PEREZ, Grisel Maria García. Perception of English vowels by native speakers of Spanish in a regular classroom setting. *Revista Virtual de Estudos da Linguagem – ReVEL.* V. 3, n. 5, agosto de 2005. ISSN 1678-8931 [www.revel.inf.br].

PERCEPTION OF ENGLISH VOWELS BY NATIVE SPEAKERS OF SPANISH IN A REGULAR CLASSROOM SETTING

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1. INTRODUCTION

When listeners are presented with phones that are not used in their own language, they typically perceive sounds in a way that is not as good as a native speaker of the language from which the phones were selected (García-Perez, 2003; Bradlow and Pisoni, 1997; Munro, Flege, and Mackay, 1996; Rochet, 1995; Munro, 1993; Werker, 1989). From a second language teaching (SLT) point of view, this issue can have both practical and theoretical implications. In practice, the teacher can foresee the difficulties the students may experience distinguishing certain phonetic contrasts in the second language. Theoretically, the teacher could look for the conditions that facilitate the development of the second language student's ability to differentiate the new phonetic categories. The present study focuses on the theoretical implications of this phenomenon in the context of training Spanish students to identify English pairs of vowels /ɪ/-/I/, /ʊ/-/Y/, and /ɒ/-/A/.

Categorical perception is a phenomenon in which labeling limits discrimination. This allows listeners to segment the words they hear according to the phonemic categories of their language and ignore unessential variations within a category. However, studies have shown that infants do not need to learn about phonemic categories to be able to group speech stimuli; they can do this soon after birth (Eimas, 1975). Moreover, studies have shown that infants are able to distinguish many, but not

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all sounds that are not used in their native language (Streeter, 1976). If this is the case, why aren't our adult ESL students able to discriminate sounds that are not included in the phonetic repertoire of their native languages?

In 1989, Werker carried out a study in which she traced how speech perception changed during development. She tested groups at different ages (adults, twelve, eight, four year olds, and eight months old), and concluded that there was a strong evidence that the decline in universal phonetic sensitivity occurs during the second half of their first year. In her study, she argues that recovery of sensitivity is very difficult in adults, and that several experiments had revealed that English-speaking adults were unable to discriminate the most difficult Hindi contrasts.

However, more recent studies have shown that when adults are trained to discriminate novel phonetic contrasts that are not distinctive in the their native language, their performance identifying the correct sounds can improve (Bradlow and Pisoni, 1997; Rochet, 1995). Incidentally, most of the studies have focused on consonants. There has been relatively little work on vowels.

In 1995, Brown argued that training with minimal pairs was far less useful than training in suprasegmentals, but he had no evidence to backup this statement. In 1989, Perlmutter carried out a study in which ESL learners were given language instruction with a special emphasis on pronunciation, and the findings showed that the students' intelligibility improved. In 1998, Derwing, Munro, and Wiebe showed that long term ESL individuals' pronunciation can improve significantly in a 12 week program emphasizing global production skills. .As stated above, Brown was categorical in saying that minimal pair instruction was less useful than suprasegmental instruction. The other studies mentioned emphasized suprasegmental instruction. It would be interesting to find out what would happen if the two are combined.

Another interesting fact is that some of the studies mentioned above were carried out in sound treated rooms and the subjects were tested in cubicles equipped with headphones and a workstation. In these studies, the stimuli were recorded in a sound-attenuated booth, filtered, and digitized with 16-bit resolution for presentation on the workstations.

The positive results in these previous studies led to the idea that similar procedures could be modified for use in SL classrooms. In practice, the majority of ESL institutions cannot provide the teachers or the students with digitized sounds and

workstations to do these types of training, although larger schools these days usually have computer labs.

The primary goal of the present study is to see if there are significant results in training ESL Spanish students to differentiate contrasting novel vowel sounds in a regular ESL classroom condition. The secondary goal of the study is to see to what extent it is a good practice to include minimal pairs in training ESL students to perceive English vowels.

Before going deeper into the details of the study, it would be useful to consider what is known about the perception of the vowel sounds by Spanish listeners. Spanish, regardless of dialect, has five 'pure' vowels /i, e, a, o, u/ as in p**i**so, p**e**so, p**a**so, p**o**zo, and p**u**so. Spanish vowels may be classified according to following three parameters which are front-back, high-low, and lip position (rounded-unrounded). Notice that the Spanish vowel system does not have the tense-lax distinction. English has eleven vowels and the four basic parameters for vowel description in English are front-back, high-low, lip position (rounded-unrounded), and the added dimension tense-lax. So, Spanish speakers learning English find difficulty in differentiating between English vowels, especially where the added dimension (tense-lax) is part of the difference.

