Exercise Science

The Effects of Music on Perceived Exertion and Overall Performance During A Rowing Exercise

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Introduction

While exercising, an individual's mood state can become heightened as their body begins to feel the effects of the exercise (Chaieb 2015). Oftentimes, when the body begins to feel weak, the mind begins to accept the sense of pain and desire to stop before the exercise is completed. To combat this, individuals will sometimes provide an external stimulus, such as listening to music, to take his/her mind off the task at hand (Costas 2012). In doing so, one may feel more capable of completing the exercise with reduced antagonistic feelings. While the mind may feel as though the exercise has become easier to perform, the body is likely putting forth the same effort as before. Additionally, one may feel a greater urge to push through the pain of exercise due to motivational effects from the outside stimulus (Frost-Sharatt 2015).

Rowing is used in research studies because it is a whole body exercise. As not many people row on a regular basis, this allows the true effects of music to show through as opposed to performing a running experiment, which many people have done before. When performing a rowing exercise, variables such as average power output, strokes per minute, time, and total distance traveled can be recorded and documented to evaluate changes in performance between exercise sessions (Tran 2015). In previous research, experiments were conducted on well-trained rowing athletes. Oftentimes, the testing consisted of the subject exercising at maximum effort for a distance of 2000 meters (Lawton 2011). The results of these studies may be directly applicable to non-athletes or those that row as only part of their training regimen. Therefore, the purpose of this study is to show the effects of music on perceived output as well as overall performance of a rowing exercise. The results of this investigation may provide evidence and recommendations for future training programs in order to increase overall performance during exercise.

Methods

Thirty-eight Lagrange College students without prior rowing experience (29 males, 9 females) ranging in ages 18-25 participated in this study. Participants were recruited from Lagrange College courses.

Each participant completed two exercise trials on the Concept2 Rower (Morrisville, Vermont). One trial was completed with music and one trial was completed without music, thus each participant served as his/her own control. Participants were assigned a number using a random number generator to determine which trial he/she would perform first. Each of the songs on the loop was 100 beats per minute in the "down tempo" genre.

In each session, participants were recorded for height and weight. Each session required the participants to row on the Concept2 rowing machine for a set distance of 1600 meters. A dynamic full-body warmup was performed prior to exercising, which included five walking lunges on each leg, 10 forward and 10 backward arm circles, and a chest opening doorway stretch. A 150 meter practice row on the Concept 2 Rower between 20-24 strokes per minute was completed to allow participants to learn proper techniques and to show a moderate pace. Participants then completed a 20 second full effort row(A Guide to Training on the Concept2 Indoor Rower 2001). Heart rate and a rating of perceived exertion (RPE) on the BORG RPE scale were recorded before and after the warm up. Participants were then given a five-minute break to allow the heart rate to decrease before they started the testing trial. Heart rate and an RPE rating were taken at the beginning of the trial, at 400 m, 800 m, 1200 m, and at 1600 m when the participant had completed the trial. Following the trial, the participant was instructed to rest for two minutes and then heart rate and a perceived exertion rating was taken once more. Statistical comparisons were made using a paired samples t-test for RPE, heart rate, average power, strokes/minute, rate, and time using SPSS (Vs. 17). The p value was set to $p \leq 0.05$.

Results

The data showed that there was not a statistically significant difference between trials where participants did receive the music stimuli and when they did not. Table 1 shows the average for all participants in RPE, strokes per minute, and power output at 1600 meters with standard deviations.

Table 1: Average RPE, strokes/minute, and power output at 1600 meters with standard deviations.

