Music Enhancing Concentration Amongst Students

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Abstract

Since the dawn of handheld music players which have revolutionized the way music is played around the world with the very first emerging in the late 2000s in the form of Apple's iPod touch which is still common and popular among millennials but when it comes to one particular claim "Music helps students focus", the millennials are divided and are occasionally seen debating over this on the web and formal debates at school. The purpose of this research is to draw up a valid and reliable conclusion as to whether or not music helps students to focus; the conclusion which will be based on the interpretation of the researcher's observations will be reached through quantitative methods such as statistical data to ensure the research is objective and value-free.

Keywords: (enhance, concentration, music, students)

1. Introduction

In recent years, students find themselves turning to de-stressing music to combat the stress of studying. We, the students of the Winchester school decided to conduct this research in an attempt to widen our knowledge on how to better our methods of studying. There have been many theories concocted on whether or not music aids in concentration, with many theories siding with specific genres of music and how they affect mood, our study aims to test those theories and prove once and for all that music does in fact aid in concentration.

2. Does music enhance concentration?

Baddley and Hitch's (1965) working memory model theory suggests that there are 2 types of 'working' memory that are able to absorb information simultaneously; one being vis spatial and the other being auditory. Andrade (2009) tested this theory by conducting a lab experiment where subjects were instructed to listen to a boring telephone call while being encouraged to doodle on paper, with the primary aim being whether or not doodling aids in concentration. The auditory task in this situation being the phone call and the vis-spatial task being the act of doodling.

Despite Andrade's success in the research, there is still debate on whether or not dividing attention is beneficial to concentration. The auditory task in the study was also classified as a 'primary task' as in the main task commanding the most amount of attention. The vis-spatial task was also known as the 'concurrent cognitive task' which is a sub-task or an additional task done at the same time as the primary task. This divides attention. Dividing attention was proven to be helpful to Andrade's hypothesis, however, some would argue that the favourable outcome was due to the fact that the auditory action was primary and doodling was secondary. So what happens when the tasks are switched? Is attention still affected?

This study aims to investigate whether music aids concentration. Secondary research collected indicates that there are positive and negative effects of music on tasks that require focused attention, like studying.

2.1 So what are the positive effects?

Music does help improve focus. A 2007 study conducted by the Stanford University School of Medicine found that music helps the brain absorb and dissect new information easily because it breaks down information into smaller segments. How does it do so? It trains the mind to make predictions about what might happen. For example, a student reads one part of a theory, they are able to hypothesize what the next part may be and establish a causal relationship between two segments. Music also improves mood, which may put a student in a more productive stance to study (Valerie Salimpoor - the brain and new music, 2013). Listening to music releases dopamine, a feel-good chemical in the brain, which consequently makes people happy. Studying can be stressful, music can help cut through that stress and maintain

a clear mindset throughout. Lastly, music is able to motivate. A study done by Gold et al. (2019) found that music acts as a reward in our brains. Since it triggers the dopamine chemical, the mind classifies listening to music as a perk to aid in studying, which can be a boring task to do at times, and also place strain on the brain. Thus, music has the ability to motivate students to learn.

2.2 What are the negative effects?

While it is proven that the working memory model does allow two types of memory to absorb information simultaneously, it is unclear whether the acts of studying and listening to music are the correct combination of auditory and vis-spatial tasks. It depends on the capacity of working memory an individual possesses. If one has little working memory capacity, which already impairs them when it comes to learning, listening to music makes it more difficult to absorb information. Secondly, music and studying also depend on what genre of music is heard while processing information. Most studies mentioned above support classical music as the best study tunes. The use of classical music in studies was popularised due to the establishment of the Mozart effect which states that listening to Mozart's pieces boosted spatial reasoning, thus helping concentration. While more researches are being conducted straying away from the classics, it is logical why this genre is the least distracting; no lyrics make it easier to concentrate, the use of classical instruments make it lighter on the ears and the rhythm stays the same for the whole composition. There are other genres that possess the same characteristics and can have the same effect on studying, ex: ambiance music, LoFi, soft jazz. Another big reason why classical is considered best is because of emotional attachment, or lack thereof. We've already established that music affects mood, now listening to sad songs or ones with deep emotional connections can be distracting for the student, which is why it is avoided. Recognizing and balancing both sides of the effects of music, this study aims to understand whether LoFi, tame music enhances concentration and consequently study skills.

