



THE EFFECT OF MUSIC ON WORKING MEMORY OF ADULTS

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ABSTRACT

The current study aimed to examine the effect of music on working memory of young adults. The objectives were to investigate the effect of music which has a significant impact on working memory performance in young adults, and to provide insight into examining the performance of working memory through music. The Post Graduate Institute Memory Scale (PGIMS) (Dwarka Prasad & N.N. Wig) is a standardized test designed to measure a person's working memory. The test was conducted on 100 participants with the age range of 18 to 25. A comparison was done between pre design and post design. In pre design, the test was conducted on the participants without the simulation of music whereas in post design, the test was conducted while the participants were listening to music in the background. This was done to help assess the effect of music on working memory of adults. The results found that the mean score of working

memory in the post-design phase was slightly higher than the mean score in the pre-design phase which suggests that working memory may improve after exposure to music. The standard deviation in the post-design phase is lower than the standard deviation in the pre-design phase which suggests that there is less change in working memory scores after exposure to music, leading to stronger performance. The t-value was significant. The addition of contrast showed that music had a positive effect on working memory. The two-tailed t value has also turned out to be significant. There appeared to be a difference in the improvement in working memory after exposure to music. Therefore, after proper assessment, the research results are significant at a 0.05 level, which shows that there exists a positive impact and an improvement in the working memory of individuals after exposure to music. The music had a positive impact on working memory.

Keywords: *Working memory, Music, Young Adults, P.G.I. Memory Scale*

INTRODUCTION

Many students listen to music to reduce feelings of stress and anxiety while performing mental tasks such as preparing for exams, doing homework, and reading and writing. Research showing the effect of music on performance is well documented, but the evidence is unclear. In studies aimed at understanding the effects of musical interventions on cognitive performance, findings support the idea that music improves cognitive performance (Cockerton et al., 1997), but there are also studies that contradict these results, including the current Music Study, found that it affected participants during

cognitive tasks (Furnham & Bradley, 1997). But with so many different genres of music available to music listeners, it is important to understand how different genres of music interact.

An interesting area of research in cognitive psychology is the effect of music on various cognitive functions, including working memory. Working memory is an important component of cognition, involved in the temporary storage and management of information. Working memory involves the temporary storage and processing of information and serves as the brain's primary source of cognitive activity. While some research shows that music can improve intelligence by creating a supportive and positive environment, others suggest that music can be disruptive.

Understanding the effects of music on older adults' working memory is particularly useful in situations where intelligence is important. The relationship between music and older adults' working memory is an ongoing study with mixed results. Some research shows that music can be beneficial for memory and improving intelligence. In these cases, music is expected to create a happy and encouraging environment, improve emotions and motivation, and therefore benefit working memory.

The effects of music on working memory may also be affected by individual differences such as personal preferences, musical background, and intelligence. Additionally, the type of cognitive function may also play a role. The relationship between music and working memory is complex. While some people may find music helpful in meditation, others may find it distracting. The results of research on this topic are mixed, and the effects of music on working memory may vary depending on many factors.

Many studies have shown that music can be beneficial for adults' working memory. Here are some ways music can benefit working memory:

Arousal and Alertness: Loud and stimulating music can increase mood and alertness. This state of high arousal will have a positive effect on listening and attention, thereby improving the performance of work-based tasks.

Increase creativity: Some types of music, especially those that are a little more difficult and newer, are associated with increased creativity. In this case, participation in creative activities will have a positive effect on the working memory process.

Mnemonics: Music that can work as mnemonics. Memory aids such as songs or musical patterns can make it easier to understand and retain information in working memory.

Promotes learning: Some studies have shown that certain types of music can improve learning and memory together. As adults begin to learn about working memory, the presence of music may make it easier to better access and retain information.

Although music can be beneficial for some people, it is important to know that music can have negative effects also, these includes.

Distractions: Music, especially loud, difficult, or emotional music, can be distracting. In tasks requiring attention and concentration, background music can divert cognitive resources from working memory, causing performance degradation.

Less accuracy and precision: In tasks that require high precision and accuracy, entering background information can lead to errors. The cognitive load associated with music performance may affect the accuracy of working memory performance.

Increased stress: For some people, especially those with sensitive hearing, music can be more stressful than relaxing. Stress can negatively impact cognitive functions, including working memory.

Memory interference: The presence of music can interfere with the encoding and retrieval of information in working memory. Background music can interfere with situations where memory is important, such as during an exam or when making important decisions.

In conclusion, music may or may not have a positive effect on older adults' working memory. It depends on many factors such as personal preferences, musical genres and intellectual characteristics. Researchers continue to study these complexities to better understand the impact of music on cognitive functions in older people.

RATIONALE

The choice to assess the effects of music on working memory in adults stems from the intersection of several factors. First, working memory plays an important role in cognitive processes important for everyday tasks such as problem solving and decision-making, making it an important part of the research. Additionally, music is everywhere in life, and people often use music to relax, work, and study. This has sparked curiosity about its ability to influence cognitive function, especially in adults who face skill needs in all areas of life. Additionally, this study aims to connect music and psychology and provide the opportunity to explore the cooperation between values. Understanding how music affects working memory may inform practices and treatments that can improve cognitive function and improve health. Additionally, although some research exists on

musical knowledge, there remains a gap in understanding, especially among adults. This study aims to fill this gap, provide new perspectives on the literature, and increase our understanding of the relationship between music and cognition in the elderly.