	Avg. RPE 1600 m	Avg. Strokes/Min 1600m	Avg. Power Output 1600m (w)
Without Music	16.00 ± 2.661	13.61 ± 4.796	123.84 ± 58.805
With Music	15.58 ± 2.564	13.55 ± 4.881	129.26 ± 60.587

* p ≤.05

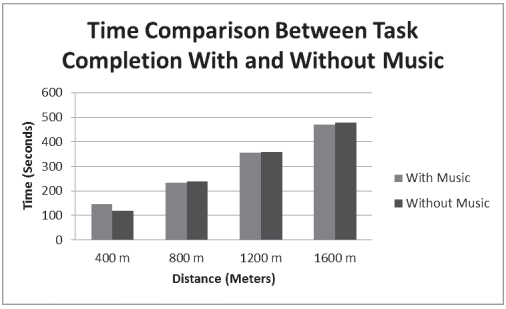

Figure 1.1 shows the average time it took with and without music to reach a certain distance. The findings were not statistically significant. Standard deviations are included.

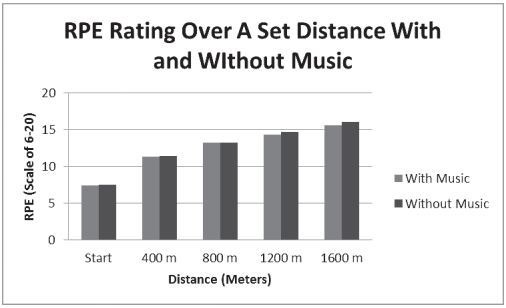

Figure 1.2 shows the average RPE at set distances with and without music. The findings were not statistically significant. Standard deviations are included.

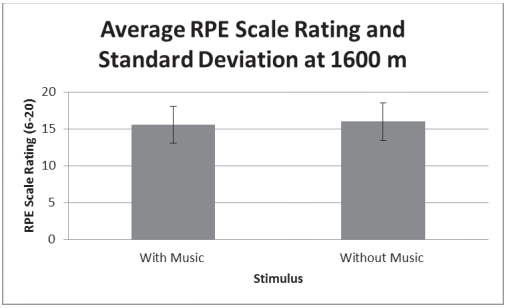

Figure 2.1 displays average RPE scale rating for all participants at 1600 meters with and without music. Standard deviations are represented by the error bars.

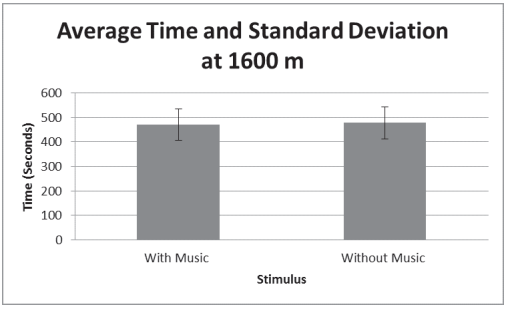

Figure 2.2 shows the average time it took to complete the rowing task with and without music. Standard deviations are represented by the error bars.

Discussion

The purpose of this study was to assess the effect of music on perceived exertion as well as overall performance of a rowing exercise. The hypothesis was not supported by the findings. The study started with 43 participants but due to scheduling conflicts, unforeseen complications, and technological difficulties, the study ended with 38 completed participant data sets. The data shows that there were no statistically significant differences between music and non-music trials. It should be noted that this may be due to the genre of music that was used for the study. Allowing participants to pick their music genre while still controlling what songs are played and beats per minute of the songs may yield better results (Karageorghis 2012).

An additional paired samples t-test comparing condition order indicates that a greater familiarization period may have been necessary. RPE differences at 800 meters were statistically significant ($p \leq 0.048$) from trial 1 to trial 2 independent of condition. This could be because participants were not familiar with rowing and/or the RPE scale during the first trial. Future studies would be benefited if experimenters ensured consistent heart rate monitoring, adding a familiarization trial at the beginning of the study, and controlling outside elements during the study. Additionally, similar studies on elite level rowers may yield statistically and practially significant results since even a two second difference could be the difference between winning a race and not.

Conclusion

The results of the current study with college-age non-rowers showed that there was no statistical significance indicating that music had an effect on power output, RPE, or task completion. However, if a familiarization trial or session was done preceding the two other trials or if music was more self-selected, the effect of music could be greater. If future researchers address these issues, statistically and practically significant differences could be found that would be beneficial to both recreational and competitive rowers.

References

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