THE EFFECTS OF MUSIC ON PHYSIOLOGICAL RESPONSES DURING SUBMAXIMAL EXERCISE

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Abstract

INTRODUCTION: Studies have shown that music can have psychological effects on a person. It can affect a person's emotions and stress levels. Other variables that can be affected by music are heart rate and rate of perceived exertion (RPE). RPE is used as a way to measure workout intensity subjectively and is usually presented in the form of Borg's scale. Heart rate is also a good indicator of the intensity of the workout. During exercise, there is an increase in sympathetic activity because of the body's demand for more oxygen which also increases HR.

PURPOSE: The purpose of this study was to evaluate the effects of music on RPE and blood lactate during submaximal exercise.

METHODS: Five students, four from the Kinesiology Department and one from outside of school, volunteered to participate in this study. Each subject was required to come to the lab for one hour on two separate days. Height, weight, age, and 60% of heart rate max were recorded first. Then the first blood lactate was recorded. The subject then began the 30 minute ride at 60% of their heart rate max on the cycle ergometer while RPE, heart rate, and oxygen consumption were recorded every ten minutes. At the end of the ride a second and final blood lactate was recorded. The next day the subject came he or she brought their music playing device to use during the 30 minute ride. Days with music and without music were chosen randomly.

RESULTS: The mean RPE for music was 8.8 ±2.2 and without music was 11.1 ±2.7 which was significantly different ($p<0.02$). The mean heart rate for music was 119.4 ±3.4 bpm and without music was 120.7 ±3.7 bpm did not result in a significant difference ($p>0.05$). The mean VO_2 for music was 18.28 ±4.1 ml/kg/min and without music was 17.62 ±3.3 ml/kg/min were not significantly different ($p>0.05$). The pre-blood lactate for music was 2.78 ±1.4 mmol/L and without music was 2.88 ±1.7 mmol/L. The post-blood lactate for music was 3.96 ±1.3 mmol/L and without music was 3.0 ±1.3 mmol/L were not significantly different ($p>0.05$). There was no significant difference between pre and post blood lactate with music ($p>0.05$) and without music ($p<0.05$).

CONCLUSION: The results of this study indicate that music did not affect heart rate, oxygen consumption, and blood lactate levels. It did however affect the RPE. This probably due to the effect that music can have as a distraction on a person in which he or she feels less stress caused by fatigue during exercise.

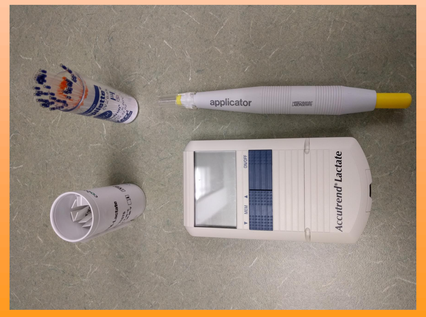
Purpose

The purpose of this study was to evaluate the effects of music on RPE and blood lactate during submaximal exercise.

Methods

The subjects' age-predicted heart rate max and 60% of that number was calcculated. Then they were weighed and their height recorded. A heart rate (HR) monitor was placed around their chest so that their heart rate could be transmitted to the watch.

A total of two blood lactate measurements were taken, once at the beginning of the test and once at the end. Their finger was cleaned with alcohol and then pricked with a blood lancet to obtain a drop of blood. A capillary tube attached to a reflation applicator collected the sample of blood from their finger. The blood sample was placed on a strip of paper inside the Analyzer and the lactate level of that blood was found using the Accusport Lactate Analyzer.



Methods (cont'd)

Then the height of the seat on the cycle ergometer was adjusted for them so that there was a slight bend (5-10%) in their knee when their leg was extended. A mouthpiece, similar to that used for snorkeling, was used along with a noseclip to ensure that exhaled air could be collected in the metabolic cart during the exercise. This allowed the calculation of their oxygen consumption, a measure of aerobic fitness.

They began pedaling at 50 revolutions per minute (rpm) and the workload was adjusted during the 5 minute warmup to reach the previously calculated 60% of age-predicted HRmax. After the warmup, they began the 30 minute exercise phase in which their heart rate and RPE, using Borg's RPE scale, was recorded every 10 minutes. Once the 30 minute exercise phase finished, they continued to sit on the cycle ergometer while the second and final blood lactate measurement was taken to finish off the experiment.

Results

Table 1: Demographics For All Subjects

	Mean	SD	Min	Max
Age	23	0.7	22	24
Height (cm)	175.6	11.1	157	185
Weight (kg)	79.02	10.5	90.9	65.5
60% HR max	118.2	0.42	117.6	118.8

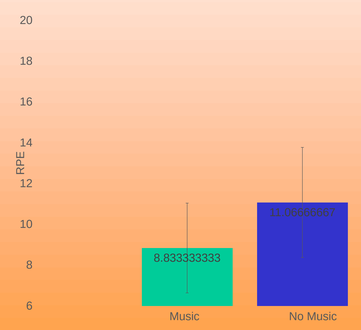


Figure 1: A Comparison Between Mean RPE Of Submaximal Exercise With Music And No Music.

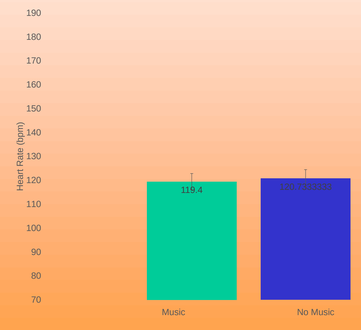


Figure 2: A Comparison Between Mean Heart Rate Of Submaximal Exercise With Music And No Music.

Results (cont'd)

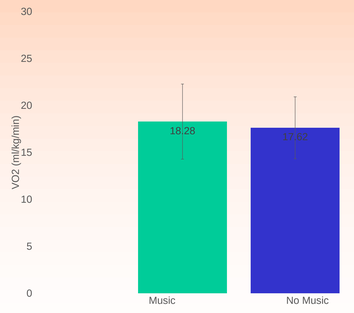


Figure 3: A Comparison Between Mean VO2 Of Submaximal Exercise With Music And No Music.

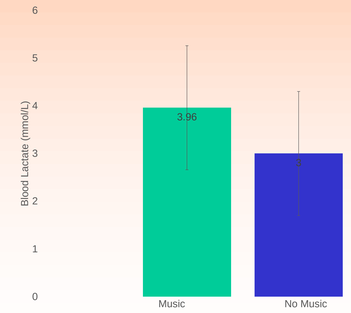


Figure 4: The Relationship Between Mean Post-Blood Lactates Of Submaximal Exercise With Music and No Muisc.

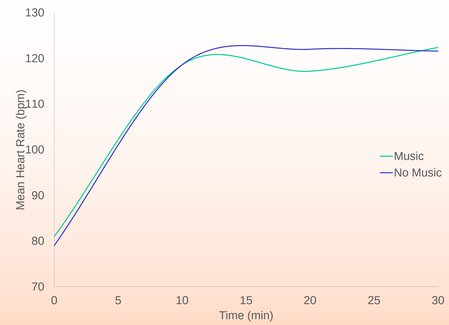


Figure 5: The Relationship Between Mean Heart Rate Every 10 Minutes Of A Submaximal Exercise With Music And No Music

Conclusions

The results of this study indicate that music did not affect heart rate, oxygen consumption, and blood lactate levels. It did however affect the RPE. This probably due to the effect that music can have as a distraction on a person in which he or she feels less stress caused by fatigue during exercise. If the test duration had been longer and at a higher intensity, there may have been more difference in blood lactate.