THE EFFECT OF TRAINING ON THE DISCRIMINATION OF ENGLISH VOWELS

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This study analyses the effect of training on the perception of English vowels by native speakers of Basque and Spanish. Participants were 109 university students who received a training course in English Phonetics and were asked to complete some questionnaires and vowel perception tests. The findings confirm that training exerts a positive effect on the perception of English vowels and that this effect is also related to the desire to acquire a native accent.

1. INTRODUCTION

The emphasis on communicative competence (Canale & Swain, 1980; Celce-Murcia et al., 1994) as the goal to be achieved in second and foreign language learning has underestimated the importance of phonetics in second language development. The shift of focus from linguistic competence to other dimensions of communicative competence (sociolinguistic, discourse, pragmatic, strategic) has drawn the attention from accuracy in linguistic competence to conversational appropriateness and fluency. In this context, phonetics has often been regarded as an area of linguistic competence which is of limited value in communication and it has not been assigned a central role in communicative language teaching.

It is also believed that phonetics is a specialized area which is not worth teaching because of its difficulty and poor outcomes and that learners acquire it without specific training. In the case of English and because of the lack of correspondence between sound and spelling, it is often thought that phonetic competence is acquired with more or less accuracy depending on age or exposure rather than on training and that pronunciation is fossilized at a certain stage and it is not worth teaching (Morley, 1994).

Although the age factor is still an unresolved issue in second language acquisition, the popular belief that young children are better at pronunciation than adults has been supported by empirical studies
(Asher & Garcia, 1969; Fathman, 1975). Nevertheless, some authors (Flege 1992a, 1992b, 1995) believe that adults have the ability to perceive and produce sounds as well as children. Adults retain their innate capacity to discriminate between sounds but change their strategies and rely on phonetic rather than sensory perception so that their perception of L2 sounds is biased by their L1 phonetic system and tend to perceive L2 sounds in terms of the categories in their L1. As far as production is concerned, Neufeld (1980) proposes that the only disability that adult learners may face is psychomotor rather than psycholinguistic and Flege (1992a, 1992b, 1995) argues that foreign accent is a consequence of the establishment of stable phonological representations for sounds in the L1. These proposals have important implications for the acquisition of phonetics because discrimination strategies and psychomotor abilities may be more suitable to be changed by training than other specific abilities. In fact, research studies in which specific training in different areas of phonetics has produced positive effects on perception and production seem to confirm these proposals (Bongaerts et al., 1997; see Pennington, 1998 for a review). Nevertheless, the effect of training has not always been proved and some research studies indicate that other factors may be more influential than training (Suter, 1976).

In recent years there is a growing interest in phonetics among researchers and L2 teachers and evaluators (Morley, 1991, 1994). It has come to be recognized that pronunciation is an essential part of communication and that intelligibility is an essential component of effective oral communication (Morley, 1994). The recent emphasis on the learner's needs has also assigned an important role to phonetics as learners tend to value pronunciation very highly among L2 learner abilities (Nunan, 1988). This interest in phonetics is also reflected in second language research which is shifting its focus from L2 syntactic development to other areas including phonetics (Major, 1998).

Phonetic development in L2 is related to a large number of individual and contextual factors. Among the individual factors, and apart from age, the factors which have received more attention are aptitudinal and affective factors. Phonetic coding ability has been recognized as an area of language aptitude and included in language aptitude tests such as the MLAT and the PLAB (Carroll & Sapon, 1959; Pimsleur, 1966). Other abilities related to phonetics are the ability to mimic, musical ability and
the ability to detect accents (Carroll, 1981; Neufeld, 1979, 1988; Thompson, 1991).

Among the affective variables that have been related to phonetic development, identity has been identified as a crucial factor. According to Guiora & Schonberger (1990) pronunciation occupies a unique position in language behavior because it defines a unique language identity. Phonological features are among the most salient linguistic dimensions used by speakers to create a sense of personal identity and in foreign language contexts acquiring a native pronunciation may be felt as identifying with native speakers of a different culture. Some models of second language acquisition, such as the Pidginization Hypothesis (Schumann, 1978) and Accommodation Theory (Giles, 1977) have proposed that ethnic identity is one of the main predictors of second language acquisition and ethnicity can also influence phonetic development in the L2 (Zuengler, 1982). Therefore, the phonetic development of learners could be affected by the relative identification with their own group and the outgroup and some learners may present a stronger wish to acquire a native accent than others. Other affective variables which have been related to phonetic development are attitudes and motivation (Gardner, 1985; Purcell & Suter, 1980; Suter, 1976). Most studies on affective variables deal with pronunciation but affective variables are also likely to influence perception.

