The Impact of Motivational Music on Sprint Performance of Division III Women's Lacrosse Players

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Abstract

The purpose of this study was to examine the effects of motivational music on sprint performance and rate of perceived exertion of Division III women's lacrosse players. This study involved the use of a sprint performance test and an Omnibus (OMNI) pictorial scale used to determine rate of perceived exertion (RPE). The findings of this study retained the null hypothesis that Division III women lacrosse players who listen to motivational music during sprint performance tests will have the same times, on average, and the same perceived rate of exertion, on average, as women players who do not listen to such music. Research in this area should continue as many results of similar studies are inconclusive and show varying results concerning the effects of motivational music on athletic performance and rate of perceived exertion.

Chapter I

INTRODUCTION

Overview

In order to be an elite athlete, it is not enough to just be skilled at your sport. Elite athletes train outside of their actual sport practice several times a week. They focus on building their strength, speed, and endurance. Many of these elite athletes will spend time in the weight room as well as out on the court, field, etc. doing various speed training drills and endurance runs. While these athletes are extremely motivated and are already experiencing peak or close to peak performance in their sport, it is important to consider the techniques they use to stay motivated and increase their performance during these workouts. One notable technique that athletes use to motivate themselves for peak performance during workouts is listening to motivational music. Studies show significant data that not only can motivational music cause an increase in performance (ex. lifting heavier weight, running faster times) but can lower an athlete's rate of perceived exertion during a workout.

Statement of Problem

The purpose of this study is to examine the effects of motivational music on sprint performance and rate of perceived exertion of Division III women's lacrosse players.

Hypothesis

The null hypothesis is that Division III women lacrosse players who listen to motivational music during sprint performance tests will have the same times, on average, and the same perceived rate of exertion, on average, as women players who do not listen to such music.

Operational Definitions

Motivational music

Each player that is selected to listen to music during their sprint performance test will be allowed to select music and create a playlist filled with their personal choice of music that they feel motivates them. They will be allowed to listen to this playlist through headphones during their sprint performance test.

Sprint performance test

Each player in the study will perform one 300-yard shuttle as their sprint performance test with a baseline being taken where no participants are allowed to listen to music. Then the group of participants will be split into groups who are allowed to listen to their motivational music of choice through headphones and those who must still run the test (one 300-yard shuttle) without music. The control group and the experimental group will run their second test independent of one another two days after their baseline test.

Rate of perceived exertion

Each player that participates in the study will be asked to determine their rate of perceived exertion post baseline and post experiment sprint performance test using the Omnibus (OMNI) Cycle Pictorial Scale, which has been proven to be more reliable and valid than the Borg Rate of Perceived Exertion (RPE) scale in adolescent females.

CHAPTER II

REVIEW OF THE LITERATURE

Overview

This literature review examines the impact that listening to music during exercise has on the overall quality of performance during said exercise and how that data can be used to formulate and understand the results of a study on the impact of music on sprint times of female collegiate lacrosse players. The first section provides information about specific studies involving music and its impact on athletic performance and what those studies entailed. The second section examines the findings from those studies. Finally, this literature review will discuss the conclusions that can be drawn from these various studies and how they can influence a study on the impact of music on sprint times of female collegiate lacrosse players.

Research and Findings on Music and Its Impact on Athletic Performance

In order to understand what, if any, impact music can have on sprint times of female collegiate lacrosse players, it is important to examine studies about the impact of music on general on exercise for specific sports, as well as the impact of music for women specifically during exercise. Many studies have been done on the impact of music on general exercise. Bishop (2010) implemented six procedures in his study to determine if/how performance can be optimized by listening to specific musical selections. His first procedure "investigated affective, behavioral and expressive components of 14 young athletes' emotional responses to their personal music tracks" (p. 36). They were asked to provide a list of their own personal music tracks, which they listened to before athletic performance. Some participants completed a diary during the two-week study, "detailing all music listening episodes throughout the study that they could recall" (p. 36) and also rated any music tracks they heard for valence (pleasantness) and their potential for arousal (activation).

The results of Bishop's (2010) first procedure indicated that "the athletes listened to music daily for two hours or more, on average, and they were predominately travelling, preparing for competition or training, in their bedrooms, or working out in the gym, often via MP3 players" (p. 36) and that all of the diary respondents used their music selections on at least one occasion to "regulate their emotional state in terms of both emotional content and emotional intensity" (p. 37) which correlated with previous research.

In Bishop's (2010) second procedure of his study, "fifty-four tennis players listened to each of the nine auditory stimuli via earphones immediately prior to undertaking a choice reaction time (CRT) task" (p. 38). Participants then logged their affective responses to the music. Next, the participants were asked to perform the choice reaction time (CRT) task of responding as fast as possible to a series of consecutive images of tennis balls which would appear randomly in three different locations on a tennis court backdrop to simulate a return-of-serve scenario. In this procedure, "music was rated as significantly more pleasant than both white noise conditions and a period of no music was adjudged significantly less arousing than all of the remaining eight conditions" (p. 39).

Bishop (2010) used himself as a participant in his next procedure in which he "manipulated the performance playlist of a 31-year-old male competitive recreational marathon runner" (p. 39). He created a playlist, in which he recorded his emotional responses to each track, and then ran a marathon listening to the playlist in its original form. He then ran another marathon on the same course and the "playlist tracks were recorded such that the first 30 minutes of the race comprised relatively low-arousal potential tracks in an attempt to moderate my fast starts" (p. 39).

