The effect of Baroque background music on reading comprehension test anxiety

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Abstract
The present study sought to investigate the effect of Baroque background music on EFL learners’ reduction of reading comprehension test anxiety. The relationship between gender and test anxiety was examined as well. Sixty Iranian EFL learners were chosen for this study. A Placement test was used to determine the English proficiency level of the participants and the test showed that all of the participants were at the same level of proficiency. Participants were randomly assigned to two groups (one experimental and one control) and there were thirty participants (15 males and 15 females) in each group. A reading comprehension course was held for each group; one for the experimental group while playing background music and the other for the control group without playing any music. Then, a reading comprehension test (test1) was administered to all of the participants while hearing Baroque music in background and another test (test 2) was administered without music. The revised 20-item version of the Test Anxiety Inventory (TAI) proposed by Spielberger (1980) was used for measuring the test anxiety level of the participants. T-test and ANCOVA were applied for statistical analysis of the data. Results obtained from this study revealed that Baroque background music had a significant effect on reducing reading test anxiety. Results also showed that gender had no significant effect on reading test anxiety experienced by the participants.

Key words: Baroque background music, reading comprehension test anxiety, relaxation.
1. Introduction:
The starting point for any problem is stress (Csoti, 2003). Anxious people may succeed, but at unnecessary cost (Jacobson, 1980). Stress makes cardiovascular changes such as elevated heart rate and rapid breathing and therefore facilitates the fight-or-flight response (Chanda & Levitin, 2013). Scientists have known for years that elevated stress hormone, cortisol, which is a corticosteroid hormone that is released by adrenal gland during stressful situations (Stannard, 2015) interferes with learning and memory (Bergland, 2013). It also impairs the ability to think and concentrate (Vytal et al., 2012). One of the stressful situations is test taking. Therefore, you should not be surprised that your stress level directly affects your success in this situation (Bernstein, 2012).

Regarding EFL/ESL learning, three major factors including cognitive, affective, and linguistic affect language learners’ learning and performance (Brown, 2014). Cognitively, reading comprehension is a mentally complex process as it is connected with many of the most intricate workings of the human mind (Cornelissen et al. 2010) and when we look at the brain processes of the actual experience of reading, we can begin to see how all of the eight intelligences suggested by Gardner have important parts to play (Armstrong, 2003). Affectively, anxiety is a major factor which influences learning and performance of the students negatively. In fact, students experiencing stress tend to shift energy from the reflective part of their brains (Feinstein, 2006). While we associate anxiety with alterations to our mental state and physical symptoms such as raised heart rate and adrenaline, we also understand that it is likely to affect us only temporarily until the source of our anxiety has passed or we have learnt to cope with it (Swift, 2014). When we are relaxed, our body’s parasympathetic nervous system counteracts the harmful effects of stress (Tennant, 2005). There are many ways to reverse what stress does to your brain, such as exercising and meditating (Borreli, 2015).

Another major factor which can be used successfully to instill excitement, reduce stress before testing, and reinforce subject matter is music (Campbell, 2009). In fact, one of the major factors which creates a relaxed state of the mind in language learners is Baroque music with sixty beats in minute (Bancroft, 1999).

Another factor is gender which could make females outperform males or vice versa. Few, if no, studies have been conducted to this date on the effects of music on reading test anxiety and the possible role of gender in subsequent anxiety. The present study investigated the effect of Baroque music on reading comprehension test anxiety and also the role of gender in experiencing this type of anxiety.

2. Research questions and hypotheses:
Research questions for the present study were (1) how does Baroque background music affect reading comprehension test anxiety of EFL learners? And (2) what is the role of gender in reduction of reading comprehension test anxiety of EFL learners in reaction to Baroque background music?

Based on the above-mentioned research questions and due to the reason that there was no unanimous consensus in research on the application of music in language learning classrooms, two null hypotheses were formulated as (1) Baroque background music has no effect on reading comprehension test anxiety of EFL learners; (2) gender has no effect on reading comprehension test anxiety of EFL learners in response to Baroque background music.

