



# The Effects of Music on Memory in Alzheimer's Patients

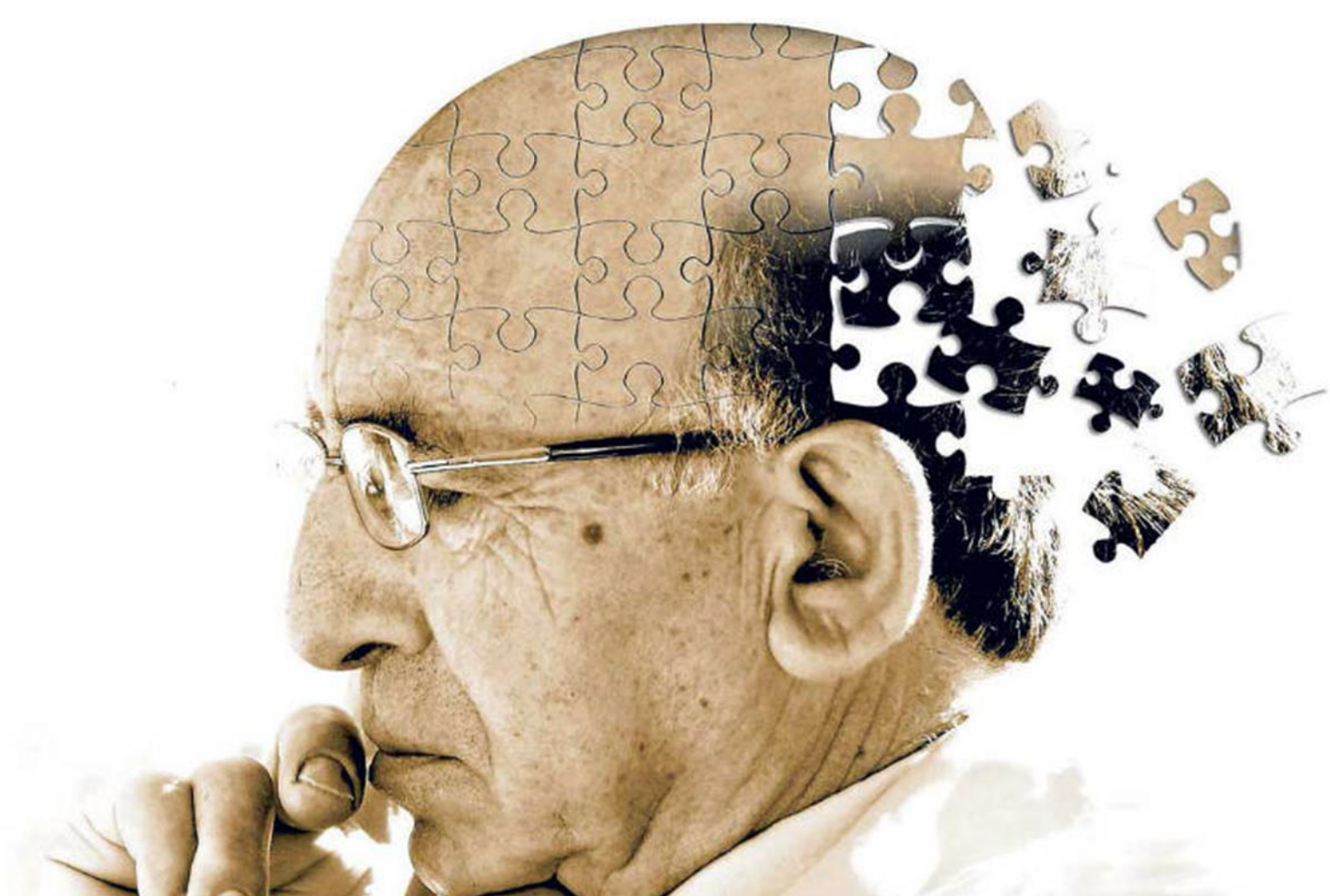
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## Introduction

