MUSIC AND FOREIGN LANGUAGE PRONUNCIATION

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This paper examines the relationship between musical training and success in foreign language pronunciation. I present the results of two studies, one involving native speakers of English learning German, and one involving native speakers of Russian learning English. The hypothesis that those participants with musical training would perform better than those with none was not supported. In conclusion I discuss possible reasons for why the hypothesis was not confirmed, pointing out shortcomings of the studies, and how to improve on them for future research. In particular, I suggest that learner level and aptitude may be relevant confounding factors.

KEYWORDS: musical training, second language, pronunciation

1 INTRODUCTION[1]

The acquisition of good pronunciation in a foreign language is one of the first, and at the same time one of the most difficult problems encountered by second language learners. It is generally accepted in SLA research that it is nearly impossible to attain native-like pronunciation in a second language for those learners who begin studying a second language after the so-called critical period (Lenneberg 1967), i.e., after the end of the period during which complete, native-like acquisition of a language is possible (probably around puberty). Nevertheless, it is important to discover what factors may facilitate L2 pronunciation. This paper is concerned with one of the potential factors in the acquisition of L2 pronunciation, musical training. While there have been some studies on the relationship between musical APTITUDE and second language success, musical TRAINING as a predictor of L2 performance has remained largely unexplored. In the sections to follow I discuss the results of a number of studies that found a positive correlation between musical aptitude and success in second language acquisition, then discuss two experiments that I conducted, which were specifically concerned with musical training and L2 pronunciation.

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2 BACKGROUND

There have been several studies on the relationship between musical aptitude and success in various aspects of first and second language learning. Brutten, Angelis and Perkins (1985) provided a comprehensive review of previous research on factors influencing achievement in foreign language learning. They mentioned several studies which found positive correlations between musical ability and language acquisition. Dexter and Omwake (1934), in a study of 118 college students, found that pitch discrimination was related to French accent rating (see below). A follow-up study (Dexter 1934) found a similar correlation among high school girls. Pimsleur, Stockwell and Comrey (1962) found that IQ, motivation, reasoning, word fluency and scores on tests of pitch and timbre were all connected to L2 achievement. Leutenegger, Mueller and Wershow (1965) found that tonal memory correlated with L2 success. Blickenstaff (1963) argued that pitch discrimination was related to L2 success in high school, but that this correlation was less prevalent in college level courses and advanced courses.

Westphal, Leutenegger and Wagner (1969) found that pitch and rhythm scores on the Seashore Measure of Musical Talents correlated with pronunciation (and other factors of L2 success) for ninth, but not seventh grade American children learning German (1969: 262).They attributed the lack of correlation among seventh graders to noisy testing conditions and a poor seating arrangement (1969: 265). Leutenegger and Mueller (1964) concluded that musical aptitude may correlate with pronunciation, but that more study was necessary. Leutenegger, Mueller and Wershow (1965) found that tonal memory correlated with success on tasks designed to assess phonological awareness among American college students learning French. There was no significant effect for other Seashore subtests, but the authors speculate that this may be due to the fact that the students had had varying amounts of French study in high school, which may have confounded the results (Leutenegger, Mueller and Wershow 1965: 31)).

2.1 PEYNIRCIOĞLU ET AL.'S STUDY OF TURKISH AND AMERICAN CHILDREN

Peynircioğlu, Durgunoğlu and Öney-Küsefoğlu (2002) performed two experiments on the relationship between musical aptitude and phonological awareness in L1. For the first experiment, the authors chose 32 children, ranging in age from four years nine months to six years one month. The children were all native speakers of Turkish from day care centers and kindergartens in Istanbul. Half of the students had high musical aptitude scores and half had low aptitude scores. The children were asked to perform two tasks: a phoneme deletion task and a tone deletion task. The tone deletion task involved singing, humming or whistling all but the final note of a tune which had just been played aloud.

After completing the two tasks, the children were administered a musical aptitude test designed to test pitch and rhythmic awareness. The children were instructed to sing back melodies which were played for them, and to reproduce rhythms which they heard. Their performance was rated by two judges, and those children with medium aptitudes were excluded from the study, so that only those with low or high aptitudes remained. In order to avoid the potentially confounding effect of reading, only children who were unable to read were selected for participation in the experiment.

The authors found that the children with high musical aptitudes did better on the phoneme deletion task than those with low musical aptitudes. This was true both word initially and word finally, and for words and pseudo words (some of the items in the phoneme deletion task were pseudo words that conformed to Turkish phonotactic rules). Initially, vowels were correctly deleted more often than consonants. All children tested performed better on word final phoneme deletion than on word initial deletion. This, the authors suggest, may have to do with the morphology of the Turkish language; since Turkish is highly inflected word finally, it would seem that the students should be better at manipulating sounds at the ends of words.

