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The Effect of Music and Television Viewing on Enjoyment During Aerobic Exercise

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To the Dean of the Graduate School:

We are submitting a thesis written by Nicole Swank entitled THE EFFECT OF MUSIC AND TELEVISION VIEWING ON ENJOYMENT DURING AEROBIC EXERCISE.

We recommend acceptance in partial fulfillment of the requirements for the degree of Master of Science in Sport and Fitness Administration through the Richard W. Riley College of Education.

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THE EFFECT OF MUSIC AND TELEVISION VIEWING ON ENJOYMENT DURING AEROBIC EXERCISE

A Thesis
Presented to the Faculty
Of the
Richard W. Riley College of Education
In Partial Fulfillment
Of the
Requirements for the Degree
Of
Master of Science
In Sport & Fitness Administration
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By
Nicole Swank

Abstract

A majority of individuals exercise with an entertainment device that promotes a positive distraction during aerobic exercise. It is however unclear if certain entertainment promotes a greater enjoyment and feeling state than others. The purpose of this study was to examine if television viewing and music would increase enjoyment and feeling state during aerobic exercise. Fourteen males and sixteen females (n=30) between the ages of 18-30 participated in the study. The participants were randomly assigned to one of three conditions: music, television viewing (TV), and control. Participants could choose between the elliptical and treadmill, and exercise was self-paced for 30 minutes. METS, WATTS, Rating of Perceived Exertion (RPE), heart rate (HR), speed/cross ramp, resistance/incline, and total distance were recorded during the 30-minute exercise bout. Additionally, participants completed the Physical Activity Enjoyment Scale (PACES) and Exercise-Induced Feeling State Scale (EFI). A repeated measures ANOVA compared enjoyment and feeling state between the three conditions. There were no significant differences in the physiological variables. However, there were significant differences in the PACES enjoyment scale (p = .014) and in the EFI feeling state subscales between positive affect (p <.*01* = .000), negative affect (p = <.001), and fatigue (p = .026), but no significance in tranquility (p = .098). The results of this study show positive mood effects of listening to music and/or TV viewing during aerobic exercise but no differences in the physiological variables associated with the workout. If a person should forget an entertainment device, there is no different in the physiological benefit to the workout, but he/she should feel higher enjoyment and feeling states with using the devices.

Acknowledgements

I would like to gratefully acknowledge various people who have guided me on all accounts during this process in completing my thesis and Masters. First, I want to thank my thesis committee for motivating and encouraging me throughout this procedure and the time I have attended Winthrop University. Second, I want to thank all of the participants who have dedicated their time in making this study possible. Lastly, my biggest thanks goes to my mom. Without her continuous support and love I would not be where I am today.

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Chapter 1

Introduction

Statement of the Problem

Exercise has as many physiological benefits as it does mental benefits (Weir, 2011). Unfortunately, those benefits are not enough to prevent an obesity epidemic. According to the Center of Disease Control (2015) more than one-third (34.9%) of American adults are obese. Prior researchers have tried to control distraction to mitigate unpleasant emotions and physical pain during exercise as a solution to increase exercise enjoyment. Music has been a successful distractor for decreasing perceived exertion and increasing exercise duration in runners (De Bourdeaudhuij et al., 2002).

Since the age of portable music it is uncommon to see individuals exercise without the aid of an entertainment device. More recently, online video streaming services and television screens connected to aerobic exercise machines are other entertainment options for exercisers. An external stimulus during aerobic exercise is perceived to distract individuals a number of ways, such as, suppressing perceived exertion and physical pain. Additionally, the options may enhance work efficiency and increase physical performance. They may also, mitigate unpleasant emotions and promote enjoyment (Lin & Lu, 2013).

Television viewing has not been researched to the extent music has according to Russell et al. (2003). A recent study by Privitera, Antonelli, & Szal (2014) showed exercise by itself increased a pleasant mood, but adding the positive distraction of television increased the participant's pleasant mood more than the exercise by itself. In

addition, not only does television and music enhance enjoyment (Annesi, 2001), they also decrease perceived exertion during exercise (Lin & Lu, 2013). Individuals who are immersed in their entertainment devises are more focused on the entertainment than the exercise. Therefore, they may report a lower RPE when the entertainment device is present during aerobic exercise.

Music and television viewing are the most used entertainment modalities during aerobic exercise, and there is a possible likelihood of them producing similar enjoyment experiences during exercise. However, one entertainment device may or may not be preferred to the other to assess enjoyment and feeling state during aerobic exercise. Due to the variety of different entertainment modalities it would be useful to understand if a particular entertainment device produced a greater outcome than the other. The purpose of this research was to examine if there was a significant difference in enjoyment between music, television, and no entertainment modality during aerobic exercise.

Research Hypotheses

The following hypotheses were postulated:

1. There will be a null hypothesis in enjoyment and feeling state between television viewing and music during aerobic exercise.
2. There will be a null hypothesis in perceived exertion between music and television viewing.
3. There will be a null hypothesis in heart rate, METS, and WATTS between music and television viewing.

Definition of Terms

For the purpose of this research, the following terms were defined:

Aerobic Exercise. Any activity that utilizes large muscle groups, can be maintained continuously, and is rhythmic. This is a type of exercise strengthens the heart and lungs so individuals won't have to work more at rest (ACSM, 2014).

Treadmill. An ergometer that has a continuous belt and is utilized for walking and running activities. This machine comes with a variety of features including speed and incline options so the individual can customize his or her workout.

Elliptical. A stationary aerobic machine used to simulate stair climbing, walking, or running and causing less strain on certain joints. This machine comes with a variety of features including resistance and cross ramp options so the individual can customize his or her workout.

Body Mass Index (BMI). Categorizes individuals into underweight, normal weight, overweight, and obesity groups by measuring weight in kilograms divided by the square of height in meters (CDC, 2015).