3. Background:
Music and sound communicate to us from the very beginning of life (Steinberg & Rothe, 2006). It is used to regulate mood and arousal and to promote psychological health (Chanda & Levitin, 2013). The ancient Greeks assigned God Apollo to reign over both music and healing (Trehan, 2004) and ancient curative rituals used music to facilitate trance induction (Lefevre, 2004). One of the most important
psychological problems is stress which might hinder students’ ability to reproduce the learned material when it is required (Ayres & Bristow, 2009). In fact, very early in life, many people become test-oriented and test-anxious (Zeidner, 1998). In recent years, studies (Menon & Levitin, 2005; Salimpoor et al, 2011; Janata, 2009; Shahabi & Moghimi, 2016; Wen et al, 2015; Daly et al, 2015; Hausmann et al, 2016; Innes et al, 2016; Habibi et al, 2016) have found that listening to music is associated with brain structures known to regulate automatic, emotional, and cognitive functions as well as changes in neural system. Music affects human beings both physically and psychologically (Sacks, 2006; Kent, 2006). Psychologically, supportive evidence can be found in the observation that listening to music can be effective in reducing stress level in healthy subjects and patients (McClurkin & Smith, 2016 Thompson, 2014; Gutierrez & Camarena, 2015; Salehi et al, 2016; Mottahedian et al, 2012; Cepeda et al, 2006; Dileo & Bradt, 2007; Nilsson, 2008; Pittman & Kridli, 2011; Spintge, 2012; Bradt & Dileo, 2009; Grape et al, 2003; Kreutz et al, 2004; McKinney et al, 1997; Thoma et al, 2013; Jenifer et al, 2014). The effect of stress on performance is one of the most researched phenomena in psychology (Bernstein, 2012) and studies have found that stress affects performance (Bernstein, 2012; Karunanithy & Ponnampalam, 2013) as well as brain structure, cognitive functions, and neural system (Bergland, 2014; Bergland, 2013; Stannard, 2015; Tennen, 2005; Borreli, 2015; Roszkowski et al, 2016; Li et al, 2016; Stanek, 2016; Marshal et al, 2015; Hollins & Cairns, 2016; Schwabe & Wolf, 2010). Also, studies have been conducted on the effect of relaxing music on performance in stressful tasks at work and school. Knight & Rickard (2001) measured salivary cortisol twenty minutes post-stressor and found that music prevented stress-induced increases in heart rate and systolic blood pressure. Also, Khalifa et al (2003) reported a more rapid lowering of cortisol levels after listening to relaxing music. Regarding EFL/ESL settings, researchers suggest applying music in the English language classrooms in general (Lai, 2011; Campbell, 2009; Bancroft, 1999) and in testing situations in specific (Strauss, 2004; Jenifer et al, 2014; Dillon, 2004; Hembree, 1998). Although some studies showed no effect of music on test anxiety (Goldenberg et al, 2013; Rastogi & Silver, 2014). Cantor (2013) believes that music can help or hinder your work depending on the nature of the task you are trying to perform and the nature of the music. Desuggestopedia is one of the language teaching methods in which elements such as harmony, color, form, music, and rhythm are emphasized as elements which influence emotions as well as the logical mind in the process of language learning (Bancroft, 1999). Music was central to this pedagogy and Baroque music, with its 60 beats per minute and its specific rhythm created the kind of relaxed concentration (Brown, 2007). Also, Campbell (2009) believes that music brings a positive and relaxing atmosphere to many classrooms. It can be used successfully to instill excitement, reduce stress before testing, and reinforce subject matter. Furthermore, the variety of applications of multiple-intelligences to educational settings has been quite diverse. One criticism of traditional academic schooling, according to Gardner, is that only two intelligences are primarily emphasized: linguistic intelligence and logical-mathematical intelligence. On the broadest level, then, Multiple intelligences (MI) theory has helped educators see the value of content areas typically deemed of less value in the overall curriculum by traditional educators, including music programs (Feinstein, 2006). Gardner (2011) proposes theory of Multiple Intelligences (MI) in which he argues that there are different intelligences in the human brain, and these intelligences can interact to promote each other. Gardner proposes seven candidates for these multiple intelligences two of which related to this part of the study, mainly, are musical intelligence which is the intelligence of rhythm, melody, timbre, and intrapersonal intelligence which is the intelligence related to the individuals’ feelings. As was mentioned before, three major factors including linguistic, cognitive, and affective affect EFL/ESL learning and performance. Another factor which might influence learners’ performance is gender. There is little agreement among researchers regarding gender differences in overall test anxiety. In some studies, (Zeidner, 1990; Volkmer & Father, 1991; Zaheri et al, 2012; Bandolos et al,
1995) females have been found to experience higher levels of test anxiety. However other studies (Chandler, 2006) showed that men experienced more test anxiety than women. This review hopefully prompts further research into the role of relaxing music in reading comprehension test anxiety as well as the role of gender in experiencing this feeling.