REVIEW OF LITERATURE

Chan et al. (1998) conducted a study on how music training can improve memory. The study investigated the effects of musical training on verbal memory and provided insight into the overall musical performance experience. The results provide preliminary evidence that musical training may provide long-term benefits in terms of improving memory.

Mammarella et al. (2013) investigated whether music could improve cognitive function in healthy adults. Controversial evidence suggests that music can improve intelligence. The results showed that classical music improved working memory performance compared to no music.

Yesil et al. (2017) conducted a study to investigate the effects of music training on listening and working memory in adults. The aim was to determine the effects of music education on listening and working memory in adult music students. It was concluded that long-term regular music training did not affect changes in the elderly, but improved some tests requiring working memory. Playing music irregularly does not produce good results. Regular music practice will have a positive effect on the cognitive abilities of the elderly.

Hoong Ong et al. (2022) conducted a study to explore how working memory changes the musical performance of learning a word. In summary, the researchers found that working memory mediates the effects of music on word learning; such that individuals with higher working memory appeared to benefit from music, while individuals with lower WM appear to be disadvantaged by music. The results show that personal characteristics should be taken into account when making aesthetic decisions.

Lindberg et al. (2012) conducted a study on the effect of background music on memory in various tasks. The study aimed to measure how background music affects memory and attention. As expected, background music did not interfere with reading or facilitate word processing. Other analyzes of music preferences, learning behavior, or visual effects found no reason for the lack of interaction between music and work. As a result, music has many effects on memory and attention.

METHODOLOGY

AIM

The aim of the study is to investigate the effect of music on working memory of adults.

RESEARCH OBJECTIVE

To Investigate the effect of music which has a significant impact on working memory performance in adults and to provide insight into examining the performance of working memory through music.

HYPOTHESIS

- Exposure to music has a significant impact on working memory in adults, i.e., the effect of music positively impacts working memory of adults.

DESCRIPTION OF TOOLS

PGI MEMORY SCALE

The test was conducted by Dwarka Prasad and N.N. Wig (1977). The PGI memory scale became a popular memory scale in India and replaced the Boston Memory Scale and Wax Le Memory Scale in Ranchi. PGI Memory Scale have become popular across India and has been replaced by the Wax Le Memory Scale at two major psychiatric institutes (National Institute of Mental Health and Neuroscience, Bangalore) and the Boston Memory Scale and Wax at the Central Institute of Psychiatry, Ranchi. Thus, the PGI Memory Scale (PGIMS) was developed and standardized in 1977. The post Graduate institute Memory Scale (PGIMS) is a standardized test designed to measure a person's working memory. It is often used in clinics and research to evaluate mental disorders such as memory loss, cognitive impairment, and Alzheimer's disease. This test usually consists of several tests or tasks that measure different aspects of memory; verbal memory; working memory, memory test. PGIMS assigns standardized scores based on performance on these different tests, allowing comparisons to be made based on representative samples of the population. These scores can help clinicians and researchers identify patterns of memory impairment and track changes over time. Overall, PGIMS is

a valuable tool for assessing many different aspects of memory function and can provide insight into whether an individual's cognitive ability and memory capacity are inadequate.

Reliability: Test-retest reliability ranged between 0.71 and 0.84 for the organic psychosis group and between 0.48 and 0.84 for the neurotic group. Split-half confidence intervals for these two groups were 0.91 and 0.83, respectively.

Validity: The P.G.I memory scale correlates 0.71 with the Boston Memory Scale and 0.85 with the Wechsler Memory Scale.

SAMPLE

The P.G.I. Memory Scale test was conducted on 100 participants with the age range of 18 to 25 years in predesign and post design.

PROCEDURE

The procedure involved administering ten tests sequentially. Test 1 assesses remote memory by asking six questions about past events, scoring one point per correct answer, with a maximum of 6 points. Test 2 evaluates recent memory with five questions, also scoring one point per correct answer, with a maximum of 5 points. Test 3 includes a mental test where subjects repeat the alphabet and perform countdowns, scoring up to 3 points based on speed and accuracy within given time limits. Test 4 measures listening and thinking abilities with number sequences, awarding points based on the accuracy and

length of sequences repeated. Test 5 evaluates auditory memory by recalling product names, scoring one point per correct answer, up to a maximum of 10 points. Test 6 assesses sentence completion with small phrases, awarding one point per correctly completed sentence, with a maximum score of 12. Tests 7 and 8 involve pair recall tasks, with the latter being more interactive and flexible in sequence recall, scoring points based on correct pairings. Test 9 requires visual memory, where subjects draw what they recall from shown cards, with varying points assigned per card. Finally, Test 10 tests knowledge retention by identifying objects from memory, with deductions for incorrect guesses and a maximum score of 10.

