

A Study on Tensification

Lee Seung-chull

Dept. of English Language and Literature

(Received December 30, 1981)

〈Abstract〉

It is a well-known fact that the voiced plosives in English are realized as tense plosives in Korean. It shows that two languages have the same sounds in them, but may have different phonological systems.

Phoneticians and linguists have different views of plosives and the primary differentiating features. But the main stream can be divided into two: one is of voicing feature, the other is of tensing feature.

In this paper, I have studied the two features and clarified that the tensification of English voiced plosives is due to the degrees of opening of the vocal folds.

경음화 현상에 관한 연구

이 승 철

英 語 英 文 學 科

(1981.12.30 접수)

〈국문요약〉

영어의 유성과파열음은 한국어에서 된소리가 되는 현상은 주지의 사실이다. 이는 어느 두 언어가 같은 소리를 가지고 있으나 음운체계는 서로 다를 수 있다는 한 증거이기도 하다.

파열음을 구분짓는 자질이 무엇인가에 대한 주장은 여러갈래이나 크게 voicing feature와 tensing feature로 대별해 볼 수 있다. 본 논문에서는 이 두 자질을 개관하고 상대의 열림의 정도가 영어의 유성과파열음이 한국어에서 된소리로 인식되게 하는 요인임을 밝혀보았다.

I. Introduction

It sometimes appears that to utter a certain speech sound is one thing, to be able to hear and discern the sound is another in the linguistic behaviour. One example is that the Koreans hear and pronounce differently the initial sounds of English words such as 'bus', 'gum'. Such voiced plosives are not, of course, included as phonemes in Korean but since they

are realized in a specific phonetic environment, e.g. between voiced sounds or vowels, they are not the sounds that Koreans can not produce at all.

Then why is it that Koreans change a sound which they can produce to a different one? Of course, the answer is simple: Koreans have their own phonological rules, and when they pronounce a foreign word they stick to their rules; a voiced stop sound is impossible in an initial position of a word while possible between

voiced sounds or vowels.

We can easily understand why Koreans change the initial voiced plosives in English to different sounds. However there is a problem to solve: why are English initial [b, d, g] realized in Korean as [p', t', k'] instead of voiceless plosives [p, t, k] or any others? Why is it that the voiced plosives [b, d, g], which are allophones of voiceless plosives [p, t, k], are replaced by tense sounds and not reduced to their original phonemes?

Here, I will examine the phonetic characteristics of the sounds and the inevitable relation between Korean and English phonological system.

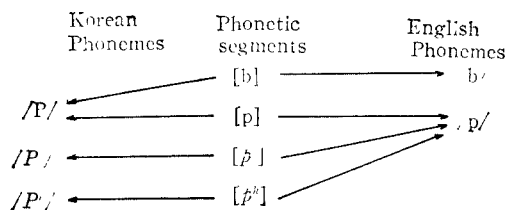
II. Criteria of Primary Differentiating Features

Phoneticians and linguists have different views of plosives and quite different assertions about what the primary differentiating features are. But the main stream can be divided into two—one is of voicing feature (voiced/voiceless), the other is of tensing feature (tense, lax, or fortis lenis). Heffner(1950), one of several linguists who advocated tensing feature as the differentiating feature, differentiated plosives by fortis/lenis, and considered the criterion to be the degree of plosive strength which he claimed was to be determined according to the degree of compression that had been built until the moment of plosion. Stetson(1956) argued that tensing rather than voicing be the standard for the differentiation of consonants, for the difference in the compression until the pronunciation of consonants which would be differentiated by fortis/lenis was the standard and the resulting tensing was lasting longer than voicing. Jakobson-Fant-Halle(1963) explained that a tense sound was stronger in compression than a lax sound and made more strained the muscles of tongue, vocal folds, and the walls of other articulatory

organs. Also they held that a strong tension in a neutral position was transformed at the articulatory organs into the extreme.