2. METHOD

2.1 PARTICIPANTS

Thirty-two native speakers of Spanish (18 females and 14 males) at the intermediate proficiency level in a full time ESL program participated in the study. They ranged in age from 17 to 32 with a mean age of 24. There were 21 from Colombia, 9 from Mexico, one from Argentina, and one from Guatemala. Their length of residence in Canada ranged from 1.5 weeks to 19 months at the time of initial testing, and all reported normal hearing.

After the introductory meeting, the 32 students were very interested in the training sessions. But they had to be sorted into two groups: the experimental group, and the control group, so we randomly assigned them to the control and the experimental groups. All the participants had an excellent attitude throughout the study.

The participants in the experimental group ranged in age from 17 to 32 with a mean age of 25. There were 11 from Colombia, 3 from Mexico, one from Argentina, and one from Guatemala. Their length of residence in Canada was 1.5 weeks to 19 months with a mean length of residence in Canada of 3.5 months at the time of initial testing.

The students in the control group ranged in age from 18 to 29 with a mean age of 22. There were 10 from Colombia and 6 from Mexico. Their length of residence in Canada was 6 to 1 month with a mean length of residence in Canada of 2.5 months at the time of initial testing

A few months before the course began, the school administrator and one teacher were approached and asked if they were willing to participate in the study. Once the nature of the research was explained, the school and this particular instructor showed an immense interest in the project. The content and the procedures of the course were negotiated, and it was agreed that an expert was going to introduce each unit, as the selected instructor was not very comfortable with the linguistics terminology. Classes started and feedback was received on a daily base from the instructor. He seemed motivated with the students' progress, and said that everyone was enjoying the course.

2.2 INSTRUCTION

The control group received no specific pronunciation instruction, while the experimental group attended 40 minutes of pronunciation classes, three times a week for three weeks. All the students in the control and experimental groups attended ESL classes, 20 hours per week, and their regular program included emphasis on pronunciation. However, the classes did not include special material covered in the experimental program.

The teacher in the experimental group used Training Spanish Speakers in the Perception and Production of English Vowels (Garcia-Perez, 1999), a booklet specifically designed for this project. The student's progress was evaluated through a quiz at the end of each unit. No recordings were used in the training.

2.3 STIMULI

The stimuli used in the pre and posttests were recorded by a Canadian English speaker in a quiet room, in a home environment, with a regular tape recorder. The speaker was given a printed material with a list of 24 different words, and she was asked to read the words out loud. The words were grouped by vowel sound:

a) First group: /ɪ/-/I/ contrast

b) Second group: /ɑ/-/ɒ/ contrast

c) Third group: /ʊ/-/Y/ contrastA

d) Fourth group: /ɒ/-/A/contrast

e) Fifth group: /Y/-/ʊ/ contrast

f) Sixth group: /I/-/ɪ/ contrast

For example, minimal pair *cheap-chip* was in the first and sixth groups. In the first group the word recorded was *cheap*, and in the sixth group the word recorded was *chip*. This was done to test the reliability of the scores.

The criteria followed to select the pairs of vowels /ɪ/-/I/ and /ɒ/-/A/ was based on their functional load (FL). According to Catford (1987), the teaching of pronunciation includes three different types of processes: selection, arrangement, and presentation of the material.

In the selection process, he argues that one can follow the principle of FL; that is, the frequency of a phonemic opposition occurring per thousand words in a text. Catford suggests that in a pronunciation course instruction should be concentrated on the phonemic oppositions with a high FL, so this is the reason why the pairs /ɪ/-/I/ (FL=95%) and /ɒ/-/A/ (FL=65%) were selected.

Although the pair /ʊ/-/Y/ (FL=7) shows a low FL, it was included in the study first, because of their spectral differences. Spanish speakers have problems specifically with the /Y/ sound. There is evidence that other pairs including the phoneme /Y/ are marked as having a higher functional load than /ʊ/-/Y/, for example, *box/books* (18%); *pill/pull* (13.5%). We considered including a high number of words with the /Y/ sound in the training, to see if this practice helped solve the problem of length when /ʊ/-/Y/ sounds were contrasted. This was done, taking into consideration that Spanish speakers

find it more difficult to perceive and produce short vowels than long ones; that is, if they see the words *pull/pool*, they will tend to say something close to /πυλ/ in both instances.

