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### The Effect of Music on Athletic Performance

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The Effect of Music on Athletic Performance

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### **Abstract**

This research study sought to find a link between listening to different music genres and the athletic performance of collegiate athletes. Thirteen college football players at a university in Arkansas participated in the study. The music group consisted of five participants, and the control non-music group consisted of eight participants. The study group listened to rap for one week, country the next week, and gospel the week after. After approximately 10 minutes of warm-up, the athletes performed a vertical jump test and a trap bar jump to measure mean power. Then they filled out two self-assessment survey questions about the previous activities: a rate of perceived exertion survey and a mood survey about the earlier exercises. Each session of testing lasted about twelve minutes in total. No significant difference was found that listening to music had on the performance of the athletes.

*Keywords:* athletic performance, music, RPE, mood

## **Introduction**

In today's world, music is a part of our everyday lives. Ferjan (2022) notes that 7.11 billion people worldwide listen to music, with the average person listening to over 18 hours of music weekly. Descriptive Audio (2022) informs that people do many different activities while listening to music, like walking their dog, playing video games, or studying. Many people exercise while listening to music. In the world of sports and exercise, music is used a lot. But one may ask, "Can the music a person listens to impact their athletic performance?"

## **Literature Review**

In the world of sports science, scientists and researchers are constantly looking for ways to improve the performance of athletes, searching for the slightest changes in a training regimen that could reveal ways to improve athletes' performance numbers, like how diet and sleep affect performance (Hughes, 2017). More recently, how music can affect a person's athletic performance is being studied in sports science. Sanchez (2014) states that music produces little to no change in a person's performance.

Some studies suggest music can help people improve their performance during exercise. For instance, Barksdale (2020) discusses how music before a game helps athletes in sports like football and ice hockey prepare and inspires them to play the game. Thakare (2017) found that young adults who listened to music could outperform their peers who did not have music while exercising. Chtourou (2012) and Brohmer (2006) found that music can alter performance in individuals during anaerobic exercises. Ballmann (2021) noted that listening to preferred music increased performance and motivation during resistance workouts more than listening to music

not preferred. In summary, a person working out and listening to music that they like will perform better than someone who listens to no music or to music they do not want to hear.

In addition to increased performance, some studies suggest that listening to music can decrease a person's rate of perceived exertion or RPE. The RPE is how much effort or energy individuals feel like they are expending. Chow (2017) and Patania (2020) noted that listening to music during exercise could reduce RPE. Both found that music can reduce a person's RPE if they listen to it while exercising. Even though the subjects performed the same exercise as everyone else, they felt like they weren't exerting as much energy because they had music. Music decreased how tired the participants felt and how much power they felt was expended during the exercise bouts. This could lead to a potential increase and improvement in an individual's overall performance.

The implementation of music can increase a person's feeling of motivation during an exercise bout. Lane (2011) found that when participants listened to motivational music, there was a link to improved moods and performance. Involving motivational music helped elevate the attitudes of those who participated in the study. Loizou (2014) found viewing music and video before exercising leads to feelings of motivation. The viewing experience even led to the participant having an increase in performance. The participants in Loizou's study felt inspired while watching the video and listening to the music before the workout began. That motivation carried them into the exercise bouts, leading to improved performance compared to those who did not listen to the music and watch the video. When people listen to music while working out, it could lead to them feeling motivated and boost their mood while they workout. That increased mood while working out could lead to better performance. Music is often used to help people get

through work or a task they have to do, whether it be cleaning the house, doing yard work, or even driving.

### **Purpose of Study**

This study aimed to determine if listening to music while working out increased athletic performance. Performance after listening to different music genres (rap, country, gospel) was compared with performance after listening to no music. Furthermore, comparisons were made among each music genre's effect on athletic performance. Many athletic programs play music while their athletes are working out. If there is a music genre that can facilitate an increased performance by the athletes, that would be beneficial for the coaches and athletes to know. If athletes can get a boost from simply changing the genre of music they listen to, this can be a quick and easy change that can pay huge dividends in the long run to athletic programs.

