

The effect of instrumental music on recall memory of words

[Food & Diet](#)



**ASSIGN
BUSTER**

This experiment was designed to investigate the effect of instrumental and non instrumental music on memory recall. 30 subjects were shown slides of words with non-instrumental music. After a 3-minute filler task, the subjects were given one minute to recall the words. The same procedure was repeated with slides of words with instrumental music. Nearly all the subjects could recall more words if instrumental music were used rather than non-instrumental music. A Wilcoxon signed-ranks test that compared the median of the two sets of observation showed that memory recall is greater at 5% significance level when instrumental music are used rather than non-instrumental music, which is go along with the experimental hypothesis.

Experimental hypothesis:

The number of words recalled with instrumental music is significantly greater than non-instrumental music.

Null hypothesis:

There will be no significant difference between the number of words recalled with instrumental and non-instrumental music.

Research and Rationale:

The aim of this experiment was to investigate the effect of instrumental music on memory recall. Memory is the ability to retain information over time through three processes that is encoding (forming), storing and retrieving.

Based on the Atkinson-Shiffrin model, human memory can be divided into 3 different systems which are sensory memory (SM), short-term memory (STM) and long-term memory (LTM). Although this experiment is designed to investigate the effect of instrumental music on the LTM, the process by which a stimulus becomes programmed in LTM involves the other memory systems.

<http://www.simplypsychology.org/multi-store.html>

Sensory memory is information that is in its real unprocessed forms. It has a large capacity but limited duration, means it's not going to stay for very long. To remember the particular information, it must move to working memory. Sensory memory is divided into two; visual sensory memory which is iconic memory and auditory sensory memory which is echoic memory.

Short term memory (STM) is also known as working memory. It is a place where most thinking believed to occur. New information received temporarily stays while it is being processed. It has a limited capacity and does not hold very much info at a time. STM have two characteristics that are limited capacity and duration. The limited duration causes info disappears from STM. It can be kept longer in STM by maintenance rehearsal which means repeating or rehearsing information so that it remains longer in STM. During maintenance rehearsal, new information cannot enter the STM. One of the main reasons info disappear from STM is interference. Interference evolves when new information enters STM and pushes out information that is already there. However, the weakness of the two characteristics can be increased with chunking. Chunking is combining separate items of information into

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

chunk and then remembering chunks of information rather than individual items.

Long term memory (LTM) is also known as semantic memory. Hippocampus is essential for formation of new long-term memories. It has an unlimited capacity which can hold large number of information. Information can stay for long duration in which the exact length of time is infinite provided that drugs or diseases does not damage brains memory circuit. LTM weakens over time and maybe forgotten if it is not used regularly. LTM may undergo change and distortion over time and not always be as accurate.

Research ([http://www.sciencedirect.com/ezaccess.library.uitm.edu.my/science?_ob=ArticleURL&_udi=B6V9F-3Y6GX0K-F&_user=6533825&_coverDate=08%2F31%2F1999&_alid=1696461683&_rdoc=1&_fmt=high&_orig=search&_origin=search&_zone=rslt_list_item&_cdi=5897&_sort=r&_st=13&_docanchor=&view=c&_ct=68&_acct=C000027478&_version=1&_urlVersion=0&_userid=6533825&md5=36386d5b2c961a2ca7db4eb29ac421fd&searchtype=a](http://www.sciencedirect.com/ezaccess/library/uitm.edu.my/science?_ob=ArticleURL&_udi=B6V9F-3Y6GX0K-F&_user=6533825&_coverDate=08%2F31%2F1999&_alid=1696461683&_rdoc=1&_fmt=high&_orig=search&_origin=search&_zone=rslt_list_item&_cdi=5897&_sort=r&_st=13&_docanchor=&view=c&_ct=68&_acct=C000027478&_version=1&_urlVersion=0&_userid=6533825&md5=36386d5b2c961a2ca7db4eb29ac421fd&searchtype=a)) have shown that instrumental music improves concentration. Non-instrumental music proved to be caused more harm. It caused the same part of the brain to be excited when listening to the words in the song and focus on a particular task. Listening to instrumental music prevents the brain from trying to do both. Besides that, instrumental music also gives physical benefits. Doctors use music as part of their patient's treatment so that they recover more quickly from illness (<http://www.buzzle.com/articles/benefit-from-listening-to-instrumental-music.html>)

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

The results from this study could benefit the process of learning of students. Students could revise their studies using instrumental music whether in school or house. Teachers also could use instrumental music in their class while teaching or while the students doing their homework. This not only makes them enjoying while doing their homework, it can also improve their concentration and reduce stress.

Several trial experiments were conducted to modify the investigational procedure. To conduct these trials, a convenience sample of 4 subjects aged 20 was taken.