RESULT

Table 1

Descriptive statistics for pre and post design

	MEAN	VARIANCE	T-TEST (ONE TAILED)	T-TEST (TWO TAILED)
PRE- DESIGN	82.43	55.01	0.22	

0.45

POST
DESIGN

83.07

18.44

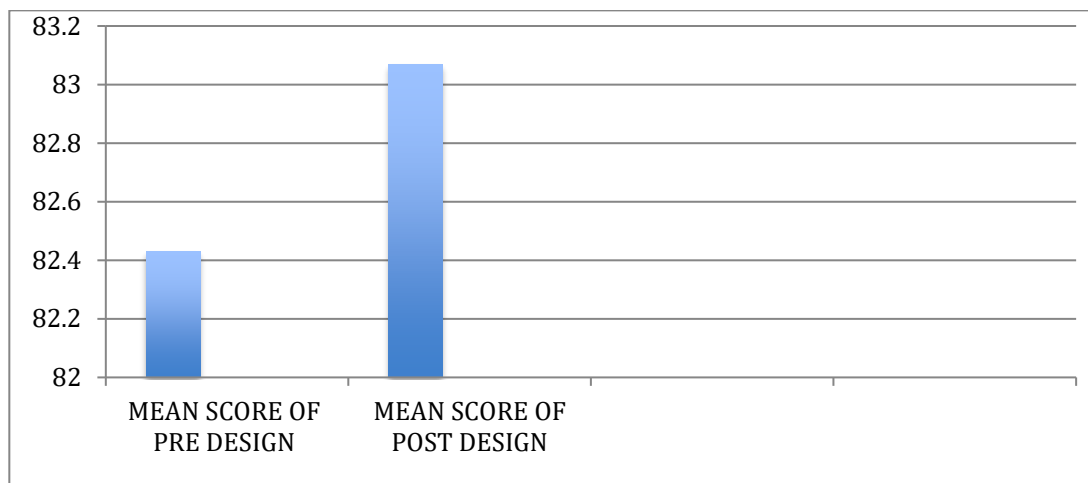


Figure 1

Descriptive statistics (mean values) for the pre-design and post-design phase.

DISCUSISION

The aim was to investigate the effect of music on working memory of adults. The objective of the research was to investigate the effect of music which has a significant impact on working memory performance in adults and to provide insight into examining the performance of working memory through music.

The findings of the P.G.I. Memory scale test conducted on several participants are as follows:

The participants scored a mean value of 82.43 in predesign and a value of 83.07 in post design, which is higher than the value in predesign. The variance score of predesign was 55.01 and the variance score of in post design was 18.44. The value of t-test in one tailed distribution came out to be 0.22 and the value of t-test in two tailed distributions came out to be 0.45. The mean score of working memory in the post-design phase (83.07) was slightly higher than the mean score in the pre-design phase (82.43). This suggests that working memory has improved after exposure to music.

One-tailed T-test; The t-value is 0.22, which is significant. The addition of contrast showed that music had a positive effect on working memory. Two-tailed T test; The two-tailed t-value of 0.45 has also turned out to be significant. There appeared to be a difference in the improvement in working memory after exposure to music.

Therefore, after proper assessment, the research results are significant at a 0.05 level, which shows that there exists a positive impact and an improvement in the working memory of individuals after exposure to music. The music had a positive impact on working memory.

Lindberg et al. (2012) conducted a study on the effect of background music on memory in various tasks. The study aimed to measure how background music affects memory and attention. As expected, background music did not interfere with reading or facilitate word processing. Other analyzes of music preferences, learning behavior, or

visual effects found no reason for the lack of interaction between music and work. As a result, music has many effects on memory and attention.

Hirokawa (2004) investigated relaxation training on flexibility and working memory in the elderly because of the effects of music. It examined cues of relaxation and music on working memory and mood in older adults. The results showed no clear relationship between arousal and working memory scores in the four categories. Results show that thematically preferred music has the ability to increase energy and reduce stress in seniors

Roden et al. (2014) conducted a study on how training can improve working memory. These results confirm previous findings regarding music training and cognitive performance. It is suggested that children who receive musical education have special advantages in cognitive functions close to information processing.

Schellenberg (2005) investigated music and intelligence. Current evidence showed that listening to music can improve performance on a variety of cognitive tests, but this effect is short-lived and is caused by the music affecting arousal level and mood, which in turn affects cognitive skills; Other experiences of listening to music include effects.

The above research studies concluded and showed that music has a positive impact on working memory and music positively impacts the working memory of adult individuals. The result analysis of this study also suggests that working memory has improved after exposure to music and that music had a positive effect on working

memory. The result values also concluded that there appeared to be a difference in the improvement in working memory after exposure to music.

CONCLUSION

The result values of this study showed that the working memory has improved after exposure to music. The music had a positive effect on working memory of adult individuals. The results also concluded that there appeared to be a difference in the improvement of the working memory after exposure to music. The effect of music had a positive impact on the working memory of individuals. Therefore, after proper assessment, the research results are significant at a 0.05 level, which shows that there exists a positive impact and an improvement in the working memory of individuals after exposure to music. The music had a positive impact on working memory.

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