

THE MOZART EFFECT IN THE FOREIGN LANGUAGE CLASSROOM A STUDY ON THE EFFECT OF MUSIC IN LEARNING VOCABULARY IN A FOREIGN LANGUAGE

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ABSTRACT

Music being an important component of Brain Based Learning and its effects on vocabulary learning in a foreign language was explored in this study. The study was conducted at Hacettepe University, School of Foreign Languages and aimed at determining the effect of music on learning and retaining new vocabulary in a foreign language. A secondary aim was to find whether musical intelligence had any effect on learning vocabulary with a music-based syllabus. A syllabus based on brain based learning principles that comprises music as its main component for vocabulary instruction was devised and implemented for 6 weeks. The experiment group got music based vocabulary instruction while the control group followed the same syllabus without the music component. Data have been collected by means of pre and post tests; student written feedback and an interview with random selected students in the experiment group to collect qualitative data. It has been found at the end of the study that the experiment group outperformed the control group with the number of words they learned. The experiment group also retained more words as music acted as a means to code the new vocabulary into the long term memory.

Keywords: Brain Based Learning, Vocabulary, Mozart Effect, Music.

INTRODUCTION

Over the last two decades music and its effects on learning has become a subject that attracted many researchers in the interdisciplinary field. Growing evidence from neuroscience suggests that music is a biologically powerful tool which means that it can have a long lasting effect on nonmusical abilities (such as language, mathematics, attention and motivation) during the lifetime of humans. Importantly, these effects can be observed not only in people who received musical training but also in ordinary individuals who engage with music.

THEORETICAL BACKGROUND

The Mozart Effect

A lot of research has been done on “the Mozart Effect” and its effects on learning and memory. There has been a lot of controversy around the term. Some studies suggest that listening to Mozart has a short-term positive effect on spatial IQ (Nantais, 1997; Nguyen, Shaw, & Tran, 1996; Rauscher, Shaw, & Ky, 1993; Rauscher, Shaw, & Ky, 1995; Rauscher, Shaw, Levine, Ky, & Wright, 1994; Rideout, Dougherty, & Wernert, 1998; Wilson & Brown, 1997). However, there is controversy around the issue and many efforts to replicate and generalize this effect have been either unsuccessful (Kenealy, 1994; Stough, Kerkin, Bates, & Mangan, 1994) or had mixed

results (Wilson & Brown, 1997). Interest for the Mozart Effect aroused dramatically when Rauscher et.al. did an experiment on the effect of music and tested the effects of music on spatial task performance (Rauscher et al., 1993). They tested thirty-six college students' performance on a set of three standard IQ spatial reasoning tasks from the Stanford-Binet intelligence scale (Thorndike, Hagen, & Sattler, 1986). Before the tasks, each group was exposed to one of the following conditions: (1) listening to 10 minutes of Mozart's sonata for two pianos in D major, K488; (2) listening to 10 minutes of relaxation instruction; or (3) 10 minutes silence. Their results showed that the IQ scores following the music condition were significantly (8-9 points) higher than the other two conditions. They speculated that the complexity of the music was a factor of the increased performance and suggested that music lacking such complexity or that was repetitive might, in fact, decrease performance. They also noted that this effect was temporary and did not last more than 15 minutes. However, the findings of the study led to a lot of misconceptions and misleading information. Campbell (1997) claimed that listening to Mozart can temporarily increase one's IQ and in 1998 Zell Miller, governor of Georgia, USA announced that he proposes to provide every child born in Georgia with a tape or CD of classical music. In the following years Rauscher and her colleagues performed follow-up studies that replicated the results of their first study (Rauscher et al., 1995; Rauscher et al., 1994) however, in all of the studies, the effect was temporary. In an effort to replicate and extend the results of the Rauscher et.al.'s study, Stough, Kerkin, Bates, and Mangan performed a similar study using 30 subjects (Stough et al., 1994). In order to test the hypothesis that repetitive music might decrease spatial IQ, the relaxation condition was replaced by 10 minutes of disco music that had a repetitive beat. The measurement was changed also from the Stanford-Binet test (Thorndike et al., 1986) to the Raven's Advanced Progressive Matrices (APM) (Raven & Court, 1992). The results revealed that although there was a small difference in the mean scores across the conditions, the difference was not significant. Nantais and Schellenberg (1999) examined musical preference as a factor in increasing arousal, therefore having a positive or negative effect on results. The auditory stimuli used were Schubert's *Fantasia for Piano in F minor, (D.940)*, Mozart's (K448) and silence. Their results indicated that students scored significantly better after the music stimulus, but there was no significant difference between the Mozart and Schubert stimulus.