During Bishop's (2010) self-evaluative procedure, he found that in his second marathon, his pacing was relatively even instead of his usual fast starts. He also found that "listening to music that varied in arousal potential and affective content – due to a combination of intrinsic and extrinsic factors – prompted a shift in attention focus" (p. 39).

In his fourth procedure, "a 19-year-old tennis player provided baseline and post-intervention data on a weekly basis for each of three measures: A Sport Imagery Questionnaire, bespoke self-efficacy scales, and The Rosenberg Self-Esteem Scale" (p. 40). Bishop (2010) chose these measures because he proposed that imagery could be used to regulate emotion in sports. He then created video footage that "incorporated highly motivating and technically sound skill execution, interspersed with positively developed word and pictorial primes" (p. 40) with three music tracks selected by the participant incorporated into the video. The participant watched the video everyday for a two-week period in which she was training/competing and kept a diary during those two weeks. This procedure produced results of "notable increases in imagery ability, self-efficacy and self-esteem from baseline to post-introduction of the music video" (p. 40).

Bishop's (2010) fifth procedure studied the "neural mechanisms involved when engaged in CRT task performance after hearing the excerpts used in the earlier study" (p. 41) of twelve full-time tennis players via fMRI (functional magnetic resonance imaging data).

The data from the procedure described above showed that "auditory stimuli perceived as highly arousing did indeed elicit greater activation in visuomotor areas (inferotemporal cortex). In addition, there was activation of areas involved in sensorimotor integration (inferior parietal lobule), motor control (putamen) and the processing of emotion (subcallosal cortex)" (p. 41-42).

In his final procedure of his study, Bishop (2010) "ten athletes listened to a popular music track that was selected for its arousal potential and an equivalent period of no music and recorded their affective responses using the Affect Grid; corticospinal excitability was determined by delivery of TMS pulses immediately thereafter" (p. 42). The participants then completed a CRT task, during which time electromyogram (EMG) signal amplitude and latency were measured.

Bishop's final procedure provided results of the music selection being rated significantly more arousing than the baseline as well as "EMG latency during the CRT task was significantly shorter for the music condition than for no-music and baseline; subsequent reaction times were also shorter and approached statistical significance" (p. 42).

Many studies have been done on the impact music has on long distance running. In a study conducted by Lima-Silva, Silva-Calvacante, Pires, Bertuzzie, Oliveira and Bishop (2012), researchers examined the effect of music on attentional focus during a 5-km run. In their study, 15 participants ran 2 controlled 5-km run trials to develop a baseline time, followed by "2 counterbalance trials during which they listened to music during the first or the last 1.5km" (p. 813).

The findings of Lima-Silva, et al.'s study show that the average running velocity during the first 1.5 km was much higher in the condition of listening to music in the first 1.5 km than in the control condition, but there was no difference in velocity in any condition during the last 1.5 km. It was also found that "the faster first 1.5 km in M_{start} (music at the start) was accompanied by a reduction in associative thoughts compared with the fastest control condition. There were no significant differences in RPE between conditions…However, along with the reduction in associative thoughts and the increase in running velocity while listening to music, rate of perceived exertion (RPE) increased linearly and similarly under all conditions, suggesting that the change in velocity throughout the race may be to maintain the same rate of RPE increase" (p. 813).

In 2015, Bigliassi, Leon-Dominguez, Buzzachera, Barreto-Silva, and Altimari conducted a similar study, which investigated the effect of the time of music application on a 5-km run, in which 15 well-trained male long-distance runners participated. They went through psychophysiological assessments before, during, and after the study. In this study, five randomly selected conditions were tested during a 5-km run on a track. These experimental conditions were "PM: motivational songs, applied before 5 km of running; SM: slow motivational songs, applied during 5 km of running; FM: fast and motivational songs, applied during 5 km of running; CS: calm songs; applied after 5 km of running; CO: control condition" (p. 305).

The results of this study by Bigliassi et al., (2015) show that the songs that were chosen were considered pleasurable and capable of activating by the participants. These songs were shown to activate the three assessed PFC prefrontal cortex (PFC) areas, "generating positive emotional consequences by autonomous system analysis" (p. 305). Findings from this study also show that the SM (slow motivational songs) and FM (fast and motivational songs) conditions produced a faster first 800 meter and that there was a high probability of running performance improving when music was applied: "(SM: 89%, FM: 85%, PM: 39%)" (p. 305). They also found that music was able to aid in "accelerating valgus tonus after 5 km of running with CS" (p. 305).

Simpson and Karageorghis (2005) conducted a research study about the effects of synchronous music on 400-meter sprint performance. In their study, a group of volunteer Caucasian males "rated the motivational qualities of 32 musical selections using the Brunel Music Rating Inventory-2" (p. 2). Then another group of volunteer Caucasian males completed three 400-meter time trials under three different conditions: motivational music, oudeterous (neither motivating or demotivating) music, and no music (control).

Findings in Simpson and Karageorghis' study (2005) supported one of their two hypotheses. "A repeated measures analysis of variance (RM Anova) on the 400-metre times shows a significant effect and follow-up pairwise comparisons revealed differences between the synchronous music conditions and the control condition"

(p. 2) which supported their first hypothesis that synchronous music would foster superior performance compared to the control condition of no music.

