

Effect of Background Music on Concentration and Mathematics Scores of Raja Melewar Teachers Education Institute Students

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ABSTRACT

Listening to music while studying has become a common occurrence among students. According to certain research, music boosts intellectual capacity due to its physiological qualities. Numerous studies have demonstrated that music teaching benefits pupils' academic achievement. Hence, the purpose of this study was to determine whether music education utilising a particular kind of music improved the concentration and mathematics scores of a group of students. Thirty-six students (n=36) from the Physical Education Department of Raja Melewar Teachers Education Institute participated in this study. Participants were randomly assigned to one of three intervention groups: control group; pop music group; or classical music group. The researchers used music in their mathematical activity. ANOVA analysis found that music had no statistically significant effect on math exam scores. There is a chance that the views of students toward background music during testing settings could make for an interesting study. Additionally, the researchers used a small sample size, which may have contributed to the indefinite results. This suggests that additional research should be conducted with a bigger sample size.

Keywords: *Classical Music, Mathematics Scores, Physical Education Department, Pop Music, Raja Melewar Teachers Education Institute*

INTRODUCTION

When studying, students can pick from a vast array of venues and environments, ranging from quiet study rooms to trendy and lively café outlets. The majority of students who study educational materials do so with background noise, such as television or music. The effectiveness of learning is strongly reliant on the student's mental state. When the learner is intensely attentive, he can comprehend and memorize a large number of complex ideas in a short amount of time, yet when he is not, he cannot learn as well.

According to Grewal (2014), everyone has the capacity to concentrate. Consider the moments when one is involved in something he enjoys, such as playing the guitar, video games, or a really brilliant game of cards, and has completely focused his attention on it. However, when it comes to the challenges

encountered by students nowadays, it is difficult to convince them to sit down and study or finish prescribed work since their focus is fragmented and their minds wander. In this question, concentration practice must be learned and practised. Grewal (2014) said that the method that must be learned is a skill practice that entails learning mental self-regulation and arranging factors that can be controlled immediately. Both of these contribute positively to concentration.

According to Mori, Naghsh, and Tezuka (2014), group study, class presentation, and music will boost student focus. They should modify the music to maintain their level of concentration. With the introduction of electronically replicated music, the prevalence of background music in contemporary culture has increased. Such music is so prevalent that a person may be unaware of its presence in their immediate environment. The role of background music differs depending on the listener and the work or activity in which the listener is engaged. Such a task or activity might consist of studying or other forms of academic preparation. Students of all ages frequently assert that listening to music enhances their ability to study and learn. Some scholars have investigated the potential transfer of cognitive talents to non-musical subjects by suggesting that exposure to music through participation and formal teaching can promote non-musical learning (Radocy & Boyle, 2012). Nonetheless, a sufficient research foundation supporting these assertions appears to be missing. Some people may think that music helps them learn, but for others, it can be a distraction.

Music training increases concentration, attention, and performance compared to no music training (Khan & Ajmal, 2017; Patston & Tippett, 2011). Franklin et al. (2008) emphasized the influence of music on memory and learning and showed that people who appreciate music score higher on performance tests and have higher GPAs than those who do not. Studies examining the effect of musical experiences on students' mathematics ability have produced contradictory findings. The majority of research examined instrumental music instruction with just a tangential relationship to mathematics in the intervention's design, with scant evidence of transfer (Sala & Gobet, 2017). Others involved explicit linkages between the conceptual and procedural knowledge inherent in music and mathematics, with results suggesting beneficial transfer effects (An & Tillman, 2015). Due to the many ways in which math and music are related to each other, there are questions about the best ways to teach music.

Therefore, the researcher seeks to investigate the effect of background music on the concentration and mathematics scores of a group of trainee teachers.

LITERATURE REVIEW

In the study of the impact of background music on concentration when engaging in mathematical activities, there are several areas of inquiry that should be examined. The first stage is to determine how focused a student is on the assignment. A person must be attentive to the subject of learning in order to learn something. When a given amount of information must be learned, maintaining attention for a set period of time is necessary. Concentration is defined in this study as a prolonged level of attention to the task. The concentration research will then lead to a review of past studies that looked at the impact of music on students' concentration and the output of mathematical scores when they were engaged in mathematical activities. This will give some insight into why students may or may not do better with music playing in the background while doing math, as well as how it affects their concentration and mathematics scores.