For the second experiment, the authors worked with 40 native English speaking children from the Washington, D.C. area, ranging in age from three years nine months to six years ten months. Half of them had high musical aptitudes, and half had low musical aptitudes; as in the first experiment, those children who scored in the medium range on the musical aptitude test were not included in the analysis. Again, none of them could read. Both the tone and phoneme deletion tasks were essentially the same as in the first experiment, but the tone deletion task involved the introduction of familiar vs. novel melodies as an independent variable.

The authors found that success in both tone deletion and phoneme deletion correlated with musical aptitude. The children in the high musical aptitude group deleted both initial and final phonemes correctly more often than those in the low musical aptitude group. The authors found that familiarity of the snippet in question had no effect on success in the musical task. This, they argue, is evidence that it is musical aptitude, not prior exposure, which predicts success in the musical tone deletion task.

The authors concluded that musical aptitude is linked to phonological awareness as well as success in tone manipulation, both for English and Turkish: 'Perhaps success in phonemic manipulation may be explained simply by a general ability in discriminating between sounds and processing temporal sequences of stimuli (cf. Tallal, 1984), and this ability contributes to the processing of tones as well as phonemes' (Peynircioğlu et al 2002: 77).

For the English-speaking children, phonological awareness correlated with success in both initial and final tone deletion. For the Turkish-speaking children, only final tone deletion correlated with phonological awareness. The authors argue that, as in the case of the phoneme deletion task, this is related to the robust system of suffixation in Turkish. Turkish speakers are accustomed to dealing with phonological manipulations at the ends of words, and this apparently carries over to success in deleting final musical tones.

2.2 DEXTER AND OMWAKE'S STUDY OF AMERICAN COLLEGE STUDENTS OF FRENCH

Peynircioğlu et al demonstrated a link between musical aptitude and performance on tasks potentially related to early L1 success; they noted for example that phonological awareness is an important skill in reading success. This raises the question whether musical aptitude is also related to L2 success. One of the earliest studies on this question was Dexter and Omwake (1934). They examined the relationship between pitch discrimination ability and L2 pronunciation. They administered the Seashore

Measure of Musical Talents (a test designed to measure musical aptitude) to 118 students at Agnes Scott College, who were then were rated on a scale of 1-5 for accuracy of pronunciation by foreign language professors at the college.

Dexter and Omwake found that most of the students with low pitch discrimination ability had had no more than two years of French. None of the 29 students who scored in the lowest quarter, and only 28% of those who scored in the second lowest quarter of the pitch discrimination test had studied French for more than two years. However, many who had not had much French did well on the pitch discrimination test. This, the authors argued, suggests that it is possible to have little French and still be good in pitch discrimination, but not to have a lot of French and be bad in pitch discrimination. This seems to raise the question whether studying a foreign language might lead to better pitch discrimination ability, but the authors did not specifically address this. Another possibility is that those with good pitch discrimination ability do better in French early on, which motivates them to study the language longer. Westphal, Leutenegger and Wagner administered their subjects a Seashore test before and after their experiment, and found that they improved on the pitch and timbre sections, but did worse on the loudness section upon second trial (1969: 264). However, Leutenegger, Mueller and Wershow (1965) found that their subjects' Seashore scores did not improve significantly after a semester of studying French or Spanish. Thus it remains an open question whether studying a foreign language can improve musical aptitude.

Dexter and Omwake found that 15 students in the sub median group for pitch discrimination were below average in accent; the other 28 were average. Among the students who scored above the median in pitch discrimination, 17 had low French accent scores. Thus, we can sum up Dexter and Omwake's findings as follows: those subjects with low ability in pitch discrimination had a bad accent in French, while those with better than average ability in pitch discrimination could have either a good or a bad accent in French. Furthermore, students with more than two years of French study under their belts do better in pitch discrimination. In a follow-up study on 515 girls at two high schools, Dexter found that pitch discrimination was as important as IQ to the development of a good French accent (Dexter 1934: 720).

2.3 SAUER'S STUDY OF GERMAN ELEMENTARY SCHOOL CHILDREN

Sauer (1975) also questioned whether there is a link between a good ear for music and a good ear for language. He tested 29 third grade children (18 boys and 11 girls) from a primary school in Dortmund, Germany; the children had been studying English for three months at the time of the study. They were administered a simplified version of the Seashore Measure of Musical Talents, followed by a language test.