Rating of Perceived Exertion (RPE). The Borg scale or RPE is a psychophysical scale that ranges from 6 (no exertion at all) to 20 (maximal exertion) and measures an individual's awareness of physical activity (Borg, 1998).

Polar Heart Rate Monitor. Includes a chest strap electrode devise and a wrist watch receiver to measures an individual's heart rate in real time (Polar, Lake Success, NY).

Metabolic Equivalent (METS). A metabolic equivalent reflects the energy expended by the body at rest. MET values for physical activity reflects the ratio of energy expenditure during that certain activity to the energy expended for an equal time at rest (ACSM, 2013).

WATT. A measure of power (ACSM, 2013).

Delimitations

1. The study was conducted at a university in the Southeastern United States.
2. Participants could only choose between the elliptical or treadmill and had to remain on the selected machine throughout the study.
3. Participants between the ages of 18 and 30 were included in the study.
4. Participants with a BMI between 18.5 and 30 kg/m^2 were included in the study.
5. Participants with no chronic illnesses (e.g. cancer, heart disease, type 1 diabetes) or pregnancy were included in the study.

Limitations

1. Due to the availability of the participants and researcher the time of day may affect the results.
2. Participants may not give their best efforts during every condition.
3. This study required three 40-minute sessions, which required coordinated scheduling by the participant.
4. Occasionally the heart rate monitor displayed inconsistent numbers that inaccurately measured the participant's true heart rate.

5. Participants self-reported on two scales and perceived exertion. Participants might have reported under or over exaggerated answers and/or biased answers.
6. Participants were recreationally active and needed sufficient aerobic fitness to complete the workouts. This could have affected their physiological variables.

Chapter 2

Review of Literature

Introduction

According to the Centers for Disease Control and Prevention (CDC, 2015) it is recommended that adults should accumulate at least two hours and thirty minutes (150 minutes) of moderate-intensity aerobic activity (i.e. brisk walking) every week. Lack of physical activity is linked to many health risks such as obesity, heart disease, diabetes, cancer, and depression (Edman, Lynch, & Yates, 2014; Galbo, Tobin, & van Loon, 2007; Laye, Thyfault, Stump, & Booth, 2007; Narayanasamy, Kanaga Sabai, Balakrishnan, & Krishnaswamy, 2010; Shephard & Shek, 1998). Benefits of physical activity include, increasing mood, decreased stress, increased bone and muscle strength, decreased risk of osteoporosis, and enhanced memory (Chaconas, Olivencia, & Russ, 2013; Oaten & Cheng, 2006; Weinstein, Deuster, Francis, Beadling, & Kop, 2010). There are many benefits that accompany physical activity, but a major issue is promoting exercise adherence by making it more enjoyable. Between 40 to 65% of individuals who begin a new exercise programs drop it within the first six months (Annesi, 2001). Some barriers that prevent individuals from participation include lack of time, prior engagements, prohibitive cost, boredom, and lack of energy (Casilio, 2012). Enjoyment and preference were discovered to be correlated with increased levels of physical activity (Salmon, Owen, Crawford, Bauman, & Sallis, 2003). Previous researchers have attempted to manipulate distraction from discomfort and internal factors while exercising as a way to increase the duration an individual is physically active. An example of a stimulus that has

been an effective distraction for increasing the duration of exercise and decreasing the rate of perceived exertion is music (Casilio, 2012).

The Purpose of Distraction During Aerobic Exercise

Prior research has studied distraction to shift individual's attention on another external cue instead of the one at hand (i.e. exercise) (Annesi, 2001). For instance, listening to music (Annesi, 2001), television viewing (Privitera et al., 2014), and virtual reality exercise equipment (Annesi & Mazas, 1997) have been studied to redirect an individual's focus away from exercising. There are three possible solutions that explain how distraction may increase exercise. First, distraction may enhance preference or enjoyment of exercise (Annesi, 2001). Second, distraction can divert time perception by decreasing the duration of time an individual believes he/she is immersed in a task (e.g. exercise). Third, distraction can redirect the focus away from exercise.

A study by Loucks (2000) examined if fast upbeat music would lower RPE more than slow music or no music during aerobic exercise for 20-minutes and staying within a target heart-rate zone. Participants completed three conditions: fast, upbeat music, slow, easy-listening music, and no music. The results indicated no significant differences between the fast music, slow music, and no music.

Russell, Pritschet, Frost, & Emmett (2003) discovered that watching television or reading during exercise did not increase mood. These could be because participants did not have a choice in their reading material or television preference. Participants only watched or read a standardized heath video/material. Russell et al. (2003) study consisted of participants biking for 25 minutes. Participants completed the Profile of Mood States

(POMS) (Russell et al., 2003) five minutes pre and post exercise. All participants where given either reading material or watched a video of standardized health material. The results indicated no significant difference in pre and post exercise scores on the POMS. In other words, the type of distraction (i.e. reading or television watching) did not affect enjoyment.

Tobin and Grondin (2009) examined the effects video games have on time perception. Participants were assigned to either the prospective paradigm (answer questions about duration after completing tasks) or the retrospective paradigm (answer questions about difficulty after completing tasks). Each participant participated in three consecutive tasks: playing a video game, reading, and playing a video game again. The video game was either 24 or eight minutes long and the reading task was eight minutes long. Participants recorded how much time they believed had elapsed in each of the tasks and total duration after all three had been finished. Participants overestimated short duration tasks (8-minute) and underestimated long duration tasks (24-minute). Participants estimated the 8-minute reading task to be longer than the 8-minute video game task. Also, the video game task was rated as more enjoyable than the reading task. Therefore, time perception was reflected on enjoyment of task (Tobin & Grondin, 2009).