Eliakim, Meckel, Gotlieb, Nemet, and Eliakim (2012) also conducted a study about music and its effect(s) on sprint ability. In their study, they examined the effect that motivational music had on repeated sprint ability. The participants of their study, a team of junior top national level league basketball players, “performed two repeated sprint tests (RSTs), with and without motivational music, in random order, during the end of the basketball season” (p. 29). The RST was a 12 x 20 meter run test with the sprints departing every 20 seconds.

The results of the Eliakim et al., (2012) study showed something interesting. Although there were “no significant differences in ideal sprint time, total sprint time and performance decrement between RST with or without music” (p. 29) there was a difference in the last two sprints of the test under the two conditions. Sprints number 11 and 12 were significantly faster with music than without.

Like the above study, many other studies have been done in order to determine the effect on music on specific sport performance. Eliakim, Meckel, Nemet, and Eliakim (2007) conducted a study on the effect of music on consecutive anaerobic performance in elite adolescent volleyball players during warm-up. In this study, “twenty-four players performed the Wingate Anaerobic Test following a 10-minute warm-up with and without music (two separate occasions, random order)” (p. 321). This study showed that “during warm-up with music, mean heart rate was significantly higher. Following the warm-up with music, peak anaerobic power was significantly higher in all volleyball players” (p. 321).

In the American Running Association Staff's work, *Workout Intensity* (2010), researchers studied the effect of the tempo of music on cycling speed. In this study, twelve 25-year old male cyclists participated in a 10-km time trial where the tempo of the music they were listening to was altered or music was taken away completely; "work done, distance covered, and cadence were measured at the end of each music track, as were heart rate and subjective measures of exertion, thermal comfort, and whether the music was considered enjoyable by the subjects" (p. 11).

Results of the study show that by speeding up the tempo of the music listened to by 10%, cycling speed increased by 2.1%, power and pedal cadence increased by 3.5% and 0.7%. Conversely, effects were seen when the tempo of the music was slowed down. Heart rate also increased when the tempo of the music was sped up. Finally, findings from *Workout Intensity* (2010) by the American Running Association Staff showed that "participants even exercised harder when they *expected* music to be introduced in a later stage of the workout" (p. 11).

In 2012, Karageorghis, Hutchinson, Jones, Farmer, Ayhan, Wilson and Bailey conducted a study on swimmers in which the purpose was to "assess the psychological, psychophysical, and ergogenic effects of asynchronous music in swimming using a mixed-methods approach" (p. 560). In their study, twenty-six participants were first habituated with the Speedo Aquabeat MP3 before the experimental phase and then were "administered two experimental trials (motivational and oudeterous music at 130 bpm) and no-music control, during which they engaged in a 200-m freestyle swimming time trial" (p. 560). The results of their study showed that times were significantly faster when participants were exposed to either music condition (motivational and oudeterous) compared to the control, "moreover, the music conditions were associated with higher state motivation and more dissociative thoughts" (p.560).

A study was done by Murgia, Sors, Vono, Delitalia, DiCorrado, and Agostini (2012) on how using auditory stimulation could enhance athletes' strength during weight lifting. In their study, eighteen volunteer lifters were exposed to "stimulation with an auditory track whose intensity varies in correspondence with the physical effort of each phase of a bench press exercise" (p. 13). They performed three bench press lifts, both in the experimental (with music) and control (without music) condition and the power exerted during the lifts was measured. Music was shown to evoke higher average exertion of power in Murgia, et al.,'s study of how auditory stimulation can be used to enhance strength in weightlifting.

Taherzadeh, Dehkhoda, Kazem, and Musavi (2015) conducted a study about the effects of kinds of music on improving some physical and psychological indices during the performance of repeated high-intensity endurance training (RHIET) in females specifically. The aim of their study was to investigate the "effect of listening to four kinds of music (sedative, brain-wave stimulator, motivation, and mixed) during performing intense endurance physical activity on blood lactate concentration, blood glucose level, physical activity to exhaustion occurrence, heart rate, ventilation frequency, and the distance covered" (p. 454). In order to conduct their study, 10 adult females performed the RHIET until her blood glucose level dropped to the reported index of 3.78 mmol/l. The participants performed this protocol for five days in a crossed design where one day was for performance and the next two were for recovery. Taherzadeh et al., study had these results; "listening to kinds of music during performing intense endurance physical activity has not a significant effect on decreasing or removing blood lactate concentration while it showed a significant effect on decreasing heart rate and ventilation frequency, blood glucose level maintenance, increasing physical exhaustion occurrence, and the distance covered" (p. 455).

Research Conclusions

Many of the conclusions drawn from the findings of these research studies were very similar. Throughout many of the studies, it was concluded that music could be used to elicit and regulate emotions that can be used in sports; music at a higher tempo had more profound effects on performance (Bishop, 2010). Other studies concluded that listening to music during exercise decreased athletes rate of perceived exertion, regardless of whether it had an actual effect on their performance (Bigliassi et al., 2015). In many of the sport specific studies, music was found to have a positive effect on performance, regardless if that music was motivational or oudeterous (Simpson & Karageorghis, 2005). There were some discrepancies on the effect that music had on heart rate during exercise. In the study of the adolescent volleyball players, the mean heart rate of the players was found to be significantly higher after listening to music (Eliakim et al., 2007) yet in a purely female-based study, music significantly decreased heart rate (Taherzadeh et al., 2015). Therefore, it is hard to draw a conclusion about music and its effect on heart rate during exercise. Overall, in all of the studies reviewed, the hypotheses proposed that music would have some kind of positive effect on performance and there are significant findings that support many of their hypotheses.

