

5-2012

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Allisha Rounds  
*Lindenwood University*

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### Recommended Citation

Rounds, Allisha (2012) "The Possible Effects Silence and Music Listening have on Memory,"  
*Undergraduate Psychology Research Methods Journal*: Vol. 1 : Iss. 14 , Article 8.  
Available at: [https://digitalcommons.lindenwood.edu/psych\\_journals/vol1/iss14/8](https://digitalcommons.lindenwood.edu/psych_journals/vol1/iss14/8)

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## The Possible Effects Silence and Music Listening have on Memory

Allisha Rounds<sup>7</sup>

*College students often can be seen listening to music while studying in the library and around campus. Previous research indicates that some instrumental music can be beneficial to a person's ability to recall information such as words, while lyrical music can have the opposite effect. Further studies have shown students do poorly on reading comprehension tests when listening to popular music than if they were sitting in silence. The current research aimed to look at music listening compared to memorization abilities. Thirty participants from the Lindenwood Participant Pool were asked to memorize two short passages. One passage was given in silence and the other passage was read while listening to the participants' choice of music. They were then asked to write down as much of the passages they could remember word for word. While no significant results were found in this study, future research could be conducted with a larger sample size while also looking at a person's preference for studying with or without music.*

Music has always been an aspect in the human experience. Young children learn nursery rhymes that aid their knowledge of the world. When they become a little older they may start to listen to popular music with their parents. Teenagers are often stereotyped by their love of music, often found listening to their favorite songs, and keeping up with their favorite bands. Many college students can be found studying in the library with ear buds in their ears, presumably listening to music. The question then can be asked, is listening to music conducive to learning or simply an unknown distraction for the parties involved?

Some research has concluded that music is not necessarily as distracting as other factors. Rowe, Philipchalk and Cake (1974) looked at two different distracters that may influence a person's ability to remember sounds and words. Their study asked participants to attempt to remember either a series of words or a series of familiar sounds such as a car horn. During the first memorization session, participants were made to listen to a distraction tape compiled with either music or poetry. After listening and attempting to remember words or sounds the

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<sup>7</sup> Allisha Rounds, Department of Psychology, Lindenwood University.  
Correspondence concerning this article should be emailed to Allisha Rounds,  
[amr561@lionmail.lindenwood.edu](mailto:amr561@lionmail.lindenwood.edu).

participants wrote down what they could remember. The second trial was similar except there were no distractions for the participants. Rowe et al. (1974) found that words were much better remembered than sounds when the participant was listening to music but was worse if they had the poetry distraction. They believe this could prove that sounds and words may be controlled by different brain functions and therefore instrumental music may not be detrimental to verbal learning (Rowe et al., 1974).

Meudell (1972) seems to confirm the idea that memory for different things may in fact be coded and stored separately by the brain and therefore distractions may not be as distracting depending on their nature. This study looked at the memorization of letters and their positioning on a piece of paper. After the participants were given time to memorize the letters and their positioning, researchers either gave them a visual or auditory distraction. Meudell (1972) found that the auditory and visual distractions had negative implications for the memory of letter locations while they did not necessarily have the same effect on the actual recall of the letters.

While it may be unclear how distracting music truly is on memory, music has been shown to facilitate learning new information. Wallace (1994) showed that presenting information in a musical way aids the recall of information. Subjects in her study were asked to listen to the words in a ballad. Some portions were sung to them while others were simply spoken. Wallace's (1994) findings showed that word for word recall of the lyrics was greatest for those who heard the sung words. People also had more of a structural sense of the words and their placements when they were presented in a musical manner (Wallace, 1994). While this indicates that information presented musically may help retain information, it does not explain if today's popular music can be used in the same manner or if they are considered more of a distraction.

Schellenberg, Nakata, Hunter and Tamoto (2007) looked at mood as it is affected by music and subsequent scores on IQ tests. They asked their participants to listen to classical music before taking an IQ test. Their mood as well as their arousal were monitored during the study. Schellenberg et al. (2007) found that when mood and arousal were high participants did receive better scores on certain subsections of the IQ tests. The results seem to indicate that music that can increase arousal or mood can also affect cognitive performance.

