



EFFECT OF MUSIC ON THE MEMORY OF WORDS

Physiology

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ABSTRACT

Several types of research in the field of music have shown a mixed result on performance and memory aspect of an individual. The present study is designed to check the impact of music on short-term memory. The study was conducted in two phases with two groups of 30 participants each. Music selected for the study was Mozart's Sonata k.448, and the time given for studying the words was 250 seconds and were asked to recall after a gap of 20 seconds. Moreover, write the words in a sheet of paper individually. In the first phase both the group were given a different set of words to study and were asked to recall and write. The second phase group "A" participants were given another set of words to study with the headphone for listening to music and asked to recall it without the music in headphone while group "B" participants were asked to study the words without headphone and recall the words while listening to music in the headphone. Data were analyzed using the paired t-test, and significant differences were measured with a maximum score of 20. The result showed that better result was observed in 1st phase that is when assessed without any music, slight decrease in mean score was observed in the 2nd phase of group B was slightly better than group A. Thus it can be concluded that music can impact the short-term memory by disturbing the data encoding process if used during studying.

KEYWORDS

Mozart's Music, Memory.

INTRODUCTION

Music has been part of human civilisation since time in memorial. It has been an integral part of day to day life of human beings and has integrated not only tradition but also nature. Being an inseparable part, it becomes unavoidable that it would have an impact on the various functioning of the human body.

On a physiological level, memory is considered a function of neural cells' ability to consolidate information and make connections between neurons. According to a current popular model, memory consists of three processes: echoic memory, short-term memory (STM), and long-term memory (LTM). Short-term memory is also referred to as working memory (WM) and is composed of both processing and storage components. Short term memory needs to be rehearsed and can be lost due to various disruptions distracting the brain¹. In this study, we will be testing the short-term memory of the participants.

Various researches have been done in this area to test the effect of music on memory. According to the study done by Emily Konantz in 2012, she found that music has a hindering effect on memory of words and that the time during which music is being played whether when the subject is studying the words or recalling them also has an impact². In another study done by Balch et al. and by Purnell-Webb and Speelman CP separately showed that music could improve the recall of text if there is a similarity in the music while study and test, it explains the memory by context-dependent memory^{3,4}. Alle and Green separately in 2008 showed that though sweet music decreases performance in short-term memory test non-lyrical music however improved performance⁵.

Though some studies have been done to observe the impact of the music of memory of text, however, more work is required to concretely say whether to employ music for improving memory or to avoid it during such tasks.

AIMS AND OBJECTIVES

1. To find out the effect of specific music on the memory of words.
2. To find out which phase of the test (during studying the word & encoding it, or while recalling the words) is affected or affected more with music.

METHODOLOGY

It is an interventional study, conducted in the Department of Physiology of Sikkim Manipal Institute of Medical Sciences, after obtaining requisite permissions from the department head and clearance from the Institutional Ethical Committee. The study was conducted with 60 participants of age group 18 to 21 years (with 30 male and 30 female participants) of first professional medical students, who were included after obtaining the consent. Participants are suffering from amnesia, hearing disorder, and those who did not give

consent were excluded from the study. Complete anonymity of the subjects and their proforma answers was maintained.

The participants were initially divided into two groups of 30 subjects based on gender and later by random selection technique were assigned into group A and B with 15 male and 15 female participants in each group.

The material used and time allotted was consistent for all the participants. Participants were tested in a silent room (Research Lab of the Department of Physiology, SMIMS). Also, the music selected for the study was "Mozart's Sonata k.448". The participants were made to listen to the music through the Active shield (up to 97%) noise cancellation Headphone (Philips, SHL 3750NC/00), with 32mm neodymium speaker drivers. The volume through the headphones remained consistent for all participants.

PROCEDURE:-

The study was done in two phases with two groups of participants tested under three different conditions. In the 1st Phase participants of both, group A and B were given a set of 20 words (set 1 for Group A and set 2 for Group B).

The selection of the words was made randomly taking the reference of work done by Alan D. Baddeley Neil Thomson and Mary Buchanan⁶, and pilot testing was done before use.

Participants were asked to study the words in 250 seconds, and then recall and write the words on the given answer sheet in another 250 seconds after a gap of 20 seconds.

In the 2nd Phase, the participants of group A were given another set of 20 different words (set 2). This time they studied the words for 250 seconds while listening to music "Mozart's Sonata k448" using headphones. Later the participants were instructed to take off the headphones and were given a gap of 20 seconds after which they recalled and wrote the words on the given answer sheet in another 250 seconds without listening to music.

While group B participants were given a set of 20 words (set 1) and asked to study the words in 250 seconds after a gap of 20 seconds the participants were instructed to put on the headphones for listening to the music then recall and write the words on given answer sheet in 250 seconds while listening to Mozart's Sonata k.448 using headphones.

Data were collected, and calculation of the individual score obtained out of 20 points (1 point for each correct response of recalled words. Spelling mistakes were avoided).

Statistical analysis was done using SPSS version 21. Comparison of

data was made using Paired t-test, and significant differences were measured (score without intervention, score with intervention in group A (music during study time), score with intervention in group B (music during recall time)).

Results of the present study reveal that short-term memory for the recall of words was better when done without any music, but the result significantly decreased when musical intervention was given.

The result also shows that a decrease in performance was even more significant when musical intervention was given during the study time of words set, compared to when given during recall time of the words set. Listening to music during studying in the 2nd phase of the study could have been distracting for the participants who have affected the ability of participants to encode the presented words which is consistent with the work done by Emily Konantz2.

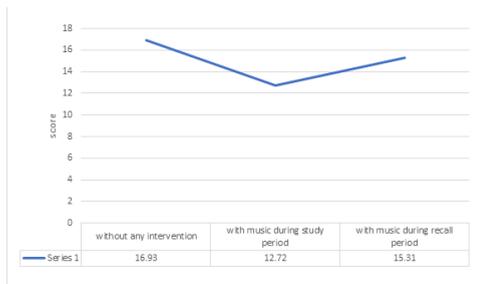
Every attempt was tried to create a controlled similar environment for all the participants. In the present study, there are certain limitations which could have impacted the findings of the result. A more variety of music could have been tested with more number of participants.

The study done was limited by the sample size, and also although the effort was made that the research area remains quite, occasional disturbances could not be denied.

RESULT AND OBSERVATION

On analyzing the data using paired t-test it was found that mean score was

Without any intervention(silence)[N=60]	16.93±2.738
With musical intervention during studying words[N=30]	12.72±2.914
With musical intervention during recalling word[N=30]	15.31±3.296



On comparing the mean score obtained (Phase 1) without intervention with mean score obtained (Phase 2) with intervention during the study period, the p-value was 0.0002 which is significant (<0.05), and the mean score was better without any intervention that is Phase 1.

On comparing the mean score obtained without intervention with mean score obtained with intervention during the recall period, the p-value was 0.017 which is significant (<0.05), and the mean score was better without any intervention.

On comparing the mean score obtained (Group A Phase 2) with intervention during study time with mean score obtained (Group B, Phase 2) with intervention during the recall period, the p-value was 0.002 which is significant (<0.05), and the mean score was better when music was given during recall period that is Phase 2 of group B.

DISCUSSION AND CONCLUSION

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ACKNOWLEDGEMENT

My special gratitude towards the Research Unit, Dept. of Physiology, SMIMS and SMU for their guidance and support.

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