The present study analyses the acquisition of English phonetics in a foreign context by native speakers of two languages, Basque and Spanish, which share their vowel systems in spite of their different origin. The study focuses on the perception of English vowels and the influence that ability and affective factors exert on this perception. The specific research questions addressed in this study were the following:

i) Which simple vowels and diphthongs are more easily recognized and which are more difficult for Spanish/Basque learners of English?
ii) Does training have any effect on the discrimination of English simple vowels and diphthongs?
iii) If training has some effect on the discrimination of English sounds, are affective and aptitudinal factors and language proficiency related to this effect?
2. METHOD

Subjects. A total of 109 university students (10.2% male and 89.8% female) participated in this study. Most students (82.3%) were between 18 and 21 years of age and all of them were in their first year of English Studies at the University of the Basque Country. Most subjects (72.2%) had been studying English for 7 years and they reported an intermediate level of proficiency in English. Most subjects had Spanish as their first language (77.8%) and those who had Basque as their first language (11.1%) were bilingual in Basque and Spanish. Most subjects were more familiar with British English (78.7%) than with other varieties of English and 67% of the students had visited an English speaking country.

All the subjects in the sample were enrolled in an English Phonetics course. This course aims at providing some theoretical background in English Phonetics as well as aural practice in sound discrimination. The course was 14 weeks long and consisted of 28 hours of theory and 28 hours of practice including phonetic transcription and aural discrimination exercises. The theoretical classes dealt with the description of English sounds including their articulation and their use as individual sounds and in connected speech. The phonetic transcription classes were devoted to written practice using the IPA phonetic symbols to transcribe written texts. A total of 14 hours was devoted to aural discrimination training and this training included listening and identification of English simple vowels, diphthongs and consonants as well as some stress and rhythm exercises. All the audio materials used for the training sessions were commercially available (Gimson, 1975; Roach, 1985) and represented the British English pronunciation known as RP (received pronunciation).

Instruments and procedure. The subjects were asked to complete several questionnaires and to take two tests of phonetic discrimination:

a. General Background Questionnaire. This questionnaire contained items on sex, age, mother tongue and exposure to English.

b. Aptitudinal and Affective Factors. A Likert format questionnaire in which the subjects had to choose one option, ranging from 'I strongly agree' to 'I strongly disagree,' (min=1; max=7) was used to measure
these variables. Aptitude was measured via two items (max=14) which referred to musical ear and the ability to recognize accents. The scores corresponding to aptitude were trichotomized so that for each of these variables the subjects were divided into three groups corresponding to low scores ($X_1; \bar{x}=6.51$), intermediate scores ($X_2; \bar{x}=9.59$) and high scores ($X_3; \bar{x}=11.59$).

The affective factors included the three components of Gardner's (1985) construct of motivation: two items on the desire to acquire a native pronunciation (max=14), three items on effort (max=21) and four items on attitude towards the teaching situation (max=28) were included to measure motivation. The scores for these variables were also trichotomized and three groups were formed for desire ($X_1, \bar{x}=10.21; X_2, \bar{x}=12.62; X_3, \bar{x}=14.00$); effort ($X_1, \bar{x}=14.39; X_2, \bar{x}=17.64; X_3, \bar{x}=20.00$) and attitude ($X_1, \bar{x}=16.06; X_2, \bar{x}=19.54; X_3, \bar{x}=21.88$).

c. English Proficiency. The measure of English proficiency was obtained via the subjects' report of their own proficiency in the four language skills: reading, writing, speaking and listening (max 40). The scores for this variables were also trichotomized and the subjects were allocated to three groups: relatively low proficiency ($X_1, \bar{x}=20.71$), intermediate proficiency ($X_2, \bar{x}=26.22$) and high proficiency ($X_3, \bar{x}=31.42$).