Summary

The review of literature suggests that music can have significant effects on athletic performance. It also suggests that high tempo music could have more of an effect than music with a lower tempo. Listening to music during exercise also decreases the rate of perceived exertion, even if it does not affect performance. Furthermore, it suggests that any type of music playing during exercise will have a positive affect on performance compared to no music at all. Finally, the literature review suggests that more studies should be done on the effects music has on heart rate increases/decreases since there were discrepancies across studies.

CHAPTER III

METHODS

Design

This study was designed as a quasi-experimental study using a convenience sample. The independent variable is the motivational music, which was self-selected by the participants. The dependent variables are the time it took for the participant to complete a sprint performance test (300-yard shuttle) and the self-given rating on the OMNI cycle pictorial scale (Appendix A), which measures rate of perceived exertion. In the experiment, all participants were required to run a 300-yard shuttle for time without music and then rate themselves on the OMNI scale. Then the participants were split into control and experimental groups and ran the 300-yard shuttle again, with the control group running without music and the experimental group running while listening to motivational music of their choice through headphones. All participants rated themselves again on the OMNI scale. Statistical comparisons of both the sprint performance test times and OMNI scale ratings were used to determine if listening to motivational music had any effect on sprint performance time and rate of perceived exertion.

Participants

The participants of this study were student-athletes who participated on the Goucher College Division III Women's Lacrosse team. The team consisted of 12 members, ranging from ages 17-22.

Instrument

There were two instruments used in this study. The first instrument was a handheld stopwatch used to time the sprint performance test. The second instrument was the OMNI cycle pictorial scale (reliability of 0.91, validity of 0.86), which the athletes used to scale their rate of perceived exertion during both sprint performance tests.

Procedure

The purpose of this study was to examine and determine if listening to motivational music while completing a sprint performance test affected the time it took to run the test and the athletes' rate of perceived exertion. All athletes in the study ran the sprint performance test (300-yard shuttle) sans music and then rated themselves on the OMNI scale. Then the athletes were split into a control group who ran the 300-yard shuttle without music, and an experimental group who ran the 300-yard shuttle while listening to motivational music of their choice through headphones. The athletes were paired together based on similar times on the sprint performance test and then were randomly placed in either the experimental or control group. Both groups rated themselves again on the OMNI scale. The pre- and post-intervention sprint performance times and ratings on the OMNI scale were compared statistically to determine whether there was a correlation to listening to motivational music and sprint performance test times and rate of perceived exertion. The *t*-test for differences in two population means (based on differences between the sample means) was used to determine if performance and exertion differed significantly between the control and experimental groups. The sample data was entered into an Excel spreadsheet that was imported into the Stata 13.1 statistical package (StataCorp, College Station, TX, revised Dec 2016).

CHAPTER IV

RESULTS

The purpose of this study was to investigate the effect, if any, listening to music would have on sprint performance times and rate of perceived exertion of Division III female women's lacrosse players. 300-meter sprint times and Omnibus (OMNI) cycle pictorial scale ratings were used to measure any statistical differences in pre and post experiment sprint performance times and rate of perceived exertion (RPE). Appendix B contains calculations of these variables. Data indicated that there were no significant differences for either variable. Table 1 displays the measure of central tendency and Table 2 displays the t-test results.

The 12 student athletes were paired on the pre-test sprint times. Using a table of random digits, one member of each pair was selected for the control or the experimental group. The other member of the pair went into the opposite group by default. In this way, the control and experimental groups were constructed of randomized equivalent pairs. The control group pre-test sprint time averaged 69.2 seconds, while the experimental group's pre sprint time was 69.0 seconds. The test of the null hypothesis for pre sprint times did not reject the null at the 0.05 level. The t-test for the pre OMNI ratings also did not reject the null hypothesis at the 0.05 level. The pre sprint times and OMNI scores validated the sampling procedure. That is, the control and experimental groups began the study on a level playing field.

