

6-2017

Music's Effects on Memory

Madyson Carroll
Lindenwood University

Follow this and additional works at: https://digitalcommons.lindenwood.edu/psych_journals



Part of the [Psychology Commons](#)

Recommended Citation

Carroll, Madyson (2017) "Music's Effects on Memory," *Psychology Research Methods Journal*: Vol. 1 : Iss. 20 , Article 6.

Available at: https://digitalcommons.lindenwood.edu/psych_journals/vol1/iss20/6

This Article is brought to you for free and open access by the Psychology, Sociology, and Public Health Department at Digital Commons@Lindenwood University. It has been accepted for inclusion in Psychology Research Methods Journal by an authorized editor of Digital Commons@Lindenwood University. For more information, please contact phuffman@lindenwood.edu.

Music's Effects on Memory

Madyson Carroll⁵

Many people believe that studying while background music is present enhances their eligibility to remember the criteria better. The effects of music on memory was examined through the completion of a memory card game. Young adults were asked to take part in this task twice. One game included background music, while the other did not include background music.

Throughout each game, the amount of time it took the participant to complete the game in seconds, was measured. I hypothesized that the inclusion of background music will have a positive influence on one's performance when completing a memory card game. However, the findings suggest that there is no statistically significant difference between speed of solving the game with the presence of background music or the absence of it.

Frequently, people encounter situations that involve immediately remembering an idea or thought to complete a task. It is therefore of great importance for one's brain to have the ability to receive, process, store, and organize this information (Kirkweg, 2009). This ability can be disrupted by different environmental variables, including background music. Music is typically used on a day to day basis within humanity. Previous research has suggested that music can influence listeners' physiological, cognitive, and emotional states (Radocy & Boyle, 1997).

Additionally, music has previously been correlated with increased reminiscence. Durnham and Whittemore (1993) conducted a study involving 12 older adults, who were also women, listening to The Golden Age radio programs. During this process, the women were also being asked multiple trivia questions. These stimuli created a common reaction among all the participants, indicating that music can evoke memories and encourage reminiscence.

⁵Madyson L. Carroll, Department of Psychology, Lindenwood University. Correspondence concerning this article should be addressed to Madyson Carroll, Department of Psychology, Lindenwood University, St. Charles, MO 63301. Contact: MLC612@lindenwood.edu

Similarly, El Haj, Antoine, Nandrino, Gély-Nargeot, and Raffard (2015) wanted to see if exposure to music could enhance self-defining memories in Alzheimer's Disease patients. An experiment was conducted using 22 mild-stage Alzheimer's Disease patients who were asked to produce autobiographical memories in silence, while listening to researcher-chosen music, and to their own-chosen music. Also, there were 24 healthier patients, which were used as a control group. Results showed that the patients suffering from the disease showed better autobiographical recall when listening to their own-chosen music than the other two conditions.

However, other studies have had varying results. Nguyen and Grahn (2017), wanted to see how background music that varied in mood, arousal, and context affected verbal memory performance. Three experiments were conducted involving a recall task, a recognition task, and an associative memory task. In all three tasks, the background music was presented in three different contexts, consisting of music played during studying only, music played during testing only, and music played during both studying and testing. Their results concluded that background music had either no effect or significantly hindered memory performance compared with silence.

These prior studies have been conducted to determine whether the presence of background music can influence a person's memory. However, based on the results of the previously discussed research, it is hard to tell if this influence is positive, negative, or if there is one at all. The results are not consistent, clearly proving that this topic should be investigated more, which is what this research is intended to do.

Method

Participants

Young adults (ten women, two men, age range: 18-32 years) were recruited through the Lindenwood Participant Pool (LPP) on Lindenwood University's main campus in St. Charles, Missouri. Participants were compensated two LPP points, a form of credit to be exchanged for grade points, for participation in this study. The students who were recruited as participants for this research project were enrolled in select sections of general education or introductory-level courses in Anthropology, Athletic Training, Criminal Justice, Exercise Science, Psychology, and Sociology. There were three freshmen, three sophomores, four juniors, and two seniors among the participating. There were seven participants recruited as described above. The participants accessed the information regarding my study and the sign-up process through the website Sona Systems. Only one participant had never completed a memory card game, similar to the one they were asked to complete.