The Effect of Music on Learning and Memory

There is a considerable body of evidence that associates academic achievement with music. Although there has been a lot of controversy around the Mozart effect, it is now an established fact that music -if not necessarily Mozart- has a significant effect on learning and memory (McIntyre, 2007; Schellenberg, 2005; Rainey & Larsen, 2002; Hetland, 2000; Davies, 2000; Weinberger, 2000; Adkins, 1997; Wallace, 1994; Falioni, 1993; Anton, 1990; Chazin & Neuschatz 1990; Guglielmino, 1986; Krashen 1985; Lozanov, 1978; Geschwind, 1970). Music can enhance various cognitive functions like spatio-temporal reasoning (Sarnthein et. al. 1997; Shaw & Bodner, 1999), attention (Drake et. al. 2000; Large & Jones, 1999) and memory (Kilgour et.al. 2000; Glassmann 1999, Deutsch, 1982). Wallace and Yalch note that text is remembered better when it is accompanied by music (Wallace, 1994; Yalch, 1991). In a study done with ninety 6 to 15-year-old boys it was found that those with music training had significantly better verbal learning and retention abilities and the longer the duration of the music training, the better the verbal memory (Ho, Cheung, & Chan, 2003). Music acts as a mnemonic tool for verbal learning especially during early development (Salcedo, 2002; Calvert & Billingsley, 1998). Patel refers to music as TTM (transformative technology of the mind) and states that "...Music should be regarded as a biologically powerful human invention or 'transformative technology of the mind". TTM theory claims that music is a human invention that can have lasting effects on such nonmusical brain functions as language, attention, and executive function, and is concerned with explaining the biological mechanisms underlying these effects (Patel 2010). Also Schellenberg's findings support the view that regular engagement with music influences a variety of nonmusical brain functions. Schellenberg argued that music training influences a variety of non domain-specific skills (e.g., memorization, fine motor skills) or general mental processes relevant to many different cognitive tasks, such as executive function (the ability to organize mental tasks, control impulses, etc.) and abstract reasoning (Schellenberg, 2005; 2006). Thaut et.al. (2005) conducted a study to test the effects of music as a mnemonic device on learning and memory. The findings of the study revealed a

significant difference between the spoken and music condition. They concluded that musical learning may access compensatory pathways for memory functions associated with learning and recall.

The Effect on Music on Foreign Language Learning

Connections between music and language have been of interest to many researchers across academic fields (Garfias, 1990; Borchgrevink, 1982; and Pribram, 1982), and TESOL (Teaching English to Speakers of Other Languages) professionals have long made use of music in their classrooms (Richard-Amato, 2003; Guiglielmino, 1986). Foreign/second language teachers have tried to identify effective uses of music in their classroom in order to help students more efficiently and effectively achieve higher language proficiency (de Groot, 2006; Salcedo, 2002; Ayotte, 2004). However, Falioni (1993) states that “all too often, music in the classroom has been relegated to recreation and entertainment status” suggesting that music should be considered as a much more powerful tool to teach a language (p.98). Similarly, Medina (1990) provides the following advice: “If music is a viable vehicle for second language acquisition to the same extent as other non-musical means, then songs can no longer be regarded as recreational devices, having little instructional value” (p. 18). Music positively affects language accent, memory, and grammar as well as mood, enjoyment, and motivation. Language teachers and music therapists alike should encourage the conjoined study of these natural partners, because communicating through a musical medium benefits everyone (Jourdain, 1997:293). In his study on the effects of music on children and language, Bygrave concludes that children who listened to music had significant improvements in learning new words and adds that music may be an effective learning medium for aspects of language development, especially students with reading problem (Bygrave 1995). Wallace (1994) performed a series of studies on the relationship between music, language, and memory. The first two studies examined two hypotheses: 1) music can aid the recall of text, and 2) some of this recall can be attributed to music’s melody rather than only to a text’s rhythmic qualities. Wallace concluded that music can be an effective aid on recall. Wallace also found that recall of text set to music is significantly better than when the same text is spoken in a rhythmic pattern. As many researchers agree (Wallace, 1994; Anton, 1990; Morrongiello & Roes, 1990; Serafine, et al., 1986), the tune and text of a song are to some extent integrated in memory rather than stored independently. According to McElhinney and Annett (1996), “The integration of the temporal aspect of a tune with the text might promote better organization of material and consequently enhance recall” (p. 399). Ensuring that vocabulary items are retained and recalled has always been a challenge in language learning and teaching. Many educational researchers agree that music is an effective way of enhancing vocabulary acquisition and comprehension, and emphasize music’s ability to engage children in learning (Wiggins, 2007; Smith, 2000; Fountas & Pinnell, 1999; Miller & Coen, 1994; Page, 1995). De Groot (2006) found that studying a foreign language with music playing in the background can increase word recall by up to 11.6% with an average of 8.7%. Medina (1990) reported on the effectiveness of music and story illustrations in the English vocabulary acquisition of second-grade limited English proficient students. Data obtained one and a half weeks after treatment showed mean gain scores were still consistently higher for the combined effects of both music and illustrations. The investigation provided empirical support that music is a useful tool for especially vocabulary in second language acquisition. A good example is *The Alphabet Song* sung to the popular tune *Twinkle Twinkle Little Star* considering that millions of children learnt the alphabet with this song.