d. Phonetic discrimination tests. A test of aural discrimination was used in order to measure the subjects' perception of English vowels at the beginning of the course and after receiving 14 hours of training in phonetic discrimination. The test included eleven vowels and eight diphthongs, that is all the sounds in the RP vowel system except schwa /a/. The stimuli had been recorded by a native speaker of English using RP pronunciation and subjects were given the phonetic symbols for all the stimuli presented and were asked to identify the sound they had heard. The stimuli were arranged in a random order and each stimulus was presented twice during the test (max score=38). The subjects underwent an identical test of phonetic discrimination after the training sessions. The tests were taken by four groups of 25 to 30 students in a language laboratory.
3. RESULTS

Our first research question was to identify the degree of difficulty that the different English vowels have for Spanish and Basque speakers of English. The means that the subjects in our sample obtained for the two stimuli (min = 0; max = 2) corresponding to each of the sounds both before and after training are given in table I.

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<th>TABLE I. THE PERCEPTION OF ENGLISH VOWELS</th>
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The results indicate that English simple vowels are more difficult to identify than English diphthongs with the exception of diphthong /eə/ which was found to be one of the most difficult sounds to identify with a mean of .27 before training and .73 after training. Diphthongs are the sounds which are more easily recognized both before and after the training sessions. The more difficult sounds for speakers of Spanish and Basque are the long vowel /iː/, the short vowel /ə/ and the diphthong /eə/. It was found out that these sounds got the lowest scores both before and after the training sessions. Therefore, in general terms, the sounds which were difficult before training are also the most difficult to perceive after training and the less difficult also remain the less difficult after the training sessions.

Our second research question aimed at analysing the effect of training on the discrimination of English simple vowels and diphthongs.

In order to analyse the general effect of training on the discrimination of English vowels a T-Test was carried out and the following results were obtained:
The results of the T-test indicate that training exerts a significant influence (T = -17.11; S = .00) on the perception of English simple vowels and diphthongs. In fact, the mean obtained after a few hours of specific training in phonetic discrimination is 6.60 points higher than the mean obtained before training.

The results on the previous table indicate that the scores for all the simple vowels and diphthongs were higher after the training sessions with the exception of the long vowel /u:/ . The sounds which obtained relatively low scores in the first test are the ones which present a greater improvement while the sounds which were more easily recognized do not present major changes.

Our third question aimed at analysing the effect of aptitudinal and affective factors and language proficiency on the development of the discrimination ability. In order to answer this question several One-way analyses of variance were carried out in which the dependent variable was the difference between the general score of the first and the second test of discrimination, that is the difference between the scores obtained before and after the training sessions. The independent variables were the three components of Gardner's construct of motivation (desire, effort and attitude), ability for discrimination (musical ear and ability to mimic) and general proficiency in English. An analysis of variance was also performed with the scores on the first test of phonetic discrimination as the independent variable in order to know the relationships between the scores on the first test and the development of the discrimination ability. As it has already been explained, the scores for all the independent variables were trichotomized into three groups so that $X_1$ corresponds to the improvement in the discrimination test by the subjects who got the lowest scores in the independent variables. Similarly, $X_2$ corresponds to the improvement of those subjects who got the intermediate scores in the independent variables and $X_3$ to that of the subjects who got the highest scores in the independent variables.
The results indicate that the desire to acquire native pronunciation exerts a significant effect on the improvement in phonetic discrimination \((F=9.81, S=.00)\). The subjects who presented the highest scores on the desire measure were the ones who improved their phonetic discrimination score in nine points while those who did not present a strong desire to acquire native pronunciation also improved their discrimination ability but the improvement was not so noticeable. The results indicate that the other two measures of motivation (effort and attitude) did not exert a significant effect on the development of the discrimination ability. As well, the measures of ability and general proficiency in English did not influence the improvement in phonetic discrimination significantly.

The results of the One-way tests also show significant differences related to the scores obtained in the first discrimination test. The subjects who got the lowest scores in the first test of phonetic discrimination \((X_1, x=18.70)\) improved these scores in 9.27 points \((X_1, x=27.97)\) while the subjects with intermediate scores \((X_2, x=23.06)\) improved 6.75 points \((X_2, x=29.81)\) and those with high scores \((X_3, x=27.92)\) only improved 4.02 points \((X_3, x=31.94)\).
4. DISCUSSION

The results of this study indicate that the perception of some English vowels presents a special difficulty for native speakers of Spanish and Basque. This difficulty is observable both before and after the specific training sessions in vowel discrimination. Even though transfer is not the only factor affecting phonetic development in a second language (Major, 1987a) it is generally accepted that the categorization of foreign language sounds in terms of the first language phonemic inventory explains the difficulties in phonetic discrimination (Odlin, 1989). The fact that both Basque and Spanish only present five vowel phonemes while English RP presents twelve and that the inventory for diphthongs is more similar in the three languages could help to understand the difficulties in discriminating English vowels.