Music During Aerobic Exercise

Several studies have examined how distraction (i.e. music and television viewing) can increase exercise intensity and duration (Barwood, Weston, Thelwell, & Page, 2009; Elliott, Carr, & Savagee, 2004; Lane, Davis, & Devonport, 2011; Tiev, Manire, Robert,

& Barbara, 2010). Music has been correlated to be a positive distracter and decreasing perceived exertion (Elliott, Carr, & Savage, 2004; Lin & Lu, 2013).

A study by Edworthy and Warning (2006) examined the effects of music loudness and tempo during exercise. The study consisted of five conditions: fast/loud, fast/quiet, slow/loud, slow/quite, or no music. The music conditions involved listening to 2.5 minutes for 10 minutes, and it was looped the entire exercise duration. Subjects participated in all five conditions that lasted ten-minutes on the treadmill. Running speed, heart rate, positive affect, and RPE were measured. The results indicated that there were significant effects and interactions in running speed and heart rate between the music conditions. Additionally, the music conditions were rated more positive than the no music condition. There was no difference for perceived exertion across the conditions. Overall, Edworthy and Warning (2006) concluded that fast and loud music can increase an individual's enjoyment and intensity.

Another study by Elliott, Carr, and Savage (2004) examined the effects of motivational music during a 20-minute sub-maximal cycle task. Participants took part in three conditions: no music, non-motivational music, and motivational music. Additionally, RPE, in-task affect, total distance traveled, and attitude towards the exercise experience were measured. The results indicated a significant difference in the motivational and non-motivational music conditions when distance traveled compared to the control condition. The motivational music and non-motivation music did not change perceived exertion.

Both of these studies showed perceived exertion did not make a difference between the various conditions. Although, many studies have found music can reduce RPE when exercising at moderate workloads, there is support that music has little difference on RPE (Elliot et al., 2005). For this reason, future research is warranted.

Television During Aerobic Exercise

Television viewing has not been researched to the extent that music has been studied on distraction. Annesi and Mazas (1997) examined virtual reality-enhanced bicycles could enhance exercise in new fitness center members. A virtual reality-enhanced bicycle had a screen attached to the bike that imitates riding a bike outside. The study consisted of three bicycle groups, upright bicycle, recumbent bicycle, and virtual reality enhanced exercise bicycle. Each group was assessed for three 20 to 30 minute sessions a week for 14 weeks. Results indicated that the virtual reality-enhanced group had 83% adherence, the upright group had 57% adherence, and the recumbent group had 62% adherence. The virtual reality-enhanced group completed most of the 3 sessions per week (87%) for 14 weeks compared to the other two groups.

Annesi (2001) examined if music, television, or combined entertainment system could increase self-motivation, adherence, and physical output in exercise. The study consisted of three groups, music group (AM/FM stereo cassette player), television group (watched one of four pre-set channels), and combined entertainment group (television, music, and audio tapes). The combined group could choose any of the 62 channels and could change them at any time; whereas the television group could only choose from one of four pre-set channels. All three groups exercised in one of the three groups.

Participants were randomly assigned to one of the three conditions and could choose any cardiovascular machine. Results indicated that there was no significant difference between the three groups on distraction measures. However, the combined entertainment group exercised significantly longer and had a lower dropout rate compared to the other two groups. Also, the combined group had a higher maximum volume of oxygen uptake (VO_2 max) from the beginning to the end of the study.

Some limitations to the study included, choice of machinery and the combined group versus the television group (Annesi, 2001). The choice of machinery could affect the participants' adherence to exercise, duration, and intensity because some machines use more muscle mass than others. Another limitation was participants in the combined group could choose from 62 channels and change the channel at anytime compared to the television group, which could choose from one of four pre-set channels and could not change the channel. This could explain the significant results in the combined group.

Perceived Exertion with a Distraction

Music has been used in the athletic realm and recent studies suggest music to be utilized to divert the mind from sensations of fatigue. In relation with RPE, studies demonstrate the use of music to lower an individual's RPE, by using music as a form of distraction. Koc and Curtseit (2009) examined a technique of diversionary which is known to physiologists as dissociation. This possible disconnect has the potential to lower perceptions of effort and in turn lower RPE. In low to moderate exercise intensities, this effect holds true and Koc and Curtseit (2009) suggest mood positivity overrides any negative aspects during the physical activity.

In a study examining the interactive effects of visual and auditory intervention on physical performance and perceived effort, Lin and Lu (2013) utilized four different testing conditions. The four conditions consisted of music, video, music and video, and a control group. Heart rate did not reach the level of significance, meaning the different conditions during exercise did not result in significant heart rate changes. Results of the study suggest participants in the music and video had better physical performance and lower RPE compared to the control group. Furthermore, the degree of RPE was significantly lower in the music group than in the video group. Unlike the findings from Lin and Lu (2013) studies have found exercises with different sensory stimulations to affect heart rate (Koc & Curtseit, 2009). However, in those studies, the methods included 6-12 weeks of training. Rate of perceived exertion was consistent with previous findings, suggesting audio stimulation may provide motivational effects.

Enjoyment with a Distraction

Prior studies have corroborated that exercise can increase well-being and mood (Moore et al., 2009; Privitera et al., 2014). But exercise alone is not enough to enhance an individual's enjoyment. Distractions during physical activity have been examined to enhance enjoyment, such as television (Annesi, 2001), music (Tiev et al., 2010), and reading (Russell et al., 2003). Privitera et al. (2014) proposed that an enjoyable distraction during exercise could increase an individual's positive mood post-exercise. Participants rated their mood and arousal pre and post exercise which included walking on a treadmill for ten minutes at 3.6 mph. The conditions were television viewing, control, and television viewing without treadmill walking. The television viewing was

pre-selected by the researcher. The results showed that exercise alone increased enjoyment. Additionally, the enjoyable distraction coupled with exercise had the highest enjoyment. These results support the findings of Privitera et al. (2014) hypothesis on television enhancing enjoyment during aerobic exercise.