3. Materials and Methods

3.1 Sample

The subjects consisted of 12 school students from ages of 16 to 18, all in the same level of education and including 75% females and 25% males.

3.2 procedure

Participants were chosen through volunteer sampling after a flyer was advertised on social media. Questionnaires that consisted of the collection of basic information and filler questions were sent beforehand along with the consent letter. The experiment was held on the Zoom platform due to unforeseen circumstances, this concluded that the conditions in which the experiment took place were a natural environment where students normally study. Participants were then divided into two groups; control and experimental conditions. During the experiment, all participants were given the same study material and test. The experimental group had Lofi music playing as they completed the study of the information. Although various researches support classical music as the optimal genre for concentration, we took the liberty of modifying the genre to fit the experimental age group and their preferences, as LoFi music is highly popular amongst students. The study period given was 45 minutes along with 45 minutes to complete the test. This experiment was repeated twice on two different days with two different sets of people for reliable results. Each condition had an equal number of 6 participants and was randomly allocated to limit researcher bias.

3.3 Data Analysis and Results

The following table includes the scores of each individual on the test that was carried out after the study period.

Experimental	Control
ST - 7	AR - 9
AS - 18	JT - 18
SS - 15	GD - 14
SK - 14	NM - 18
DV - 19	LF -14
DM - 19	HR- 14
Total Avg. : 15.3	**Total Avg. : 14.5**

Initials of participants were used to keep the identity of students private.

The total mean of scores in experimental was 0.8 higher than of the scores in control. This deduced that those who studied under the music condition did overall better in the test than those who did not.

Fig.1

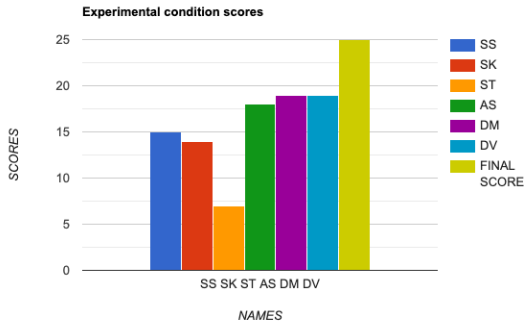
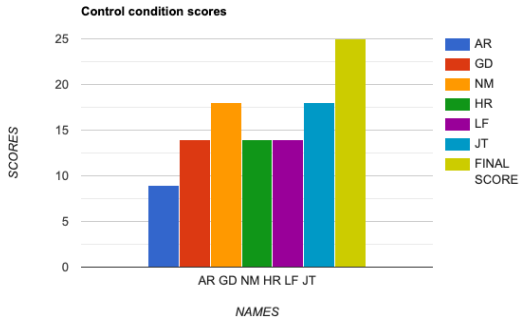