However, Jones(1959), Pike(1943) and Ladefoged(1964) were doubtful of tensing. They asserted that tensing couldn't be a fundamental criterion which differentiated sounds, for the standard of it was impressionistic or was not clearly put forward. While there had been no reference to the relation between tensing and voicing, Lisker--Abramson(1964) strongly claimed that a kind of a physical standard, whether physiological or acoustic, be not explained without regard to voicing. Moreover they argued that no authentic ground had been presented for the pure physiological examination concerning tensing. But contrary to them Kim(1965) found out that tensing could be evaluated in the physical numerical value as a consonant-differentiating standard, through close examinations of Korean plosives with various acoustic experiments. Yet, he made implicative assertions that voicing was merely a fundamental norm, and that we could not exclude from consideration other factors like voicing which were concerned with articulations.

From the assertions and claims of many linguists we understand that there can not be any single standard for determining sounds especially plosives, and that the standard depends on what language it belongs to. For example phonemes and allophones in Korean plosives are not identical with those in English ones. Where the voiced sounds which are phonemes in English are allophones in Korean, tense sounds [p', t', k'] and strongly aspirated [p^h, t^h, k^h] which are phonemes in Korean are in turn allophones in English. The relation between the two can be illustrated as follows:



Moreover all the plosives in Korean are voiceless and opposed in aspiration, but in English it is in voicing that the plosives are opposed.

III. Aspiration and Voicing Lag

Now let us examine Korean plosives a bit more deeply. According to Kim(1965), voicing was the standard, contrary to the position cherished by many Korean linguists that tensing was the criterion to differentiate plosives. Skaličková(1960), along with Martin(1958) explained that Korean plosives were to be differentiated by voicing and tensing and especially voicing time of vowels which followed plosives. Since most linguists explained aspiration with regard to voicing lag, aspiration and voicing lag may be said to be in an inseparable relation with each other. Kim(1965) and Sohn(1974) found out the correlation between the degree of aspiration and voicing lag. For example, the voicing lag is about 90—98 msec. in [p^h, t^h, k^h] which are strongest in aspiration, 10—16 msec. in [p^l, t^l, k^l] which are least aspirated and 25—48 msec. in weakly aspirated [p, t, k]. Accordingly both voicing lag and the degree of aspiration should be taken into consideration in the determination of the standard for differentiating plosives in Korean.

Now let us look further into the correlations of aspiration and voicing lag. First, aspiration has been traditionally explained as “puff of air” or “breath” with stress on the impressionistic phenomenon of the sounds. Jones (1956) defined:

“Voiceless plosive consonants pronounced in such a way that voice begins at the instant of the plosion are said to be unaspirated breath is heard immediately after the plosion. The sounds are then said to be aspirated”.

And Heftner(1950) gave a similar definition to it:

“If the release is impulsive or sudden, the rush of air out of or into the stopped cavity may be vigorous and puff-like Stops which have it are called aspirated: stops which lack it are called unaspirated stops.”

Such definitions were predominant among linguists such as Bloomfield(1933), Gleason(1961), Malmberg(1963), etc.. But many others have explained it as voicing lag, among whom Lisker-Abramson(1964) defined: “Aspiration... is regarded simply as a large delay in voice onset.”

However according to Kim(1970) and Sohn(1976) who conducted their research based on cineradiographic film, it was found that aspiration had something to do with the opening of the vocal folds at the moment of the plosion of plosives. The width between the vocal folds was about 1cm in case of severely aspirated [p^h, t^h, k^h], 1—1.5 mm in case of non-aspirated [p^l, t^l, k^l], and 3—4 mm in mildly aspirated [p, t, k]. The importance here is that the time it takes for the vocal folds to get together is nearly in accordance with that of voicing lag.

