The relation between musical ear and L2 acquisition

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This study examined the perception of French vowel contrasts, as well as tonal and rhythmic music perception, by university students representing two levels of proficiency in French (beginner and advanced). In the language perception task, a recording of thirty monosyllabic words (consisting of ten [y/u] contrasts, ten contrasts $[\tilde{\alpha}/\tilde{o}]$, ten $[e/\epsilon]$ contrasts) was presented to students for identification as a two-alternative forced choice paradigm. All these words contained only open syllables. In the music perception task, the students were presented with a recording of forty pairs of tones and forty pairs of rhythms for which they performed a same/different identification test. The goal of this study was to explore the relation between music perception and second language perception. The factors of L1, music training and immersion were also examined.

1 Introduction

This study, which is the perceptual component of a perception and production experiment to learn why some students acquire a second language pronunciation with an apparent facility whereas others experience great difficulty. Various criteria have been studied to explain individual differences between learners: age of learning (Major 2001, Long 1990), L1 interference (Major 2001), attitude (Fillmore 1979) and so on. Although some studies have shown that there is a correlation between music training and L2 acquisition, this study will not at first consider musical training but rather the musical ability of sample groups regardless of knowledge or practice of music.

Many studies have recognized the relation between L2 perception and L2 production. For example, the first law of the Tomatis method, states that you cannot reproduce a sound you cannot hear(Tomatis 1987). The Tomatis method, therefore uses ear training in order to help people with, among other things, accents in foreign languages by training the ear to perceive frequency rare in L1 but common in L2. This method also helps with different learning disabilities and speech difficulties. Bernard Rochet (1995) also attempted to discover if defective production was due to faulty perception or to faulty articulation. His results showed that, at least in the early stages of L2 learning, auditory training will improve perception performance, which will in turn improve production performance.

Nora Harrison in her M.A. thesis (1979) tested 83 students of grade 8 to see if there is a difference between music students and non-music students in their acquisition of French as a second language. She gave students four tests, two on patterns of intonation used in French and two on the pronunciation of French words and phrases. The result was that the students who had music training were generally more successful than students who had no music training.

Another study by Mary Techmeier (1996), showed an improvement in French pronunciation after a group of American students joined a chorale at Laval University.

"Singing tunes the ear to the delicate shades of sound besides promoting articulation of words and focussing attention on proper accentuation (Techmeier, p. 96). Graham (1969) also describes the foreign accent as coming from "speaking one language with the music of another" (p. 446).

If there is a correlation between perception in music and perception in speech, this could suggest that the difference in L2 learners is caused by a differing ability in perceiving contrasts and therefore in producing these contrasts. On the other hand, if there is no correlation between the two, then the difference in L2 learning could stem for a differing ability in imitating what is heard. In this case, the L2 learner would perceive the contrasts correctly but might have difficulty in reproducing what is heard (this will be the content of a further study).

2 Method

2.1 Participants

Eighty-eight students from Simon Fraser University participated in this experiment. One third were beginner students for French 100 whereas the other two thirds were students from intermediate/advanced levels (French 201, 205 and French 270 – a language class, a conversation class and a linguistic class). One-third on the students were Native-English speakers, one third Cantonese speakers and the other third contained Portuguese, Korean, Indian, and East-European students.

2.2 Material

All students completed a questionnaire asking them information about their level of French, their level of musical training, their L1 and their participation in an immersion program. A recording by a native French speaker was used to test Speech perception. It consisted of three list of randomly ordered monosyllabic words, 10 words for the [u/y] contrast, 10 for the $[\tilde{\alpha}/\tilde{o}]$ contrast and 10 for the $[e/\epsilon]$ contrast. The Gordon test "Intermediate Measure of Music Audiation" assessed the musical perceptual ability of the students. This test is a simple same/different test with 40 pairs of musical tones and 40 pairs of musical rhythms. The Gordon test was created in order to test the musical discrimination ability of children but the answer sheet was adapted here to test young adults and could be used to test people with absolutely no knowledge of music.