### **Hypotheses:**

The different music genres the athletes listen to while working out will affect their performance. It is hypothesized that, of the three music styles, rap music will lead to the athletes having a higher peak power output, a higher mean power output, and a higher mood while working out. In addition to an increase in those areas, it is hypothesized that rap music will also most decrease athletes' RPE.

### **Method**

#### **Participants**

The participants of this study were chosen based on convenience. The study subjects were twenty collegiate football players at a university in central Arkansas. Of the twenty, only thirteen could ultimately participate due to changes in their summer plans and schedules. The demographic of those participating is outlined in the table below:

Genre preference	Age	18	19	20	21	22	23	Total
rap				1	3	4		8
country					2		1	3
gospel		1						1
Other							1	1

**Instrumentation**

For this study, four instruments were used to gather and collect data. Two instruments measured physical output, and the other two were self-reflection measures concerning the two physical activities. The two physical activity instruments were a Just Jump mat and a Vitruve device. The Just Jump mat is a mat that calculates a person’s vertical jump based on how long the participant is in the air when they jump. The Vitruve device calculates a person’s mean power output by measuring how fast one can pull the string attached to the device and measures how many watts the pull generates (Vitruve Team, 2020). The Vitruve is a velocity-based training device that considers the weight on the bar, and the lift being performed. The Just Jump mat and the Vitruve device are top-class devices currently used in athletics. The two self-reflection surveys administered were a mood survey and an RPE survey. The Borg CR10 scale for RPE will require participants to choose 1 to 10, with one representing that the exercise or event that just took place felt like rest and ten representing that the event or activity felt like the

most taxing or straining event one's life (Williams, 2017). The mood survey will also request a rating on a scale of 1-10, where one represents being in a horrible mood and the person does not feel motivated or enthusiastic at all, and ten represents a great attitude and feeling on top of the world.

## **Procedure**

For three weeks the athletes showed up to either a planned morning or afternoon group lift. The athletes were not assigned a specific group. They were just told to pick either a morning testing time or an afternoon testing time, based on scheduling and availability. The morning group had music, and the genre of music changed each week. The afternoon group was the control group that had no music. The participants would show up fifteen minutes before their planned training schedule. All participants went through the same warm-up, which consisted of ten knee hugs with a deep lunge, ten quadricep pulls with an overhead reach, ten ankle cradles with a lateral lunge, ten forward lunges, and ten bodyweight squats, fifty jump ropes, and two warm-up jumps with hands-on-hips. After the brief warm-up, the athletes would then begin the tests. The first exercise was a vertical jump test conducted on the Just Jump mat. The participants placed their hands on their hips to prevent a subtle change in arm swing from altering their jump height. Next, the participants performed a trap bar jump, with the Vitruve device attached to measure the mean power output. The trap bar had 185 pounds on it. The objective is to measure the athletes' mean power velocity by asking them to jump as explosively and powerfully as possible with the trap bar in their hands with locked-out arms. The athletes performed the exercises three times each. The highest vertical jump performed and the highest power output on the Vitruve device was recorded. After completing the vertical and trap bar jumps, the athletes filled out the self-assessment surveys. From the start of the warm-up until the end of filling out



the self-assessment survey, each athlete was testing for about twelve minutes at most. This process was repeated twice a week for three weeks.