This newly found fact has provided a sufficient ground for synthesizing varied theories concerning aspiration so far. That is to say, it can provide an explanatory basis for “puff of air” or “voicing lag” which is a definition through observations of only the exterior phenomena of aspiration. Since the gap between the vocal folds is widened in case of strongly aspirated [p^h, t^h, k^h], it naturally follows that the amount of air stream is large and voicing lag gets longer because it takes long time for the vocal folds to contact with each other for the articulation of the following vowel. On the other hand, the gap between

the vocal folds is no more than 1 mm at the moment of plosion of [p', t', k'] which have no aspiration at all. So the stream of air that has started from the lungs is checked for the moment by the vocal folds, and just a small amount of air flows so that there is no "puff of air", and because the gap is narrow in this case it takes much shorter time for the vocal folds to begin to vibrate than in [p^h, t^h, k^h] where the gap is wide. Naturally the voicing lag will be short. Finally as for [p, t, k], the vocal fold gap is around 3 mm at the moment of plosion of the sounds. Thus the stream of air is to some extent allowed to flow and weak aspiration is observed.

II. Replacement of Voiced Plosives

Now let us find out what relation the various phenomena concerning aspiration have with the replacement of English voiced plosives with tense plosives.

As pointed out above, voiced plosives in Korean are mere allophones and not phonemes. This means that the voiced plosives [b, d, g] cannot be used as meaning-differentiating sounds but are only realized as variants according to the phonological rule. Though Koreans pronounce the sounds unconsciously and naturally they do not hear nor have to hear the sounds conscious of the difference between the sounds and other sounds, that is, the phonemes. As language relates sounds to meanings, it is natural that no attention be paid to sounds which do not differentiate meanings. So Koreans do not hear English initial voiced plosives as they are but recognize them as other most similar sounds found in Korean. Accordingly English voiced plosives are replaced with these sounds which are thought to be similar sounds, because it is easiest to vibrate vocal folds in case of tense plosives with narrow gap between the vocal folds. Indeed tense plosives are felt to be

similar to voiced plosives since voiced plosives in English are not entirely voiced when they occur at the initial position and since voiceless plosives in English become strongly aspirated [p^h, t^h, k^h] at the initial position.

V. Conclusion

So far I have examined the tensification phenomenon of English voiced plosives. Two languages have same sounds in common, that is, allophones but may have different system of phonemes. In Korean, there are voiced plosives not as phonemes but as allophones of voiceless plosives that are phonemes. So English voiced plosives are realized as tense plosives in Korean because it is easier to vibrate vocal folds in case of tense plosives than in that of other plosives, for narrow is the gap between the vocal folds.

References

- Bloomfield, L. 1933. *Language*. New York, Holt, Reinhart & Winston.
- Gleason, H.A., Jr. 1961. *An Introduction to Descriptive Linguistics*. New York, Holt, Reinhart & Winston.
- Heffner, R. 1950. *General Phonetics*. Madison, University of Wisconsin Press.
- Jakobson, R.G., Fant, G. and Halle, M. 1963. *Preliminaries to Speech Analysis*. Cambridge, Mass. The M.I.T. Press.
- Jones, D. 1956. *An Outline of English Phonetics*. 8th ed. New York, Dutton.
- Kim, C.W. 1965. "On the Autonomy of the Tensity Feature in Stop Classification." *Word* 21 : 339-359.
- _____. 1970. "A Theory of Aspiration." *Phonetica* 21 : 107-116.
- Ladefoged, P. 1964. *A Phonetic Study of West African Languages*. Cambridge, England, The Cambridge University Press.
- Liberman, P. 1964. *Intonation, Perception,*

- and Language*. Cambridge, The M.I.T. Press.
- Lisker, L. and Abramson, A. 1964. "A Cross-Language Study of Voicing in Initial Stops: Acoustical Measurements." *Word* 20 : 384—422.
- Malmberg, B. 1963. *Phonetics*. New York, Dover.
- Pike, K.L. 1943. *Phonetics*. Ann Arbor, University of Michigan Press
- Skaličková, A. 1960. "The Korean Consonants." Rozpravy Československé akademie ved. *Roenik* 70, Sesit 3, Praha.
- Sohn, H. 1974. Some Notes on Stop Consonants. Unpublished Research Paper.
- _____. 1976. A Cineradiographic Study of Selected Korean Utterances and Its Implications. Unpublished Doctoral Dissertation, University of Illinois.
- Stetson, R.H. 1951. *Motor Phonetics*. Amsterdam, North-Holland Pub. Co.