Concentration

Attention problems are one of the most prevalent problems students have during their studies, and which might have an impact on their academic performance. Focus is lost when people become fatigued or bored with a continuous task, resulting in decreased performance (Mori et al., 2014). The

limited capacity theory by Kahneman (1973) piqued the researchers' interest in this study of concentration, and this theory has ultimately gained acceptance by researchers today. This model shows that a person cannot process information or do cognitive tasks as well as they could.

Concentration may be flexibly distributed across many concurrent tasks, and attention can be increased or lowered depending on the arousal level of each one. The demand of each individual action done in isolation determines the ability to conduct many mental processes simultaneously. Various mental activities place different demands on our attention capacity, and when that ability is insufficient, performance suffers. According to Ahissar and Hochstein (2002), learning requires attention, even for simple perceptual tasks, and learning that is more difficult requires more attention.

Benefits of Music

The capacity model of attention proposed by Kahneman (1973) gives a theoretical foundation for how music might possibly distract a cognitive endeavor like reading. This research looks into how different forms of music might distract or damage students' concentration when they are engaging in a reading comprehension task. The increasing number of studies addressing musical learning in the health and education fields have demonstrated its importance in treatment alternatives, especially when used as an intervention technique in behavioral and learning processes and emotional states, demonstrating its importance in treatment alternatives.

Classical music has been demonstrated to alleviate anxiety and increase memory (Cash, 2009). Many studies studying links between music instruction and cognitive ability were carried out during the last two decades (Schellenberg & Weiss, 2013). Many of them identified favorable links between music training and certain cognitive capacities like auditory (Kraus & Chandrasekaran, 2010; Magne, Schön, & Besson, 2006), verbal (Moreno et al., 2011), or mathematical capabilities ((Southgate & Roscigno, 2009), while others found no such links (Haywood et al., 2015; Lukács & Honbolygó, 2019).

According to Hallett and Lamont (2015), gym users listen to music to stay motivated while working out, whereas employees listen to music at work to stay focused on their work. This will increase the personal motivation to listen to music. Lee (2016) found that pupils do their coursework while listening to music. Music has an influence on a person's physiological responses, according to Lee, Chung, Chan, and Chan (2005). Music has been shown to affect brain waves, heart and pulse rates, blood pressure, breathing rate, and muscular reflexes, all of which help people focus. They argue that concentration improves a person by increasing motivation during study, resulting in exceptional academic achievement.

According to Khan and Ajmal (2017), music aids individuals in increasing focus while performing a task, while according to Mensink and Dodge (2014), music has no meaningful influence on subjects' concentration. This is most likely owing to the limited number of participants, which may have influenced the findings.

METHODOLOGY

The availability of a control condition prompted the use of a quasi-experimental design, which allowed for comparisons of the indicators judged important in mathematics scores (dependent variables) acquired before and after intervention (music instruction – independent variable). Two methods, arithmetic exam questions and two forms of music, were used to assess three groups (no music, pop music and classical music) on 36 students from the Physical Education Department of Raja Melewar Teachers Education Institute. The sample were randomly divided into the three different groups. There were two experimental groups and a control group. The experiment was conducted in a seminar room

in the physical education department. Each participant in the experiment was required to complete the task for 15 minutes under each condition. The control group performed the mathematics task first without any background music, followed by the participants in the first experimental group performed the mathematics task with classical music in the background and the second experimental group performed the mathematics task with pop music in the background.

In this intervention, the individuals were given two tests. First, there was a pre-test session with no music, followed by a post-test session with two distinct types of background music. The subjects were given two minutes to familiarize themselves with the question and ten minutes to respond. The responses were then gathered and graded. After a brief respite of around three minutes, the subjects resumed the post-test mathematical quiz with classical and pop background music.