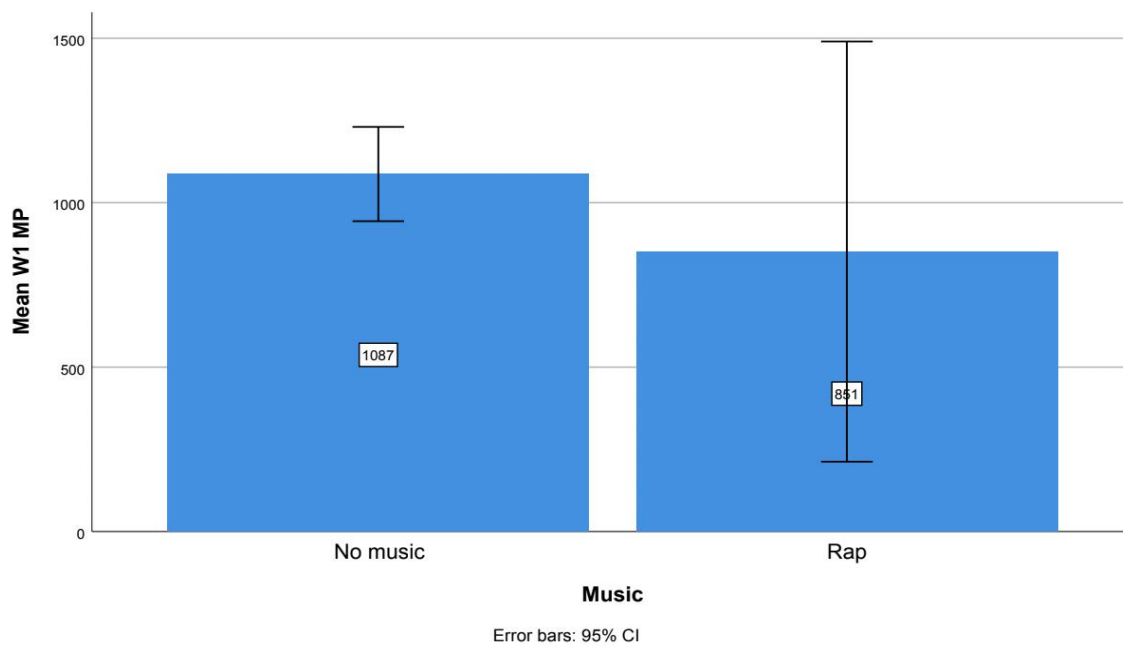
**Data Analysis**

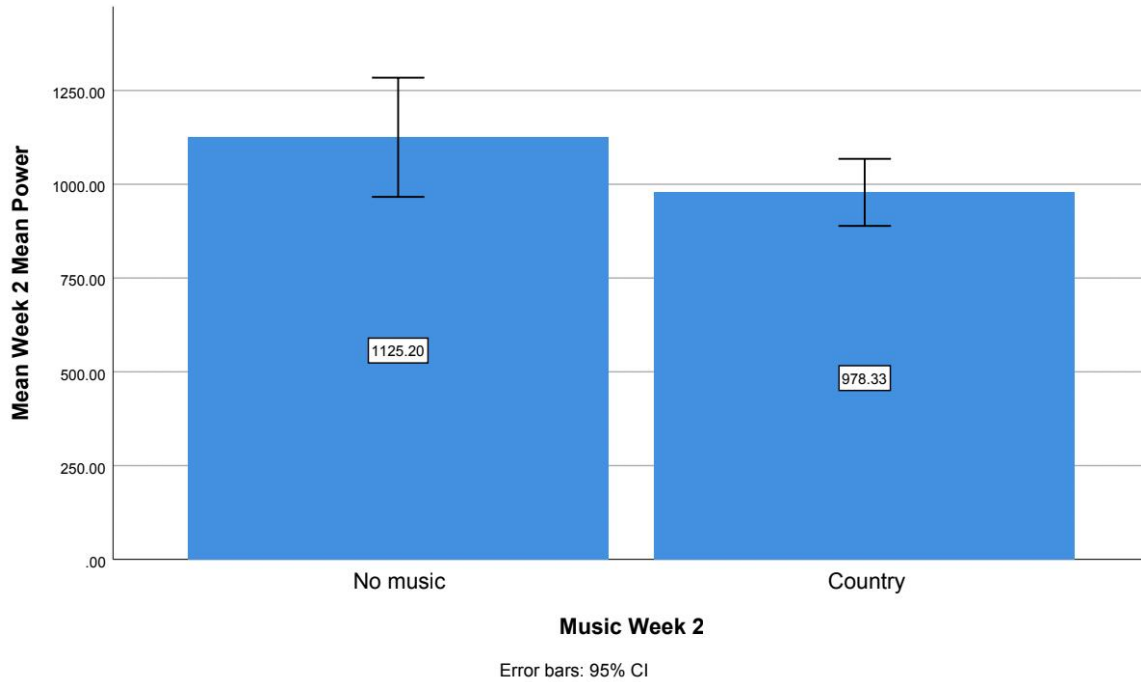
There were two ways to analyze data points for this study. For the vertical jump and mean power tests, a sample T-test was used to find a difference between the music and non-music groups. A Mann-Whitney test was used for analyzing the RPE and mood surveys to see the difference between the music and non-music groups. The expected probability outcome would be  $p > .05$  to reject or support the null hypothesis.