The language test consisted of four parts, each made up of a German and an English section. The first part of the test involved identifying sounds as identical or different, as in German *Hof, Huf,* and English *cup, cap*. For the second part of the test, students were asked whether a given sound was present in a group of words, e.g. which of the words in the German series *Paul, Ball, Polizei*, or in the English series *big, pig* contained the sound /b/. The third part of the test involved identifying stress in a given phrase as identical or different, as in *auf allen* / *auffallen* and *Bilder-Folge* / *Bild-*

Erfolge, and English *Tracy's / Tracy is* (which were stressed differently) and *transfer / transfer* (which were two instances of the same word with identical stress). The last part of the language test involved recognition of sentence stress. The students were asked whether the sentence stress was the same or different in two consecutive orally-presented sentences.

Sauer found that, on average, students answered 64% of the questions on the music test correctly. As for the language test, he found that the students answered 77% of the German questions and 86% of the English questions correctly. It is puzzling that the students performed better on the English discrimination tasks than on the German ones. Sauer posited that understanding the material may have affected the students negatively. Although this seems counterintuitive, Sauer argued that the students did better in discriminatory ability in English because they did not know the language as well. He also suggested that the students may have been distracted because they knew how to write many of the words in German. Another possible explanation, which Sauer did not consider, is that the German tasks were more difficult than the English ones. The examples which Sauer provided from the second section of the test involved three words per German item, and only two words per English item. This indicates that the German items, on that section at least, may have been longer and thus more complicated than the English ones.

In general, Sauer found a positive correlation between scores on the music test and the language test. Those who performed well on the music test also did so on the discrimination tasks of the language test. He also found that girls did better than boys. Unfortunately he did not provide average scores for boys and girls for comparison.

2.4 BRUTTEN, ANGELIS AND PERKINS' STUDY OF ESL STUDENTS

In contrast to the studies above, Brutten, Angelis and Perkins (1985) did not find a correlation between musical ability and ESL proficiency. The subjects in their study completed a phoneme identification task, took the Seashore Measure of Musical Talents, and completed a sentence repetition task designed to measure auditory memory. They were also administered the Test of Spoken English (TSE), in order to assess their ESL proficiency.

In order to test the relationship between L1 and performance, the authors divided the 52 participants into four language groups, included here with the corresponding number of subjects for each: Spanish, 15; Arabic, 9; Oriental (Chinese, Japanese and Korean), 13; Others (Malaysian, Thai, Greek, Tamil, Polish, French and Yoruba), 15. (The group 'others' is problematic; French speakers, for example, may have more L1 transfer to English than speakers of the other languages).

The authors found that the only significant predictor of ESL performance was the sentence repetition task. They argued that memory seems to correspond to ESL performance, i.e. those subjects with high memory scores were more proficient in English. The measures of musical ability did not correspond to ESL proficiency.

Although the authors ran several types of statistical analyses, they did not specifically address whether they had looked for correlations between the independent variables and the various dependent variables. It is not clear, for example, whether they tried to correlate scores on the Seashore subtests to the pronunciation section of the

TSE (the TSE assesses pronunciation, grammar, fluency and overall comprehensibility), which would have been relevant to my research question.

2.5 STOKES' STUDY OF AMERICAN COLLEGE STUDENTS LEARNING SPANISH

I know of only one study that has considered musical training as a possible correlate to second language pronunciation success, namely Stokes 2001. For his study, three native speakers of Spanish rated the pronunciation of 37 American college students. The participants were asked to rate themselves on how well they read music, and to indicate the number of years they had played an instrument or been involved in vocal performance (Stokes 2001: 75). Stokes also considered length of residence in a Spanish-speaking country, amount of formal language training and attitude as predictors of pronunciation success.

In Stokes' study, only attitude was found to correlate with pronunciation success in Spanish. None of the other factors, including musical training, had an effect. Stokes did suggest that perhaps aptitude, rather than training, may correlate with pronunciation, and in some of the studies previously mentioned, this was the case.

3 EXPERIMENT 1

Each of the above mentioned studies except Brutten et al suggest a positive relationship between musical ability and success in both the L1 and the L2. What is unclear is whether the experience alone of studying either voice or a musical instrument also promotes success in the L2. The only scholar to have addressed this issue that I am aware of is Jeffery Stokes. In the following sections, I discuss two studies designed to determine if musical training correlates with successful acquisition of L2 pronunciation.

3.1 HYPOTHESIS

Students who have studied music, either vocal or instrumental, acquire better pronunciation in foreign languages. This is because training in music develops sensitivity to differences in pitch and rhythm, and this sensitivity translates into increased phonological awareness. With increased phonological awareness, students are better able to perceive the unfamiliar phonemes of a foreign language, and are thus better able to produce them. Those students who have studied music will perform better on a pronunciation judgment task than those who have not.

