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Effects of Motivational Music on Post-Exercise Recovery

Previous studies have been conducted to analyze the physiological effects listening to motivational music has on exercise performance. For music to be considered “motivational”, literature suggests a tempo of 120-140 bpm if it is expected to elicit a positive response during high-intensity exercises. However, there is a scarcity of research analyzing the effects of music during the post-exercise recovery period (EPOC). Due to this, my research study was meant to examine the effects of types of music on exercise recovery.

With OUR support, my mentor Dr. Shannon Jordan and I were able to carry out this project. With the funds provided, we purchased materials needed to conduct this experiment, including filters, hoses, and headgear for the Lamar University Health and Kinesiology Department’s ParvoMedics Metabolic Cart (in order to measure metabolic gas exchange variables) and the book Applying Music in Exercise and Sport by Costas I. Karageorghis. This textbook provided the Music Brunel Rating Inventory (MBRI), a validated survey tool that was used to assess the degree to which is deemed motivational.

While working on this research project, I learned many new skills that will be beneficial to me in the future, as one of my goals is to attend graduate school. These new skills include becoming more proficient in taking exercise blood pressure, analyzing data, and using Excel. Dr. Jordan has also taught me how to calibrate and perform maintenance on the metabolic cart, as well as analyze lactate samples.

Previously, ten healthy, college-age (non-smokers, 18-30 years) people participated in a pilot study using this protocol. Currently, five additional participants are in various stages of completing the protocol. The goal is to have 20 participants total for the final data analysis. Each
participant completed an initial evaluation – including providing an informed consent and a PARQ+ (an IRB approved screening tool). Participants meeting the criteria performed a treadmill exercise test to determine their aerobic fitness level (VO$_{2\text{peak}}$). Throughout the test heart rate (HR), blood pressure (BP), and lactate were monitored, along with metabolic gas exchange. Next, participants performed at 70% of their VO$_{2\text{peak}}$ for three different exercise trials in which they would listen to different types of music during the recovery period of each session. Participants completed three trials in random order:

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Recovery</th>
</tr>
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<tbody>
<tr>
<td>Motivational Music</td>
<td>No Music</td>
</tr>
<tr>
<td>Motivational Music</td>
<td>Motivational Music</td>
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<tr>
<td>Motivational Music</td>
<td>Calming Music</td>
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</table>

Exercise recovery was determined based on post-exercise gas exchange data, heart rate, blood pressure, and blood lactate. Data were organized into an excel sheet and analyzed in the statistical program SPSS. At this time, a total of ten participants have finished the experiment by completing all five visits. Five additional participants have completed some of their visits to the lab but not all, and we are continuing to recruit participants until we reach 20 participants. We will continue to schedule these participants and complete their data collection. The data we present in this final report will be for the ten completed data sets, as incomplete data sets pose an issue with analysis. Once the other participants complete their trials (which we anticipate prior to the conclusion of spring 2022 semester), we will add their data to the analysis in SPSS.

Our findings, to date, show no difference in recovery when comparing the three different trials. This conflicts with our research hypothesis that calm music or no music would allow the participants to recover more quickly during the EPOC. In the attached data table, you can see the means ± SD for heart rate, lactate, VO2 (absolute and relative), ventilation (VE), respiratory rate (RR), and respiratory exchange ratio (RER). When the statistical analysis was performed in SPSS, there were no significant differences between music trials for any physiological variable.
associated with recovery during the EPOC. The additional completed data sets will allow us to
determine if this trend is accurate or if the pilot data set of n=10 was too small to determine
statistical significance.

Throughout this process, there were challenges we faced and overcame, one being when a
participant’s braces made it difficult to fit the mouthpiece in their mouth correctly, causing it to
pop out in the middle of their run. Since the trial was not completed, the participant had to
reschedule while the team retrieved a mouthpiece that was shaped differently and more suitable
for the participant’s condition. Another problem manifested itself with scheduling and the number
of participants able to complete all five visits of the experiment.

Personally, I also found monitoring blood pressure to be a little challenging; it can be
difficult to detect Korotkoff sounds (the sounds emitted while recording a person’s blood pressure)
when the person being monitored is running; their constant arm movement can affect the gauge,
and their footfalls can make it difficult to hear. For this experiment, motivational music was
required during exercise at a certain volume, adding to the noise levels. However, as I grew more
experienced, I also grew more confident in my readings.

While I have had the opportunity to present my pilot study at the Ninth Texas STEM
Conference and will present at the EXPO 2022, I hope to present my updated research at the
Spring 2023 Texas American College of Sports Medicine meeting and subsequently at the national
conference for the American College of Sports Medicine. Following this, my mentor and I plan
to prepare a manuscript for a publication in a peer-reviewed scientific journal within the field of
exercise science.

This experience fueled my interests for this topic and my love for the study of exercise
science in general. Not only has it made me more confident in my abilities and what I want my
future career to revolve around, but it has created a much more curious mind and stimulated a great
and newfound appreciation for research within me as well. If I had known how much I would
come to enjoy research through this experience beforehand, I would have applied for SURF and
OUR and all the opportunities they offer sooner. As it is, I cannot wait for future chances to
conduct more studies.
N=10. The objective of exercise intensity at 70% of VO\textsubscript{2}\text{max} was confirmed as seen above.

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No significant differences between treatments for any time point.

SBP= Systolic Blood Pressure; DBP=Diastolic Blood Pressure
No significant differences between treatments for any time point.