Table 1

Measures of Central Tendency

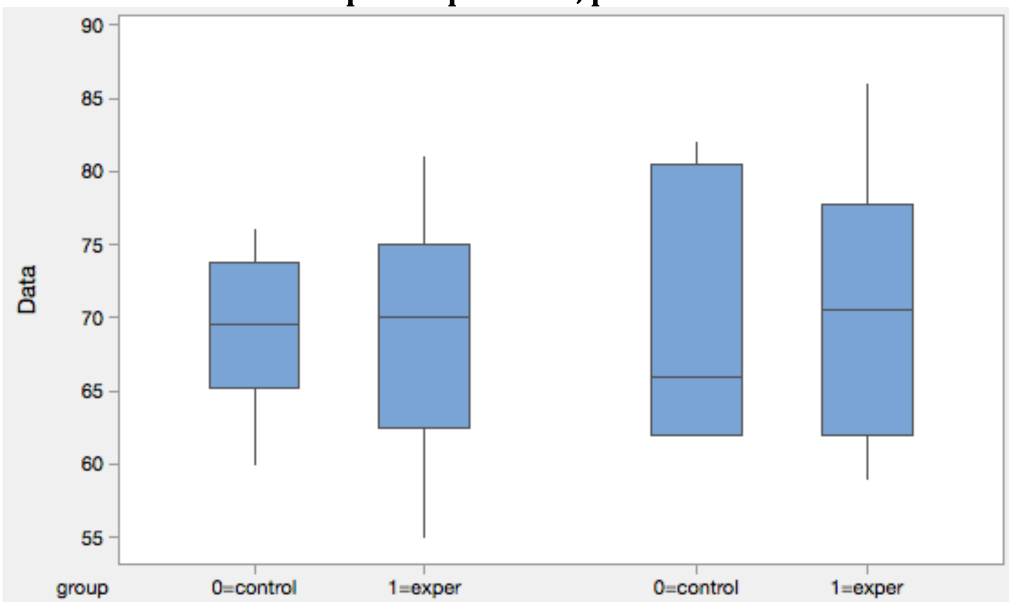
	N	Mean	Std. Deviation	Std. Error Mean
Pre-Time Exp.	6	69.1	5.70	2.330
Pre-Time Con.	6	69.0	8.67	3.540
Pre-OMNI Exp.	6	7.00	1.54	0.6325
Pre-OMNI Con.	6	6.66	0.81	0.3333
Post-Time Exp.	6	69.6	9.00	3.676
Post-Time Con.	6	70.6	9.52	3.887
Post-OMNI Exp.	6	6.7	0.52	0.2108
Post-OMNI Con.	6	6.0	1.41	0.5774

Table 2

Test Results

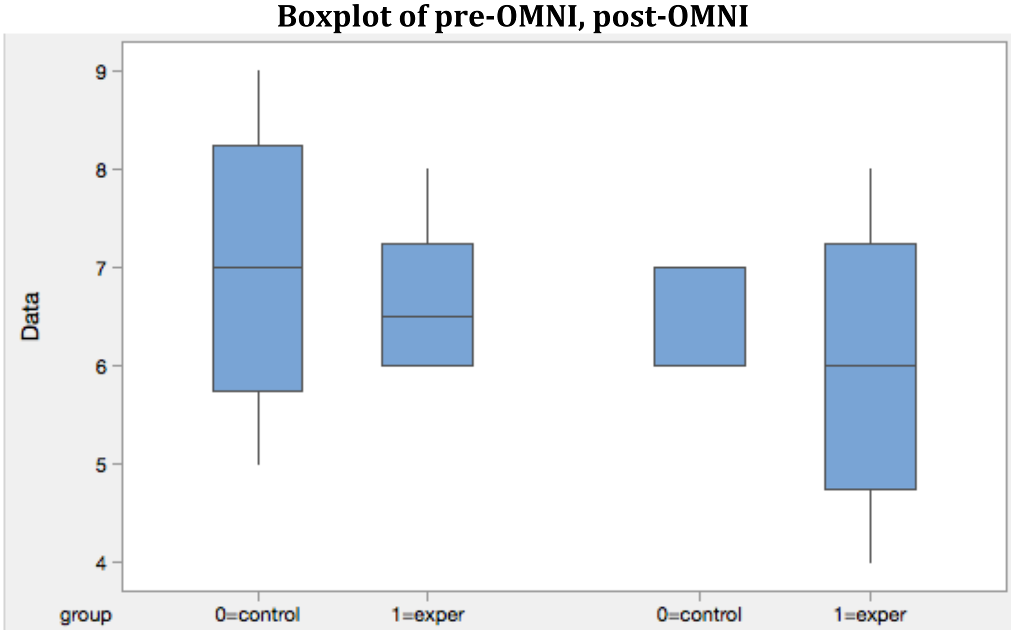
	t-Value	DF	P-Value
Pre-Time Exp./Con.	0.04	10	0.9694
Pre-OMNI Exp./Con.	0.47	10	0.6510
Post-Time Exp./Con.	-0.19	10	0.8555
Post-OMNI Exp./Con.	1.08	10	0.3035

