

Korean Native Speakers' Perception of English Sounds According to the Groupings of Phonetic Contrasts*

Gina Kim** · Soo-Jin Kim***

ABSTRACT

The purpose of this study was to investigate Korean native speakers' perception of English sounds according to groupings of phonetic contrasts. The four groupings looked at were vowels, voicing (voiced – unvoiced), fricatives with difference in place of articulation, and other clusters of specific sound contrasts, such as stop-fricatives and liquids. The position of a sound in syllable was also examined. According to the results of ANOVA and a post-hoc analysis, the perception of vowels, in the medial position was different from that of consonants in the initial and final position. Vowels proved to be the most difficult group to perceive correctly. With the consonants, there was not a big difference whether the contrasts came initially or finally. The order of difficulty was liquids, fricatives, stop-fricatives, and finally voicing.

Keywords: Perception, Phonetic Contrasts, Korean Native Speakers, English Sounds

1. Introduction

This study was sparked by the fact that most Korean university students have a problem with pronouncing English sounds, especially those that do not exist in Korean. This led to the questions, Are the students unable to distinguish specific English sounds when they hear them? Or, is their perception of English sounds unproblematic but they have problems with production? Are muscles used for articulation undeveloped or untrained to pronounce the sounds? Flege (1992) had pointed out that foreign accents are caused, at least in part, by the inaccurate perception of L2 (second language) sounds. He stated that accurate phonetic perception is a necessary, though not sufficient

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** Dept. of General English and Education, Korea Nazarene University

*** Dept. of Communication Disorders, Korea Nazarene University

condition for accurate L2 segmental production.

Many research papers that have concluded that as children grow older, their abilities to distinguish target language sounds that are non-existent in the mother tongue diminish (Werker & Tees, 1984a, 1984b; Werker & Pegg, 1992; Wode, 1994). Since the age factor is crucial, much related research has been done in areas of cross-linguistic perception and production studies with the focus on age.

In this study, however, the age factor is not the main issue. Rather, we wish to look at the relationship between L2 linguistic abilities and perception. The students had been divided into different classes according to English proficiency in terms of vocabulary and grammatical knowledge beforehand. A difference was detected in the different classes of students in the degree of understanding of spoken English even at the vocabulary level. Therefore, another question was raised: Is there a relationship between English proficiency in the areas of vocabulary and grammar and the perception of English sounds?

Whereas most related studies were done in America, this study was conducted in Korea. Therefore, it can be beneficial in the Korean educational field in that there is a large population of students who have studied and is studying English. It would also benefit the clinical field in Korea and abroad for the diagnosing and treatment of Korean people.

The research questions are as follows. 1) Is there a relationship between L2 vocabulary and grammatical abilities and the perception of English sounds? 2) Are differences of perception detected according to initial, medial, or final place of contrast? 3) Are differences of perception detected according to the grouping of contrasts? 4) Is there a difference of perception whether the contrasts come initially or finally?

2. The Experiment

The subjects were 70 Korean native speaking university freshmen who were taking "English Reading" at Korea Nazarene University. They were in three separate classes, upper-intermediate, intermediate, and elementary, according to their placement test (vocabulary and grammar) scores. All of the students that participated in the study were taught by one of the authors and no special emphasis was put on pronunciation

and perception throughout the course.

All freshmen at Korea Nazarene University were given a placement test for "English Reading" at the end of the spring semester. The test consisted of 100 questions. The first 50 vocabulary questions were based on the Peabody Picture Test and the other 50 were grammatical judgment questions. The results of the placement test were in normal distribution. Out of more than 1200 students who took the test, about 100 students were put into upper-intermediate classes, about 150 into elementary, and the rest were put into intermediate classes.

It is a well-known fact that even though there are some sounds that exist in both Korean and English that can be substituted, there are many English sounds that do not exist in the Korean sound system (Moon, 1997). For this study, a total of 36 contrasts were chosen as perception test phonemes. The English sounds that do not exist in the Korean phonemic system were chosen. We tried to include most of the sounds that do not exist in Korean. In addition, a few other choices of phonemes were made based on expected difficulty from the teaching and experimental experiences of the authors.

