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## The Effect of Music Genre on a Memory Task

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### Abstract

*This study examined the effects of two different music genres and silence on a memory task. Sixty participants were randomly assigned to three groups which were exposed to rap music, classical music or silence while playing the Concentration game. The number of flips needed to complete the Concentration game was measured and served as the memory score. Results of a one-way analysis of variance detected a significant difference between the groups. A planned post hoc analysis found that the classical music group completed the Concentration game in significantly fewer flips than the rap group.*

*Keywords: music, genre, memory*

### Introduction

Many different genres of music have been studied as to their effects on different variables. Classical music has been found to have a range of effects from increasing purchases (Areni & Kim, 1993) to affecting memory and cognition (Hallam, Price & Katsarou, 2002). For example, Rausher, Shaw and Ky (1993) found that listening to classical music improved intelligence and memory (the "Mozart Effect") but others have been unsuccessful in replicating these findings (Pietschnig, Foracek & Formann, 2010; Steele, Bass & Crook, 1999; McKelvie & Low, 2002).

A British radio station, called Classic FM, specializes in western classical music whose programming is designed for relaxation (Dibben & Williamson, 2007) and relaxation has shown to be beneficial for the brain to work more efficiently (Blanchard, 1979). If the brain works more efficiently, better memory may be a result.

A genre quite different from classical music that has received research attention is rap. Unlike classical music, rap music tends to be fast, aggressive, and stimulating with about 100 beats per minute. Classical music, on the other hand, tends to be much slower with about 40 beats per minute. Rap music has distracting cognitive effects (Dibben & Williamson, 2007; Smith & Morris, 1977). Smith & Morris (1977) found that stimulating music increased emotionality and was related to poorer performance in participants over those exposed to a more sedating kind of music.

Music is very popular these days, especially among college students. Roy (2009, p. 505) stated, "It's unusual for students not to be around music; she explains that this is true because of the increased availability of portable music devices and free music on the internet." Most students play music while studying

(Patton and Offenbach, 1978). Anderson and Fuller, 2010, found that about 70% of students listen to music while studying. If most students study while listening to music, concern could arise that listening to music may have negative effects on cognitive performance.

As previously shown, classical and rap music seem to have differing effects on cognition and memory. What about the effect of silence on performance? The effect of silence on memory and cognition is less clear than the effect of rap and classical music. Several studies were conducted which included silence and music as independent variables with differing outcomes. Konecni (1982) stated that "all music processing utilizes cognitive capacity, so listening to music impairs cognitive task performance" (p. 44). It could be assumed from this statement that avoiding music and working in silence would produce higher cognitive task performance than music. Yet, Anderson and Fuller (2010) found that silence did not increase or decrease memory. Hallam, Price and Katsarou (2002) however, in a study of primary school children, found that participants performed better on a cued recall task in a calming music condition than an aggressive music condition or silence.

In the current study the effect of rap music, classical music and silence on a memory task was evaluated in an experiment similar to that conducted by Eskritt and Lee (2005). Related research seems to show that classical music may have a positive effect on memory, rap music may have a negative effect and silence may have no effect on memory. The first hypothesis was that there would be a difference between the three groups (classical, rap, and silence) on a memory task score. Secondly, it was hypothesized that the classical music group would have the best performance on a memory task.

## Method

### Participants

A total of 60 college undergraduates (24 men and 36 women) served as participants in this experiment. The participants had an average age of 20.25 (S.D. = 2.58). All participants were students from a small, private, liberal arts university in the south. Participants were recruited from an upper level psychology class, a general education biology class, and a general education sociology class. All students were given extra credit to participate in the experiment. The participants were randomly assigned to one of three experimental groups; all groups had 20 participants.

### Materials

The dependent variable in this study was the number of cards "flipped" to complete a game called Concentration (Milton Bradley, 1979). In the Concentration game there are 40 cards. Each card has an identical match; this means that each deck of Concentration cards consists of 20 matches. Eskritt & Lee (2005) described the process:

In Concentration, cards are placed face down in an array randomly. A player turns over any card and then turns over a second card to look for the first card's match. If the cards match, the player removes these cards from the array and then repeats the procedure. If the cards do not match, they are turned back over. When all matches are collected, the experiment is completed (p. 255)

### Design

An independent groups design was used in this experiment. Sixty participants were randomly assigned to 3 groups. One group was exposed to classical music and one to rap music while playing Concentration. The 3<sup>rd</sup> group played Concentration in silence. The dependent variable was the number of flips required to complete the game and was the operational definition of memory.