3.2 METHODOLOGY

Thirteen students in second semester German classes at the University of South Carolina were given a survey designed to asses the amount and type of musical training they had had, as well as the amount of previous foreign language study they had had (see Appendix). Those who wished to participate in the study were then recorded reading a text (see Appendix), which contained difficult phonemes for native speakers of English to pronounce. The students recorded the text alone in a soundproof room

using a high quality microphone and recorder. Prior to reading the text aloud into the microphone, the students were allowed one minute to look it over and practice.

The students' pronunciation was then rated by two native speakers of German on a scale of 1 to 5, with 1 being barely comprehensible pronunciation and 5 being excellent, with only a slight trace of an accent. Besides being native speakers, both raters were professors in the University of South Carolina German department; neither had taught any of the students participating in the study. Previous foreign language study could not be used as an independent variable in pronunciation, as all of the participants had had at least two years of foreign language study prior to beginning second semester German.

3.3 RESULTS

My hypothesis that those students who had studied vocal or instrumental music would perform better in German pronunciation than those who had not was not confirmed by the results. Following the native speaker judgments, I averaged each student's score to come up with a composite score. Table 1 lists the amount of instrumental and/or vocal training which each student had, as well as each student's composite score.

Table 1: Amount of musical training and composite scores.

Student number	Vocal training	Instrumental training	Composite score
1	1-3 years	Piano – less than 1 year	2.625
2	None	None	1.125
3	3-6 years	None	2.375
4	None	Guitar – less than 1 year	1.25
5	Less than 1 year	Guitar – less than 1 year	2.125
6	None	None	3.125
7	None	Violin – 1-3 years	1
8	1-3 years	Violin and piano – more than 6 years	2.5
9	None	None	2
10	None	Guitar and trumpet – more than 6 years	2.625
11	None	None	3.875
12	1-3 years	Guitar and piano – 1-3 years	2.5
13	None	Violin and piano – more than 6 years	3

The average composite score for all subjects was 2.32. The overall score for the four subjects who had not studied music (instrumental or voice) at all was 2.53. This result is surprising, as it is higher than the combined score for all subjects. It is also higher than the overall score for the nine subjects who had studied some music, 2.22. However, the scores must be considered in light of the relatively small sample of students. It is equally important that there was one outlier; the highest score, 3.875 was obtained from a subject who not only had never studied vocal or instrumental music, but also had begun learning German at age 60. Motivation was probably a crucial factor in his success. He told me that, although he is older than many of his peers, he felt that his

age may have given him an advantage in one respect: he knew more or less how much effort he would have to put into learning the language in order to be successful. Furthermore, he had visited Germany on several occasions, and expressed a strong desire to return and be able to speak the language well.

While a pure comparison of the no music group vs. the music group would seem to indicate a disadvantage on the part of the students who had studied music, the situation is different when one considers the amount of music which the students had studied previous to the experiment. If we group together the four subjects who had studied music for more than three years, their overall score was 2.625. This is somewhat better than the score of 2.25 obtained by the six subjects who had either not studied music at all, or had studied it for less than one year. Furthermore, if we do not include our outlier, the overall score for the remaining five subjects who either had no music or had studied it for less than one year drops to 1.925, which is considerably less than the 2.625 obtained by the subjects who had studied music for more than three years. Nevertheless, these data do not indicate that the students with a musical background had a significant advantage in German pronunciation over those without one. Table 2 shows the average scores for each of these groups.

Table 2: Average scores for each group.

All students	Music group	Non-music group	More than three years	Less than one year, outlier included	Less than one year, outlier excluded
2.32	2.22	2.53	2.65	2.25	1.925

3.4 Analysis

The study did not find a significant correlation between musical training and German pronunciation. There are several possible reasons for why the results did not support the hypothesis. The most obvious is the small sample size. With only 13 participants, it is difficult to establish clear patterns of correlation. Another problem was the level of the students. The text contained many words which they had certainly never encountered. The fact that they did not understand the words may have been a distracting factor. The raters commented that most of the students seemed to perform at a relatively low level. The experiment may have been more successful if it had involved students in their third year of university level instruction rather than their first year.

There were also problems with the instruments used to gather data. The survey could be improved by adding questions on whether the subjects had lived abroad in a German speaking country, or whether they have any family members who speak the language. Finally, the reading text itself was a problem. Several of the students seemed to be having as much trouble with reading as with pronunciation. Related to this is the fact that the native speakers were asked to judge pronunciation, which involves correct articulation of phonetic segments and prosody. However, they commented that it was difficult to understand some of the students. This question of comprehensibility may

have interfered with an accurate assessment of pronunciation. Therefore the results might have profited from having two judgments per student: one for pronunciation, and one for comprehensibility.