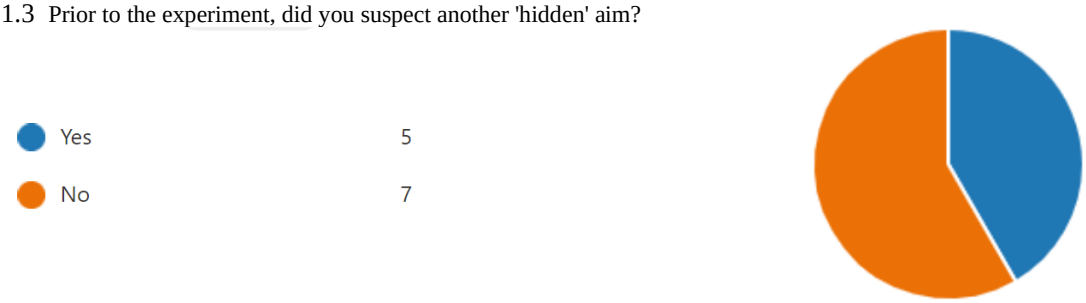
Fig.1.2



Post-Experimental Survey

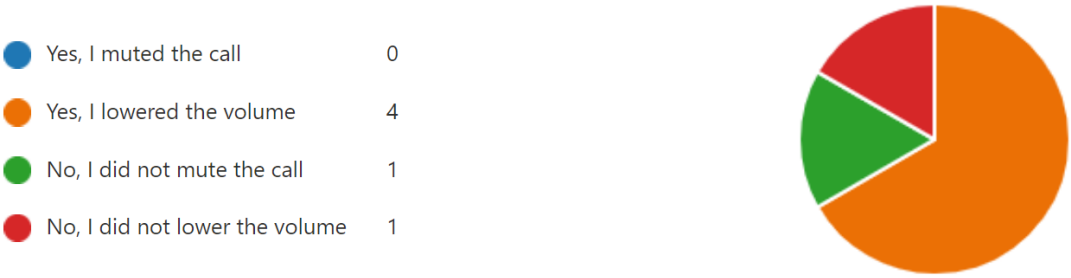
In the post-experimental survey that was conducted, 58% of participants did not suspect another aim and 42% suggested that they did believe another aim was taking place.

Fig.1.3 Prior to the experiment, did you suspect another 'hidden' aim?



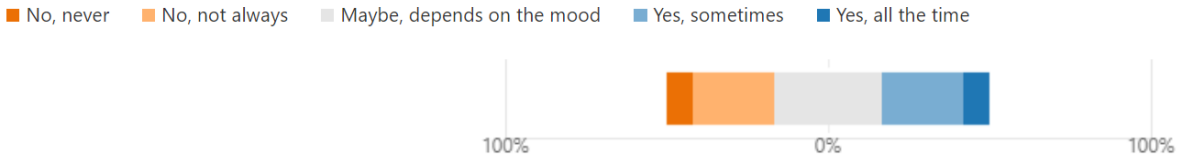
67% of students admitted to lowering the volume of the call and 34% of students did not lower the volume of the call. None of the participants muted the call.

Fig. 1.4 If you were in the experimental condition [music was played while you were studying], did you lower and /or mute the call, so you did not need to listen to the music that was being played?



In an attempt to further investigate our aim, we questioned the participants on whether they play music during the period in which they study. 33.3% of students leaned towards no, never, and no, not always and 66.6% of participants agreed on ranges between maybe, depends on the mood, and yes, all the time.

Fig 1.5 Do you regularly listen to music while studying?



The total results of experiment and post-experimental survey work in favour of our aim and hypothesis.

4. Discussion/Implications/Conclusion

4.1 Discussion of results

From the aforementioned results, we concluded that music does in fact aid in concentration. The scores positively correlate with the music played while studying. The experimental condition, on average, scored better [15.3>14.5] than the control condition, with the few standard deviations. The music group also spent less time answering the quiz, suggesting that they understood and thoroughly studied the content. One experimental participant suggested in the post experimental survey that he was able to deduce the aim of the study during the procedure, along with 4 others who suspected that they were being deceived were not able to recognise the correct aim. The aforementioned candidate also specified that he did in fact not listen to the music we played for the group, but rather admitted to playing his own music during the study. This is understandable, as personal music preference is important for concentration, and does not devalue the aim of this study, as some music was still listened to. It is natural to assume that not everyone would be stimulated by the same type of music.

4.2 Implications of findings

In the post experimental survey, it was shown (fig.1.5) that 33.3% of participants possibly do listen to music while studying as they answered ‘maybe, depends on the mood’ on the likert scale. Participants listening to music while studying whenever they're in the mood suggests that music is in fact a mood stabiliser that increases

productivity in students, clearing their heads and improving focus on the content in front of them. Furthermore, many suggested that their criteria for listening to music during studies is that there has to be low volume and no lyrics. This further proves our hypothesis that pupils prefer low impact, calming, instrumental music as that is prime focus music. Many respondents also specified that they only listen to music when they are ‘taking notes’ or ‘solving equations’. None of these procedures require immense attentiveness, which further aids our research, that when content studied requires a large amount of brain power, it is best to not play music as it divides attention.