### Procedure

Sixty participants were randomly assigned to one of three groups which resulted in twenty participants in each group. All participants were told how to play the Concentration game, and were asked to perform to their highest ability. Participants in each group were led into a room, approximately three at a time. There were three tables and three chairs placed in

the middle of the room. On each table there was a deck of Concentration cards faced upside down in the same starting formation and a short demographics questionnaire inquiring about participant age and gender. Participants completed the experiment while listening to either classical or rap music, or they participated in silence. Once the Concentration game had been completed participants responded to the demographics questionnaire.

The participants were observed through a two-way mirror without their awareness. The observer on the other side of the mirror counted the number of flips needed to finish the memory game.

The music for the classical and rap conditions was played at the same volume (Spintge and Droh, 1987), was instrumental to reduce distraction (Furnham and Stephenson, 2007), and was thoughtfully selected. The classical piece selected was consistent with the research of Freeburne & Fleischer (1952). It was *Symphony No. 5 Piano Concerto in E-flat Major* by *Beethoven* (London Festival Orchestra, 1991) which is slow with 48 beats per minute (BPM). For the rap music condition a Dutch piece was selected called *Coke moet gepushed worden*, by Kempfi (2007) which has about 120 BPM.

After the participants finished the memory task, the experimenter entered the room, collected the demographics questionnaire and thanked the students for participating in the study.

## Results

The first hypothesis predicted that there would be a difference between the three groups (classical, rap, and silence) on a memory task score. The first hypothesis was supported. The data were analyzed with a one-way analysis of variance which showed a significant difference between the groups [ $F(2, 57) = 3.97, p = .02$ ] (Table 1). The second hypothesis predicted the classical music condition would produce the best performance on a memory task. This hypothesis was also supported with the group exposed to classical music completing the memory task in fewer flips than the other groups. However, there was only one significant difference between the groups. A planned post hoc analysis (Scheffe) found that the classical music group completed the Concentration game in significantly fewer flips than the rap group (Table 2).

The results supported the hypothesis with the classical music group scoring the best on the memory

task with a significantly better memory task score than the rap group.

## Discussion

It was hypothesized that there would be a difference between the three conditions (classical, rap, and silence) on memory scores that resulted from playing the Concentration game. The results indicated that there was a difference between the three groups on the scores of the memory task. Participants in the classical group scored significantly better on the memory task than those in the rap group. No other differences between groups were found.

These findings are consistent with the work of Hallam, Price and Katsarou (2002) that found that participants performed better on memory and cognitive tasks when exposed to calming music as opposed to aggressive music.

Secondly, the current results support the existing research suggesting that working in silence neither increases nor decreases performance (Anderson and Fuller, 2010).

One major limitation is that while the current study demonstrated that participants exposed to classical music outperformed those exposed to rap music on a memory task, it does not help us understand

why. Dibben and Williamson (2007) suggested that participants performed worse in a rap condition due to distraction. Was performance improved in the classical condition, in the current study, due to a lack of distraction? Or was the superiority of the classical group related to relaxation that was associated with more soothing music? This theory may relate to the findings of Smith and Morris (1977) that found that poorer performance seemed to be related to heightened emotionality. A second limitation relates to the limited music genres that were tested (only classical and rap).

In light of the current findings and limitations, three recommendations for future research are in order. First, more research should be done exploring these issues in an attempt to determine whether relaxing music, like classical, has beneficial effects or aggressive music, like rap, has a distracting effect. Or could it be that both are possible? Secondly, the effect of other genres of music on memory should be evaluated. Other types of music, both soothing and aggressive, should be tested on a memory task. This might shed light on the issue as to whether something unique is occurring with classical and rap music or whether it is a more general effect of soothing and aggressive music. Thirdly, the effect of music on other cognitive tasks should be evaluated. Is there a difference in performance between classical and rap participants exposed to non-memory cognitive tasks?

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**Table 1**

Group	N	Mean	S.D
Classical	20	100.10	30.119
Rap	20	136.10	37.313
Silence	20	104.85	32.793

**Table 2** Post Hoc – Multiple Comparisons (Scheffe)

I (Group)	J (Group)	Mean Difference (I-J)	Sig.
Classical	Rap	-36.000	.042
	Silence	-4.750	.943
Rap	Classical	36.000	.042
	Silence	31.250	.088
Silence	Classical	4.750	.943
	Rap	-31.250	.088