The effect of music on second language pronunciation: Based on multiple intelligences theory

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Abstract

This research is based on the premise that the human intelligence is not a single unitary entity which determines all our learning activities: instead, it draws on the findings by Gardner and the posited taxonomy of intelligence. The Musical intelligence has been documented to be positively related to the acquisition of pronunciation. This study investigated the interplay between the Musical intelligence and learning pronunciation, along with Linguistic-verbal and Visual-spatial intelligences. After sampling, the sample group took a pre-test of pronunciation. This test asked the learners to identify and produce sound features of English. Afterwards, there was a treatment of fifteen sessions during which phonetic features were taught to the students. These sessions incorporated mainly issues which cause problems for Persian speaking English learners. At the end of the treatment they took the post-test, a pronunciation test similar to the pre-test. It was concluded that the Musical intelligence is positively and significantly correlated with learning pronunciation features in the classroom; however, the other two intelligences were not found to be in correlation with learning the pronunciation materials presented in the class.

Keywords: Pronunciation, Multiple intelligences, Musical intelligence.
Background

Language is not writing, nor is it speech; but speech is the closest to language (as a competence). Language is that ability of human to practice social belonging through symbols, firstly spoken, and then through semiotic systems as well. Views on teaching pronunciation have been changing dramatically over the last half of the twentieth century (Brown, J.D. 2001). A review of the ways pronunciation has been treated in different approaches and methods reveals that while pronunciation was stressed in some decades, it was otherwise in others, depending on the teaching method that was popular during that particular time (Silveira, 2002). Language teaching pedagogy is still under development, and although the Communicative Approach has recognized the necessity of teaching pronunciation, teachers and material developers who follow this approach have found it difficult to incorporate the communicative feature in the teaching of pronunciation.

The theory of multiple intelligences developed by Howard Gardner (1983) has significantly influenced education in the last decades. Gardner refers to the intelligences as ways of knowing and understanding yourself and the world surrounding you. The eight identified intelligences include linguistic intelligence, logical-mathematical intelligence, spatial intelligence, musical intelligence, bodily-kinesthetic intelligence, naturalistic intelligence, interpersonal intelligence, and intrapersonal intelligence (Gardner, 1999).

Persian is a syllable-timed language (Windfuhr, 1979). In other words, the syllables are said to occur at approximately regular intervals of time, and the amount of time it takes to say a sentence depends on the number of syllables in the sentence, not on the number of stressed syllables as with stress-timed languages like English and German. This fact is a major challenge to the Persian speaker learning English.

Pronunciation teaching is a prominent factor in foreign language teaching. Since sounds play an important role in communication, language teachers and educators should attach proper importance to teaching pronunciation in their classes. However, this fact is very much neglected by many foreign language teachers. Pronunciation accuracy may help raise one’s social status since speaking with a foreign accent may be degraded and stigmatized by native speakers and, this may result in social and/ or professional discrimination (Derwing, Rossiter, & Munrol, 2002). In Iranian general education, English is taught using the same national syllabus and textbooks all over the country, mainly the way other disciplines are taught. Following such a syllabus is less challenging than the newer communicative-driven approaches; however, it has withstood the tide of innovations in the field for decades. Herein, pronunciation is mainly present in the form of pronunciation drills. Iranian English teachers use different techniques (oral repetition, using materials, using dictionary, focusing on the place of articulation, etc) in teaching pronunciation among which oral repetition is the most common technique (Shahriari & Dastgahi, 2014). It seems that pronunciation is a sub-skill that needs to be looked at more closely and from more innovative points of view. Taking the above points together, in the present study, the aim of the researcher is to measure whether musical intelligence could affect second language pronunciation of Iranian students.
Research Questions and Hypotheses
1. Is there any significant relationship between the musical intelligence and production of new phonological contrasts in the second language pronunciation of a group of Iranian EFL learners?
2. Is teaching production of new phonological contrasts effective in the foreign language pronunciation of a group of Iranian EFL learners?

To investigate the research question of this study, the researcher formulates the following null hypotheses:

H₀₁: There is no significant relationship between the musical intelligence and production of new phonological contrasts in the second language pronunciation of a group of Iranian EFL learners.
H₀₂: There is no effect to teaching production of new phonological contrasts in the foreign language pronunciation of a group of Iranian EFL learners.

