The Effects of High Tempo and Slow Tempo Music on Reaction Time

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Introduction

Our study aims to determine if slow tempo or high tempo music has an effect on one's reaction time. Reaction time is an important skill in day to day activities such as driving, playing sports, or even in school.

Purpose

The objective of this study was to determine differences in reaction time scores between slow tempo music, high tempo music and no music. The purpose is to determine which is the most beneficial for improving reaction time skills.

Methods

Independent Variable: Varying BPM (Tempo).
Dependent Variable: Reaction time & Accuracy.
Procedure: To test
reaction time, we used a Stroop colour and word test to study the delay in reaction time between congruent and incongruent stimuli. Slow-tempo music is considered anything under 76 BPM. High tempo music is considered to be 170-190 BPM. The music that we chose for the trials has been selected from two HIIT workout playlists on Spotify. The high tempo music we selected is at 180 BPM and the low tempo music is at 70 BPM. For our study, we had 1 control trial group and two different groups that listened to high and slow-tempo music. The order of these trials changed to ensure accurate results. Each participant performed 6 reaction time tests. The music was played on a speaker at a volume of 90.
Participants: 39 students participated in our study, all of which are in Douglas college's bachelor of physical education and coaching
program. Students who are colour blind were not able to participate in this study.
Figure a) demonstrates the first Stroop test participants completed. Participants had to give the first initial of the word that appeared. Figure b) participants wrote the initial of the colour of the rectangle that appears. Figure c) participants wrote the initial of the colour that appeared, not the word.

a) 

b) 

c) 

Anova: Single Factor			
Accuracy	P Value	Time	P value
Control Trial Vs High	0.45	Control Trial Vs High	0.002
Control Trial Vs Low	0.83	Control Trial Vs Low	0.001
High Tempo Vs Low	0.41	High Tempo Vs Low	0.79

Figure 1. Is a bar graph representing reaction time averages for the control, the slow tempo, and high tempo trials. The control group with no music had a much quicker reaction time score. The control trials score was faster than the slow tempo music by 9.61 seconds and quicker than high tempo music by 10.07 seconds. The slow tempo music demonstrated a faster reaction time than the high tempo trial by 0.46 seconds, which was considered statistically significant from the Anova test.

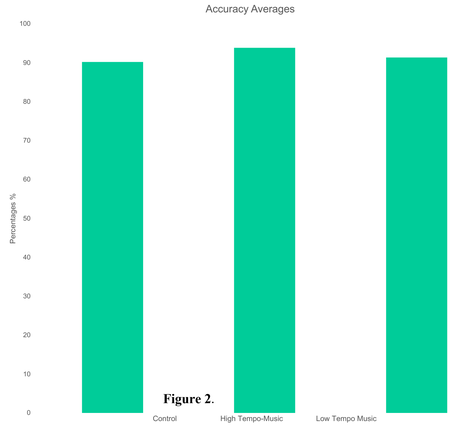

Figure 2.

Results

Using a single factor ANOVA test, we tested reaction time and accuracy with the results from the Stroop test. The ANOVA test showed that there was not a statistically significant difference between the control, high tempo, and low tempo accuracy trials. The reaction time ANOVA test demonstrated that there was a statistically significant difference in results between the control trial and the high tempo trial. With the control having the fastest score. When comparing the High tempo and Slow tempo trials, there was not a statistically significant difference with a P-value of 0.79.

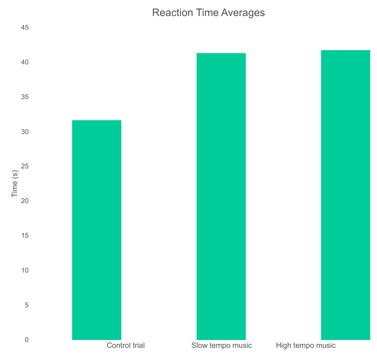

Figure 1.

Figure 2. Is a bar graph representing the accuracy percent averages between trials. Although the results look significant, the differences in accuracy are not statistically significant differences according to the ANOVA test. The control trial with no music shows less accurate results on average. The high tempo music trial shows the most accurate responses out of the three trials with an average of 93.88%

Discussion

In this study we proposed and verified slow tempo and high tempo music influences one's reaction time. The results generated using the Stroop effect game, showed statistical significance that participants displayed quicker reaction times while listening to low tempo music compared to high tempo music. However, the control group was the quickest when comparing it to slow tempo and high tempo. When looking at accuracy we discovered statistical significance that high tempo music created more accurate responses compared to low tempo and control trials. As well, low tempo music was more accurate when compared to no music at all. Our findings go against what Brodsky et al. (2018) discovered where music which excites us distracts us from the task at hand. Furthermore, possible implications of these findings include having a small control group compared to the high tempo and slow tempo trials, could possibly affect the accuracy of our findings; another implication could be that all three trials were done at three different times. The control trial was done at 8:30 in the morning, which could skew data as participants may not be fully focused. The other trials were done at 12:30 in the afternoon and at 4:30pm. The varying times can influence results as individuals' reaction time can be affected by gender, age, physical and mental fitness, sleep deprivation and consumption of intoxicants (Taimela, 1991).

Conclusion

It was identified in the study that students displayed quicker reaction times when listening to low tempo music. However, it was also discovered that students demonstrated better accuracy when listening to high tempo music. We hypothesized that this may have occurred because with the second group high tempo music was done after low tempo music which means students had time to get used to the test after the low tempo trial. For future studies who have more time it would be beneficial to test music trials on separate days to avoid the chance of participants becoming familiar with the test. As well it would be beneficial for future studies to test how listening to low and high tempo music before the test can affect reaction time.

References

Brodsky Warren, Olivieri Dana, Chekaluk Eugene. Music genre induced driver aggression. *3. Music & Science.* 2018;

Taimela, S. (1991). Factors affecting reaction-time testing and the interpretation of results. *Perceptual and Motor skills*, *73* (3_suppl), 1195-1202.