Although, it isn’t clear whether music is the defining factor affecting concentration and study. There are most obviously other factors to consider, such as light and temperature. So playing music alone does not completely deter distraction, but has the effect to transform the atmosphere around a student, so that they can study in seclusion.

4.3 Conclusion

From these findings and discussion, we can make [4] definitive conclusions:

1. Music does aid in concentration.
2. There is a specific criteria to be implemented when playing music while studying:
    - Low volume
    - Wordless
    - Calming
3. Music improves mood and hence can act as a motivator.
4. While music is a largely considerate factor in improving a study environment, there are other factors to be considered, such as light, temperature and the study consent.

References

1. anon. (2019): „Does music help study?“. *Foundation Education*. Retrieved am 17.02.2021 from https://www.foundationeducation.edu.au/articles/2018/07/does-music-help-study.
2. anon. (n.d.): „How Listening to Certain Songs Can Impact Our Brain and Affect Our Mood“. *How Listening to Certain Songs Can Impact Our Brain and Affect Our Mood | SCL Health*. Retrieved am 17.02.2021 from https://www.sclhealth.org/blog/2019/04/how-listening-to-certain-songs-can-impact-our-brain-and-affect-our-mood/.
3. Cornelius, Bradley (2013): „Dr. Valorie SALIMPOOR – the brain and new music“. Retrieved am 17.02.2021 from https://www.wamc.org/post/dr-valorie-salimpoor-brain-and-new-music.
4. Gold, Benjamin P.; Mas-Herrero, Ernest; Zeighami, Yashar; et al. (2019): „Musical reward prediction errors engage the nucleus accumbens and motivate learning“. *PNAS*. National Academy of Sciences Retrieved am 17.02.2021 from https://www.pnas.org/content/116/8/3310.
5. Lehmann, Janina A. M.; Seufert, Tina (2017): „The Influence of Background Music on Learning in the Light of Different Theoretical Perspectives and the Role of Working Memory Capacity“. *Frontiers*. Frontiers Retrieved am 17.02.2021 from https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01902/full.
6. N. D.. Anderson, F. I. M.. Craik; A. [D.]. Baddeley, V.. Lewis; F. I. M.. Craik, R.. Govoni; et al. (1998): „Concurrent task effects on memory encoding and retrieval: Further support for an asymmetry“. *Memory &*
7. *Cognition*. Springer-Verlag Retrieved am 17.02.2021 from https://link.springer.com/article/10.3758/BF03193389#citeas.
8. Raypole, Crystal (2020): „Music and Studying: It's complicated“. *Healthline*. Retrieved am 18.02.2021 from https://www.healthline.com/health/does-music-help-you-study.
9. Sridharan, Devarajan; Levitin, Daniel J.; Chafe, Chris H.; et al. (2007): „Neural Dynamics of Event Segmentation in Music: Converging Evidence for Dissociable Ventral and Dorsal Networks“. *Neuron*. Cell Press Retrieved am 17.02.2021 from https://www.sciencedirect.com/science/article/pii/S0896627307005004.
10. History.com Editors (2009): „World War II“. *History.com*. A&E Television Networks Retrieved am 11.02.2021 from https://www.history.com/topics/world-war-ii/world-war-ii-history.
11. Singh, M., 2021. *World War 2: A timeline*. Available at: https://drive.google.com/file/d/1ZpRKCxkulkgTxdKtS3OeWIEqeVD4jcMM/view?usp=sharing [Accessed February 14, 2021].
12. Singh, M., Rajapakse, K. & Naveed, T., POST experiment SURVEY(1-12) (1). Available at: https://docs.google.com/spreadsheets/d/1_o_vkF6eizl-yLygOiOpxSiiv6EVSfN8oXPXlRzr8mw/edit?usp=sharing [Accessed March 1, 2021].