4. Test Anxiety:
Affective domain of SLA includes many factors such as self-esteem, extroversion, inhibition, anxiety, attitudes and so forth. Some of these may seem at first rather far removed from language learning, but when we consider the pervasive nature of language and the centrality of our emotions, any affective factor can be relevant to L2 learning (Brown, 2014). Research on the role of the affective factors in language learning (e.g. Henter, 2014) has confirmed that SLA is affected by these factors one of which is anxiety which expresses itself in three levels of experience: the cognitive or thinking level, the physical level, and the behavioral level. These three components are related to one another but their expression can vary from person to person (Vye et al., 2007). The amount of test anxiety during processing depends on the complexity of the information, the extent to which memory is realized, and the level of organization of the presented material (Tobias, 1985: as cited in Ayres & Bristow, 2009). It is normal to have a touch of stress before a test. However, when it gets out of control, performance plummets (Tennant, 2005).

The type of stress you face can eventually develop into chronic stress, at which point it will begin to change your brain. AS high levels of cortisol over a prolonged period of time have notable effects on the brain. It causes your brain to shrink, resulting in a loss of synaptic connections between neurons and the shrinking of the prefrontal cortex, a part of the brain that regulates your behavior (Borreli, 2015).

Emotion is physiologically programmed into the human brain (Walsh, 2015). When you are stressed, your brain is flooded with dopamine which is a chemical that affects how your brain works. Too much dopamine makes students have a hard time concentrating and recalling facts (PBS Newshour Extra, 2013).

According to Nicky Hayes, editor of foundations of psychology, a student’s stress triggers the sympathetic division of the automatic, nervous, and endocrine system (Edelstein, 2000). Neuroscientists have found that stress and cortisol can damage the brain structure and connectivity (Bergland, 2014). However, music has been shown to modify heart rate, respiration rate, perspiration and other automatic systems (Blood, 1999). There is a wide range of sensitivity to the emotional power of music, ranging from virtual indifference to a sensitivity that can barely be controlled (Sacks, 2006). Music can slow down and equalize brain waves. The slower the brain waves, the more relaxed, concentrated and peaceful we feel. Music affects the heartbeat, pulse rate, and blood pressure and a lower heartbeat creates less stress and calms the mind (Campbell, 2009). Owing to the fact that stress affects students’ performance on tests and reading comprehension test is one of the most complex tests which might create more stress than do the tests of other English language skills. Also, due to the reason that neuroscience has discovered activations in at least eighteen areas of the brain during performance of specific tasks in making or hearing music (Perrett, 2004), the evaluation of the impact of music on reading test anxiety seems to be of crucial importance.

5. Research design and methodology:
5.1. Theoretical framework:
Desuggestopedia as proposed by Goerge Lozanov and theory of multiple intelligences (MI) proposed by Howard Gardner were the frameworks for this study. In Desuggestopedia music has a central role and Baroque music, with its 60 beats per minute and its specific rhythm creates the kind of relaxed concentration (Brown, 2007). Lozano also believes that as in psychotherapy, the success in pedagogical process directly depends on the subject's emotional state and classical music aids in the
creation of a positive emotional response to the program. In particular, Baroque music is claimed to appeal to the affections or passions in the sense of the spiritual movement of the mind (Bancroft, 1999). Theory of multiple intelligences (MI) has helped educators see the value of content areas typically deemed of less value in the overall curriculum by traditional educators, including music programs (Feinstein, 2006). In fact, Gardner believes that human intelligences can affect and support each other.

5.2. Study design:

5.2.1. Setting:
The research study was conducted in the Iran Language Institute (ILI).
The target population included EFL learners who were:
- a. registered for reading comprehension course,
- b. between the ages of 14 to 16,
- c. in the same level of English proficiency (elementary),
- d. without any health problem physically and psychologically,
- e. present in all of the sessions during the reading comprehension courses,
- f. given the same amount of time to be prepared for the final exam,
- g. given the same reading comprehension tests at the end of the reading courses,
- h. given an appropriate amount of time (75 min) for doing the reading tests.