A study on the relationship between music and L2 pronunciation should thus involve a larger sample size, more advanced students, a free interview, perhaps combined with a reading text, and finally a further subcategorization of the term 'pronunciation'. In the second experiment, I tried to address these issues.

4 EXPERIMENT 2

4.1 HYPOTHESIS

Once again I assume that musical training will affect phonological awareness. Because production problems can sometimes be traced to perception problems, those subjects with better phonological awareness will exhibit better pronunciation. Therefore, those in the music group will outperform those in the non-music group on variables indicative of pronunciation.

4.2 METHODOLOGY

26 native speakers of Russian were asked to complete a survey designed to assess the amount and type of musical training they had had. The survey also included questions on how long they had studied English, whether they had studied other foreign languages and if so how long, whether they had previously resided in an English-speaking country and whether either of their parents was a native speaker of English (see Appendix).

Those who agreed to participate in the project were recorded, first in an interview (see Appendix for talking points), which lasted approximately 10 minutes, and then reading a text aloud (see Appendix). Next, a two-minute sample was taken from each interview, and the first minute of the reading text was sampled from each subject. The subjects were all English teachers in Russia or Kazakhstan, and were participants in a six-week program at the University of South Carolina for winners of a teaching excellence award given by American Councils for International Education. Both the interview and the reading text were in English. By utilizing both an interview and reading condition, I hoped to avoid the effect of reading alone, where pronunciation may differ from pronunciation during free speech.

Two native speakers of English rated each of the subjects for both comprehensibility and pronunciation on the interview and reading task. They also rated each speaker for overall fluency. Overall fluency was a subjective measure of how freely the subjects spoke, i.e. whether they were halting and reticent, or whether they spoke comfortably and with little hesitation. Thus, for each speaker, the raters assigned five scores: interview comprehensibility, interview pronunciation, reading comprehensibility, reading pronunciation and overall fluency. The subjects were rated on a scale of 0 to 5, with 0 being entirely incomprehensible and 5 being close to native-like.

Inter-rater reliability, measured by an intraclass correlator coefficient, was high, at .88. This indicates that the ratings given by the two judges were reliable when considered against one another. Both raters were ESL professionals at the English Programs for Internationals of the University of South Carolina, and both had extensive experience in ESL oral proficiency assessment. It is my opinion that, with the raters' experience, the breakdown of 'pronunciation' into five subcomponents and the subjects' higher level of L2 competence, I was able to eschew some of the methodological problems associated with experiment 1. Table 3 lists the scores each speaker (S) received from rater 1 (R1) and rater 2 (R2) for each subcomponent: interview comprehensibility (IC), interview pronunciation (IP), reading comprehensibility (RC), reading pronunciation (RP) and overall fluency (OF).

Table 3: Scores for each speaker.

S	**IC**		**IP**		**RC**		**RP**		**OF**	
	R1	R 2	R1	R2	R1	R2	R1	R2	R1	R2
1	5	5	5	5	5	5	5	5	5	5
2	5	5	4	4	5	5	4	4	4	4
3	5	5	3	3	5	5	3	3	4	4
4	5	5	5	4	5	5	5	4	4	4
5	4	4	4	3	3	4	3	3	4	4
6	5	5	5	4	5	5	5	5	4	4
7	5	5	5	4	5	5	5	5	5	5
8	5	5	4	4	5	5	5	4	5	5
9	5	5	5	4	5	5	5	5	5	5
10	5	5	4	4	5	5	4	4	4	4
11	5	5	5	5	5	5	5	5	5	5
12	4	4	3	4	5	5	4	4	3	3
13	4	5	4	4	5	5	4	4	4	4
14	5	5	4	4	5	5	4	4	5	4
15	5	5	5	4	5	5	5	4	5	5
16	4	4	4	4	5	5	5	4	4	4
17	5	5	5	4	5	5	5	4	5	5
18	5	5	5	5	5	5	5	5	5	5
19	4	5	4	5	5	5	5	5	4	5
20	5	5	5	5	5	5	5	5	5	5
21	5	5	4	5	5	5	5	5	4	4
22	5	5	5	5	5	5	5	5	5	4
23	5	5	4	4	5	5	4	4	5	5
24	5	5	5	4	5	5	5	4	5	4
25	4	5	4	4	5	5	5	4	5	4
26	5	5	5	5	5	5	5	5	5	5

Nearly all of the participants had studied foreign languages other than English, so previous foreign language study was not factored into the analysis. None had native English-speaking parents. The participants varied in their amount of musical training from none at all, to more than six years of study. The questionnaire asked whether they had had less than one year, one to three years, three to six years or more than six years

of musical training. The breakdown of the participants' musical training is provided in table 4.