An external stimulus or distraction in which exercise is performed can change perceived exertion, enjoyment and exercise adherence. Tiev et al. (2010) examined music and dialog on RPE and enjoyment during exercise. Participants completed twenty minutes on the treadmill and completed both conditions (i.e. music and dialog). RPE and enjoyment were measured. The results indicated that RPE was significantly lower and enjoyment was greater during the music condition compared to the dialog condition. These results indicate participants favor the vocal elements of music, whereas dialog contains no rhythmic and melodic features. In conclusion, both of these studies showed television viewing and music augment enjoyment during aerobic exercise. Additionally, a pre-selected distraction or selected distraction did not affect an individual's enjoyment.

Conclusion

In conclusion, the overall studies showed exercise can increase well-being and mood (Moore et al., 2009; Privitera et al., 2014). But exercise alone is not enough to enhance an individual's enjoyment. Distractions during physical activity have been examined to enhance enjoyment, such as television (Annesi, 2001), and music (Tiev et al., 2010).

Chapter 3

Methods & Procedures

The purpose of this study was to examine the effects of television viewing and music on increase enjoyment and perceived exertion during aerobic exercise. Prior research has discovered external stimuli (e.g. TV and/or music) during aerobic exercise suppressed perceived exertion and physical pain, enhanced work efficiency and increased physical performance, and mitigated unpleasant emotions (Lin & Lu, 2013). The effects of music have been studied to a greater degree than television viewing as an external stimulus during aerobic exercise. This study compared three conditions: music vs. TV vs. control, and examined if one of the treatment conditions showed a significant difference in enjoyment and perceived exertion compared to the control condition.

Participants

Fourteen males and sixteen females (n=30) between the ages of 18 and 30 years volunteered to participate in this study. All thirty participants completed the study and were students recruited from a university in the southeastern United States. Participants were recruited through word-of-mouth and academic classes. All participants were screened prior to the study and had no existing chronic diseases, such as, coronary heart disease, diabetes, lung disease, or orthopedic problems that could limit their participation. Also, participants had to have a body mass index (BMI) between 18.5-30 kg/m^2 (normal to overweight) to be eligible to participate. Additionally, pregnant women were excluded from the study. The study was approved by the University Institutional Review Board (IRB) (See Appendix A). Before the experiment, all participants completed and signed an

informed consent agreement form (see Appendix A), which explained the procedures and possible risks and benefits of the experiment. Additionally, all participants completed and signed a Physical Activity Readiness Questionnaire (PAR-Q) (Canadian Society of Exercise Physiology, 2002) and a ACSM health history form (ACSM, 2014) (see Appendix B).

Research Design

A randomized crossover design, also known as a repeated measures design, was used to treat the data. In this case, the participants received three different treatments at three different time periods. The independent variable was the external stimuli during aerobic exercise (television vs. music vs. control). The television and music were self-selected by the participants. The dependent variables were enjoyment and feeling state Physical Activity Enjoyment Scale (PACES) and Exercise-Induced Feeling State Scale (EFI) during aerobic exercise (Gauvin & Rejeski, 1993; Moore et al., 2008) (see Appendix E).

Instruments

The physiological instruments included the Polar Beat heart rate monitor and RPE. The Polar Beat heart rate monitor included a chest strap electrode devise and a wrist watch receiver to measures an individual's heart rate in real time (Polar, Lake Success, NY). The heart rate displayed on the wrist watch and synced with the elliptical and treadmill. The Borg scale or RPE measures perceived exertion. The scale ranges from 6 (no exertion at all) to 20 (maximal exertion) (Borg, 1998).

Enjoyment during aerobic exercise was evaluated by the revised Physical Activity Enjoyment Scale (PACES), which measured positive influence coupled with physical activity (Moore et al., 2008). The original PACES measured positive affect linked with physical activities in college students (Kendzierski & DeCarlo, 1991). The original contained 18 bipolar statements on a 7-point continuum (I enjoy it – I hate it) which was scored by adding the total enjoyment score. The revised PACES was used for this study because two items were omitted and others rewritten to improve comprehension and reduce redundancy (Moore et al., 2008). The revised PACES measures positive enjoyment during a physical activity. The PACES contains 16-items that started with the stem. Two items were omitted from the original to reduce redundancy, and a 5-point Likert scale (1 = "Disagree a lot" to 5 = "Agree a lot") was used instead of the 7-item bipolar continuum. The score is configured by averaging the 16-items (Moore et al.). Reliability analysis for the PACES scale in this sample was performed for each study condition. The Cronbach alpha values were control α =.548, music α =.712, and television α =.668 (Streiner, 2003). The control and television conditions did not show high reliability. However, the music condition demonstrated higher reliability.

Feeling state during aerobic exercise was evaluated by the Exercise-Induced Feeling State Scale (EFI), which measured feelings in conjunction with aerobic exercise (Gauvin & Rejeski, 1993). The subscales have internal consistency, shared variance with related constructs, are sensitive to exercise interventions, and are responsive to various social contexts (Gauvin & Rejeski, 1993). The EFI contains 12-items and participants rate on a 5-point Likert scale (0 = "Do not feel" to 4 = "Feel very strongly) how they feel

at this moment in time. The 12-items were categorized into one of four subscales: positive affect (1, 3, 11); negative affect (6, 10, 12), fatigue (4, 7, 9), and tranquility (2, 5, 8) (Lox et al., 2000). The subscales scores were calculated by summing or averaging the numerical values chosen for the adjectives within a particular subscale (Gauvin & Rejeski, 1993). Reliability analysis for the PACES scale in this sample was performed for each study condition. The Cronbach alpha values were control α = .821, music α= .822, and television α= .828 (Streiner, 2003). All of the conditions showed good reliability for the EFI scale.

Procedures

The data collection was conducted from December 2015 to February 2016. All participants had to meet specific criteria prior to the study. Participants had to be between the ages of 18 to 30, current students, BMI between 18.5-30 kg/m^2, not pregnant, and free from any chronic disease.