2.3 Procedures

The testing was done in the classroom. For the speech perception task, the students were asked to listen to the recording and perform a two-alternatives forced choice task for each vowel contrast. Lado (1961) suggested that testing of language might be accomplished by the use of either orthographic or phonetic symbols. Since only one group of students had knowledge of phonetic transcription, I chose orthographic symbols, the letter "u" representing the sound [y], the letters "ou" representing the sound [u], the letters "an" and "on" for the sounds [$\tilde{\alpha}$] and [\tilde{o}] and the accented vowels "é" and "è" representing [e] and [ϵ]. The students were instructed on the system and examples were given in order to assure their

understanding. The music perception task was a simple same/different test chosen because of its possibility to be used on students of all ages and with or without knowledge of music. The students listened to the CD of "Intermediate Measure of Music Audiation" and simply wrote an "S" or a "D" for same or different when they heard a pair or sounds. The two answer sheets were subsequently graded and compared.

3 Results

3.1 Music Perception and L2 perception

It appears that for the beginner level, there is absolutely no correlation between music perception and second language perception, ($\underline{r} = .01$) whereas for the advanced group there is a higher, although not significant correlation. ($\underline{r} = .15$).

3.2 Music training

The subjects in this study were asked to give information about their musical training, years of studies, level achieved, instruments played...Although many studies have shown that music training improves speech perception (Harrison 1979), the students in my study who have studied music for three years of more do not appear to perform better than students who never studied music or studied music for less than three years (table 1).

3.3 Influence of L1

One of the questions answered by the students on the questionnaire was about their mother tongue. The speech perception scores of the students were then divided in two groups: native English students and non-native English students. The native English students have better scores in the speech perception test than non-native English students; nevertheless, the difference does not seem to be large enough to reach any conclusion (table 1). However, one must keep in mind that some of the non-English languages were Portuguese, Spanish and Italian, which would surely not be an obstacle to the learning of French. More studies has to be done on this topic to reach more significant conclusion.

3.4 Influence of Immersion

When filling out the questionnaire, the students had to say if they had participated in an immersion program and for how many years. Immersion students would be in advanced French only since the beginner group had never taken French before or very little, this explains the empty case in the Table 1. As could be expected, students who took part in the immersion program during their pre-university studies received better scores in the speech contrasts discrimination test than other students (table 1).

Proficiency	Music	Non-M.	English	Non-E.	Immersion	Non-Imm.
Beginner	20	23	22.6	20.77		
SD	3.83	4.10	3.22	5.13		
Advanced	24.58	25.57	24.98	24.42	27.48	22.74
SD	5.98	3.93	5	6.35	3.21	4.69

Table 1. Mean accuracy scores as a function of proficiency and learning variables.

Note: SD = Standard Deviation.

4 Discussion

Although there is no correlation between music perception and L2 perception, there might still be a correlation between L2 perception and production. The only conclusion suggested by the results in the paragraph 3.1 is that the problem in perceiving L2 sounds might be a deficiency of acquisition of L2 rather than a deficiency in discriminating between two sounds.

It was anticipated that students who had extensive music training would score better on the speech discrimination test, as did the students of Nora Harrison. However, whereas the subjects in Harrison's study were grade 8 students, the subjects in the present study were university students. Thus, the same test should be presented to children in order to better understand the results of this study.

It would also be very instructive to observe how extensive the gap is between immersion students and non-immersion students for perception and production, since this topic has been shown to be very controversial during the last decades (Hammerly, 1989).

In the second part of this study, the same students will be tested for music and speech production to observe if there is a correlation within groups between speech perception and production, and also to test the hypothesis that there is a relation between music production and speech production. If there is such a correlation, it will suggest that a faulty pronunciation in L2 might be caused by a difficulty in reproducing what is heard, a difficulty in imitating.

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