Materials

The experiment took place in a small room consisting of four chairs, two desks, and two computers. Each participant sat across from the researcher when attempting to complete each task. Before beginning, each participant signed in and was given a research study consent form (see Appendix A). This form provided the participants with the information needed to understand the nature of the study. The research study consent form had to be read and signed by all the participants, in order to continue their participation. Along with this form, the participant was given a demographic questionnaire (see Appendix B). This questionnaire consisted of six questions regarding gender, age, year in school, any hearing or vision impairments, and whether they had completed a memory card game before.

The memory card game depicted in my study, consisted of 10 various fast food illustrations that were adapted from a random graphic design website. Each illustration was used on 2 playing cards for a total of 20 cards (see Appendix C). Each card was 2 x 2 in. The cards were placed face down in front of the participant. The participant was asked to turn over two cards to reveal the two illustrations, trying to find matching cards. If the cards did not match, the participant turned the cards back over and repeated the process until a match was made. All the participants played this memory card game twice.

During one of the two games, background music was provided from a personal laptop at the volume of 70. The song that was played was the instrumental version of Havana by Camila Cabello, which was the number one song on the Billboard Hot 100 list, at the time the study was conducted, thus, being popular and possibly being more common to the participant. I used a stopwatch to time each trial, which was then recorded in a personal notebook.

At the end of both trials, all participants were given a feedback letter (see Appendix D). This letter thanked them for their participation in the study and provided all the information needed for any further questions. Overall, the experiment took approximately 12 min.

Procedure

Before starting the experiment, the participant was given a research study consent form to read and sign. Along with this form, the participant was given a demographic questionnaire to complete. Once these forms were completed, the study commenced.

Each game began with the cards being shuffled and presented faced down in front of the participant. Participants turned over two cards to reveal the 2 images, while trying to find matching images. If the cards did not match, the participant had to turn the cards back over and try again until a match was made. This process was repeated until all 10 images were matched to their pair. This process was completed once with background music and

once without background music, and I measured the time it took the participant to complete each task. These conditions were counterbalanced. Participants were instructed to complete the task as quickly as possible. The time of both trials were recorded and later compared.

After completing both trials, all the participants were given a feedback letter. Once given their feedback letter, the researcher answered and clarified any questions asked by the participants, before they exited the room.

Results

During the analyses of the data, a related samples *t*-test was conducted to see if there was a significant difference between all of the participant's time, in seconds, to complete the memory card game with and without background music. This related samples *t*-test established that there was not a significant difference between all participants completion time with background music ($M = 87.17, SD = 28$) and without background music ($M = 82.33, SD = 22.97$), $t(11) = 1.11, p = .29$.

Discussion

As outlined previously, there were two possible outcomes for the participant's performance in the experiment: The participant's speed could have increased when completing the task with background music rather than without background music or the participant's speed could have decreased when completing the task with background music rather than without background music. The results lent more support towards the second outcome, similar to the study conducted by Nguyen and Grahn (2017).

Although the results are opposite of my hypothesis, it can be due to many variables. The most influential variable that could have contributed to the study being statistically non-significant, can be the very small sample size. A small sample size makes it hard to calculate a difference between the results. However, some of the participants' speeds did vary, meaning

further work is required to gain a more complete understanding of the influence of music on one's memory.

Additional limitations can be only having two conditions, the song choice, bad shuffling of the playing cards, or even fatigue within the participants. In the future, to better the study, I would like to do a few things differently. Firstly, I would include another condition involving lyrical music. Secondly, I would like to ask the participants what their preferred music genre is, before performing the task, so I can then choose music based off of this. Thirdly, I would want to ask the participants which condition they prefer, before and after performing the task. Fourthly, I would want to consider making this an online study. This would allow more people to have access to it, as well as, the possibility of creating an algorithm to better the shuffling of the playing cards. In conclusion, I would want to see how these changes would affect the results.