Review of Literature
Multiple Intelligences
In the early twentieth century, the assessment of a person’s intelligence was carried out using an intelligence quotient (IQ). The IQ test mainly measures a person’s ability in terms of their performance in linguistic, logical-mathematical and also some visual spatial tasks. However, this kind of testing does not measure other skills/talents of a given person. According to Gardner (1999) human minds do not work in the same way and they exhibit different profiles of cognitive strengths and weaknesses, and this reality, accordingly, must be reflected in how students are taught and how their learning is assessed.

However, according to Gardner, intelligence is “the capacity to solve problems or to fashion products that are valued in one or more cultural setting” (Gardner & Hatch, 1989). Based on this definition, he proposed a list of seven intelligences:

1. Logical-Mathematical Intelligence: the ability to detect patterns, reason deductively and think logically. Most often associated with scientific and mathematical thinking.
2. Linguistic Intelligence: the ability to use language masterfully to express oneself rhetorically or poetically. Also allows one to use language as a means to remember information.
3. Spatial Intelligence: the ability to manipulate and create mental images in order to solve problems. Not limited to visual sight, Gardner noted that blind children can possess spatial intelligence.
4. Musical Intelligence: the ability to read, understand, and compose musical pitches, tones, and rhythms. (Auditory functions are required for a person to develop this intelligence in relation to pitch and tone, but it is not needed for the knowledge of rhythm.)
5. Bodily-Kinesthetic Intelligence: the ability to use one’s mind to control one’s bodily movements. This challenges the popular belief that mental and physical activities are unrelated.
6. Interpersonal Intelligence: the ability to apprehend the feelings and intentions of others.
7. Intrapersonal Intelligence: the ability to understand one’s own feelings and motivations.

In 1997, he added an eighth intelligence:
Music and Pronunciation
Music and speech share interesting similarities; music and speech are complex auditory signals based on the same acoustic parameters: frequency, duration, intensity etc. Owing to the commonalities that music and pronunciation share, it has been increasingly researched in the language teaching profession. It has been suggested that enjoying a higher musical intelligence predestines the learner with the possibility to master target pronunciation features more effectively, and that such learners can best benefit from the musical modality of instruction. According to Schoepp (2001), songs may largely benefit of the motivational and structuring properties of music in song. Music is claimed to provide balance, proportion, rhythm, and pleasure to educational experience. It also accelerated the process of fixing information in short and long term memory. By pronunciation in language learning we mean the production and perception of significant sounds of the language in order to achieve meaning in contexts of language use (Seidlhofer, 2001). Accordingly, this comprises the production and perception of segmental sounds, of stressed and unstressed syllables, and of speech melody, or intonation. According to Harmer (2001), almost all English language teachers have students study grammar and vocabulary, but some of these teachers draw a blank when it comes to teaching pronunciation in any organized way.

Previous Studies
The scholars of the field in the late 1960’s and early 1970’s stated that native-like pronunciation could not be totally taught, mainly because the cognitive code approach de-emphasized pronunciation in favor of grammar and vocabulary. Recently, the goal of pronunciation has changed from the attainment of 'perfect' pronunciation to the more realistic goals of developing functional intelligibility, communicability, increased self-confidence, the development of speech monitoring abilities and speech modification strategies for use beyond the classroom (Morley, 1991). Generally, there have been a couple of opposing viewpoints regarding teaching pronunciation. The first position holds that L2 learners are unable to achieve native-like ability, and the bulk of evidence within this strand of research comes from research on grammatical development as well as phonology (sound system and pronunciation). On the other side of the continuum are those researchers who have found some support that L2 learners can become native-like. Regarding phonological properties of language, Theo Bongaerts has produced a number of studies that demonstrate that L2 learners can become native-like in pronunciation; that is, their pronunciation is consistently mistaken by native judges to be native-like, and these judges mark them as ‘native’ on the measures Bongaerts has used. The Communicative Approach holds that oral communication is the primary use of language; therefore it should be central to the instruction (Carey, 2002). There has been a big shift within the field of language teaching with greater emphasis put on learners and learning rather than on teaching over the last years. Along this new shift of interest, a move from specific linguistic competencies to broader communicative competencies has emerged as goals for teachers and students (Morley 1991: 481-520). The need for the integration of pronunciation with oral communication, a change of emphasis from segmentals to suprasegmentals, more emphasis on individual learner needs, meaningful task-based practices, development of new teacher strategies for the teaching and introducing peer
correction and group interaction were emphasized within the field of pronunciation teaching (Castillo, 1991:4). Studies show that the teaching of segmental phonemes is not enough for intelligibility in communication (Cohen, 1977).