The contrasts consisted of 4 vowel contrasts and 32 consonant contrasts. The contrasts were grouped into four categories. First, there were vowels. Then, within the consonant contrast were voicing (voiced - unvoiced), fricatives with difference in place of articulation, and other clusters of specific sound contrasts such as stop - fricatives, and liquids. For the consonants both positions, word-initial and word-final, were looked at. (See Appendix.) Two minimal pairs were selected per contrast. From this a perception test consisting of 72 questions was formed.

Whereas other studies focused on specific sounds such as vowels (Moon, 1997) or liquids (Yamada, 1995), we tried to include a variety of sounds categorized in groups as mentioned above.

Consonant-vowel-consonant (CVC) one-syllable real words were used for the experiment. The reasons were that 1) they were frequently used communicative words, 2) other cues, such as intonation and/or prosody in multi-syllable words could be excluded. CVC one-syllable words are frequently used when testing perception of English sounds using English words as in Kent et al's 1989 study.

The minimal pairs containing the various sounds in English were read by a native speaker of English and recorded by an engineer in a recording studio. The recording was used to test the subjects' perception of English sounds. The subjects were asked to choose and check the pair of words heard from the recording out of 4 possible answers.

This is an example of the questions given to the students.

1.	Ⓐ	pit – pat	Ⓑ	pat – pit	Ⓒ	pit – pet	Ⓓ	pat – pet
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3. Results and Discussion

As mentioned in the introduction, a difference in understanding of spoken English in the classroom was detected among the different proficiency levels. Therefore, in order to find the relationship between the placement test scores and the students' perception abilities, a correlation analysis was conducted. There was a significant correlation between the placement test scores and the perception test scores with .417 ($p < .001$). The phonemic discrimination ability could predict the placement test score with only 17% ($R^2 = .17$).

One-way ANOVA was used to find the significance of the difference in perception detected according to initial, medial, or final position of the sound in a syllable. As shown in Table 1, it proved to be significant at .001. According to a post-hoc analysis (Scheffe), vowels, thus medial position, was different from the other positions. In other words, the perception was different between initial-medial and final-medial contrast.

Table 1. The differences according to position in syllable.

	SS	Df	MS	F	sig.
Between groups	20053.80	2	10026.90	72.80	.000
Within groups	25479.90	185	137.73		
Total	45533.70	187			

The finding that native Koreans failed to discriminate English vowel contrasts such as /i/ - /ɪ/ and /ε/ - /æ/, just as in our study was done by Flege (1995). The Korean subjects who were learning English in America were divided into two groups depending on the number of years they had been in America. Group 1 had a mean of 7.3 years, and group 2 had only 0.8 mean years of stay. The results showed that the rate of misidentifications of vowels spoken by the two Korean groups did not differ significantly.

Bohn's (1995) experiment with native English, Spanish, and Mandarin subjects shows

that rather than the influence of L1 (first language) vowels, their ability to differentiate L2 vowels were proven to be based on vowel duration or spectral differences. It is suggested that similar experiments with native Koreans' perception of vowels could give answers in that respect. From our study, the perception of vowels that come in medial position, the perception was shown to be more difficult than perception of consonants in initial or final position.

The third research question of this study was to find whether differences of perception were detected according to the groupings of contrasts. As mentioned earlier, the groupings of contrasts were vowels, voicing (voiced – unvoiced), fricatives with difference in place of articulation, and other clusters of specific sound contrasts, such as stop-fricatives and liquids. The mean and standard deviation scores for the groupings of contrasts are compared and given in Table 2.

Since we chose CVC one-syllable words in the perception test, it would be difficult to compare the difficulty of vowel perception according to the position of the vowel in this study. However, it was interesting to find that there was not a big difference in perception between the initial or final position of the contrasts. The order of difficulty was vowels, liquids, fricatives, stop-fricatives, and finally voicing, which seemed the easiest to discriminate.

Table 2. The mean percentage and standard deviation scores of perception per groupings of contrasts.

Groupings of contrasts	Mean	SD
Vowels (M)	60.71	16.78
Voicing (I)	88.55	6.36
Voicing (F)	85.26	8.30
Fricative (I)	77.51	18.73
Fricative (F)	81.35	20.06
Stop-Fricative (I)	80.69	15.03
Stop-Fricative (F)	82.01	12.72
Liquids (I)	75.40	21.29
Liquids (F)	65.32	33.37

I: initial, M: medial, F: final position in syllable

It was found that when children acquire their first language, stops are acquired first and liquids last (Jakobson, 1941). Therefore, among consonants, liquids seem to be the most difficult whether learning the sounds as L1 in childhood or as L2 later in life. As

for vowels, although there is variation among individual children and languages, Dutch children acquire vowels comparatively later in life (Fikkert, 1994).

