

FRENCH AND KOREAN PLOSIVES: A COMPARATIVE ANALYSIS

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ABSTRACT

The aim of this study is to examine, for French and Korean, differences between acoustic temporal cues in the production of plosives by French and Korean bilinguals.

The Korean consonantal system has three unvoiced plosives:

	lenis	aspirated	glottalized
bilabials	p	p ^h	p ^ʔ
alveodentals	t	t ^h	t ^ʔ
palatals	c	c ^h	c ^ʔ
velars	k	k ^h	k ^ʔ

It is admitted for French that there are two series of plosives:

unvoiced	p	t	k (fortis)
voiced	b	d	g (lenis)

They differ as to their voicing status (voiced/unvoiced) and their degree of tension (lenis/fortis).

The main question addressed here is, how can one explain the difference in behaviour for apparently the same elements that are in a similar context? The answer to this question is discussed in relation to the notion of the phonetic context and its influences. An additional theoretical notion should also be taken into account; that of a system, a decisive factor that can not be dissociated from the notion of "phonological constraints".

A series of experiments are presented, in which identical stimuli are used to examine similar cue-trading relations in the perception of the voicing contrast in word stops in French and Korean. Predicted cross-linguistic differences are found in the basic category boundary and in the case of cue trading between VOT and aspiration.

INTRODUCTION

The native language (L1) one learns in early childhood and a second language (L2) learned later in life often influence one another. The authentic pronunciation of phones in a foreign or second

language (L2) may require the establishment of new phonetic categories. Even though the acoustic differences resulting from these different articulators may be detectable (Flege and Hammond, 1983; Flege, 1990), listeners seem to classify realisations of /t/ in Spanish and English as the "same" at a phonological level. For example, Bohn and Flege (1990) found that Spanish monolinguals consistently identified long-lag English [t^h] tokens as /t/ in a two-alternative forced-choice test. English monolinguals identified Spanish short-lag [t] tokens as /t/ in the majority of instances even though they had VOT values that, in an experiment with synthetic stimuli, would be expected to give rise to the perception of /d/ (Williams, 1977; Flege and Ecfing, 1986).

Second language (L2) speech production researches have shown that few late learners fully differentiate /p,t,k/ in their two languages if voiceless stops in the L1 are realized with short-lag VOT values and voiceless stops in the L2 are realized with long-lag VOT values. Previous studies have shown that many adult L2 learners produce English /p,t,k/ with significantly shorter VOT values than English monolinguals, but with significantly longer VOT values than monolingual native speakers of the learners' first language (L1) (Port and Mitted, 1983; Nathan, 1987; Flege, 1987). When late learners' VOT values for English /p,t,k/ are intermediate to the values observed for monolingual speakers of the L1 and L2, they are said to have been produced with "compromise" values (Williams, 1980). The seeming limitation on how accurately VOT in English /p,t,k/ is produced also seems to apply to adolescents and older children (Flege and Ecfing, 1987). Flege and Hillenbrand (1984) hypothesized that an upper limit exists on the extent to which late L2 learners can approximate the phonetic

norms of English for /p,t,k/ based on the observations that compromise VOT values.

The results of other L2 production studies, on the other hand, suggest that even early learners may fail to produce English /p,t,k/ authentically. Caramazza et al. (1974) found that native French speakers who began learning English by the age of 7 produced English /p,t,k/ with significantly shorter VOT values than native speakers of English. Flege and Ecfing (1987) also found that native Spanish adults and children who began learning English as a second language by the age of 5 to 6 years produced English /p,t,k/ with significantly shorter VOT values than age-matched groups of native English subjects. These studies suggest that early learners may be unable to fully differentiate /p,t,k/ in L1 and L2, and thus, support the view that both the L1 and L2 phonetic systems remain activated to some degree.

In summary, previous research have established that late learners are apt to produce English /p,t,k/ with VOT values that are too short for English. But it remains uncertain as to whether early learners will also differ from native speakers of English, or if they will fully differentiate corresponding L1 and L2 stops. Few previous studies have examined whether learning L2 affects how bilinguals produce stops in their L1. It appears that no previous study has directly compared the production of L2 stops by early and late learners. The aim of this study is to determine if such sub categorical phonetic differences between native and non-native speakers will suffice to cue the detection of VOT (consonant duration and duration of the preceding vowel).

I. EXPERIMENT

A. Methodology

1. Subjects

Two groups of monolinguals (six males: 3 French, 3 Koreans) and one group of bilinguals (3 Koreans: males) participated as paid subjects. The native French and the native Korean monolinguals differed little in mean age (31 vs 25 years). The native French were students at the University of Strasbourg. The native French-speaking Koreans did not begin learning French until they were

adults. The subjects in this group were native speakers of Korean who learned French as a second language. The learners indicated that they were first exposed massively to French when they started their university studies in Seoul between the ages of 18 and 19.

2. Materials and procedures

Owing to phonological differences between French and Korean, it was not possible to find a list of matched French and Korean words. Each speaker uttered a series of words in carrier sentences (with comparable syllabic structures) at a normal self-selected speaking rate. The reading task was modeled at a moderate speaking rate on the instruction tape using a list of utterances resembling those on the randomized list.

3. Measurements

Native (Group 1: Control Group) and non-native (Group 2: Experiment Speakers Group) produced minimally paired /VCV/ syllabic structures. Each of the test words occurred three times on the French and Korean lists. A total of 36 phrases in Korean and 27 phrases in French from the middle of each list were digitized at 10 kHz.