Trial 1: Words versus Images

This trial was designed to investigate whether words or images should be used as objects of recall. First of all, the subjects were given 10 images that were each projected for 5 seconds. The subjects were shown the images with instrumental music. Then they require watching a video as a 3-minute filler task. They were then given a minute to write down the images remembered. This process was repeated using a new list of words with non-instrumental music of the same version of song.

Versions of Music with Images Median

Instrumental 8.5

Non-instrumental 7.5

The images were replaced with slides of 15 words that were each projected for 5 seconds. First, the subjects were shown slides of words with

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

instrumental music. After a similar 3-minute filler task, the subjects were given a minute to list of as many words as they could recall. This was then repeated with a new list of words with non-instrumental music of the same song.

Version of Music with Words Median

Instrumental 8. 0

Non-Instrumental 5. 0

There was a more significant difference when words were used instead of images. Words were thus chosen for the experiment.

Trial 2: Necessity of the Filler Task

I also did a trial to determine whether filler task is necessary after presented with the slides before proceeding to the recall of the words. Four participants took part, two with a filler task and another two without. Under the filler task group, one will be doing with the instrumental music and another one with non-instrumental music. The same goes with the non-filler task group.

Filler task group Median

Instrumental 10

Non-Instrumental 9. 5

Non-filler task group Median

Instrumental 12. 5

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

Non-Instrumental 11

These results indicate that the number of words the subjects would recall without the filler task was slightly higher. Thus, a filler task was found necessary to prevent the subjects from rehearsing the last piece of information they have just received and recalled it straightaway without having the information converted into short-term memory. I decided to let the subjects to watch a 3 minute video clip before starting to recall the words.

The song chosen was *Teardrops on My Guitar* by Taylor Swift because most of the females knew this song. It is a simple song with clear pronunciation of the words. Two versions of the song which is instrumental and non-instrumental were picked from the YouTube. It is played with computer with acceptable volume.

The manipulated variable in this experiment is the type of versions of the song while the responding variable is the number of words recalled from the slideshow. The constant variable in this study include the gender of the subjects, the age of subjects, the level of education, and the environmental conditions. Participants in this study that comprised of a sample of thirty Advanced Level students from the University Technology of MARA all aged 20. Besides that, all the tests were conducted in the morning only.

Experimental Method:

The 30 female subjects were given instructions about what they should do in this experiment. They were told to use any optical aids if they have been using before this.

Each participant received three sheets of paper containing a filler task, a blank recall sheet and a consent form.

The subjects were shown 15 words (Appendix 1) using a projector and instrumental music of $\frac{1}{2}$ Teardrops on My Guitar by Taylor Swift $\frac{1}{2}$ was played together. Each word was shown for 5 seconds.

After that, the subjects were asked to perform a 3-minute filler task.

Next, they were given a minute to recall as many words as possible.

After a break for 20 minutes, the procedure was repeated with the same group of subjects, but this time using different slides of words (Appendix 2) and non-instrumental music of the same song were played.

A Wilcoxon signed-ranks test was used to compare the median of the number of words recalled using instrumental and non-instrumental music at 5% significance level.

Risk Assessment:

The experimental procedure is positioned as low-risk. The volume of the music player over the computer was set at an acceptable volume so that it will not cause any problem on hearing.

The subjects were told that the data acquired would be used in scientific investigation and they were asked to sign consent forms to give seal of approval to use their results. Their results were kept anonymous for confidentiality reasons. Besides that, the subjects also enlightened not to reveal any details regarding the slides of words to anyone who had not taken it.

The change of the slideshow was not quick (each image were still for 5 seconds), and does not involve any custom animation such as flashing or flying in. In any case, the subjects were informed that they would be shown a slideshow and who felt they were at risk were asked to withdraw.

Results:

Number of Words Recalled Instrumental Music Non-Instrumental Music

0 0 0

1 0 0

2 0 0

3 0 0

4 0 0

5 0 0

6 0 0

7 0 0

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

8 1 0

9 0 1

10 4 10

11 8 10

12 9 4

13 5 5

14 3 0

15 0 0

Total 30 30

The graph shows the number of words recalled using instrumental and non-instrumental music from the slideshow by the 30 subjects.

The following graph shows how instrumental music contributed to recall words in the higher range (at least 11 words)

Statistical Analysis:

A Wilcoxon signed-ranks test was used to analyze the data for each type of slideshow. Wilcoxon signed-ranks test was chosen as the data is negatively skewed and does not show normal distribution.