It has been increasingly suggested that brain organization is modulated by practice, for example, through musical or linguistic training. Recent studies, using neuropsychological tests and brain measures, have revealed a connection between musical aptitude and second language linguistic abilities. Moreover, music practice may also have a modulatory effect on the brain’s linguistic organization and modify hemispheric functioning. Chen (2005) recommend that language teachers spend more time working on individual sounds by teaching English rhythms because they may find a surprising progress in students’ English pronunciation.

Zybert and Stepien (2009) reported that there is a correlation between musical aptitude and perception and production of some aspects of FL phonetic features. Kung (2013) showed that Jazz Chants can be used to give students more authentic and rhythmic input through providing more opportunities for practice. Gilbert (2008) posits that the prosody of one’s first language which is acquired during the first year of life is linked to personality, and students commonly feel uneasy to speak with a different rhythm and melody belonging to a different language. He suggests a teacher can help overcome this psychological barrier and other challenges by thinking of the goal of pronunciation instruction not as helping students to sound like native speakers but as helping them to learn the core elements of spoken English so that they can be easily understood by others. Miyake (2004) believes that music is a great method of introducing reduced speech forms of connected English.

**Methodology**

**Participants**

The participants are a homogeneous group of 60 high school female students who will receive a treatment of 15 sessions. This sample was selected from among a larger population of 82 students, who took a pronunciation multiple-choice pre-test. Based on their performance on this initial test the mean and the standard deviation were arrived at. Those students who their score on the pre-test fell one SD below or above the mean score were then excluded; this procedure let us have a homogeneous group of participants.

**Pre-test**

Since the population at hand was not big enough to do a random sampling, and further since a homogeneous sample was crucial to the study, the entire population, 82 students, were pre-tested. This pre-test has two functions. First, to help leave out the outgoing participants, i.e. those who outperformed or underperformed (those who scored one standard deviation above or below the
population mean, respectively) the majority; and second to provide the researcher with a pre-test against which to interpret the post-test scores.

The pre-test was a written pronunciation test which incorporated 20 multiple-choice items asking test takers to identify given sounds in groups of words, find the rhyming words, and find homophones. The test was acquired from the book *Test Your Pronunciation* (Vaughan-Rees, 2002).

**Treatment**
Having collected the preliminary data on the sample size and its specifications in terms of their age range, background, etc, the researcher will commence the treatment sessions. The treatment consists of 15 training sessions during which the consonants and vowels are worked on in terms of their being short or long vowels, their minimal differences compared to Persian phonetic inventory, the rhyming sets, word primary stress, and finding homophones (different spelling, the same sound). During these sessions these areas were covered: Session 1) Songs, Session 2) Reading out loud, Session 3) Reading aloud fast, Session 4) Rhymes, Session 5) Listening to real Audio, Session 6) Intonation practice, Session 7) Pronunciation practice, Session 8) Reading fast, linking sounds, Session 9) Verbal/linguistic activities, Session 10) Spatial/visual, musical intelligence, Session 11) Students listen to a longer music, working on music before moving to the pronunciation, Session 12) Articulation training, Session 13) Eliciting mechanical production, Session 14) Voice-setting features, Session 15) Listening discrimination task based on minimal contrast.

**Post-test**
The post-test is a minimal contrast test; the participants are required to discriminate the different sounds presented by an audio file prepared for them. The audio file has been recorded by the researcher herself. This test includes sets of three words, two of which include the target sound segment:
- In the following, check the word or words that have the vowel [i] (as in *did*).
  *(feet, fit, feet)*
  1. 2. 3.

Both the stem and the stimulus are present in the audio file, since it is necessary that they hear the sample words in the item and the stimulus presented in each stem.

**Results and Discussions**

**The First Hypothesis**
There were 17 cases reported as possessing a prominent musical intelligence among the total 60 students.

| Table 1 Correlation of the scores on the post-test and musical intelligence |
|---------------------------|------------------|
| Score | MI |
| MI | Point-biserial | 1 |

http://www.ijhcs.com/index
Table 1 presents the details of the correlation. The computation of this correlation resulted in a value of 0.34. This value is the correlation coefficient of the two variables, musical intelligence and the score on the post-test. The value of 0.34, when checked in the table of critical values of correlation coefficient turns out to be significant with an accuracy level .01. This allows us to reject the first null hypothesis with a reasonable level of certainty in terms of the relation between the two variables. This result indicates that the MI students normally do better at pronunciation class and in pronunciation tests. This is most probably due to their excellence in music perception and codification.