While classical music may improve cognitive performance on some tasks, what effect does today's popular music have on reading and comprehension of material? While students may claim they can easily study with the radio on, it may not be the case. Anderson and Fuller (2010) asked junior high students to listen to popular music, as shown by the top hit songs of Billboard Magazine for the week of their study, while attempting to take a reading examination. The reading exam involved reading information and then being asked questions about the material. Their research showed that students exposed to music while reading did significantly worse than students in a quiet environment (Anderson & Fuller, 2010). Their demographic survey included a question about whether or not the participants preferred to listen to music while studying. Those who said they preferred to listen to music and often did so while studying had lower reading comprehension skills than their peers who preferred to study in silence (Anderson & Fuller, 2010). It is interesting to see how music can be detrimental to a person's ability to study and learn material.

The purpose of the current research was to look at the effect music may have on an undergraduate's ability to memorize and recall passages verbatim. While past studies have looked at the effects of classical music and IQ or popular music and reading comprehension, this study aimed to look at the effect music may have on memorization. It is true that many students

prefer to listen to music while studying and often they say they can do so without any negative consequences. The present hypothesis was that students would become distracted by listening to their favorite music and therefore do more poorly on the memorization task than when they are asked to memorize information in silence. This was the hypothesis because even though past research has found some music to be beneficial on other cognitive tasks, lyrical music was found to be a distraction in reading and comprehension. The research project was also created in order to look at the effect age, gender, year in school, GPA, and if a person prefers to study with music may have on the memorization task scores. This research aimed to test this hypothesis by requiring voluntary participants to read and memorize two different passages from a textbook. While reading one passage they were asked to listen to their favorite artist/song and then given the next passage in silence. Test and conditions were counterbalanced. Afterwards they were given a sheet to recall as much of the passage as they can verbatim.

## **Method**

### **Participants**

I recruited 30 participants for this study from the Lindenwood Participant Pool. The Lindenwood Participant Pool is a way for undergraduate students to receive extra credit in some of their social science general education courses such as Psychology, Sociology and Anthropology. There were 11 men and 19 women participated in this study. The participants' ages ranged from 18 to 25. More than half of the participants were 19 years old. Sixteen of the participants were freshman, six were sophomores, five were juniors, and three were seniors. There were a high percentage of history majors as well as education majors. Of the recruited participants, 9 preferred to study with music, 10 preferred to study without music, and 11 sometimes studied with music.

To recruit subjects, I posted sign-up sheets with a description form on the Lindenwood Participant Pool bulletin board where potential participants read about my study and signed up for a time they were available to participate.

### **Materials and Procedure**

Once the participants arrived they were asked to verify that they are in the Lindenwood Participant Pool. I then asked them to read the informed consent form (see Appendix A) and sign if they felt comfortable continuing the study. The informed consent form explained to the participants what the study would ask of them and the potential risks involved. The researcher also asked if the participants had any hearing or visual disabilities that could hinder their performance on the surveys. This allowed researchers to disregard data collected from these particular individuals because one's hearing and visual abilities were necessary for the purpose of this study. It was explained that participants could terminate their involvement with the study at any time without any penalties towards them. The participants were then given two short passages to read and memorize separately in 3 minutes (see Appendices B and C). Each passage was similar in reading level and length as well as both being 41 words long with two sentences total. Both passages were retrieved from Erika Hoff's (2009) textbook "Language Development" (p. 148 and 215). Three minutes was the allotted time for memorization because that is roughly the length of one song and there are only two sentences to memorize.