Once the participant agreed to be part of the study, the researcher scheduled three appointments based on the participant's and researcher's schedules. The researcher instructed the participant to abstain from exercise prior to his/her appointment, bring headphones, and come prepared with music and television or movie streaming programs on a mobile device or watch television from the elliptical or treadmill.

The day of the first appointment the researcher randomized the participant in either television condition, music condition, or control condition. The participant selected either the treadmill or elliptical and was instructed to continue with the same machine throughout the entire study. In addition, the participant was weighed and measured and

the researcher calculated the participant's BMI, age predicted maximum heart rate (220-age), and 85% of age predicted maximum heart rate (.85 x maxHR). The participant wore a Polar Beat heart rate monitor strap during the 30-minute exercise bout.

After screening, the participant and researcher went to the participant's selected cardio machine. The researcher instructed to the participant the 30-minute exercise bout was self-paced; meaning the participant could change the speed/cross ramp and incline/resistance on the elliptical or speed and grade of the treadmill to his or her preference. In addition, the music and television viewing was self-selected and could be changed throughout the exercise bout. The researcher kept a distance from the participant to avoid any observational effects confounds such as, the Hawthorn Effect and/or anxious behavior. Every five minutes the researcher recorded the following, heart rate, WATTS and METS, which was displayed on the treadmill or elliptical, self-reported RPE, and any changes on the speed/cross ramp and resistance/incline. The researcher recorded the final distance once 30-minutes elapsed. After the exercise bout, the participant cooled down on the cardio machine for five-minutes then stopped the machine. Lastly, the participant completed two scales, the PACES and EFI scale.

The second appointment was randomized for the two remaining conditions. The participant had to remain on the same cardio machine as the first appointment. The participant's initial speed/cross ramp and incline/resistance had to be the same for the beginning stages and then could be changed for the reminder of the exercise bout. The same procedure applied as the first appointment. Meaning, heart rate, WATTS, METS,

RPE, speed/cross ramp, and incline/resistance was recorded every five-minutes. Lastly, the distance was recorded and the participant completed the two scales.

For the third appointment the participant was subjected to the remaining test condition. The participant did the same procedure as the second appointment with the exception of the debriefing form. After the two scales the true purpose of the study was revealed to the participant through the debriefing form.

Data Analysis

The physiological measures, enjoyment, and feeling state were calculated using SPSS Statistics program V.22 (IBM Corporation, Armonk, NY). Descriptive statistics were calculated on the participants' measurements (i.e. age, weight, height, BMI, maxHR-220, maxHR 85%). A repeated measures analysis of variance (ANOVA) was completed to examine enjoyment and feeling state between music, television, and control. Physiological measurements were also examined between the three conditions using a repeated measures ANOVA. Protected dependent *t*-tests were used as a post-hoc analysis from the repeated measures analysis within-subjects data.

Chapter 4

Journal Manuscript

Introduction

Exercise has as many physiological benefits as it does mental benefits (Weir, 2011). Unfortunately, these benefits are not enough to prevent an obesity epidemic. According to the CDC (2015) more than one-third (34.9%) of American adults are obese. Prior researchers have tried to control distraction to mitigate unpleasant emotions and physical pain during exercise as a solution to increase exercise enjoyment. Music has been a successful distractor for decreasing perceived exertion and increasing exercise duration in runners (De Bourdeaudhuij et al., 2002).

Since the age of portable music it is uncommon to see individuals exercise without the aid of an entertainment device. More recently, visual outlets such as, Netflix, Hulu, and television screens mounted to aerobic exercise machines are utilized as entertainment option for exercisers. Lin & Lu (2013) discovered an external stimulus during aerobic exercise is perceived to distract individuals a number of ways, such as, suppress perceived exertion and physical pain, enhance work efficiency and increase physical performance, and mitigate unpleasant emotions and promote enjoyment. A recent study by Privitera et al., (2014) showed exercise by itself promoted a more pleasant mood, but adding a positive distraction significantly increased a pleasant mood compared to no television. In addition, not only does television and music enhance enjoyment (Annesi, 2001), it also decreases perceived exertion during exercise (Lin & Lu, 2013). Individuals who are immersed in their entertainment devise are more focused

on the entertainment than the exercise, therefore, they typically report a lower perceived exertion then they might actually feel (Lin & Lu, 2013).

Music and television viewing are the most used entertainment modalities during aerobic exercise, and there is a possible likelihood of both of them producing similar enjoyment experiences. However, one entertainment device may or may not be preferred to the other to increase enjoyment and feeling state during aerobic exercise. Due to the variety of entertainment modalities, it would be useful to understand if a particular entertainment device produced a greater outcome than the other.

The advantages of using music as a distraction during aerobic exercise is it has been correlated to be a positive distracter and decreases perceived exertion (Elliott et al., 2005; Lin & Lu, 2013). Also, using music as a distraction has increased distance traveled compared to no music, and fast and loud music can increase the enjoyment and intensity of the exercise (Edworthy & Warning, 2006; Elliott et al., 2005). However, prior studies have shown music tempo and genre have made no impact on RPE (Edworthy & Warning, 2006; Elliott et al., 2005). Many studies concluded that music can reduce RPE when exercising at moderate workloads, other studies have concluded that music has little difference on RPE (Elliot et al., 2005). However, prior studies have shown television viewing has increased exercise adherence, exercise duration, and maximum volume of oxygen uptake (VO_2 max) (Annesi, 2001; Annesi & Mazas, 1997). The purpose of this research was to examine if there was a significant difference in physiological variables and enjoyment between music, television, and control during aerobic exercise.