The results of this study also indicate that training exerts a significant effect on the discrimination of English simple vowels and diphthongs and confirm previous studies on the effects of training on segmentals and suprasegmentals (Bongaerts et al., 1997; see Pennington, 1998 for a review). The fact that the most difficult sounds are those which present the most important improvement has pedagogical implications as it highlights the positive effects of training.

The results of the One-way analyses also show that those subjects who obtained the best results before training presented less improvement than subjects with poor results. While the difference between the means of the lowest and highest group was 9.22 before the training sessions (18.7 vs. 27.92, max=38) it is only of 3.97 (27.97 vs. 31.94, max=38) after training. Thus, it seems that training is bringing the different groups together and that the discrimination abilities of the highest group have reached a threshold and do not benefit from the training sessions as much as it could be expected. These learners could possibly benefit from more hours of training or more likely from a different type of training. In fact, some studies have reported that some training is necessary for phonetic development but that subjects who had had more formal training are not better at pronunciation and that informal exposure to the language is a more relevant factor in phonetic development (Suter, 1976).

This threshold in phonetic discrimination could also be explained as related to ability, communicative need or affective factors. The influence
of the first language and age could influence the subjects' ability to achieve optimal results in vowel discrimination as it has been suggested by different authors (Asher & Garcia, 1969; Oyama, 1976; Major, 1987b). The results could also be related to communicative need as learners may feel that a relatively high discrimination of English vowels is sufficient for comprehension because they can rely on the interaction of several factors and not only on vowel discrimination. The fact that a significant relationship was found between the desire to acquire a native pronunciation and the improvement in the discrimination underlines the role of affective factors in phonetic development and fossilization (Schumann, 1978; Guiora, 1972; Pennington, 1998). These results also extend to phonetic discrimination the results of previous studies which prove that strength of concern for pronunciation accuracy is a good predictor of pronunciation (Suter, 1976; Purcell & Suter, 1980).

The relationship between affective factors and phonetic development addresses a very important issue in foreign language situations: Is it desirable to acquire a native accent? Do European non-native speakers of English wish to sound British or American? Native pronunciation is not a necessary condition for communication and some learners may wish to mark their L1 identity by retaining foreign accent features. It is generally agreed that intelligibility is a more realistic goal than nativeness as far as pronunciation is concerned (Dalton & Seidlhofer, 1994). Therefore, the aim of training can be 'to provide instruction that enables students to become, not 'perfect pronouncers' of English, but intelligible, communicative, confident users of spoken English for whatever purposes they need' (Morley 1991, 489).

Even though acquiring native pronunciation may not be considered a realistic or desirable goal in foreign language situations, discrimination is a crucial factor both for comprehension and intelligible pronunciation (Leather, 1983; Prator & Robinett 1985; Spolsky, 1989; Munro & Derwing, 1995). The present study proves the positive effect of training on phonetic discrimination but it presents some limitations. It focuses on the segmental level (simple vowels and diphthongs) and needs to be complemented by other studies on other segments and on the suprasegmental level (stress, rhythm, intonation) as well as studies on the relationship between discrimination and production. It would also be important to analyse the long term results of training by conducting
longitudinal studies and studies in which different training methods are compared.

Phonetic development in a second language is certainly a complex process involving cognitive, psychomotor, linguistic and interactive factors (Pennington & Richards, 1986; Major, 1987a; Pennington, 1998). The need to analyse the different factors affecting phonetic development is underlined by the fact that phonetics is not only part of linguistic competence but an integral part of communication related to sociolinguistic, discourse and strategic competencies. As part of phonetic competence, sound discrimination is a necessary condition for second language learning 'The better a learner can discriminate between the sounds of the language and recognize the constituent parts, the more successful his or her learning of speaking and understanding a second language will be' (Spolsky 1989,106)

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