Boxplot of pre-time, post-time



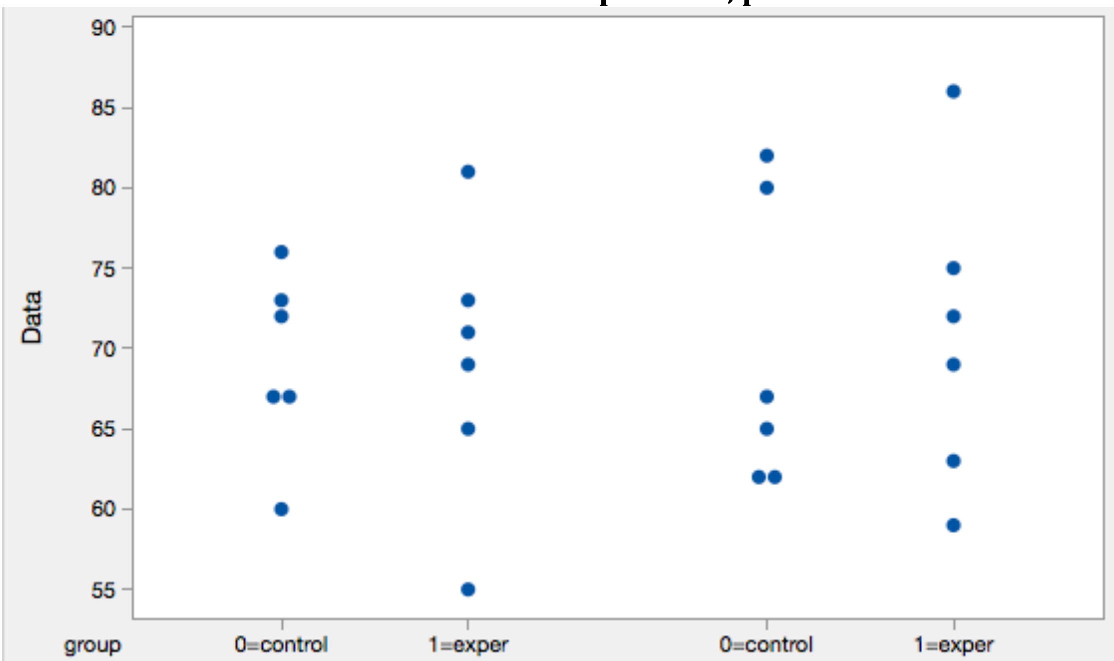
pre-time post-time

Boxplot of pre-OMNI, post-OMNI



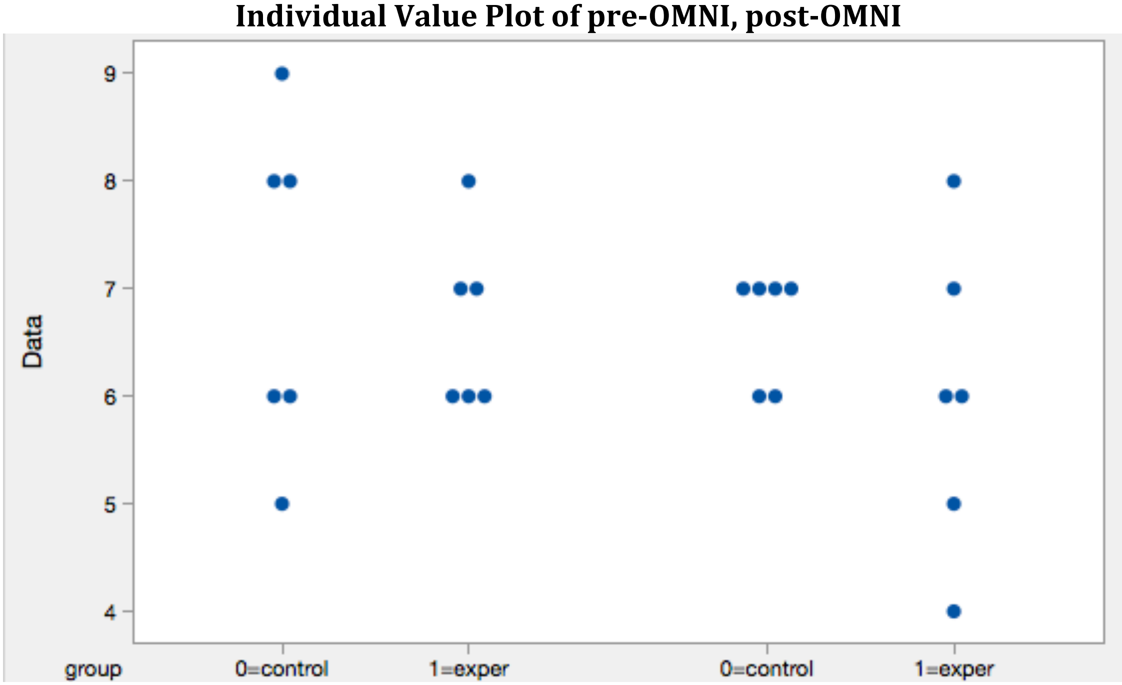
pre-OMNI post-OMNI

Individual Value Plot of pre-time, post-time



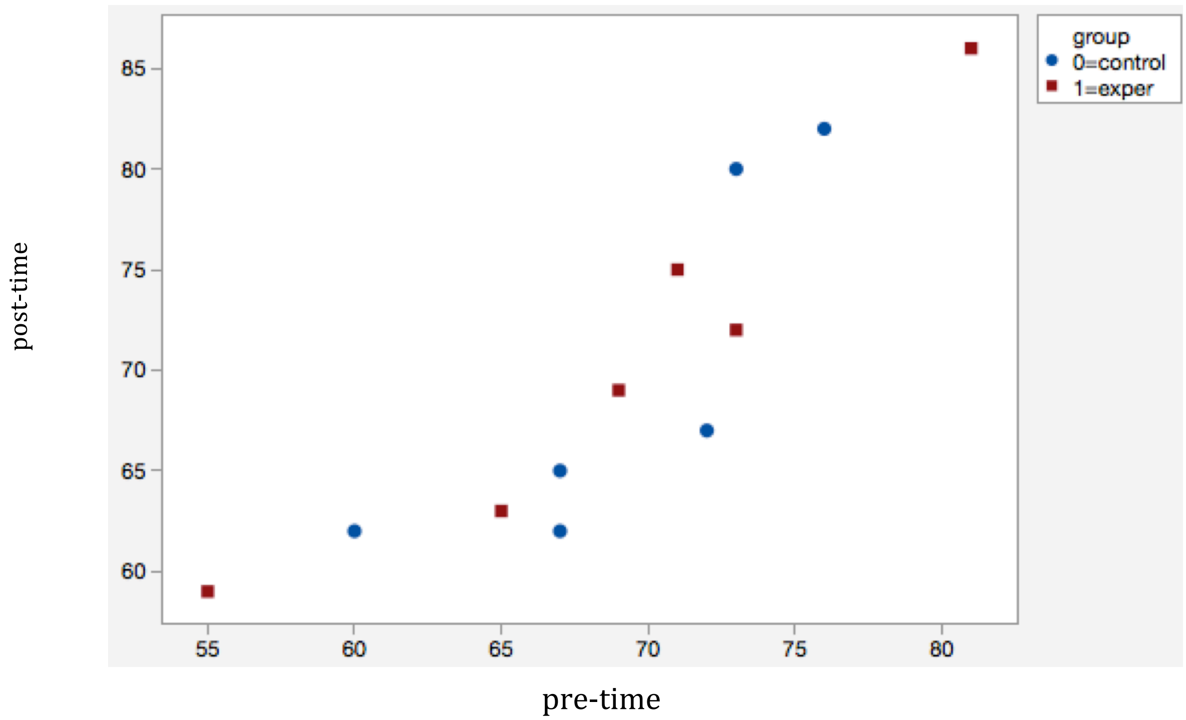
pre-time post-time

Individual Value Plot of pre-OMNI, post-OMNI

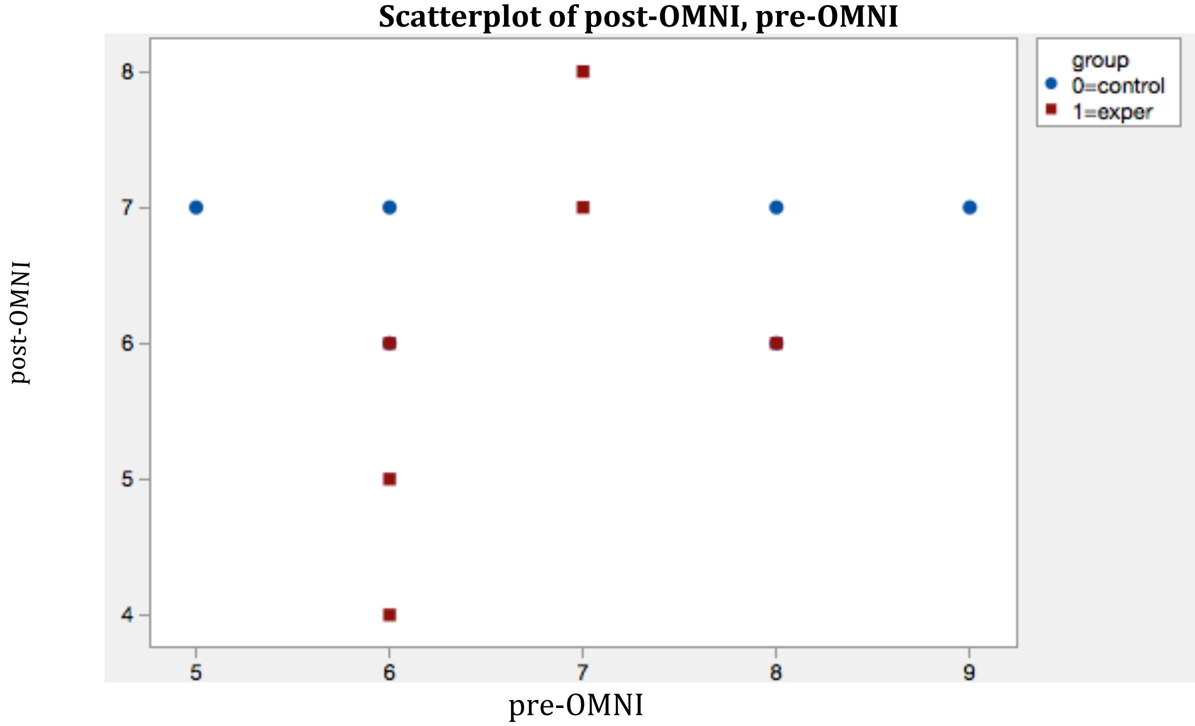


pre-OMNI post-OMNI

Scatterplot of post-time, pre-time



Scatterplot of post-OMNI, pre-OMNI



The post-test results for sprint times and OMNI scores were similar to the pre-test results and did not reject the null hypotheses at the 0.05 level. Hence the control and experimental groups had equivalent pre-test sprint times and OMNI scores on average, and maintained equivalent sprint times and OMNI scores on average for the post tests. Therefore, there was no evidence that the experiment had any significant effect on mean sprint times or mean OMNI scores.

CHAPTER V

DISCUSSION

The purpose of this study was to investigate if listening to music affects college women's lacrosse 300-meter sprint performance times and their rate of perceived exertion (RPE). The analysis of the data indicated that listening to music had no significant affect on sprint performance time and RPE, therefore the null hypothesis was accepted.

Implications of Results

The implications of results demonstrate that there are no significant benefits or detriments to listening to music during sprint performance tests on speed or rate of perceived exertion.

Threats to Validity

Any study is subject to both internal and external threats to validity. External validity threats involve the sample and sample type, while internal threats to validity involve the actual design of the study. In this study, external threats to validity are that the sample contained only members of the Goucher College Women's Lacrosse team. Only one specific team in Division III is taken into consideration, which could create a bias. The sample size was also very small, containing only twelve participants, when the average women's lacrosse team has anywhere from 18-28 players.