Table 4: Amount and type of musical training for each speaker.

Subject	Voice training	Instrumental training
1	None	None
2	More than six years in choir	None
3	More than six years in choir	None
4	None	None
5	Three week teachers' course	One to three years self-taught guitar
6	One to three years in choir	None
7	One to three years in choir	Less than one year self-taught piano, bayan and guitar
8	Less than one year in choir	None
9	More than six years in choir	More than six years private lessons on piano
10	None	None
11	One to three years in choir	None
12	None	None
13	None	None
14	None	None
15	Three to six years in choir	Less than one year bayan in school band
16	More than six years choir	None
17	None	None
18	Less than one year in choir	None
19	None	None
20	Three to six years in voice class	Three to six years piano in music school
21	More than six years in music school	More than six years piano in music school
22	Three to six years in choir	One to three years piano in music school
23	One to three years in choir	One to three years piano in music school
24	One to three years in choir	None
25	More than six years in choir	None
26	Three to six years in choir	Three to six years piano in music school

4.3 RESULTS

The students with instrumental or vocal training did not perform significantly better than those with none. For the statistical analysis, the scores given to each subject in each of the five subcategories (interview comprehensibility, interview pronunciation, reading comprehensibility, reading pronunciation and overall fluency) were added together, yielding a sum for gross fluency. The highest available score for gross fluency

was 50 (5 possible points for each category x 2 raters x 5 categories). Linear regression analyses were performed in order to determine if amount of vocal or instrumental training would correlate with gross fluency scores. No significant effect for amount of vocal ($p = .629$) or instrumental training ($p = .255$) on gross fluency was found.

Surprisingly, the age of first exposure to English also did not have a significant effect on gross fluency ($p = .308$). This fact may seem unusual, because we know that age of onset is a significant predictor of pronunciation success, at least when the speaker lives in a country where the L2 is spoken. Because the subjects had not lived in an English-speaking country, it is understandable that age of first exposure to English was less relevant for them, even though some of them had begun learning English before the end of the critical period. For many of them, their six-week sojourn in South Carolina was their first English immersion experience.

Further linear regression analysis showed no significant effect for a combination of age of first exposure to English ($p = .224$), amount of voice training ($p = .452$) and amount of instrumental training ($p = .191$). The data would then seem to indicate that there was no significant effect for age of first exposure to English, amount of voice or amount of instrumental training on the combined measure of the five subtests.

In order to factor out scores for overall fluency and comprehensibility and thereby isolate the pronunciation scores, the scores for interview pronunciation and reading pronunciation were added, yielding a sum for gross pronunciation. The highest available score for gross pronunciation was 20 (5 points x 2 categories x 2 raters). Once again, linear regression analyses were performed, and there was no significant result for age of first exposure to English ($p = .123$) or amount of voice training ($p = .222$). Only amount of instrumental training approached statistical significance, but even it was not significant ($p = .087$).

4.4 Analysis

What the data show is that there was no correlation between voice or instrumental training and pronunciation. My hypothesis that those subjects who had studied music would exhibit better pronunciation of English was not borne out. One possible reason for this is that, since the speakers were all advanced learners of English, there may have been a ceiling effect. If there is a correlation between music and second language pronunciation, perhaps it is most salient at the intermediate level. All of the subjects in experiment 2 were teachers of English in their home country, and they were all motivated to learn the language and speak it well. Perhaps attitude trumps any effect that musical training might have had on these speakers' pronunciation.

Assuming however that there is indeed no correlation between musical training and L2 pronunciation at any level, we can hypothesize that it is musical aptitude alone, and not musical training, that is a predictor of success in L2 pronunciation. As numerous studies have shown, those who do well on the Seashore test, i.e. have a high musical aptitude, tend to have good L2 pronunciation. Experiment 2 suggests that, although aptitude may play a role, training is irrelevant.

5 CONCLUSION

The results of both experiments do not support my hypothesis that those who have had musical training are more likely to acquire better L2 pronunciation than those who have not. While the data from the first experiment are inconclusive, those from the second seem to indicate that study of music has no significant positive effect on L2 pronunciation or comprehensibility, at least not among advanced learners. While previous studies have found a positive correlation between musical aptitude and success in L2 pronunciation, the experience of studying music alone is not enough to give learners a significant advantage in L2 pronunciation.