The first passage was either presented in silence or while listening to the participants' choice of music with ear buds in at their choice of volume. Before each passage the researcher wrote down the participants ID numbers, which is a set of arbitrary numbers the researcher assigned to the participant to ensure anonymity. Example ID numbers are A100, A101 and so on. The researcher then recorded on the passage sheet if the participants would be listening to music

or sitting in silence while memorizing the passages. If the participants listened to music, the participants were asked to list the genre of music being listened to which allows the researcher to see if there could be a correlation between music genre and achievement on the memory test. This question is necessary because the researcher did not choose the music the participants listened to, rather the participants were allowed to listen to his or her favorite artist for the study. Genre did not have to be a constant in this study because the idea was to replicate a possible study situation for the participants. Internet radio from [www.pandora.com](http://www.pandora.com) was used for the music listening portion of the study. The explicit content on internet radio was turned off so participants can only listen to clean versions of songs (see <http://help.pandora.com/customer/portal/articles/24645-enable-explicit-filter>). Music was obtained through the use of the researcher's laptop and later the researcher's iPod touch due to the University's blocking of Pandora internet radio through the school's internet. While the device used for acquiring Pandora radio changed, this should not greatly affect results because Pandora was still used in both cases.

The participants were then given a passage worksheet to write down the passage word for word (see Appendix D). The worksheet asked the participant to write his or her assigned ID. The next passage was then read and memorized with the opposite condition (music or silence) with a time limit of 3 min as well. So if participants listened to music for the first passage they sat in silence for the second and vice versa for the next participants. This counterbalanced the test conditions and the tests to ensure there are no order effects contributing to the results of the study. After the second passage, participants were asked to write down on a new sheet the passage word for word. After both passages were read and written down the participants were given a short demographic survey (see Appendix E). This demographic survey was created by

the researcher and asks basic questions such as age, gender, year in school, GPA, and if they prefer to listen to music while studying. The participant was then given a feedback letter explaining the purpose of my study along with my contact information for any further questions they may have (see Appendix F). Participants were finally be given their slip of paper for bonus credit in their class to take to the Lindenwood Participant Pool office.

### **Scoring**

After the collection of all data, the researcher then scored each passage worksheet. The original grading system was that every correct word in the correct position in each sentence received five points while every omission, misplaced word, and addition of new words in each sentence was a deduction of one point. Each sentence was graded individually and then totaled to find the score for each passage recall sheet. Spelling was not held against participants. This grading system proved to be inefficient at calculating a participant's achievement on the memory test because if one word were misplaced the entirety of that sentence was technically incorrect. This seemed unfair to the researcher because often times the participants were actually able to copy words in sequence, just not necessarily in the proper placement within the entire sentence. It resulted in many participants receiving 0 points for the tasks.

Therefore, the researcher created a new grading system that looked at word combinations. Under this new system each correct word that was placed next to another correct word, the participant would receive a point for each word in sequence. So for example, when a participant read the sentence "making discriminations among sounds in ambient language depends, of course, on being able to hear the speech others produce" and wrote "discriminations among sounds in language" they would receive 4 points. They would not receive 6 points because they missed the word "making" at the beginning of the sentence and the word



“ambient” that should have gone between “in” and “language”. In the previous scoring system this particular participant would have received a 0 score because he or she technically misplaced all of the words in the sentence after omitting the word “making”. The new scoring system seemed more logical at assessing a participant’s memory for the written information and gave the researcher greater variability between participants’ scores. Finally, the scores obtained from the new grading system on the two recall sheets were recorded and analyzed to determine if there was a significant difference between the two conditions. The answers on participants’ demographic survey, such as age, gender, sex, year in school, major and whether they preferred to study with music or not were also analyzed for trends.

### **Results**

The research hypothesis stated that participants would do more poorly on the memorization task when exposed to music than when they were in the silent condition. This hypothesis was based on research that lyrical music could be distracting and detrimental to reading comprehension skills. A paired *t*-test was conducted to determine if there was a significant difference between a participant’s memory score when listening to music or when sitting in silence. The results revealed that there was no significant difference between the average scores obtained from the music condition ( $M=24.4667$ ,  $SD=10.18699$ ) and the silent condition ( $M=22.4000$ ,  $SD=10.08789$ )  $t(29)=1.368$ ,  $p>.05$ .

The results of another paired *t*-test revealed no statistically significant differences between the two passages in terms of how well they were recalled, thereby confirming that Passage A ( $M=22.8000$ ,  $SD=10.37038$ ) was comparable to Passage B ( $M=24.0667$ ,  $SD=9.96869$ ) in level of difficulty,  $t(29)=-.822$ ,  $p>.05$ .