Methods

Participants

Fourteen males and sixteen females (n=30) between the ages of 18 and 30 years volunteered to participate in this study. All thirty participants completed the study and were students recruited from a university in the southeastern United States. Participants were recruited through word-of-mouth and academic classes. All participants were screened prior to the study and had no existing chronic diseases, such as, coronary heart disease, diabetes, lung disease, or orthopedic problems that could limit their participation. Also, participants had to have a body mass index (BMI) between 18.5-30 kg/m^2 (normal to overweight) to be eligible to participate. Additionally, pregnant women were excluded from the study. The study was approved by the University Institutional Review Board (IRB) (See Appendix A). Before the experiment, all participants completed and signed an informed consent agreement form (see Appendix A), which explained the procedures and possible risks and benefits of the experiment. Additionally, all participants completed and signed a Physical Activity Readiness Questionnaire (PAR-Q) (Canadian Society of Exercise Physiology, 2002) and a ACSM health history form (ACSM, 2014) (see Appendix B).

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treadmill. The Borg scale or RPE measures perceived exertion. The scale ranges from 6 (no exertion at all) to 20 (maximal exertion) (Borg, 1998).

Enjoyment during aerobic exercise was evaluated by the revised Physical Activity Enjoyment Scale (PACES), which measured positive influence coupled with physical activity (Moore et al., 2008). The original PACES measured positive affect linked with physical activities in college students (Kendzierski & DeCarlo, 1991). The original contained 18 bipolar statements on a 7-point continuum (I enjoy it – I hate it) which was scored by adding the total enjoyment score. The revised PACES was used for this study because two items were omitted and others rewritten to improve comprehension and reduce redundancy (Moore et al., 2008). The revised PACES measures positive enjoyment during a physical activity. The PACES contains 16-items that started with the stem. Two items were omitted from the original to reduce redundancy, and a 5-point Likert scale (1 = "Disagree a lot" to 5 = "Agree a lot") was used instead of the 7-item bipolar continuum. The score is configured by averaging the 16-items. (Moore et al.). Reliability analysis for the PACES scale in this sample was performed for each study condition. The Cronbach alpha values were control α =.548, music α =.712, and television α =.668 (Streiner, 2003). The control and television conditions did not show high reliability. However, the music condition demonstrated higher reliability.

Feeling state during aerobic exercise was evaluated by the Exercise-Induced Feeling State Scale (EFI), which measured feelings in conjunction with aerobic exercise (Gauvin & Rejeski, 1993). The subscales have internal consistency, shared variance with related constructs, are sensitive to exercise interventions, and are responsive to various

social contexts (Gauvin & Rejeski, 1993). The EFI contains 12-items and participants rate on a 5-point Likert scale (0 = "Do not feel" to 4 = "Feel very strongly) how they feel at this moment in time. The 12-items were categorized into one of four subscales: positive affect (1, 3, 11); negative affect (6, 10, 12), fatigue (4, 7, 9), and tranquility (2, 5, 8) (Lox et al., 2000). The subscales scores were calculated by summing or averaging the numerical values chosen for the adjectives within a particular subscale (Gauvin & Rejeski, 1993). Reliability analysis for the PACES scale in this sample was performed for each study condition. The Cronbach alpha values were control α .821, music α .822, and television α .828 (Streiner, 2003). All of the conditions are significant for the EFI scale.

Procedures

The data collection was conducted from December 2015 to February 2016. All participants had to meet specific criteria prior to the study. Participants had to be between the ages of 18 to 30, current students, BMI between 18.5-30 kg/m^2, not pregnant, and free from any chronic disease.

Once the participant agreed to be part of the study, the researcher scheduled three appointments based on the participant's and researcher's schedules. The researcher instructed the participant to abstain from exercise prior to his/her appointment, bring headphones, and come prepared with music and television or movie streaming programs on a mobile device or watch television from the elliptical or treadmill.

The day of the first appointment the researcher randomized the participant in either the television condition, music condition, or control condition. The participant selected either the treadmill or elliptical and was instructed to continue with the same

machine throughout the entire study. In addition, the participant was weighed and measured and the researcher calculated the participant's BMI, age predicted maximum heart rate (220-age), and 85% of age predicted maximum heart rate (.85 x maxHR). The participant wore a Polar Beat heart rate monitor strap during the 30-minute exercise bout.

After screening, the participant and researcher went to the participant's selected cardio machine. The researcher instructed to the participant the 30-minute exercise bout was self-paced; meaning the participant could change the speed/cross ramp and incline/resistance on the elliptical or speed and grade of the treadmill to his or her preference. In addition, the music and television viewing was self-selected and could be changed throughout the exercise bout. The researcher kept a distance from the participant to avoid any observational effects confounds such as, the Hawthorn Effect and/or anxious behavior. Every five minutes the researcher recorded the following, heart rate, WATTS and METS, which was displayed on the treadmill or elliptical, self-reported RPE, and any changes on the speed/cross ramp and resistance/incline. The researcher recorded the final distance once 30-minutes elapsed. After the exercise bout, the participant cooled down on the cardio machine for five-minutes then stopped the machine. Lastly, the participant completed two scales, the PACES and EFI scale.

The second appointment was randomized for the two remaining conditions. The participant had to remain on the same cardio machine as the first appointment. The participant's initial speed/cross ramp and incline/resistance had to be the same for the beginning stages and then could be changed for the reminder of the exercise bout. The same procedure applied as the first appointment. Meaning, heart rate, WATTS, METS,

RPE, speed/cross ramp, and incline/resistance was recorded every five-minutes. Lastly, the distance was recorded and the participant completed the two scales.

For the third appointment the participant was subjected to the remaining test condition. The participant did the same procedure as the second appointment with the exception of the debriefing form. After the two scales the true purpose of the study was revealed to the participant through the debriefing form.

Statistical Analyses

The physiological measures, enjoyment, and feeling state were calculated using SPSS Statistics program V.22 (IBM Corporation, Armonk, NY). Descriptive statistics were calculated on the participants' measurements (i.e. age, weight, height, BMI, maxHR-220, maxHR 85%). A repeated measures analysis of variance (ANOVA) was completed to examine enjoyment and feeling state between music, television, and control. Physiological measurements were also examined between the three conditions using a repeated measures ANOVA. Protected dependent *t*-tests were used as a post-hoc analysis from the repeated measures analysis within-subjects data.

