CORNERSTONE
MINNESOTA STATE UNIVERSITY MANKATO

Journal of Undergraduate Research at Minnesota State University, Mankato

Volume 3 Article 6

2003

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Recommended Citation

Sandberg, Kristin and Harmon, Sarah (2003) "Effects of Popular Music on Memorization Tasks," *Journal of Undergraduate Research at Minnesota State University, Mankato*: Vol. 3, Article 6.
DOI: https://doi.org/10.56816/2378-6949.1175
Available at: https://cornerstone.lib.mnsu.edu/jur/vol3/iss1/6

EFFECTS OF POPULAR MUSIC ON MEMORIZATION TASKS

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Abstract

This study investigated the effects that popular music has on memory performance. It was proposed that popular music would adversely affect both studying and memory recall. Forty introductory psychology students participated in the study. Subjects were given a list of fifty words to study in 6 ½ minutes, with music either being present or absent. This was termed the learning stage. In this study, four conditions were tested. In all 4 conditions, subjects were assigned to either a "music" pre-period or a "non-music" pre-period and a "music" post-period or a "non-music" post-period. After they had studied the words, subjects were given another 6 ½ minutes to recall the words either with or without music present. This period was called the recall stage. The researchers hypothesized that music would have a detrimental effect on performance, these expected results were not found. Findings from this study suggested that students who study while listening to popular music performed at the same level as those without music present in either condition. Results indicated that women excelled in recall when the testing condition did not have music present in comparison to men.

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The purpose of this study was to find whether popular music would have a positive or negative effect on memory tasks. There are many different perspectives on how background music and noise affects performance. The current body of research reports mixed results with some studies reporting positive effects and some reporting negative effects of music on performance.

Numerous studies have been conducted to test the Mozart effect. The Mozart effect is a term used to explain the claim that people perform better on tasks when listening to music composed by Mozart. Rauscher, Shaw, and Ky (1993) indicated that subjects' performance on spatial tasks was better while listening to music compared to the silence condition. Due to this study, many people questioned whether listening to music increases intellectual ability. Other researchers stated that it is possible that the Mozart effect has very little to do with music. They postulated that enhanced performance is due to arousal or mood (Thompson, Schellenberg, & Husain, 2001). Those researchers proposed that musical stimuli that may be enjoyable to that individual might produce a small improvement in performance on a variety of tasks.

Many studies have emerged from the concept of the Mozart effect. The results of these studies have been mixed. Ransdell & Gilroy (2001) indicated that background music significantly disrupted writing fluency while using a computer. The participants in that study showed signs of slower writing and a decreased writing quality when their writing was accompanied by background music.

An earlier study found that when students frequently studied to music, a specific type of music was less likely to impair their performance on reading comprehension tests (Etaugh & Micheals, 1975). Hillard and Tolin (1975) indicated that if the background music was familiar to

the subject, they performed better on the given task than when unfamiliar music was present. Another study argued that the differences were due mainly to individual differences in music preference (Daoussis & McKelvie, 1986).

Tucker and Bushman (1991) found that rock and roll music had a detrimental effect on tasks involving mathematical and verbal skills, but it did not have an effect on reading comprehension tasks. In another study, the researchers found that music that contained speech had significant negative effects on the participants' ability to perform tasks (Martin, Wogalter & Forlano, 1988).

It has also been found that males and females perform differently in the presence of music when performing various types of tasks (Miller & Schyb, 1989). Although these studies found different results for gender and the frequency of listening to the type of music presented in the study, the results still indicated that music helped their performance.

Broadbent (1958) tested the effects of noise on tasks that required complex mental processing. He showed that noise produces deterioration in performance over time. He also proposed that noise has a negative effect on later performing of the same activity in silence. This suggests that there are other factors involved in this phenomenon beyond distraction of attention from the task.

The irrelevant speech effect indicates that the presentation of speech based irrelevant sound that is to be ignored by subjects actually impairs their task performance (LeCompte, 1995). The irrelevant speech effect results in performance deficits on many cognitive tasks such as serial recall, free recall, cued recall, and recognition. Irrelevant speech can cause poor performance in many everyday situations such as offices, dorm rooms, and other situations where concentration on tasks is important. One study found words to be more disruptive than

tones and nonsense syllables. The researchers suggested that this was due to the semantic meaningfulness of words (LeCompte, Neely, & Wilson, 1997).

The irrelevant speech effect breaks down the person's ability to focus attention on a particular task. This is thought to be due to the irrelevant speech gaining access to the phonological loop. The phonological loop is a short-term memory store for speech-based material. This effect is not controllable by the individuals experiencing it. Short-term memory is dependent on attention paid to to-be-learned items. Even though a person may be focusing on to-be-learned information, sounds from the environment are registered and organized in the phonological store (Jones, 1999).