Subject Non-Instrumental Music, X_i Instrumental Music, Y_i $D = (Y_i - X_i)$

Absolute D Rank of Absolute Signed Rank

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

1 11 12 1 1 8. 5 8. 5

2 10 10 0 0 — —

3 11 12 1 1 8. 5 8. 5

4 12 13 1 1 8. 5 8. 5

5 11 12 1 1 8. 5 8. 5

6 10 11 1 1 8. 5 8. 5

7 10 13 3 3 25 25

8 11 13 2 2 20 20

9 10 11 1 1 8. 5 8. 5

10 11 13 2 2 20 20

11 11 10 -1 1 8. 5 -8. 5

12 10 11 1 1 8. 5 8. 5

13 13 12 -1 1 8. 5 -8. 5

14 10 11 1 1 8. 5 8. 5

15 11 12 1 1 8. 5 8. 5

16 13 14 1 1 8. 5 8. 5

17 10 8 -2 2 20 -20

18 12 12 0 0 — —

19 11 11 0 0 — —

20 13 10 -3 3 25 -25

21 10 12 2 2 20 20

22 9 11 2 2 20 20

23 13 14 1 1 8.5 8.5

24 10 10 0 0 — —

25 11 14 3 3 25 25

26 11 12 1 1 8.5 8.5

27 12 11 -1 1 8.5 -8.5

28 12 13 1 1 8.5 8.5

29 10 12 2 2 20 20

30 13 11 -2 2 20 -20

$W_{+} = 260.5$, $W_{-} = 90.5$

The lowest value between the two sum of ranks is W_{-} , therefore test statistic, $T = 90.5$

The critical value at 5% significance level (one-tailed test) is found using Wilcoxon signed ranks table to be 151. $T = 90.5$ is lower than the critical

<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

value of 151, thus the null hypothesis is rejected and the experimental hypothesis is accepted. More words could be recalled when instrumental music used rather than non-instrumental music.

Data Analysis:

The memory recall is better when instrumental are used rather than non-instrumental music when demonstrated with Wilcoxon signed-ranks test. At $\alpha = 0.05$, the value of test statistics, $T = 90.5$ is lower than the critical value that is 151. This shows that the probability of the number of words with instrumental music recalled being significantly greater is more than 95 % if the experiment was to be repeated on the same community, and the probability that the results occurred by coincidence is less than 5%. This supports the experimental hypothesis that the number of words recalled is higher when instrumental music are used compared to non-instrumental music.

From all the subjects, 80% of the subjects recalled more words when instrumental music was used rather than non-instrumental music. Figure 1 shows that the mode for instrumental music distribution is 9 and for non-instrumental music is 10. Figure 2 shows that there were a greater number of people who could recall at least 11 words when the words shown with instrumental music which is 25 people compared to non-instrumental music that is 19 people.

Instrumental music improves the concentration of subject. Several area of brain area are activated when listening to music which is auditory cortex,

cerebrum, cerebellum and limbic system. Amyglada in the limbic system affects emotions of a particular person. It is the place where stress, sadness and anger occur. When listening to music, this area is normally inhibited. So, it controls the emotion of a person. When emotion is controlled, a person's concentration will increase. Prefrontal and parietal cortex is responsible for this response. However, different parts of the brain are excited when listening to instrumental and non-instrumental music. When listening to non-instrumental music, same part of the brain is excited. For example, listening to the words in the song and focusing on a particular task caused the same part of the brain to be excited. While, instrumental music prevents the brain from trying to do both. Thus, non-instrumental music causes more harm than non-instrumental music.

Evaluation:

The gender of the subjects was controlled because there are research done shows that men and women's brain are difference in a way. The men brain is larger than the female brain in their physical size. So, to have a reliable result, I choose to control the gender. Other than that, I also used subjects with the same age because as the age of the people increases, the effectiveness of memorizing power decreases. Besides that, the experiment is carried out in the morning only since that is the time brain is fresh. If the experiment conducted in the evening, most of the students already tired and it will affect the result of the experiment. Thus, it helps to improve reliability.

The uncontrolled variable was kept for minimum degree of error. For example, subjects that cannot withstand the volume of the song played were
<https://assignbuster.com/the-effect-of-instrumental-music-on-recall-memory-of-words/>

asked to withdraw. Other than that, subjects are ensured to take breakfast and have enough sleep the night before so that they are alert enough for the experiment.

A large sample of 30 subjects was taken. The experiment was carried out as a group. Speaker was used to play the song. Since speaker was used, there is variation of the distance of the speaker with the subjects. Subjects that sitting in front will hear the music was loud whereas the subject sitting at the back will hear the music soft. To improve the reliability of the result obtained, the subjects should be tested individually rather than a large group.

Other than that, it is also difficult to control how the subjects memorizing the words. Some of them may repeat the words to themselves and some of them may create a story behind the words. The main objective of filler tasks it to prevent covert rehearsal. However, it difficult to practice because the subjects may repeating the words while performing the filler task.

This experiment could have been improved if the subjects are presented with a list of printed words. This will eliminate the factor of distance of subjects from screens and it also may affect the attention of the subjects. Besides that, the size of the words shown should also be the same size as printed in the books. This is because different size of the words can also affect the results. Further studies on the type of music that affect memory could have been investigated.