I was interested in seeing if there are any relations between gender, age, year in school, GPA, music genre, and whether the participant listens to music or not while studying and their achievement on the memory tests so I used a Pearson correlation. None of the subject variables examined were significantly correlated with performance.

An independent t-test was done on preference for studying with music and it suggests that participants who normally studied with music had higher scores in the music condition ( $M=27.800$ ,  $SD=11.62755$ ) than students who do not study with music ( $M=16.2500$ ,  $SD=6.58461$ ), although these findings were not statistically significant though due to a small sample size,  $t(4)=2.027$ ,  $p>.05$ .

### **Discussion**

The results of this present study of have indicated that my hypothesis was not supported; there is no significant difference between a person's achievement on the memory test in the music and silence conditions. There was no significant relationship between a participant's age, gender, year in school, GPA, genre of music and scores on the memory tests. While, I would have liked to analyze the relationship between genre of music listened to and achievement on the music condition there were not enough participants in each genre category to conclude anything. Given previous research on the topic, I assumed there would be a significant difference between scores in the music condition and scores in the silent condition. Some reasons as to why my hypothesis was not supported could be small sample size and giving the participant the option to choose what music they listened to and at what volume. My research is limited in the fact that the sample size is quite small. If I could have collected more data there may have been more variability and significant results. A convenience sample was chosen due to time restraints with the study. For this project, I only had one semester to conduct and analyze the research, therefore

my sample size and recruitment procedure needed to be limited to complete the research in time and could be partially responsible for my lack of significant results.

I believe the main difference between my study and previous research was the ability of the participant to choose what kind of music he or she wanted to listen to and at what volume. Seeing as my participants knew they would be involved in a memory test they may have chosen a genre of music that would aid them in said memory test. Since I gave them the option to adjust the volume for comfort purposes some may have decided to listen to the music at a lower volume which could be less distracting for them. These are some of the limitations and factors that may have contributed to my results not supporting my hypothesis.

Some other factors that may have contributed to my results were the task itself and the passages I chose. For instance, in past research such Anderson and Fuller's (2010) students were tested on reading comprehension whereas, I tested my participants on their ability to memorize information. Memorization can be a difficult task that not everyone is proficient at. I chose a memory task instead of a comprehension task because I felt it important that the participants were not forced to endure a long procedure that would include reading longer passages and then answering questions about the passages. In the future I may look at reading comprehension in this fashion but between participants so the participants do not become fatigued by the process. I chose a memorization task because I felt that when many students are studying for tests they may try to memorize facts and term definitions, however I realized many students may study in many different ways and memorization is not necessarily a factor in the amount of information being retained. I believe many of the participants were able to understand and remember the gist of the two passages but had a harder time producing this information word for word.

Overall, I still believe this research was important because it looks at the relationship between music and a person's ability to memorize written information. Future studies may look at comprehension rather than memorization, instrumental music and lyrical music, as well as possibly looking at the differences between individuals who are accustomed to listening to music while studying and those who choose not to study with music.

### References

- Anderson, S. A. & Fuller, G. B. (2010). Effect of music on reading comprehension of junior high school students. *School Psychology Quarterly*, 25(3), 178-187.
- Meudell, P. R. (1972). Short term visual memory: Comparative effects of two types of distraction on the recall of visually presented verbal and nonverbal material. *Journal of Experimental Psychology*, 94(3), 244-247.
- Rowe, E. J., Philipchalk, R. P., & Cake, L. J. (1974). Short-term memory for sounds and words. *Journal of Experimental Psychology*, 102(6), 1140-1142.
- Schellenberg, E. G., Nakata, T., Hunter, P. G. & Tamoto, S. (2007). Exposure to music and cognitive performance: tests of children and adults. *Psychology of Music*, 35(1), 5-19.
- Wallace, W. T. (1994). Memory for music: Effect of melody on recall of text. *Journal of Experimental Psychology*, 20(6), 1471-1485.