Salame and Baddeley (1987) showed that short-term memory is detrimentally affected by unattended speech but is not disrupted by unattended sound. This suggests that the speech based sounds disrupt the phonological loop.

Irrelevant sound disrupts attention and has detrimental effects on performance of cognitive tasks. Even relatively quiet sound shows this effect. Acoustic change has been shown to have negative effects on performance where repeated sounds have not been shown to be disruptive. Non-speech sounds can be disruptive when there is acoustic variation. Irrelevant sounds produce these effects when stimuli is presented and when it is present during retention. Habituation has not been shown to occur in the case of irrelevant sound. Memory is highly vulnerable to the negative effects of irrelevant sound. Irrelevant sound that holds semantic meaning has been found to disrupt comprehension tasks (Banbury, Macken, Tremblay, &Jones, 2001).

Tolan and Tehan (2002) conducted a study involving irrelevant speech effects on the immediate cued recall of stimuli. They found that irrelevant speech had adverse effects on cued

recall. They also found that steady-state irrelevant speech had the same detrimental effect on recall as did changing-state irrelevant speech. This contradicts other literature in the field that shows that changing-state speech should decrease performance more than that of steady-state speech. When speech based sound is masked by noise, it becomes less disruptive. This is thought to be due to the added noise, masking the speech to make it unrecognizable as such (Ellermeier & Hellbruck, 1998).

Many college students study while listening to music. Earlier research has not provided a clear and consistent picture of the effect of listening to music on learning. The present study attempted to determine if studying to popular music would have a detrimental effect on memory. If music does hinder a student's ability to study, it would be beneficial for them to have that information available. It is possible that earlier research did not indicate an accurate picture of the effect that music has on learning because previous researchers had not taken into consideration the music people frequently listen to while performing cognitive tasks.

The present study tested the effects of popular music on immediate recall tasks. It was proposed that because popular music often contains lyrics, it would have a detrimental effect on performance, as the irrelevant speech effect would predict.

Method

Participants

Participants in this study were 40 introductory psychology students. They received extra credit for their participation.

Procedure

Participants were placed in a testing room. Subjects were given a list of fifty words that were randomly selected out of the dictionary. They were given 6 minutes and 30 seconds to study the list of words that were provided. After that time had lapsed, the subjects had 6 minutes and 30 seconds to write down the recalled list of words. This amount of time had been chosen because that was the length of time it took to play the two songs that were used in the study. The subjects were tested in groups of three or fewer.

There were a total of four testing conditions. These conditions consisted of a subject either studying and being tested while listening to popular music, studying with popular music and being tested without, studying with no music and being tested with popular music, and a subject studying and being tested without music present.

The songs that were played in the music condition were “Let Me Blow Your Mind” by Eve and Gwen Stefani and “What Would You Do” by City High. These songs were selected because they are a representative sample of popular music chosen from the CD Now 7.

Results

There were no significant differences found between conditions in this study. T-tests were conducted to find significance values. Recall was not significantly different with or without music $t(17) = 1.239$, $p = .232$, $t(11.67) = 1.328$, $p = .210$.

Insert figure 1

There was only one significant finding. Women performed better than men did when tested without music. The mean recall for women in this condition was 15.5 words while the

mean recall for men was 10.2. A t-test illustrated this $t(19) = -2.882$, $p = .01$, $t(10.032) = -3.535$, $p = .005$. This was an unexpected finding.

Insert figure 2

Discussion

The data from this study did not support the hypothesis that music would have a detrimental effect on memory performance. This may be a result of a number of different circumstances. One reason could be the lack of sufficient numbers of subjects. Originally, we expected to obtain data from 120 subjects. We were only able to gather data from 40 subjects due to lack of participation. Had there been more subjects, it is possible that our hypothesis would have been supported.

Even though results were not supportive of the hypothesis, subjects made comments that suggested the hypothesis to be valid. One subject said after being tested in the no music-music condition, “When the music came on I forgot everything.” This indicates that the memory trace had been disrupted by the music during the testing condition, as the irrelevant speech effect would indicate.

There are many additional limitations to this study. At times, the room where the equipment was stored had been occupied by other researchers. Therefore, testing conditions could not always be randomly assigned because the equipment needed was not available. Random assignment is important in these types of studies to gain a representative sample in each condition. This unfortunate circumstance could not have been predicted early in the study.

Students and faculty members often disrupted the study by walking in while testing was being conducted even when the door was closed. These disruptions may have had an adverse effect on the results obtained in this study. This could have been prevented by using a room that could be locked during testing sessions.