The subjects were required to complete the mathematics quiz within the allotted period to assess their focus. The correct answer is used to determine the concentration of the topics. The stronger the attention given to the topics, the more accurate were the answers to the math quizzes which were completed in the time allotted. The fewer correct answers a subject obtained on a math quiz in the time allotted, the poorer his attention was on the topics.

RESULTS

The purpose of this research was to see if background music had an influence on concentration while doing a mathematics quiz. The results for the purpose of this study, which is to investigate whether different genres of background music, particularly classical and pop music, had an influence on concentration during a mathematical activity, were analyzed using a two way ANOVA (Table 1). The mean score for the control group ($M=0.091$, $SD=0.831$) while the mean score for classical music ($M=0.000$, $SD 1.000$) did not differ between pre-test and post-test. The mean score for the pop music group was $M=0.455$, $SD=0.820$. On the other hand, pop music got an average score that was a little bit higher than classical music.

Table 1: Descriptive Statistic for Mathematics Score

Group	Mean	Std Deviation
No music (Control group)	4.18	0.603
Pop music	4.73	0.467
Classical Music	3.64	0.674

The comparison of the mean score between the control group ($M=4.18$, $SD=0.603$), the classical music group ($M=3.64$, $SD 0.674$), and the pop music group ($M=4.73$, $SD=0.467$) revealed no statistically significant results in the one-way ANOVA, $F(2, 30) = 0.808$, $p=0.455$. This means that the varied genres of music in the background had no meaningful effect on the mathematics results (see Table 2).

Table 2: ANOVA Summary Table

Source	SS (Variance)	Df	Mean Square	F	Sig.
Between groups	1.273	2	.636	.808	.455
Within groups	23.636	30	.788		
Total	24.909	32			

DISCUSSIONS

The pretest and posttest mean scores revealed that group pop music had a higher mean. This shows that the subjects in this study liked doing math. This research backs up Khan and Ajmal (2017) findings, which found that pop music can boost positive mood and happiness levels. It reveals that in this study, more individuals had a high level of satisfaction in ongoing tasks and assignments. However, when a paired sample t-test was used to see if pop music had a significant influence on mathematic scores, the results were inconclusive.

Meanwhile, the mean score for the classical music group showed no difference between the pretest and posttest. This revealed that the classical music group had no effect on the individuals' moods or focus. According to Mensink and Dodge (2014), classical music is not usually chosen by subjects as part of their music demand and heard regularly, but it is perceived as unfamiliar by the pupils. This can be explained by the fact that the subjects were from Generation Y, a younger generation which mostly favored pop music over classical music. This conclusion was supported by Khan and Ajmal (2017) research, which found that people in their 20s preferred to listen to pop music over classical music, despite the latter being able to assist with anxiety, memory, and focus as posited by (Cash, 2009), by calming people down while also promoting the brain's ability to retain and recall information when focus is required.

Overall, the type of music playing in the background has little influence on the execution of a cognitive task such as mathematics, according to the study. When compared to the scores of those who performed the mathematics test without music in the background, both forms of music backdrop had no significant influence on the execution of the mathematical task in this study. This demonstrated that music had no effect on the participants' concentration in both experimental groups.

CONCLUSIONS

According to a previous study, there is a considerable difference in the impact of classical and pop music on focus. However, this study suggests that the condition in which each individual was placed had no bearing on the overall results. From the findings of this study, the best approach for pupils to study is to listen to pop music. The pop music ensemble received the highest marks in the mathematical task. Despite the fact that pop music has a higher mean, the paired sample t-test does not show a significant influence of pop music on mathematics scores, most likely because of the small sample size. In the future, the researchers intend to conduct more tests with more people to improve the statistical reliability of what we've found.

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AUTHORS' CONTRIBUTION

The experiments were designed and planned by Nadiah Diyana, T. A. and Azrul Afifi, while M. Radzliyana, R. was in charge of data preparation. Nadiah Diyana, T. A. was also in charge of authoring the manuscript. All writers gave constructive criticisms and assisted in the development of the study, analysis, and article.

CONFLICT OF INTEREST DECLARATION

I/We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research/manuscript has not been submitted for publication nor has it been published in whole or in part elsewhere. We testify to the fact that all Authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to Jurnal Intelek.

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