Threats to internal validity include the fact that those participating in the study were of varying ages and physical capabilities. Some participants were much more conditioned than others. Also, participants were not monitored for how much physical training they completed in between the pre-and post-tests and could have had physiological changes occur to their bodies that could have made them faster or slower, also creating a bias. Participants selected for the experimental group were also allowed to choose the music that they each individually listened to, creating bias. The results of this study would not be applicable to other Division III women's lacrosse teams unless further research was conducted with more participants of equal physical conditioning.

Comparison to Previous Research

The results of this study show that listening to music does not have any significant effect on sprint performance time or rate of perceived exertion in Division III women's lacrosse players. Dissimilar conclusions were drawn in previous research studies. While many of the studies concluded that listening to music did not have any effect on athletic performance, it did have a significant effect on Rate of Perceived exertion, making athletes believe that the physical performance was less challenging regardless if they were performing better, worse, or equal to their previous performances. In this study, there was no significant effect on either sprint performance or rate of perceived exertion.

Conclusions and Impact for Future Research

As coaches, setting your players up to be as successful as they can be is a goal everyone shares. But coaches need to understand what avenues they can take to make their athletes more physically fit and make those workout sessions have more of an impact. Trying different techniques to increase athletic performance or decrease rate of perceived exertion is something that all coaches do but there is not enough research pinpointing one specific technique that will allow for these increases and decreases to occur. In order for future research to be successful, a larger sample size should be utilized and multiple techniques should be tested. This research was limited to the Goucher College Women's Lacrosse players and the sample size was much smaller than the size of a full Division III women's lacrosse team. Also, only one type of technique, listening to music, was tested to see if it could increase athletic performance and decrease the rate of perceived exertion. Future research should be aimed at pinpointing what technique has the most success in increasing athletic performance and decreasing rate of perceived exertion.

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Appendix A:

TABLE OF RANDOM NUMBERS
39634 62349 74088 65564 16379 19713 39153 69459 17986 24537
14595 35050 40469 27478 44526 67331 93365 54526 22356 93208
30734 71571 83722 79712 25775 65178 07763 82928 31131 30196
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80583 70361 41047 26792 78466 03395 17635 09697 82447 31405
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81638 36566 42709 33717 59943 12027 46547 61303 46699 76243
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95970 81452 48873 00784 58347 40269 11880 43395 28249 38743
56651 91460 92462 98566 72062 18556 55052 47614 80044 60015
71499 80220 35750 67337 47556 55272 55249 79100 34014 17037
66660 78443 47545 70736 65419 77489 70831 73237 14970 23129
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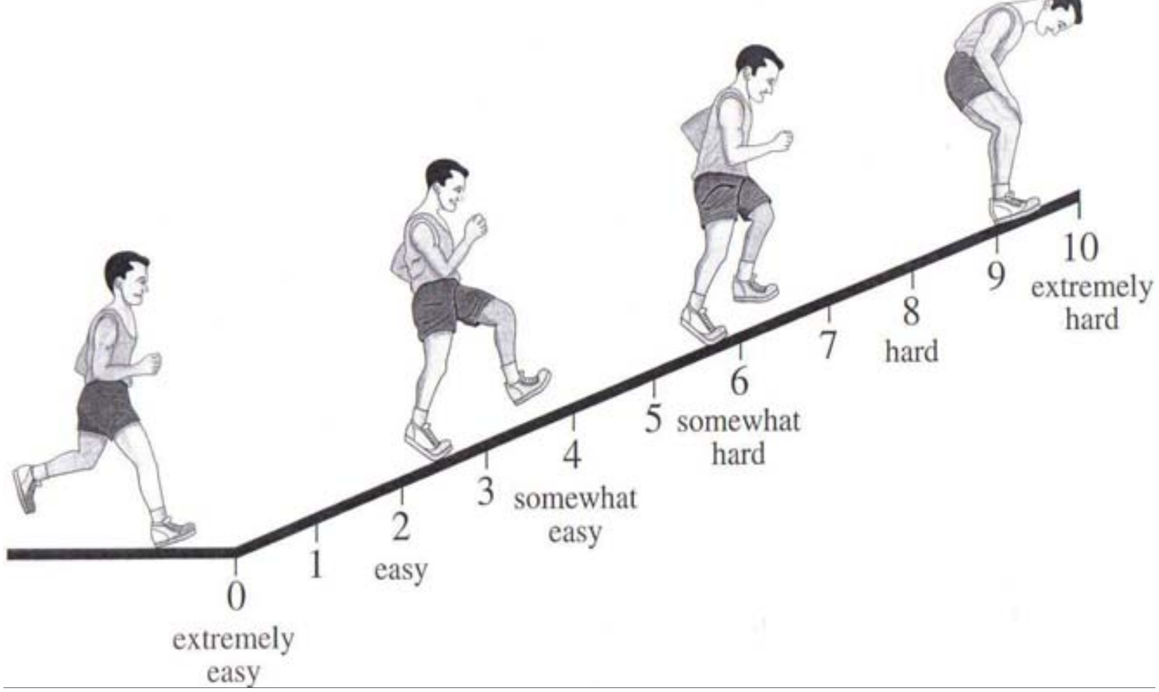
Appendix B:



0
extremely easy
1
2
easy
3
4
somewhat easy
5
6
somewhat hard
7
8
hard
9
10
extremely hard