B. Results

The subjects, made identifications of medial stops as /p,t,k/ French or /p,t,k,p^h,t^h,k^h,p^ʔ,t^ʔ,k^ʔ/ Korean. In the experiment, VOT was measured in the French words of carrier sentences (with comparable syllabic structures) spoken by 3 French monolinguals and by 3 Korean bilinguals who had learned French and in the Korean words spoken by 3 Korean monolinguals. Each speaker uttered a series of words in carrier sentences (with comparable syllabic structures) at a normal self-selected speaking rate. The study aimed first at determining the differences between the production of the voiceless stops and the differences in the degree of palatalization (revealed by VOT) for the two languages using the VOT values, and second, at analysing the characteristics of the French consonants produced by native French-speaking Koreans.

Results discussed mean VOT values for French and Korean voiceless stops tokens that were produced in utterance-medial position. The value shown here averaged across the /a/ context. VOT, we

have noticed, is the principal cue in distinguishing the three Korean plosives, as both absolute and relative VOT values for aspirates are different from those of the non-aspirates.

In Korean, VOT is, therefore, among the indicators that permit us to distinguish the three categories of Korean voiceless stops, which is very important in making a distinction between the aspirated consonants and the glottalized consonants for utterances in medial position.

As expected, the monolingual French speakers' VOT is superior to the voiceless glottal stops of VOT of the French-speaking Koreans.

Also, as expected, the French-speaking Koreans produced the French plosives with shorter VOT values than the French monolinguals, as their VOT correspond to values comparable with those of the glottal plosives for Korean.

The duration of Korean plosives permitted us to distinguish between the three categories, i.e. aspirates, glottals and lenis in an intervocalic context.

Total consonant duration in Korean allows distinguishing aspirates, from glottals and lenis consonants, when flanked by vowels; the voiced counterparts are always shorter.

With regards to the duration of the preceding vowel, we recognized that this measure is not an indicator sufficient to distinguish the voiceless plosives of French-speaking Korean, even less in the case of the aspirated plosives and of the glottalized plosives. The duration of the preceding vowel is clearly shorter before the lenis plosive velars in comparison with the lenis plosive bilabials and the lenis plosive alveodentals.

In the case of the French plosives of the native French, (as well as in the case of the Korean bilinguals), the duration of the preceding vowel, being practically identical, does not constitute an indication of differentiation.

II. FINDINGS, DISCUSSION & IMPLICATION

This study will be very useful for comparing our results with any other recent research on VOT especially in FLEGE's works. This experiment yielded results that were very much the

same as those obtained in his experiments. Both the native French, the native Korean monolinguals and the Korean bilinguals produced French and Korean plosives

The bilingual Korean subjects had larger VOT differences in the sentence condition, where the French and Korean sentences were produced in alternation.

These changes, in the production of VOT of the bilinguals, are more important than the results obtained by CARAMAZZA for French-English bilinguals. This is also a very strong tendency, as in the research of WILLIAMS (1977), for the voiced /b/ of bilinguals in English.

CARAMAZZA & YONIKOMSHIAN (1974) have concluded that VOT is a sufficient phonological cue for the distinction of the homorganic stop consonant of French spoken in Paris. They have also proposed an explanation for the observed differences between French and Canadian French based on a linguistic change hypothesis.

FLEGE (1988, 1990), on the other hand, hypothesized that complete separation of sounds in the L1 and L2 phonetic inventories is possible, at least for early learners.

Previous studies have shown that many adult L2 learners produce English /p,t,k/ with significantly shorter VOT values than English monolinguals, but with significantly longer VOT values than that of monolingual native speakers of the learners L1 (FLEGE & PROT, 1981; PORT & MITLER, 1980; HATHAN, 1987; FLEGE, 1987A; NATOR, 1987; LOWIE, 1988).

According to FLEGE & EEFTING (1987), it appears that proficient Dutch speakers of English produced Dutch /t/ with shorter VOT values than non-proficient subjects, suggesting they formed a new category for English /t/.

This finding corroborates our results. As mentioned earlier, VOT is the strongest cue in differentiating Korean plosives. VOT in French is superior to that for the glottal class in Korean. For French-speaking Koreans (stressed = 22 ms; unstressed = 17 ms), VOT values are not high and correspond to those obtained for French speakers (stressed = 25 ms; unstressed = 18 ms), as they also correspond to those measured for

glottalized Korean plosives (16 ms). However, VOT for the glottals in Korean are shorter than that for French spoken by Koreans.

The findings of FLEGE (1987) presented here indicate that adults are capable of learning to produce new phones in an L2 and of modifying their previously established patterns of articulation when producing similar L2 phones. It appears that the mechanism of equivalence classification leads to identifying acoustically different phones in L1 and L2 as belonging to the same category. This may, ultimately, prevent them from producing exactly similar but new phones authentically.

CONCLUSION

We can therefore conclude that Korean bilinguals who speak French realized another form for French /p,t,k/. We are dealing here with a new category for French /p,t,k/. Because VOT values of French voiceless stops /p,t,k/ produced by Korean bilinguals are very similar to VOT values by French monolinguals. But it seems, under examination of consonant duration, that neither Korean glottalized consonants nor French voiceless stops are used by Koreans who speak French and, with regard to VOT, it is not used for Korean consonant aspirated. This may correspond to a new category of voiceless plosives (for French-speaking Koreans).

These results are interpreted to mean that individuals who learn L2 later in life are also able to establish phonetic categories for sounds in the L2 that differ acoustically from corresponding sounds in the native language. The results strongly suggest that the late L2 learners produced /p,t,k/ with slightly longer VOT values in French than Korean glottalized plosive and shorter VOT values in French than Korean aspirated plosive by applying different realization rules to a single phonetic category.

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