Results

The purpose of this study was to examine if television viewing and music would increase enjoyment and decrease perceived exertion during aerobic exercise. There were no documented injuries throughout the data collection procedure. Assuming individuals know how to properly utilize an elliptical or treadmill, this concludes individuals can safely incorporate television viewing and music during aerobic activity.

Participant Demographics

Table 1 presents the descriptive statistics of the participants such as, fourteen male and sixteen female university students (*M* age = 21.17 years, *SD* = 2.04), body measurements included weight (*M* weight = 156.71 lbs., *SD* = 28.94), height (*M* height = 67.03 inch., *SD* = 4.53), and BMI (*M* BMI = 24.38 kg/m^2, *SD* = 2.68), and maximum heart rate (*M* maxHR-220 = 198.83, *SD* = 2.04; *M* maxHR85% = 169.01, *SD* = 1.73). The BMI was calculated for pre-screening before participation. All 30 participants completed the study.

Table 1

Descriptive Statistics

	N	*Minimum*	*Maximum*	*M*	*SD*
Age (years)	30	18.0	27.0	21.1	2.035
Weight (pounds)	30	117.0	220.4	156.7	28.94
Height (inches)	30	59.0	78.0	67.0	4.52
BMI (kg/m^2)	30	18.9	28.9	24.4	2.67
Max HR-220	30	193.0	202.0	198.8	2.03
Max HR 85%	30	164.1	171.7	169.0	1.73

Note. Body Mass Index (BMI), kilograms per square meter (kg/m^2); Age-predicted max heart rate (220-age); 85% age-predicted max heart rate.

Physiological Measurements

Table 2 presents a repeated measures ANOVA, which was calculated comparing the physiological measurements of the participants at three different conditions: Television viewing, control, and music. No significant effect was found in the following: RPE ($F(2,58) = .139$, $p > .05$), METS ($F(2,58) = .983$, $p > .05$), WATTS ($F(2,58) = 1.019$, $p > .05$), or Heart Rate ($F(2,58) = 2.631$, $p > .05$). In other words, RPE, METS,

WATTS, and heart rate were not different between the three conditions. These results supported the null hypothesis that there would be no difference in the physiological variables between the treatment conditions and control.

Table 2

Tests of Within-Subject Effects Physiological Measurements

Source	*Type III Sum of Square*	*df*	*Mean Square*	*F*	*p*
RPE	.671	2	.335	.139	.870
METS	.831	2	.416	.983	.380
WATTS	1232.811	2	616.406	1.019	.367
Heart Rate	618.995	2	309.498	2.631	.081

Note. Rated of Perceived Exertion (RPE); Metabolic Equivalents (MET).

Physical Activity Enjoyment Scale

Table 3 presents a repeated measures ANOVA, which was calculated comparing the PACES enjoyment scale of the participants at three different conditions: Television viewing, control, and music. There was a significant difference in the overall PACES scale ($F(2,58) = 4.637$, $p = .014$) (Figure 1). Protected post-hoc *t*-tests revealed that the control condition had a higher PACES enjoyment score vs. the television condition, but not the music condition. The other study conditions were not different. These results did not support the null hypothesis in the control versus television viewing condition only.

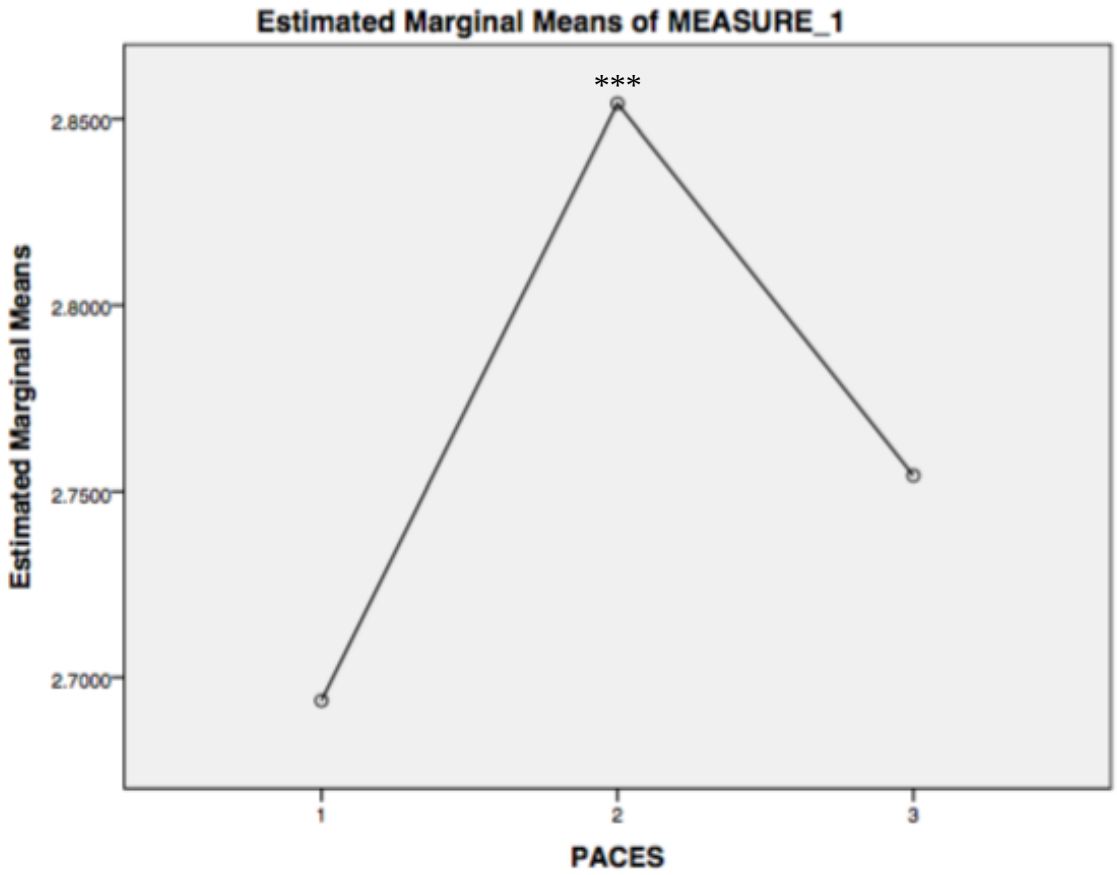
Reliability analysis for the PACES scale in this sample was performed for each study condition. The Cronbach alpha values were control $\alpha = .821$, music $\alpha = .822$, and television $\alpha = .828$ (Streiner, 2003). All of the conditions showed good reliability for the EFI scale.