**Appendix A**

## Informed Consent Form

I, \_\_\_\_\_ (print name), understand that I will be taking part in a research project that requires me to look over and attempt to memorize two short passages. One while sitting in silence and the other passage will be attempted to be memorized while listening to my choice of music. Finally, I will complete a short demographic survey asking simple questions about myself. I understand that I should be able to complete this project in about 15 minutes. I am aware that I am free to skip any questions in the unlikely event that I feel uncomfortable answering any of the items on the demographic survey. I am also aware that my participation in this study is strictly voluntary and that I may choose to withdraw from the study at any time without any penalty or prejudice. I should not incur any penalty or prejudice because I cannot complete the study. I understand that the information obtained from my responses will be analyzed only as part of aggregate data and that all identifying information will be absent from the data in order to ensure anonymity. I am also aware that my responses will be kept confidential and that data obtained from this study will only be available for research and educational purposes. I understand that any questions I may have regarding this study shall be answered by the researcher(s) involved to my satisfaction. Finally, I verify that I am at least 18 years of age and am legally able to give consent or that I am under the age of 18 but have on file with the LPP office, a completed parental consent form that allows me to give consent as a minor.

\_\_\_\_\_  
Date: \_\_\_\_\_

(Signature of participant)

\_\_\_\_\_  
Date: \_\_\_\_\_

(Signature of Investigator receiving consent)  
Student Researcher Name and Number:  
Allisha Rounds (636) 373-0967

Supervisor: Dr. Michicko Nohara-LeClair  
Course Instructor  
(636) 949-4371  
Mnohara-

## Appendix B

Passage A

ID: \_\_\_\_\_

(Assigned by Researcher)

Music or Silence

Genre: \_\_\_\_\_

Please read and memorize the following passage from “Language Development” by Erika Hoff 4<sup>th</sup> Ed (p. 215). You will have 3 minutes to memorize as much of this passage as you can. You will be asked to write this passage word for word after the time has elapsed.

**Words do not always map onto concepts in a one-to-one manner. One indication of this is that sometimes children have concepts for which there is no word in their language, and they invent words to fill these lexical gaps.**

## Appendix C

### Passage B

ID: \_\_\_\_\_

(Assigned by Researcher)

Music or Silence

Genre: \_\_\_\_\_

Please read and memorize the following passage from “Language Development” by Erika Hoff 4<sup>th</sup> Ed (p. 148). You will have 3 minutes to memorize as much of this passage as you can. You will be asked to write this passage word for word after the time has elapsed.

**Making discriminations among sounds in ambient language depends, of course, on being able to hear the speech others produce. At one time, it was thought that babies were blind and deaf at birth and that basic sensory abilities matured only later.**





## Appendix E

### Demographic Survey

ID: \_\_\_\_\_

(Assigned by Researcher)

Please read the questions and answer accordingly.

1. How old are you? \_\_\_\_\_

2. Gender :

Male                  Female

3. What year are you? (by credit, circle one)

Freshman      Sophomore      Junior      Senior      Other \_\_\_\_\_

4. What is your major? \_\_\_\_\_

5. Do you normally read for your classes while listening to music? (Circle one)

Yes                  No                  Sometimes

6. What is your cumulative G.P.A? \_\_\_\_\_

## Appendix F

### Feedback Letter

Thank you for participating in my study. The present study was conducted in order to determine whether people are more able to remember/memorize information in silence or with background music. I hypothesized that people would remember the passages better in silence because the music would be more of a distraction than they think.

Please note that I am not interested in your individual results; rather, I am only interested in the overall findings based on aggregate data. No identifying information about you will be associated with any of the findings, nor will it be possible for us to trace your responses on an individual basis.

If you are interested in obtaining the final results of this study based on aggregate data, or if you have any questions or concerns regarding any portion of this study, please do not hesitate to let us know now or in the future. Our contact information is found at the bottom of this letter.

Thank you again for your valuable contribution to this study.

Sincerely,

Principal Investigator:

Allisha Rounds (636) 373-0967

Supervisor:

Dr. Michiko Nohara-LeClair 636-949-4371 ([mnohara-leclair@lindenwood.edu](mailto:mnohara-leclair@lindenwood.edu))