References

- "Camila Cabello - Havana (Official Instrumental)." *YouTube*, YouTube, 5 Jan. 2018, www.youtube.com/watch?v=UzbNprOh7MI.
- Durham, P. R., & Whittemore, M. P. (1993). Memory recall and participation levels in the elderly: A study of Golden Age radio. *Educational Gerontology, 19*, 569-575. doi: 10.1080/0360127930190608
- El Haj, M., Antoine, P., Nandrino, J. L., Gély-Nargeot, M., & Raffard, S. (2015). Self-defining memories during exposure to music in alzheimer's disease. *International Psychogeriatrics, 27*(10), 1719-1730. doi: 10.1017/S1041610215000812
- Kirkweg, S.B. (2009). *The effects of music on memory*. Unpublished manuscript, Department of psychology, Missouri Western State University, Missouri. Retrieved from <http://clearinghouse.missouriwestern.edu/manuscripts/230.php>

Nguyen, T., & Grahn, J. A. (2017). Mind your music: The effects of music-induced mood and arousal across different memory tasks. *Psychomusicology*, 27(2), 81-

94. doi: 10.1037/pmu0000178

Radocy, R. E., & Boyle, J. D. (1997). *Psychological foundations of musical behavior* (3rd ed.).

Springfield, IL: Charles C Thomas.

Appendix A

Research Study Consent Form

LINDENWOOD**Research Study Consent Form**

Music's Effect on Memory

Before reading this consent form, please know:

- Your decision to participate is your choice
- You will have time to think about the study
- You will be able to withdraw from this study at any time without being penalized
- You are free to ask questions about the study at any time

After reading this consent form, I hope that you will know:

- Why I am conducting this study
- What you will be required to do
- What are the possible risks and benefits of the study
- What alternatives are available, if the study involves treatment or therapy
- What to do if you have questions or concerns during the study

Basic information about this study:

- I am interested in learning about whether a person's performance during a memory card game is impacted by listening to music while completing the task or by not listening to music.
- You will complete a memory card game twice, as fast as you can. You will complete the task once while listening to music and once without listening to music.
- Risks of participation include feelings of anxiety when trying to finish the task in a timely fashion and feelings of embarrassment if performance did not go as planned.

LINDENWOOD

Research Study Consent Form

Music's Effect on Memory

You are asked to participate in a research study being conducted by Madyson Carroll under the guidance of Dr. Michiko Nohara-LeClair at Lindenwood University. Being in a research study is voluntary, and you are free to stop at any time without being penalized. Before you choose to participate, you are free to discuss this research study with family, friends, or a physician. Do not feel like you must join this study until all of your questions or concerns are answered. If you decide to participate, you will be asked to sign this form.

Why is this research being conducted?

I am doing this study to observe whether a person's performance during a memory card game is impacted by listening to music while completing the task or by not listening to music. I will be asking about 75-100 other people to answer these questions.

What am I being asked to do?

When beginning the experiment, you will be provided with a consent form that you must sign to participate. Some demographic questions will then be asked, but your identity will be kept confidential. After these questions, you will begin the first trial with the memory card game with or without music and then a second trial with the memory game with or without music, differing the condition from the one experienced during the first trial.

How long will I be in this study?

In total, the experiment will take approximately 10-12 minutes.

Who is supporting this study?

No grant or funding agency is funding this study.

What are the risks of this study?

- Privacy and Confidentiality:

I will not be collecting any information that will identify you, such as your name.

What are the benefits of this study?

A potential benefit could be the feeling of accomplishment when completing the task at hand.

Will I receive any compensation?

Participants recruited from the LPP will be granted two bonus points for participation in the research study.

What if I do not choose to participate in this research?

It is always your choice to participate in this study. You may withdraw at any time. You may choose not to answer any questions or perform tasks that make you uncomfortable. If you decide to withdraw, you will not receive any penalty or loss of benefits.

What if new information becomes available about the study?

During this study, I may find information that could be important to you and your decision to participate in this research. I will notify you as soon as possible if such information becomes available.

How will you keep my information private?

I will do everything I can to protect your privacy. I do not intend to include information that could identify you in any publication or presentation, like your name. Any information I collect will be stored by the researcher in a secure location. The only people who will be able to see your data

are: members of the research team, qualified staff of Lindenwood University, representatives of state or federal agencies.

How can I withdraw from this study?