**Results**

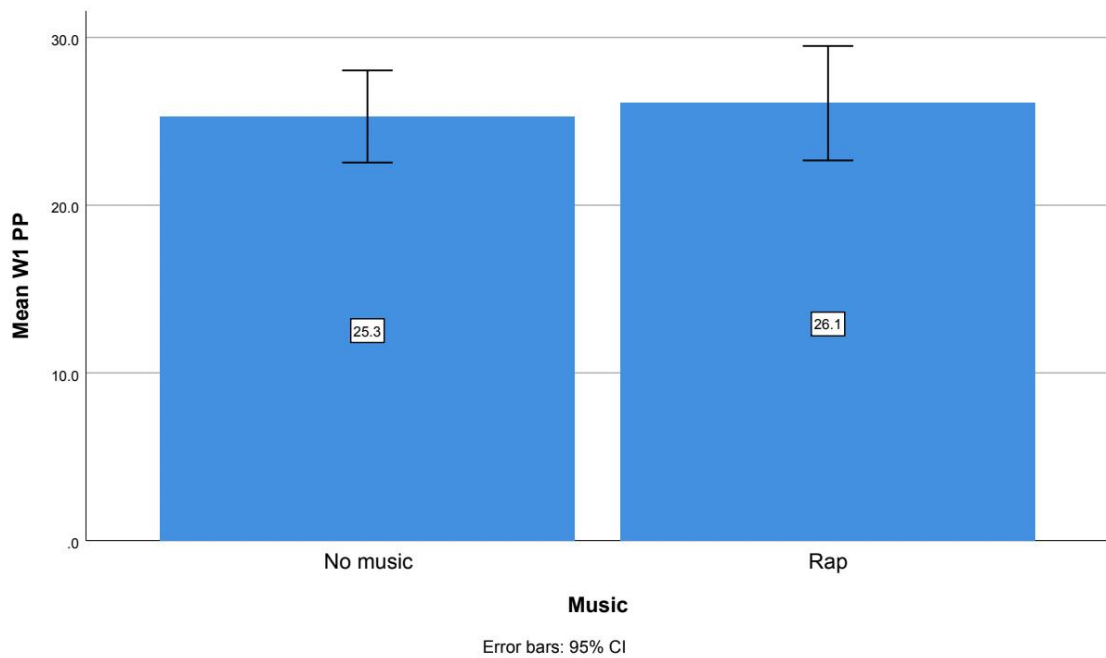
Research Questions

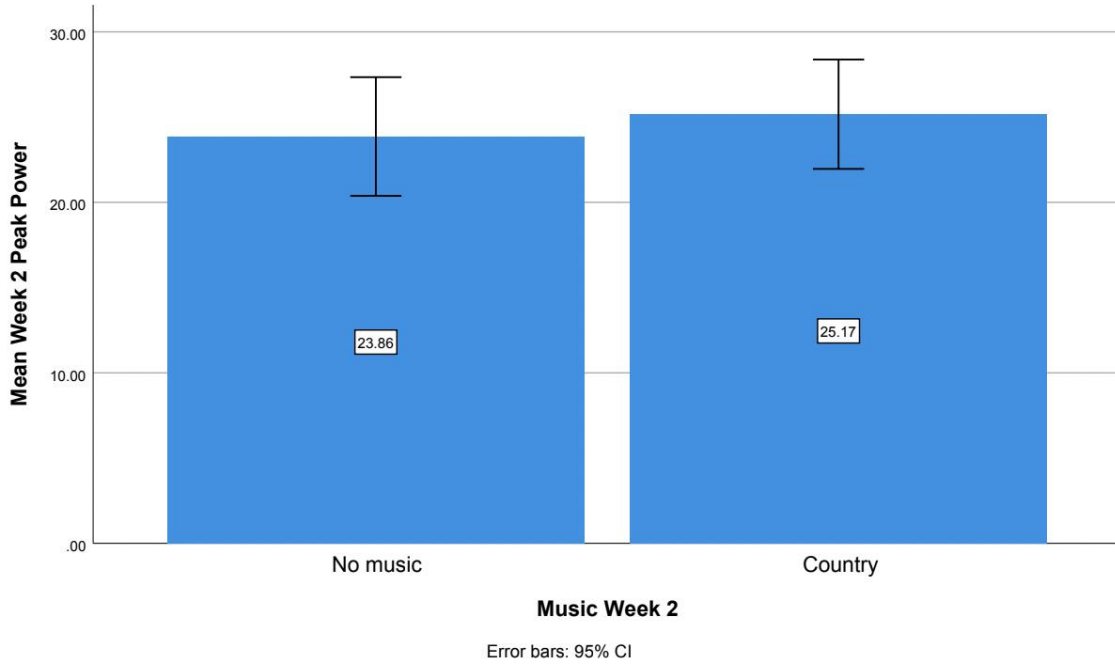
Testing the first research question’s null hypothesis as to whether music genre alters an athlete’s peak power output required a sample T-test to compare the data. There was shown to be no significant data to allow for the null hypothesis to be rejected.



