the scope of this study is limited to the Gyeongbuk province and the population to the university freshmen, the weaknesses and strengths in the perception of English vowel sounds revealed through this study could be a useful source for pronunciation education.

References

Action, W. (1984). Changing fossilized pronunciation. *TESOL Quarterly, 18*(1), 71-85.

Bae, D. (2006). A pragmatic analysis of cross-cultural prospective and the implications for Korean EFL class. *Modern English Education, 7*(2), 3-18.

Chay, H. (2006). Adaptation of word-stress to the phonological variation: American English /e/-/i:/ and /i:/-/ai/. *Modern English Education, 7*(1), 16-32.

Flege, J. E. (1987). A critical period for learning to pronounce foreign language. *Applied Linguistics, 8,* 162-177.

Flege, J. E. (1995). Second-language speech learning: Theory, findings, and problems. In W. Strange (Ed.), *Speech Perception and Linguistic Experience: Issues in Cross-language Research* (pp. 229-273). Timonium, MD: York Press.

Kachru, B. B., & Nelson, C. L. (2001). World Englishes. In A. Burns, & C. Coffin (Eds.), *Analyzing English in a Global Context* (pp. 9-25). London: Routledge.

Krashen, S. D. (1973). Lateralization, language learning, and the critical period: Some new evidence. *Language Learning, 23,* 63-74.

Kuhl, P. K., & Iverson, P. (1995). Linguistic experience and the perceptual magnet effect. In W. Strang (Ed.), *Speech Perception and Linguistic Experience: Issues in Cross-language Research* (pp. 154-182). Timonium, MD: York Press.

Lenneberg, E. (1967). *Biological foundations of language*. New York: Wiley.

Lett, J. A., & O'Mara, F. E. (1990). Predictors of success in an Intensive foreign language learning context: Models of language learning at the Defense Language Institute Foreign Language Center. In T. S. Parry & C. W. Stansfield (Eds.), *Language Aptitude Reconsidered*. Englewood Cliffs, NJ: Prentice.

MacKain, K., Best C. & Strang, W. (1981). Categorical perception of english /r/ and /l/ by Japanese bilinguals. *Applied Psycholinguistics, 2,* 369-390.

Marron, M. A. (2000). What is the role of lower-level process in the reading of low-literate adults? A descriptive study and a training study. *Dissertation Abstracts International, 61* (12), 232B. (UMI No. 9998623)

Morley, J. (1991). The pronunciation component in teaching English to speakers of other languages. *TESOL Quarterly, 25*(2), 481-520.

Scovel, T. (1969). Foreign accent: Language acquisition and cerebral dominance. *Language Learning, 19,* 245-254.

Shewell. J. R. (2005a). *Hearing the difference: A computer-based speech-perception diagnostic tool for non-native speakers of English*. Unpublished master's thesis, Brigham Young University, Utah.

Shewell, J. R. (2005b). Perception of spoken English test. Retrieved April 20, 2006, from http://eslactivities.com/pt

Shin, J. (2000). Understanding of speech sound. Seoul: Hankookmunhwasa.

Underbakke, M. E. (1993). Hearing the difference: Improving Japanese students' pronunciation of a second language through listening. *Language Quarterly, 31,* 67-89.

Walsh, T., & Diller, K. (1981). Neuro-linguistic considerations on the optimal age for second language learning. In K, Diller (Ed.), *Individual Differences and Universals in Language Learning Aptitude* (pp. 112-141). Rowley, Mass: Newbury House.

Daekweon Bae
Language Center/Andong National University
388 Songcheon-dong, Andong
Gyeongbuk, South Korea 760-749
Tel: 054-820-5772
E-mail: bdk@andong.ac.kr

논문접수일자: 2007. 6. 10
게재확정일자: 2007. 7. 20