The Second Hypothesis
The fourth hypothesis concerns the very effectiveness of pronunciation instruction. While one might state that it is obvious that at least some students may probably have benefited from the treatment, it is not that straightforward when we look back at the debate concerning the effectiveness of pronunciation practice in the classroom. As mentioned before, there have been a couple of opposing viewpoints regarding teaching pronunciation. The first position holds that L2 learners are unable to achieve native-like ability, and the bulk of evidence within this strand of research comes from research on grammatical development as well as phonology (sound system and pronunciation).

On the other side of the continuum are those researchers who have found some support that L2 learners can become native-like. Regarding phonological properties of language, Theo Bongaerts has produced a number of studies that demonstrate that L2 learners can become native-like in pronunciation; that is, their pronunciation is consistently mistaken by native judges to be native-like, and these judges mark them as ‘native’ on the measures Bongaerts has used.

The results of this study add to the previous findings for the effectiveness of pronunciation practice. It really works when you draw students’ attention to single sounds in pairs, show them how a sound is articulated, and show them the merits of speaking plausibly.

First the standard error of differences between the means of the pre-test and post-test was computed. This value was 3.11. Table 2 shows the details of the two exams.

Table 2 Descriptive statistics of pre-test and post-test

<table>
<thead>
<tr>
<th></th>
<th>X of pre-test</th>
<th>X of post-test</th>
<th>SD of pre-test</th>
<th>SD of post-test</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>14.8</td>
<td>15.9</td>
<td>2.37</td>
<td>2.15</td>
</tr>
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</table>

Table 3 presents the details of this correlation.

Table 3 Correlation of the scores on the post-test and pre-test

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<tbody>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.34*</td>
</tr>
<tr>
<td>N</td>
<td>60</td>
</tr>
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<td></td>
<td>17</td>
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* Significant at the .01 level
As table 3 shows, this correlation resulted in a value of -2.77. This value is the correlation coefficient of the two variables, the treatment, i.e. the teaching of pronunciation and the score on the post-test. The value of -2.77 is significant with an accuracy level .02.

**Discussing the Hypotheses**

The first hypothesis states that those students with a prominent musical, linguistic-verbal, and visual-spatial intelligence are no different from those without this intelligence in production of new phonological contrasts in the second language pronunciation. The results of the point-biserial correlation however indicate a high positive correlation between possessing a musical intelligence and the performance on the pronunciation test. The correlation coefficient value for this hypothesis was 0.34. The musical intelligence was correlated with the pre-test firstly and then with the post-test, and this revealed an interesting issue. When alternatively the researcher correlated the intelligences with the scores on the pre-test, no correlation was evident. In fact an intelligence may be improved through education, and this seems to have been the case here. The value of 0.34 turns out to be significant with an accuracy level .01. This allows us to reject the first null hypothesis with a reasonable level of certainty in terms of the relation between the two variables. This result indicates that the MI students normally do better at pronunciation class and in pronunciation tests. This is most probably due to their excellence in music perception and codification.

The second hypothesis concerns the very effectiveness of pronunciation instruction. There have been generally two opposing viewpoints regarding teaching pronunciation. The first position holds that L2 learners are unable to achieve native-like ability. On the other side of the continuum are those researchers who have found some support that L2 learners can become native-like. Regarding phonological properties of language, Theo Bongaerts has produced a number of studies that demonstrate that L2 learners can become native-like in pronunciation; that is, their pronunciation is consistently mistaken by native judges to be native-like, and these judges mark them as ‘native’ on the measures Bongaerts has used.

Moreover, there are two important facets of MI theory which appear to have significant bearing on the nature of musical intelligence. First is the premise that the intelligences can be educated or developed through schooling and teaching (Gardner, 1993). Secondly is the premise that the intelligences may each be exploited as a means of transmission, often referred to as an entry point or catalyst for learning all manner of content (1996).
The results of the matched $t$ test suggest a high correlation between pronunciation practice and pronunciation improvement in terms of the differences evident in pre-test and post-test. The value of -2.77 which is significant at a 0.02 level for a sample of 60 students is promising in that pronunciation practice really works and should matter to any communicative language syllabus. There seems that students through pronunciation practice pick up the delicate differences between English and their native language, and through articulation practice overcome the claimed lack of neuromuscular plasticity, verifying Flege’s (2005) Full Access Hypothesis which states that the processes and devices that control successful L1 speech acquisition, including the ability to develop new phonetic categories, remain intact across the life span. This means that brain retains its plasticity and ability to change even at adult age.