There are a few possibilities for why the hypotheses were not borne out. As mentioned earlier, the participants in experiment 1 were low-level learners. Perhaps they were too novice to benefit from musical training. Also, the rating system may not have been powerful enough. Experiment 2 attempted to address these concerns by working with higher level learners, and by separating 'pronunciation' into smaller subcategories. Nevertheless, there was one potential problem with experiment 2; there may have been a ceiling effect. The learners were advanced; all were English teachers in their home countries. The fact that they had won a highly competitive teaching excellence award from American Councils, which had enabled them to come to the United States, is further evidence of their motivation to speak English well. Only 30 applicants from Russia and 10 from Kazakhstan receive this award each year. Perhaps this confounded any potential effect of musical training. Finally, it is possible that musical training really has no effect. In light of previous studies indicating a link between aptitude and L2 pronunciation, perhaps it is aptitude alone, not training that matters.

This study did not factor aptitude into the analysis. It may be worthwhile to conduct a study in which aptitude is tested, so that it could be removed as a possible confounding factor, and we could see if training would then have an effect on L2 pronunciation. Furthermore, this study did not include whether participants were practicing musicians, or had merely studied music in the past. As Neal Norrick pointed out in an earlier draft of this paper, it may be possible that practicing musicians hold an advantage over non-practicing musicians in acquisition of L2 pronunciation. These types of study remain an opportunity for further research.

REFERENCES

Blickenstaff, Channing B. 1963. Musical talents and foreign language learning ability. *Modern Language Journal* 47: 359-363.

Brutten, Sheila R., Paul J. Angelis and Kyle Perkins. 1985. Music and memory: predictors for attained ESL oral proficiency. *Language Learning* 35, 2: 299-313.

Dexter, Emily S. 1934. Pitch Discrimination and French Accent on the High School Level. *Journal of Applied Psychology* 18: 717-720.

Dexter, Emily S. and Katharine T. Omwake. 1934. The relation between pitch discrimination and accent in modern languages. *Journal of Applied Psychology* 18: 267-271.

Lehmann, Dieter. 1988. Zum Verhältnis von Fremdsprachenlernbefähigung und Musikalität. *Deutsch als Fremdsprache* 25, 4: 237-242.

Lenneberg, Eric. 1967. *Biological Foundations of Language*. New York: Wiley.

Leutenegger, Ralph R. and Theodore H. Mueller. 1964. Auditory factors and the acquisition of French language mastery. *Modern Language Journal* 48: 141-146.

Leutenegger, Ralph R., Theodore H. Mueller and Irving R. Wershow. 1965. Auditory factors in foreign language acquisition. *Modern Language Journal* 49, 1: 22-31.

Peynircioglu, Zehra F., Aydyn Y. Durgunoglu and Banu Oney-Kusefoglu. 2002. Phonological awareness and musical aptitude. *Journal of research in reading* 25, 1: 68-80.

Pimsleur, P., R.P. Stockwell and A.L. Comrey. 1962. Foreign language learning ability. *Journal of Educational Psychology* 53: 15-26.

Purcell, Edward T. and Richard W. Suter. 1980. Predictors of pronunciation accuracy: a reexamination. *Language Learning* 30, 2: 271-287.

Sauer, Helmut. 1975. Diskriminationsvermögen im Primärschulalter: Untersuchungen zu Musikalität und Spracherwerb. *Praxis des neusprachlichen Unterrichts* 22, 3: 237-245.

Stokes, Jeffery. 2001. Factors in the acquisition of Spanish pronunciation. *I.T.L. Review of Applied Linguistics* 131-132: 63-83.

Suter, Richard W. 1976. Predictors of pronunciation accuracy in second language learning. *Langauge Learning* 26, 2: 233-253.

Westphal, Elizabeth M., Ralph R. Leutenegger and Dorothea L. Wagner. 1969. Some psycho-acoustic and intellectual correlates of achievement in German language learning of junior high school students. *Modern Language Journal* 53: 258-266.