Thirty participants of 14 to 16 years old were determined to be the appropriate sample size to be enrolled in each of the groups (background music versus non-background music) (n=60) (table 1). All study participants were given the ILI placement test to make sure that they are at the same level of language proficiency. The test results showed that all participants were at the elementary level. The ILI placement test was used as the ILI is one of the most respected English language institutes in Iran and its tailor-made placement test is reliable.

### Table 1. Frequency distribution of the sample group based on gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage of control group</th>
<th>Frequency of control group</th>
<th>Percentage of experimental group</th>
<th>Frequency of experimental group</th>
<th>Total percentage</th>
<th>Total frequency</th>
<th>Statistical index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>50</td>
<td>15</td>
<td>50</td>
<td>15</td>
<td>50</td>
<td>30</td>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
<td>50</td>
<td>15</td>
<td>50</td>
<td>15</td>
<td>50</td>
<td>30</td>
<td>Male</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>30</td>
<td>100</td>
<td>30</td>
<td>100</td>
<td>60</td>
<td>Total</td>
</tr>
</tbody>
</table>

5.2.2. Variables:
The independent variables of the study were the two treatment conditions (Baroque background music vs. non-Baroque background music) and gender (male vs. female). The objective was to assess the effects of the mentioned independent variables on the dependent variable namely the reading comprehension test anxiety of EFL learners (figure 1).
6. Materials:
In order to investigate the possible effect of the Baroque music as background music on the reduction of reading comprehension test anxiety of the participants, first “Select Readings Elementary, Second Edition” book written by Linda Lee, which is a collection of teacher-approved readings was taught to both the experimental and the control groups. The reason behind selecting this book was that it offers high-interest, level-appropriate content through dynamic, carefully selected readings. Then, two audios from the Baroque era named "Chopins Nocturane" and “Dubussy Reverie" were selected for playing during the reading comprehension course of the experimental group and during the reading comprehension tests as well. The reason for choosing the mentioned audios was that the Baroque music suggested in Desuggestopedia by Lozanov was a music with sixty beat in a minute. It is kind of music which is slow and with a rhythm appropriate for relaxation. Then, two reading comprehension tests presenting the items related to what was taught during the reading courses were administered; one with Baroque music in the background for both groups and the other without any music for both groups. The modified 20-item version of the Test Anxiety Inventory (TAI) proposed by Spielberger (1980) was used for examination of the test anxiety. The modified 20-item version of the Test Anxiety Inventory (TAI) has itself been well researched. Reported test-retest reliabilities ranged from .62 to .81, and internal consistency reliability estimates are in the .90s. With respect to validity, Spielberger (1980) has reported that correlations of the TAI with six other anxiety measures range from .54 to .86 for males and from .34 to .85 for females.

7. Procedure:
In phase one of the study two reading comprehension courses were run by the author; one for the experimental group while playing Baroque music in background and one for the control group without playing any music. At the end of the courses, two tests named test 1 and test 2 were administered. Test 1 with background music and test 2 without music. Finally, Test Anxiety Inventory (TAI) proposed by Spielberger (1980) was used for measuring the test anxiety of the participants.

8. Findings:
8.1. Baroque background music and test anxiety:
Test Anxiety Inventory (TAI) proposed by Spielberger (1980) was used to examine the impact of background music on the reading test anxiety of the participants and their answers to the questions were scored and analyzed. Analysis of Covariance (ANCOVA) was applied as the statistical tool for comparing data obtained from the control and the experimental groups. Results of the co-variance analysis related to this hypothesis are shown in table 2. As can be seen in the table below, the value of
F related to the effect of independent variable (Group), (133.354) is significant (sig=.049). Thus, according to the findings obtained from the analysis of the data related to the first hypothesis, one can come to the conclusion that Baroque background music has a significant impact on learners’ test anxiety. In other words, participants’ anxiety was reduced when hearing Baroque music in background. So the null hypothesis is rejected and the opposite hypothesis is confirmed. Accordingly, we can claim that Baroque music affects test anxiety of Iranian EFL learners significantly.