METHOD

In this study the following hypotheses were tested: 1) Vocabulary instruction based on brain based principles and the use of music as an encoding tool given to intermediate level students will be more effective than vocabulary instruction based on brain based principles but without the music component. 2) Learning vocabulary with this method will be independent from the musical intelligence as a factor and there will not be a significant difference between the scores of students who have musical intelligence and students who do not have musical intelligence.

Participants

The study was conducted with 56 intermediate level students who were enrolled in the School of Foreign Languages (SFL) at Hacettepe University, Ankara. The total number of girls was 33 comprising 58.9% of the group and 23 were boys comprising 41.1% of the group. The students were enrolled in various faculties and departments (engineering, business administration, nursing, medicine, actuaries, nutrition and dietetics, biology and social work). Students enrolled in SFL have to sit a placement test and classes are formed according to the results of this test. Thus, it was assumed that the students in the same class have the same level of English proficiency and the control and experiment groups were formed based on this assumption which relies on the results of the placement test.

Data Collection Methods

Quantitative data were collected by employing a test to determine whether each individual student in the experiment group had musical intelligence with the Teele Multiple Intelligence Inventory. The pre test showed the mean scores of both groups at the beginning of the application and the post test mean scores are used in order to determine whether the application justifies the research questions. Qualitative data were collected by interviewing students who represent a specific group of students (high scorers, average scorers and low scorers) to have a realistic sample of the group. Also, after each lesson written feedback is collected from experiment group students to evaluate their reactions to the lesson. Qualitative data was as important as quantitative data in this study as qualitative data provided an in-depth account of students' perspectives on the new syllabus tested. Myers concludes that the ultimate aim of qualitative research is to offer perspective of a situation and provide well-written research reports that reflect the researcher's ability to illustrate or describe the corresponding phenomenon (Myers, 2000).

Procedure

Two classes with close mean scores at the placement test results were chosen as control and experiment groups. The words that are used in the study were chosen from the units of the course book that were not covered in the lessons yet. Those units were not covered also during the study. A variety of word categories was chosen for the study including nouns, verbs, adjectives, adverbs and phrasal verbs. The pre-test was devised using these words as multiple choice vocabulary questions. A pilot study was conducted on 134 students other than the control and experiment groups and the pre test was tested for validity and reliability. The pilot study results were used for item analysis and the pre test was finalized after the items of the test were changed, improved or deleted based on the item analysis results. The final version of the pre test consisted of 60 multiple choice items with four options. The pre test was then given to both the control and experiment groups prior to the application. The pre test revealed that the means of the control group was 7.30 and the means of the experiment group was 10.10. Taking these mean scores into account and as the differences in the mean scores were not statistically significant, it was concluded that both groups were equal at the beginning of the application.

Another test conducted only on the experiment group before the study was the Teele Multiple Intelligence Inventory in order to determine whether each individual student has musical intelligence or not. The aim of determining the presence of musical intelligence for each student is to draw reliable conclusions based on the collected data. If the experiment group students had a high level of musical intelligence the results that support the hypothesis of the study could not be attributed only to the method used but to their level of musical intelligence and the experimenter eliminated that by determining the students' musical intelligence. The Teele Multiple Intelligence Inventory revealed that twelve of the students in the experiment group had musical intelligence. After the validity and reliability checks the final version of the pre-test was devised and used with both control and experiment groups.

The application of the method lasted six weeks and students were given vocabulary lessons twice a week for two hours. Both groups received instruction from the same instructor. The students of the experiment group