To find the difference of perception whether the contrasts come initially or finally, a paired T-test was done. Among the various groupings of contrasts, voicing was the only category that showed significant difference. As in Table 3, there was no significant difference detected in fricatives contrasts nor in stop-fricatives contrasts. Only the voicing contrasts difference was significant at .05 level.

Table 3. The results of paired T-test.

	t	Df	Sig.
Pair 1 Voicing I- F	2.630	62	.011
Pair 2 Fricatives I - F	-1.305	62	.197
Pair 3 Stop-fricatives I - F	-.723	62	.473

4. Conclusion

From the results of this study, there seems to be a connection between L2 linguistic abilities and the perception of L2 sounds. It was personally rewarding to find that L2 proficiency did indeed have a relationship with the ability to discriminate L2 sounds perceptually. It is thought that other L2 linguistic abilities such as listening comprehension and/or oral skills will also be related to perception.

In this experiment, it was unique that we chose to analyze perception in groups of phonetic contrast (common and natural classes of phonetic contrast features). If students find difficulty with a particular group, the common perceptual traits of the group can be focused on using the materials in the appendix. Furthermore, it could be more easily generalized in discrimination of similar qualities.

In future studies, the difference in phonemic discrimination abilities according to each contrast will be looked at. Especially, focus will be put on the groupings that the students found the most difficult, that is vowels, liquids, and fricatives. Also, the relationship between the perception and the production of the phonemes are going to be researched. Furthermore, the degree of improvement or progress after treatment in the students' perception and/or production will be analyzed.

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▲ Gina Kim

Department of General English and Education, Korea Nazarene University
456 Ssangyong-Dong, Chonan-City, Choong Nam, 330-718, Korea
Tel: +82-41-570-7959
E-mail: gnkim@kornu.ac.kr

▲ Soo-Jin Kim

Department of Communication Disorders, Korea Nazarene University
456 Ssangyong-Dong, Chonan-City, Choong Nam, 330-718, Korea
Tel: +82-41-570-7978 Fax: +82-41-570-7783
E-mail: sjkim@kornu.ac.kr

Appendix.

Phonetic Contrast and Minimal Pairs

	Phonetic Contrast (IPA)	Minimal Pairs	
Vowels	i-æ	Medial	Pit-pat/lip-lap
	ɛ-æ		Bait-bat/kate-cat
	ɛ-æ		Pen-pan/met-mat
	ɪ-i		Fit-feet/bit-beat
Voicing	p-b	Initial Final	Pill-bill/pea-bee Tap-tab/rip-rib
	t-d	Initial Final	Till-dill/tip-dip Knot-nod/pat-pad
	k-g	Initial Final	Kill-gill/cap-gap Lock-log/peck-peg
	f-v	Initial Final	Fine-vine/fat-vat Life-live/belief-believe
	θ-ð	Initial Final	Thin-then/thigh-thy Breath-breathe
	s-z	Initial Final	Sip-zip/seal-zeal Rice-rise/bus-buzz
	tʃ-dʒ	Initial Final	Chilly-jelly/chin-gin Rich-ridge/breech-bridge
Fricatives	f-s	Initial Final	Fin-sin/foe-sew Knife-nice/rife-lice
	θ -s	Initial Final	Thin-sin/think-sink Mouth-mouse/math-mass
	s-ʃ	Initial	Sip-ship/seat-sheet
Stop-Fricatives	p-f	Initial Final	Pin-fin/pull-full Leap-leaf/snip-sniff
	b-v	Initial Final	Ban-van/bend-vend Curb-curve/dub-dove
	t-θ	Initial Final	Tin-thin/tank-thank Bat-bath/fate-faith
	d-θ	Initial Final	Din-thin/die-thigh Bad-bath/fade-faith
	d-ð	Initial Final	Den-then/dare-there Bad-bathe/seed-seethe
Liquids	ɹ-l	Initial Final	Read-lead/ rip-lip More-mole/roar-roll
	ɹ-w	Initial	Rich-witch/rock-walk