Two important facets of MI theory appear to have significant bearing on the nature of musical intelligence. It was said that the intelligences can be educated or developed through schooling and learning (Gardner, 1993). This was evident in this study in terms of the outcome of a correlation procedure carried out between the pre-test and the multiple intelligences. Although not a focus of this study, the treatment seems to have affected musical intelligence in such a way that there was almost a zero correlation between this intelligence and the scores on the pre-test. However, as discussed above, there was a certain amount of covariance between the two in the second test.

The value -0.09 is not meaningful statistically. The fact that there is a high covariance present between musical intelligence and the post-test but such is not the case with the pre-test has to do with the treatment. As the participants were within the age range of 16 to 18, the odds are they have highly benefited from the treatment sessions. Gardner puts that the different intelligences, unlike the traditional unitary intelligence conception, are subject to further development through practice. To reiterate, take Flege’s (2005) Full Access Hypothesis. Accordingly, the processes and devices that control successful L1 speech acquisition, including the ability to develop new phonetic categories, remain intact across the life span.

**Conclusion**

There is a strong meaningful correlation between the musical intelligence and pronunciation success. This success was defined in terms of the students’ scores on the proficiency test. This result indicates that the MI students normally do better at pronunciation class and in pronunciation tests. This is most probably due to their excellence in music perception and codification and the commonalities between music and pronunciation.

Further, through the second hypothesis, we conclude that pronunciation practice in the language classroom does work. Through the practices incorporating manners of articulation, sound discrimination and attending the minimal differences between pairs of common sounds in Persian and English and other tasks enumerated in chapter three students get the *feel* of the sound system of the second language. Although this may not guarantee removing a foreign accent in learners pronunciation, it will aid them surmount the common obstacles and proximate the target pronunciation norms, especially if they are young adolescents. This finding is in line with that of Bongaerts and others who produced a number of studies and demonstrated that L2 learners can become native-like in pronunciation.
Implications
Although the English textbooks in general education incorporate pronunciation practice to some extent, it seems necessary that pronunciation be taken into account more systematically and covering a wider range of tasks. For example, there are no practices drawing teachers’ and students’ attention to the subtle differences between consonants and vowels common to both English and Persian. These sound segments are treated as the sounds of Persian by teachers and subsequently by students. Further, it seems necessary that a section be included in the textbooks regarding the manner and place of articulation of certain sounds, or at least such training get available to teachers. Introducing music as a new dimension in English classes can be fruitful, but it takes some training on the part of the teachers.

Regarding the intelligences, there are quite a lot of implications to education in general and language teaching in particular. The implications of such theorizing for classroom practice is that teachers and book and materials developers had better take this level of personal differences into account. Maybe the biggest implication of this theory for learning is the fact that teachers should have at their disposal a wider range of techniques and tools. Gardner’s theory has several implications for teachers. One implication is that all eight intelligences are needed to productively function in society. Therefore, education planners should think of all intelligences as equally important. This is at variance with traditional education systems, which typically place a greater emphasis on the development and use of verbal and mathematical intelligences. Thus, the Theory of Multiple Intelligences implies that educators should recognize and teach to a broader range of talents and skills. Another implication is that teachers should structure class activities and tasks in a way that incorporates most of the intelligences, if not all of them.

Suggestions for Further Research
There could be suggestions for more research in the area of intelligences and pronunciation. This research and previous research on pronunciation and intelligences have shown a link between the two factors. It is desirable to see which musical tasks would be suitable and boost intelligence training, especially in the milieu of Iranian general education. A further step would be to mainstream these tasks and practices. Aside from the significant role of the musical intelligence in pronunciation training, it has been documented to be a main intelligence in the development of the brain. Having an asset of musical intelligence-tailored portfolio of tasks and materials will be an unprecedented but major step toward a more communicative perspective on language teaching. Of course reaching this goal takes much effort and further studies.

A further suggestion relates to developing intelligence maps at schools. The premise that the intelligences can be educated or developed through schooling and teaching (Gardner, 1993) helps educators assist students in developing their potential in learning a language, especially in terms of musical intelligence and pronunciation. There are standard devices such as questionnaires for ascertaining the intelligences of students. Once such a map is designed, further planning could be carried out based on that. There are other skills and sub-skills liked to other intelligences mentioned before which need further studies, especially studies carried out with Iranian students.

Due to some limitations, the population of this study was a group of female learners. It is desirable to see if male learners possess the same features as reported in this study.
Since intelligences can be trained to a certain extent through teaching, it seems crucial to address this issue in schools. More studies could investigate the ways MI-tailored education can be mainstreamed and what practices would be more promising in this regard. By developing intelligence maps and doing pilot studies one could guarantee ways and techniques to better develop successful language education.
References