received vocabulary instruction with the new syllabus while the control group received the vocabulary instruction also with the new syllabus excluding the music component. Activities based on music were replaced by similar activities without music in the control group. At the end of each lesson students of the experiment group were encouraged to write some feedback about their reactions and feelings towards the lesson. Those feedback sheets were later used for qualitative data analysis. Music was used both as background music and as prompts to trigger certain moods in the classroom. The experimenter used music also as context while teaching new vocabulary in order to help students associate a certain type of music with a certain word e.g. an upbeat, cheerful music for words like blissful, exhilarated, enthusiasm, masterpiece etc; or a slower and more depressive music for words like severe, assassinate, misty, revolting etc. All music used during the lessons was without lyrics in order not to distract the students. 10 – 12 new words were introduced in each lesson. The experiment group listened music in the background during *all* activities, the music was chosen by the experimenter depending on the desired mood to be created that would help students associate a word's meaning with the music during the coding process. The activities used included but were not limited to: categorizing words under broader concepts, word formation activities, matching the words with their definitions, guessing the meaning of the words from context, spelling activities, rewriting a paragraph using synonyms of the target words, the Taboo game, making sentences using the new words, Tic Tac Toe with words, free association with words (students were given a word and asked to report what comes to their mind when they hear that word), the bidding game (students were given sentences with the wrong words and asked to guess which word should be changed or omitted), drawing the word (the teacher gave students a word and asked them to draw what that word reminds them of), writing a paragraph with the new words. Two activities were done only with the experiment group because they relied solely on musical coding of words. While the experiment group did those activities the control group chose one of the activities listed above. The two activities included matching the new words with a specific piece of music; and listening to authentic songs where the target words appear in lyrics. At the end of the application the pre test was given to both groups as the immediate post test. The same week the experimenter held interviews with some of the students from the experiment group about their reactions to the application and the method.

RESULTS AND DISCUSSION

The results of the post test revealed that the differences between the mean scores of the control and experiment groups were significant. As given in Table 1. the control group's mean score was 33,62 while the experiment group's mean score was 51,32. Test results revealed that the experiment group that received vocabulary teaching based on a syllabus with music learnt and retained more words than the control group. Thus it can be concluded that teaching vocabulary with music was a successful procedure and that music served as a powerful tool in encoding new vocabulary into the long term memory. The first hypothesis of the study was found to be valid.

Table 1: Comparison of the control and experiment groups' mean scores.

	Mean	SD	T	df	p
Control Group	33.6296	12.8517			
Experiment Group	51.3214	7.3235	-6.301	53	.006*

*P>.05

To test the validity of the second hypothesis, the mean scores of the experiment group students who had musical intelligence were compared to the mean scores of the rest of the experiment group. It has been found that the mean score of the students with musical intelligence was 50.61 while the mean score of the students

with no musical intelligence was 50.53. This result was not statistically significant and it was concluded that the second hypothesis of the research is valid. Thus, it was concluded that teaching vocabulary with music is a successful application independent of the presence of musical intelligence of the individual students.

Table 2: Comparison of the mean scores of students with and without musical intelligence (MI).

	Mean	SD	T	df	p
Students with high MI	50.6154	8.2010			
Students with no MI	50.5333	10.4940	.023	26	.739

*P<.05

The comments of the students in the interview also revealed that the vocabulary instruction with music was successful. The students pointed out that music in the background helped them to remember the words; two students said that although music used to distract them while studying, the music used in the application did not. They said that this is due to the fact that all music used in the study was without lyrics. Some of the students said that when they heard the piece of music that was previously played during the lesson they could immediately recall the words learnt in that lesson. Students also liked the free association with words activity where they associated a piece of music with the words they were learning. To conclude, all students stated that the musical activities helped them to learn and recall words, increased their motivation to learn more words and helped them to build a positive atmosphere in the classroom. The feedback sheets showed similar reactions on the students' behalf. All students who wrote feedback wrote that the instruction was successful and they expressed their wish to continue with the lessons in that way.

The findings of the study were consistent with the literature on brain based learning, and using music as an encoding tool to learn a new language. Results of this study showed that music can actually be an instructional tool rather than being a fun activity. As Medina (1990) points out music is not only an entertainment tool in the foreign language classroom. It can always be used as a tool for setting the mood, entertainment, motivation even for class management however its powers go beyond these functions as data from brain based learning reveals (Jensen, 2000). The most important aspect of vocabulary instruction with music was how it touched the different pathways of the brain and thus aided long term recall. The written feedback of the students showed that learning words with music helped them to recall the situation these words presented in and then the words came to their mind almost automatically. The same idea was supported in McElhinney and Annet's research (1996) as well as De Groot (2006).

CONCLUSION

Using music in vocabulary instruction in a foreign language has been discussed by many researches and it is an agreed fact that it has a positive effect in learning new information like words. It can be suggested as a result of this study that foreign language teachers can use music not only as a recreational tool but as an active instrument that has the power to encode new data in the students' long term memory. As this has been the challenge of many teachers for a long time using music can be the solution. Most course books have an element of music included in their book series but few books use music as an aid for memory. Therefore, foreign language teachers who are aware of the impact of music could adapt the book by including music that they bring in. Teachers do not need to be experts of music as most of the cited studies which advocate for the use of music were simple enough to be implemented. The debate of whether the Mozart Effect exists or not should not make teachers hesitant towards using music in their vocabulary classes as it is now an established

fact that music aids long term retention whether the teacher plays Mozart or another type of music. Further research could be conducted on the effects of specific types of music and using music with different age groups of students.

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