Table 2. Co-variance analysis with post-test control
Tests of Between-Subjects Effects
(Dependent Variable: with music)

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>3584.097*</td>
<td>2</td>
<td>1792.048</td>
<td>233.406</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>35.915</td>
<td>1</td>
<td>35.915</td>
<td>4.678</td>
<td>.035</td>
</tr>
<tr>
<td>Without.music</td>
<td>3455.030</td>
<td>1</td>
<td>3455.030</td>
<td>450.001</td>
<td>.000</td>
</tr>
<tr>
<td><strong>Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>437.636</td>
<td>57</td>
<td>7.678</td>
<td>4.032</td>
<td>.049</td>
</tr>
<tr>
<td>Total</td>
<td>43754.000</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>4021.733</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .891 (Adjusted R Squared = .887)

8.2. Gender differences and test anxiety:
In this step, co-variance analysis with post-test control was used as operational statistics and results of the analysis were shown in table 3. As can be seen in the table, the value of F related to independent variable (Gender), (1.319) is not significant (sig=.256).

Table 3. Co-variance analysis with pre-test control.
Tests of Between-Subjects Effects
(Dependent Variable: with music)

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>3563.741*</td>
<td>2</td>
<td>1781.870</td>
<td>221.765</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>68.170</td>
<td>1</td>
<td>68.170</td>
<td>8.484</td>
<td>.005</td>
</tr>
<tr>
<td>Without.music</td>
<td>3307.474</td>
<td>1</td>
<td>3307.474</td>
<td>411.635</td>
<td>.000</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>10.600</td>
<td>1</td>
<td>10.600</td>
<td>1.319</td>
<td>.256</td>
</tr>
<tr>
<td>Total</td>
<td>43754.000</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>4021.733</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .886 (Adjusted R Squared = .882)

On the account of the above-mentioned statistics, the second null hypothesis is confirmed. There is no statistically significant difference in test anxiety of male and female participants.

9. Discussion and Conclusion:
Findings of this study are in accordance with Lai (2011) who believes that music reduces stress and is known as a reliever for stress and anxiety.
It seems that listening to Baroque music provides relief from psychological stress. The results obtained in this part confirm this claim because answers of the participants to the items of the applied questionnaire revealed that those who received Baroque background music while taking the reading comprehension test experienced more relaxed state of the mind and subsequently, they felt less anxious during the test.

Findings of the current study are also in accordance with Knight & Rickard (2001) and Khalifa et al (2003) which indicate positive effect of relaxing music on alleviating anxiety in stressful tasks in general as well as those which show this effect on test anxiety (Strauss, 2004; Jenifer et al, 2014; Dillon, 2004; Campbell, 2009).

Regarding gender differences, results are contrary to both studies which show that females experience higher levels of test anxiety than do males (Zeidner, 1990; Volkner& Father, 1991; Zaheri et al, 2012; Bandolas et al, 1995) and those which suggest that males experience more anxiety than do females (Chandler, 2006).

The present study provided evidence that Baroque as soft relaxing music has a significant role in alleviating reading test anxiety and both Desuggestopedia and theory of multiple intelligences (MI) are supported by findings of the current study. Also, results demonstrated no significant role of gender in reading test anxiety.

10. Implications:
This study offers both theoretical and pedagogical implications. From the theoretical perspective, the findings provide empirical evidence for Lozanov’s claim that music (Baroque) provides a relaxed state of the mind and affects emotional state of second/foreign language learners. In fact, soft relaxing music affected participants psychologically and this way reduced their reading test anxiety. On the other hand, the research results can be used to insinuate the inadequacy of the testing methodologies which neglect emotional state of the second/foreign language learners. Sufficient it to say that, according to the findings of this study, emotional state of the students during the tests is as important as their attempts and studies for the tests and their learning and studying strategies. So, Baroque music helps learners to be relaxed and have more control on their anxiety.

The pedagogical implications that can be drawn from the results of the current study are that first, utilizing Baroque background music, in general, pictures some strong implications for L2 educators. By playing Baroque as relaxing background music in reading test environments, English teachers can provide learners with relaxing state of mind and subsequently alleviate their test anxiety. Second, regarding the profound effects of relaxing Baroque music on reading test anxiety, and its relation to second/foreign language learners’ achievement in tests, test designers can try to devise the tests in such a way that they can provide the EFL test takers with the opportunity for hearing relaxing music in the background while being in testing environments.

References:


کارگاه‌های آموزشی مرکز اطلاعات علمی

آموزش مهارت‌های کاربردی ISI در ندوبین و چاپ مقالات
روش تحقیق کمی
آموزش نرم‌افزار برای پژوهشگران