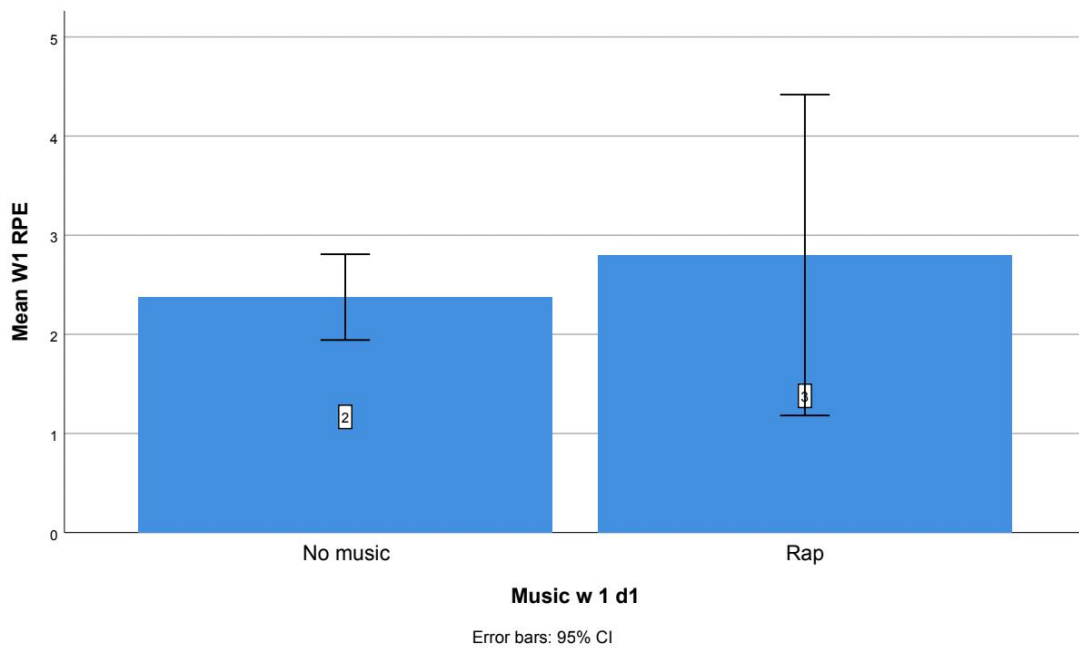


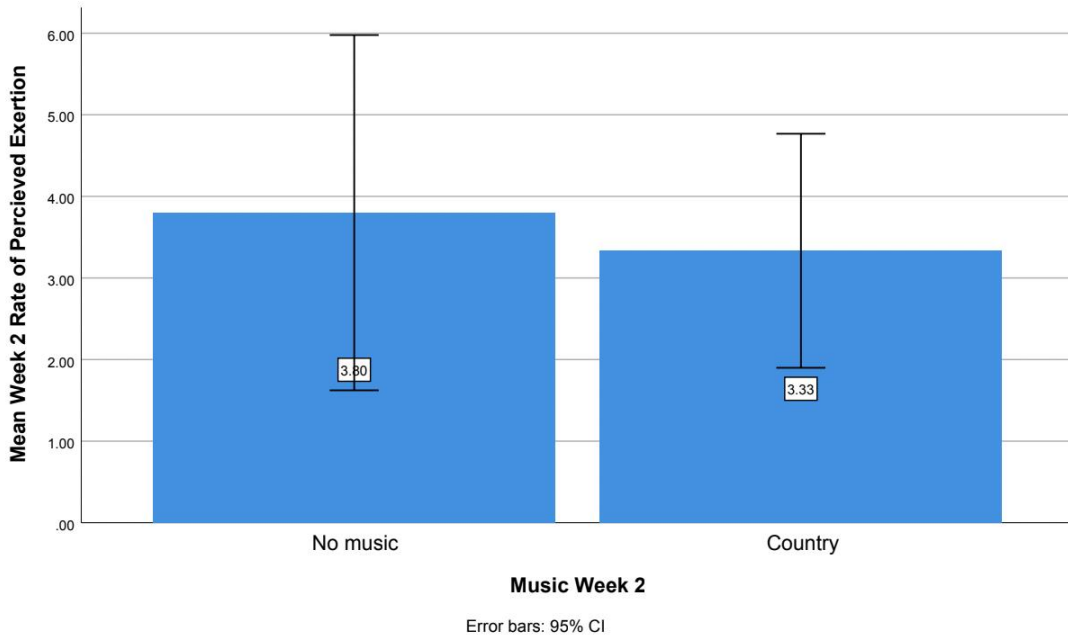
Testing the null hypothesis of the second research question as to whether music genre effects mean power output was accomplished using a sample T-test to compare the data. No significant data were present to allow the null hypothesis to be rejected.