3. PROCEDURE

A pretest-posttest design was used to assess the effects of training. In the pretest, students in the control and experimental groups were presented with the recorded stimuli. The students were given a printed material, with clear instructions. The students' task was to identify the word which they heard by circling the appropriate word. The participants were presented with the stimuli just once.

During the training period, the students attended a 40-minute pronunciation session given by an instructor at the College during three weeks (three times a week). The exercises varied among sessions, but in all cases, the students were presented with tasks which were very similar to the ones included in the pre and posttests.

After a three-week training period, both groups were tested again with the same measurement used in the pretest. The same procedure was followed as in the pretest.

4. RESULTS

The students in the experimental group showed a significant improvement from the administration of the pretest (mean percentage of correct responses 60%) to the posttest (mean percentage of correct responses 83%). The mean percentage of correct responses in the control group slightly decreased from the pretest (59%) to the posttest (56%).

A mixed design (ANOVA) with one between factor (group: experimental and control), and two within factors (vowel: /ɪ/-/I/, /ʊ/-/Y/, and /ɒ/-/A/ and time: before and after) showed a significant groupXtime interaction [$\underline{F}(1, 30) = 31.3$, $\underline{p} < .05$. Although there were significant main effects for group [$\underline{F}(1,30) = 23.77$, $\underline{p} < .05$], vowel [$\underline{F}(1,30) = 18.9$, $\underline{p} < .05$], and time [$\underline{F}(1,30) = 18.2$, $\underline{p} < .05$], there were no significant main effects neither when group and vowel interacted [$\underline{F}(1,30) = 2.26$, $\underline{p} < .11$], nor when

vowel and time interacted [$\underline{F}(1,30) = 1.6$, $\underline{p} < .19$]. This resulted in the fact that group, vowel and time did not interact [$\underline{F}(1,30) = 2.23$, $\underline{p} < .11$]. Although the effects are evident enough to be detected in isolation for vowel, time and group, they seem to be not that relevant enough in the case of vowels as to be able to interact with time and group.

A test of simple main effects revealed no significant differences between the groups at Time 1. However, the test showed that there was a significant difference in group from Time 1 to Time 2. Moreover, test of simple main effect showed no significant difference between the Times (before and after) for the control group, but a significant difference between the times for the experimental group.

The analysis of individual pairs of vowels revealed the following: First, the /ɪ/-/I/, contrasting pairs showed an improvement in the experimental group of 23%. That is, the experimental group scored 61% of correct responses before training, and 84% after training. The explanation at the beginning of the unit, comparing the /ɪ/-/I/ sounds to situations where similar allophones are used in Spanish, seemed to help the students a lot. The control group scored 58% in the pretest, and 47% in the posttest. There was actually a decrease in percentages of correct responses in the posttest. There is no obvious explanation as to why this happened.

Second, the /ʊ/-/Y/ contrast revealed an improvement of 31%. The fact that emphasis was made on the phoneme /Y/ during training might suggest that similar procedures could be useful whenever the lax/tense feature presents the contrast in minimal pairs. This assumption may have outstanding implications in second language teaching. The control group did not show any improvement. Both scores for the pre and posttest remained the same (46%).

Finally, the /ɒ/-/A/ contrast yielded a very interesting result. To begin with, the scores in the pretest were very high for both the experimental (72%) and the control groups (73%). Both groups showed an increase in correct responses in the posttest (experimental, 87%; control, 74%). The fact that these sounds are new for Spanish speakers, might explain why the students had such good scores. They had to learn the sounds as they are, and there is no previous experience to relate the production of these sounds to the production of other vowel sounds in students' mother tongue.

5. CONCLUSIONS

One of the main objectives of the study was to see if there was significant improvement as a result of training Spanish speakers in the perception of English vowel sounds. First, the study was carried out taking into consideration the findings of other studies, and at the same time giving a little bit of more reality to what an ESL teacher would face in the present ESL classrooms. The fact that all the trained students showed a significant improvement in the percentage of correct responses between the pretest and the posttest demonstrates that although recovery of sensitivity is very difficult in adult SL learners, there are practical and economical ways to try to remedy this situation.

Another interesting question this study reveals is related to the emphasis on lax vowels in training. The results may indicate that such procedure may have important implications in second language teaching.

In conclusion, emphasis should be placed on the idea the present data should bring as a starting point for carrying out research in our ESL classrooms. The findings showed that a perceptual training procedure was effective in training Spanish students to perceive novel vowel sounds in English. From an applied point of view, it can encourage second language teachers to do similar analysis in a classroom or school setting, and from a theoretical point of view, it demonstrates that training can positively contribute in the phonetic perception of novel sounds.

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