Notify the researcher immediately if you would like to withdraw from this research study.

Who can I contact with questions or concerns?

If you have any questions about your rights as a participant in this research or concerns about the study, or if you feel under any pressure to enroll or to continue to participate in this study, you may contact the Lindenwood University Institutional Review Board Director, Michael Leary, at (636) 949-4730 or mleary@lindenwood.edu. You can contact the researcher, Madyson Carroll directly at 618-920-5745 or MLC612@lindenwood.edu. You may also contact Michiko Nohara-LeClair at mnohara-leclair@lindenwood.edu.

I have read this consent form and have been given the opportunity to ask questions. I will also be given a copy of this consent form for my records. I verify that I am at least 18 years of age or have a parental consent form filed with the LPP Office. I consent to my participation in the research described above.

Participant's Signature

Date

Participant's Printed Name

Signature of Principal Investigator or Designee

Date

Investigator or Designee Printed Name

Appendix B

Demographic Questionnaire

DEMOGRAPHIC QUESTIONNAIRE

Please do not put any identifiable information on this questionnaire.
Please feel free to skip any questions you do not feel comfortable addressing.

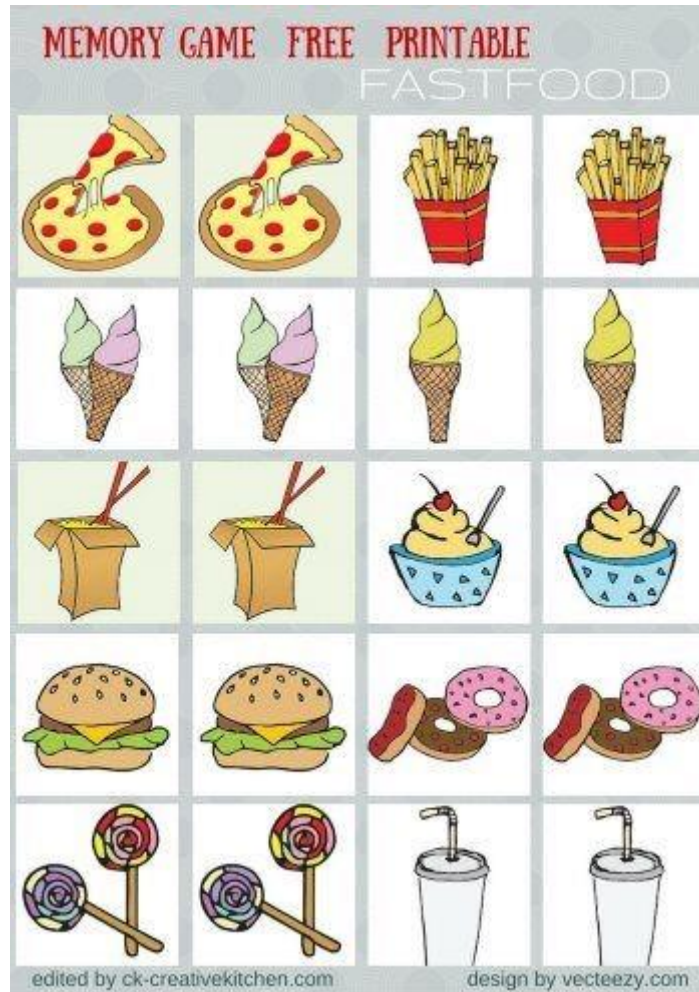
1. Are you MALE OTHERFEMALEPREFER NOT TO ANSWER
2. How old are you? _____ years
3. Which of the following best describes you? (Circle one)

FRESHMANSOPHOMOREJUNIORSENIOROTHER
4. Have you ever completed a memory card game prior to today?

Yes No

Appendix C

Memory Card Game



Appendix D

Feedback Letter

Feedback Letter

Thank you for participating in my study. The present study was conducted to determine whether a person's ability to complete a memory card game can be impacted by listening to music during the task or not listening to music during the task. I hypothesized that a person's speed will increase when listening to music compared to no music. I believe that the music will help them stay focused on the task and will be eager to finish it.

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 me 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 me 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:

Madyson Carroll 618-920-5745 (MLC612@lindenwood.edu)

Supervisor:

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