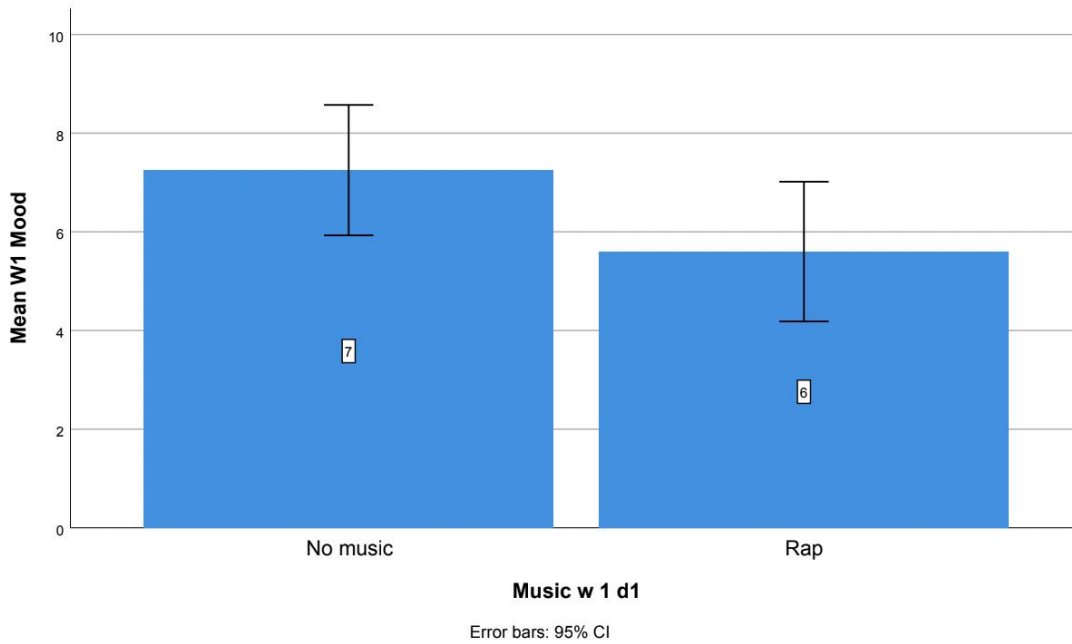


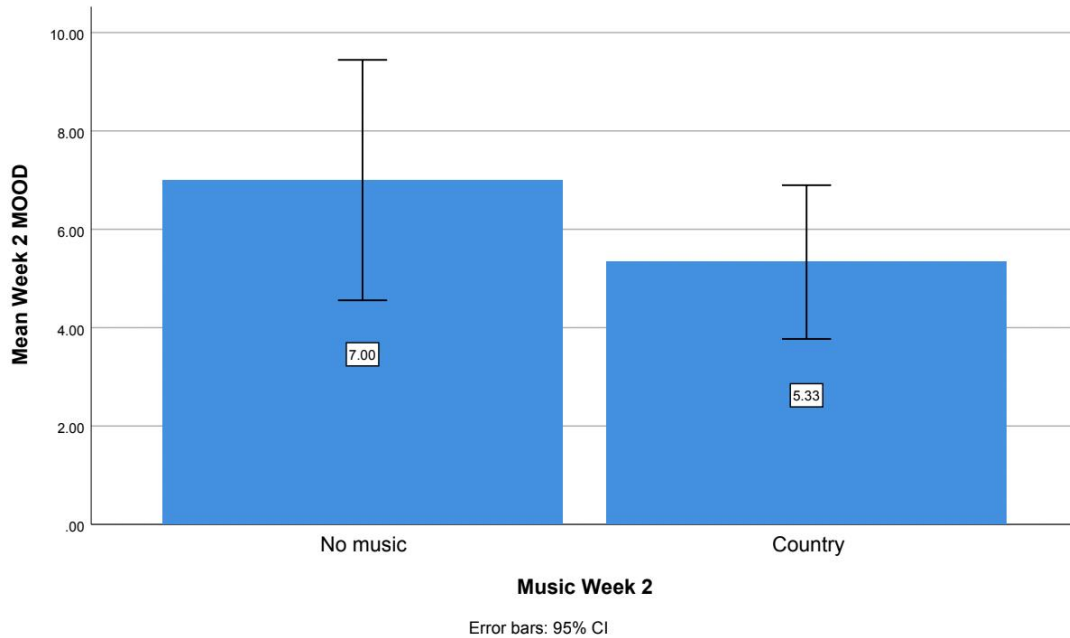
Testing the null hypothesis of the third research question as to whether music genre alters an athlete’s perceived rate of exertion required a Mann-Whitney test to compare the data. No significant data were found for RPE that would enable the null hypothesis to be rejected.





The null hypothesis of the final research question as to whether music genre changes a person’s mood was analyzed using a Mann-Whitney test to compare the data. No significant data were found for the mood that would enable the null hypothesis to be rejected.





## Discussion and Conclusions

### Limitations

In this study the music had little to no effect on the athletic performance among collegiate football players when performing short exercise bouts. However, a limitation to the study may have been that the players were listening to music for only about twelve minutes, so about three to five songs depending on the length of each piece. Another limitation of this study was a small sample size that was uneven in the group numbers and inconsistent in terms of participants showing up to testing times. Some athletes missed a few days due to work or family emergencies. Ideally, it would have been nice to have an even number of participants in the experimental and control groups.

### Suggestions for Future Studies:

Future studies should include more participants. Studying the effects of the exercise over a longer duration should also be studied. Most collegiate workouts last anywhere from one to

two hours. To better understand how music genre can affect athletes' mood and performance during a workout, it would be better if the athletes listened to each genre for longer periods.

Also, of interest would be to analyze the beats per minute of each song on a playlist to see if there is a correlation between tempo and performance.

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