APPENDIX

SURVEY FOR STUDENTS OF GERMAN (EXPERIMENT 1)

Musical Training and Foreign Language Study Survey

Name: _____ Gender: M F
Age: _____ Email: _____
Instructor: _____ Phone: _____

1. Have you ever had voice training?
Yes No

2. If so, please indicate the type of voice training you have had.

- Private lessons
- School or church choir
- Other _____

3. Please indicate the amount of voice training you have had.
   - Less than one year
   - One to three years
   - Three to six years
   - More than six years

4. How old were you when you first began to study voice?

5. Have you ever studied a musical instrument?
Yes No

6. If you have studied a musical instrument, please indicate the type of training you have had.
   - Self taught
   - Private lessons
   - School band
   - Other _____

7. Which instruments have you studied?

8. Please indicate the total amount of training you have had on all your instrument(s).
   - Less than one year
   - One to three years
   - Three to six years
   - More than six years

9. How old were you when you first began to play a musical instrument?

10. Have you had any other German classes besides 109 and 110 (in high school for example)?

11. If yes, how long did you study German before beginning 109?

12. How old were when you first began studying German?

13. Have you ever studied a foreign language other than German?

14. If so, which languages and for how long?

15. How old were you when you first began studying a foreign language?

16. Would you be willing to participate in an interview or to record yourself reading a text? (The total time required would be five to ten minutes, and it could be done immediately before or after your class, or at another time convenient to you).
    Yes No

Please note: Should you decide to participate, your name and personal information will be kept private.

READING TEXT (EXPERIMENT 1)

Johann Müller wohnt in München. Er studiert Psychologie an der Universität. Das Studium macht ihm unheimlich viel Spass. Montags bis freitags steht er um sieben Uhr auf und geht zur Uni. Heute ist er aber verspätet – er hat verschlafen. Das bedeutet, dass er keine Zeit fürs Frühstück hat. Er nimmt einen Apfel aus dem Kühlschrank, und isst ihn unterwegs. Weil er sich sehr beeilen muss, bekommt er einen Krampf im Bein. Am Eingang zur Universität begrüsst er den Pförtner. Er humpelt weiter zum Klassenzimmer, und hofft, dass der Dozent über seine Verspätung nicht sauer ist.

SURVEY FOR RUSSIAN AND KAZAKH TEACHERS OF ENGLISH (EXPERIMENT 2)

Musical Training and Foreign Language Study Survey

Name: _____
Age: _____
Gender: M F

1. Have you ever had voice training?
Yes No

2. If so, please indicate the type of voice training you have had.
    - Private lessons
    - School or church choir
    - Other _____

3. Please indicate the amount of voice training you have had.
    - Less than one year
    - One to three years
    - Three to six years
    - More than six years

4. How old were you when you first began to study voice?

5. Have you ever studied a musical instrument?
Yes No

6. If you have studied a musical instrument, please indicate the type of training you have had.
   - Self taught
   - Private lessons
   - School band
   - Other _____

7. Which instruments have you studied?

8. Please indicate the total amount of training you have had on all your instrument(s).
   - Less than one year
   - One to three years
   - Three to six years
   - More than six years

9. How old were you when you first began to play a musical instrument?

10. How long did you study English before coming to South Carolina?

11. How old were you when you first began studying English?

12. Have you ever studied a foreign language other than English?

13. If so, which languages and for how long?

14. How old were you when you began studying your first foreign language?

15. Is either one of your parents a native speaker of English?
    Yes No

16. Have you ever spent time living in an English-speaking country before your trip to South Carolina?

17. If you have spent time living in an English-speaking country, which country was it and how long did you live there?

18. Would you be willing to participate in a recorded interview with me? (The total time required would be about ten minutes, and it could be done at a time convenient to you – most likely in the evening at Capstone dormitory).
    Yes No

Please note:

- Should you decide to participate, your name and personal information will be kept private.
- Thank you for taking the time to complete this survey.

INTERVIEW TALKING POINTS (EXPERIMENT 2)

Where are you from? Tell me about your home.
Do you have any children? Tell me about your family.
Have you done much traveling before your trip to South Carolina? Are there any places you visited that you really liked?
How would you compare life in the United States with life in your home country? What are the similarities and what are the differences?
What advice do you have for young language teachers?

READING TEXT (EXPERIMENT 2)

For the past four years, EPI has trained Mexican English language teachers sponsored by the Mexican Fulbright Commission. EPI faculty are also regularly invited by Partners of the Americas to provide teacher training in Colombia. In addition to the teacher training offered for participants from El Salvador, Germany, Japan, and Francophone, Lusophone and Anglophone African nations, EPI faculty have also provided teacher training to Fulbright participants from Moldova and Romania, as well as two ACTR interns (summers of 1999 and 2000). During summers 2001 and 2002, EPI successfully hosted the Professional Development Seminar for 50 Eurasian teachers in 2001 and 40 in 2002. In summers 2001 and 2002, EPI also hosted the three-day Conference, "Celebrating Teaching Excellence Across Cultures: A Unique Conference for Teachers of English and American Studies," for Eurasian and US teachers, both in conjunction with American Councils for International Education: ACTR/ACCELS.