During testing conditions subjects developed a lack of interest in the study and wanted to leave before the 6 ½ minutes had elapsed. Future research could shorten the study and test interval to decrease the boredom that some subjects may feel that could be affecting the results.

One unexpected finding was that women performed better than men in the no music testing condition. This result was not dependent on the type of study condition, significant results were only produced during the testing period without music present. Miller and Schyb (1989) also showed sex differences on tasks performed when music was present, but their study indicated that music significantly helped performance. This study did not find that to be the case.

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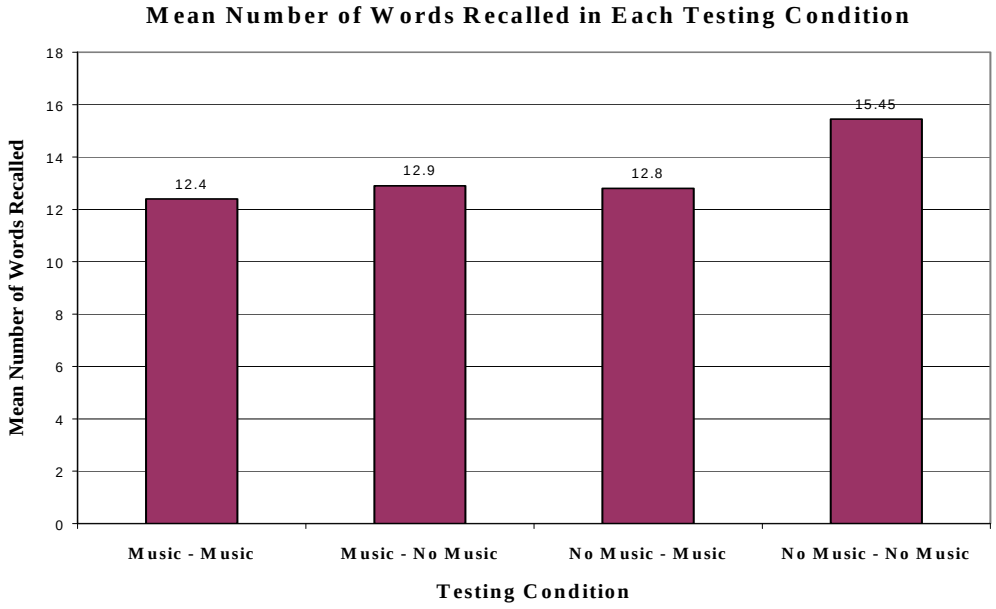

Figure 1: Mean number of words recalled in each testing condition

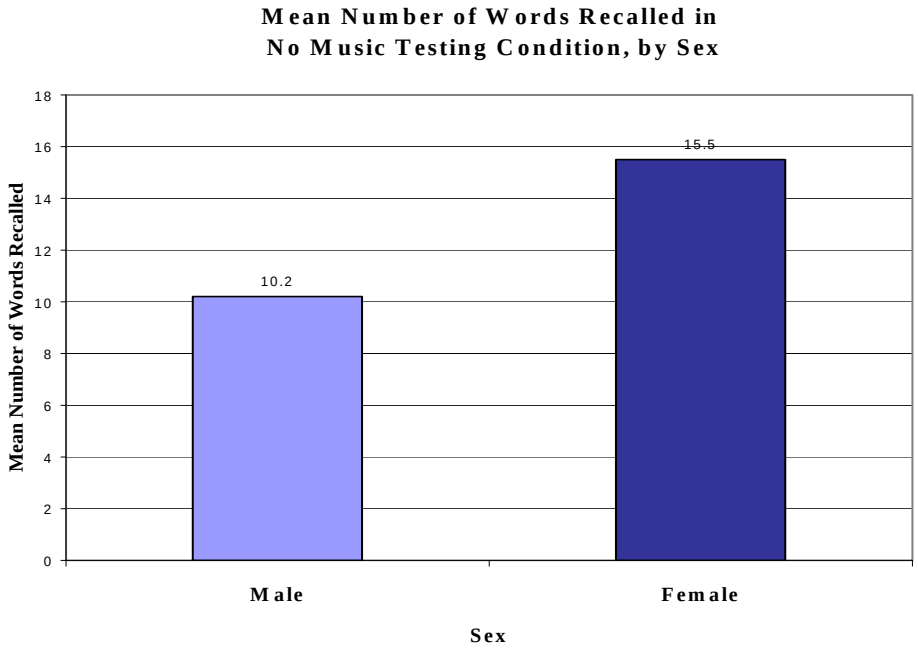

Figure 2: Mean number of words recalled in no music testing conditions for each gender

DOI: 10.56816/2378-6949.1175