- Alzheimer's disease affects specific parts of the brain involved in memory, causing millions of people worldwide to slowly lose their memories of loved ones and their own lives (Palisson, J., Roussel-Baclet, C., Maillet, D., Belin, C., Ankri, J., & Narme, P., 2015).
- Despite the large number of people affected by this disease and the numbers of scientists working on a treatment, there is still no cure for it.
- There are three main stages of Alzheimer's disease: mild, moderate, and severe. In each of these stages, there is a different degree of memory loss ranging from minimal memory loss to maximum memory loss (Woodruff - Pak, D., 1997).
- Many scientists are turning towards music as a way to alleviate the symptoms of Alzheimer's disease.
- Music therapy has proven very effective in improving the psychological state of the Alzheimer's patients and improving their autobiographical memories (LaPook, J., 2017).
- Autobiographical memory is a type of memory that consists of specific moments, including the time and place that occurred in a person's life



## Research Question

- The previous studies that have been researched have all experimented with generalized Alzheimer's disease.
- Previous researchers haven't investigated music's effects on patients' memories based on the stage of Alzheimer's they are in.
- How do various types of music effect autobiographical memories in the different stages of Alzheimer's disease?

## Hypothesis

- Once the Alzheimer's patients have progressed out of the mild and moderate stages, there is a severe cognitive decline in which there are few things that could be done to help.
- Based on this knowledge the hypothesis that can be drawn is that personal music will improve the memory of Alzheimer's patients in the first two stages of the disease.

## Methodology

### Participants:

- The participants of this study were Central Magnet High School students between the ages of 15 to 18. In total, 67 students participated in this study, 31 in the experimental group and 36 in the control group.

### Materials:

- PowerPoint was used to flash the correlated words on the screen
- Instrumental music, provided by John Mears of Central Magnet.
- GradeCam was used to score the participants' out of 20

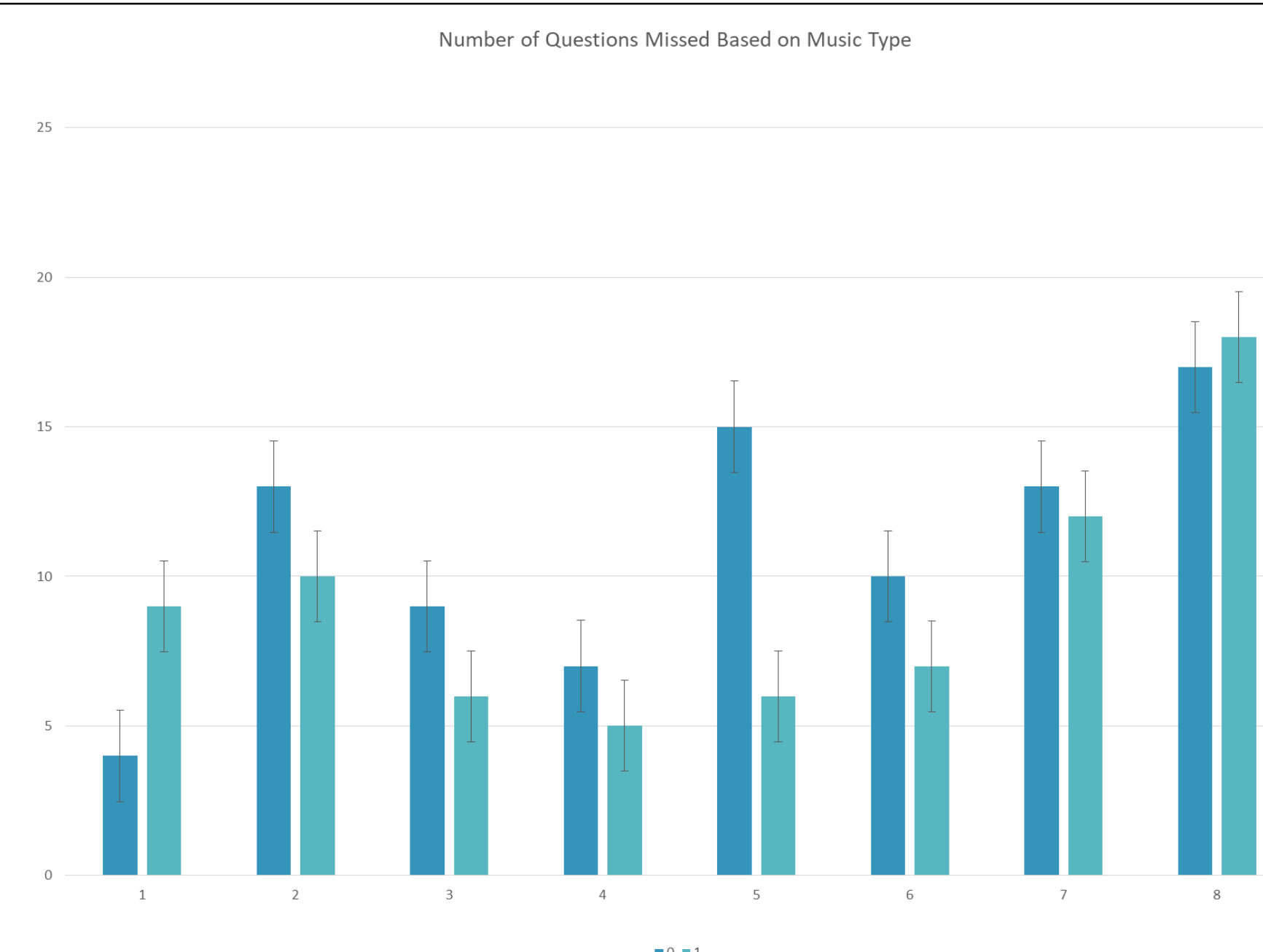
### Procedure:

- Experimental-
  - 20 pairs of correlated words flashed on the screen while the instrumental music played in the background
  - After observing the words and listening to the music the participants took a 3 minute break to solve a puzzle
  - For each of the following pairs of words one of the words flashed on the screen and the participants chose from the options A, B, or C the correct word that was paired while listening to the same music in the background.
- Control-
  - 20 pairs of correlated words flashed on the screen
  - After observing the words in silence the participants took a 3 minute break to solve a puzzle
  - For each of the following pairs of words one of the words flashed on the screen and the participants chose from the options A, B, or C the correct word that was paired in silence.

## Results

- Student's t-test was performed and the p-value was 0.919, which is staggeringly high since the p-value needs to be 0.05 or less for the study to be statistically significant
- Another Student's t-test was run without question 11 and the p-value was 0.793, which is still too high for the experiment to be statistically significant
- The skewness of the distribution curve was -1.098, meaning there were outliers in the control group that caused the graph to skew to the right.
- The skewness for this distribution curve is -0.713, which means that the skewness for the experimental group is within the normal distribution curve and is not skewed negatively or positively

		Statistic	df	p	Mean Difference	SE Difference	Lower	Upper	Cohen's d
Correct	Student's t	-0.102	65.0	0.919	-0.0573	0.564	-1.18	1.07	-0.0249
	Mann-Whitney U	558		1.000	1.93e-5		-1.00	1.00	-0.0249
Points_no_eleven	Student's t	-0.263	65.0	0.793	-0.1649	0.627	-1.42	1.09	-0.0644
	Mann-Whitney U	548		0.904	-2.22e-5		-1.00	1.00	-0.0644



## Discussion

- Overall, the experiment provided insignificant results for the hypothesis and research question.
- However, there was one piece of music where the control group missed a significant amount of questions more than the experimental group that were associated with that piece of music.
- There are many research studies that were done with Alzheimer's patients and music that prove that it does improve their memory.

## Limitations

- Didn't have access to Alzheimer's patients.
- Experimented on high school students who wouldn't have any significant memory impairments.
- Abstract words were needed to create temporary autobiographical memories so that the improvement of these memories could be more easily measured, but everyone has a different idea and image of abstract words.

## Future Research

- If Alzheimer's patients had been accessible to work with the methodology would have been more in line with the mainstream research on Alzheimer's patients.
- A playlist of Alzheimer's patients personal music would be created
  - Music would be gathered by family members
- Playlist would be played individually for each Alzheimer's patient and they would be given 5 minutes to say whatever comes to mind when listening to their chosen music

## References

- LaPook, J. (2017). Using music to help unlock Alzheimer's patients' memories (Video file). Retrieved from <https://www.youtube.com/watch?v=G7vkKHYouQ&t=2s>
- Palisson, J., Roussel-Baclet, C., Maillet, D., Belin, C., Ankri, J., & Narme, P. (2015). Music enhances verbal episodic memory in Alzheimer's disease. *Journal of Clinical and Experimental Neuropsychology*, 37(5), 503 - 517. [doi.org/10.1080/13803395.2015.1026802](https://doi.org/10.1080/13803395.2015.1026802)
- Woodruff - Pak, D. (1997). *The neuropsychology of aging*. Oxford, England: Blackwell Publishers.

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