Table 3

Tests of Within-Subject Effects Physical Activity Enjoyment Scale

Source	*Type III Sum of Square*	*df*	*Mean Square*	*F*	*p*
PACES	.394	2	.197	4.637	.014*

Note. Physical Activity Enjoyment Scale (PACES). *$p < .05$



1 = Television Viewing, 2 = Control, 3 = Music

Figure 1. Comparison of PACES between music, television viewing, and control conditions. There was a significant difference in the overall PACES $p = .014$*.

Exercise-Induced Feeling State Scale

The EFI are categorized into one of four subscales: positive affect, negative affect, fatigue, and tranquility (Lox et al., 2000). The subscales scores are calculated by averaging the numerical values chosen for the adjectives within a particular subscale (Gauvin & Rejeski, 1993) (Table 4). Reliability analysis for the EFI scale in this sample was performed for each study condition. The Cronbach alpha values were control α .821, music α .822, and television α .828 (Streiner, 2003). All of the conditions are significant for the EFI scale.

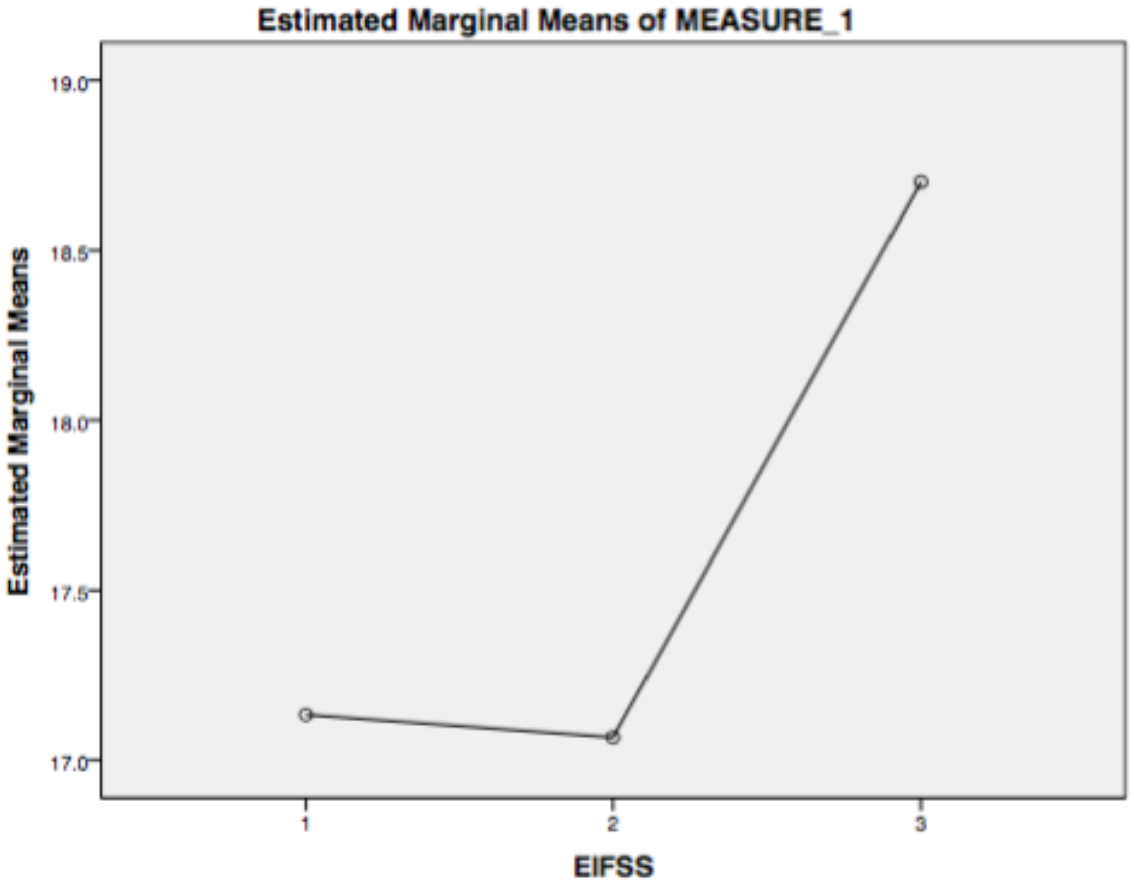
Table 4

Tests of Within-Subject Effects Exercise-Induced Feeling State Scale

Source	*Type III Sum of Square*	*df*	*Mean Square*	*F*	*p*
EFI	51.267	2	25.633	2.230	.117
POS	180.356	2	90.178	20.675	<.001***
NEG	207.089	2	103.544	60.310	<.001***
FATIG	24.956	2	12.478	3.883	.026*
TRQ	17.222	2	8.611	2.423	.098

Note. Exercise-Induced Feeling State Scale (EFI); Positive Affect (POS); Negative Affect (NEG); Fatigue (FATIG); Tranquility (TRQ). *$p < .05$, ***$p < .0001$

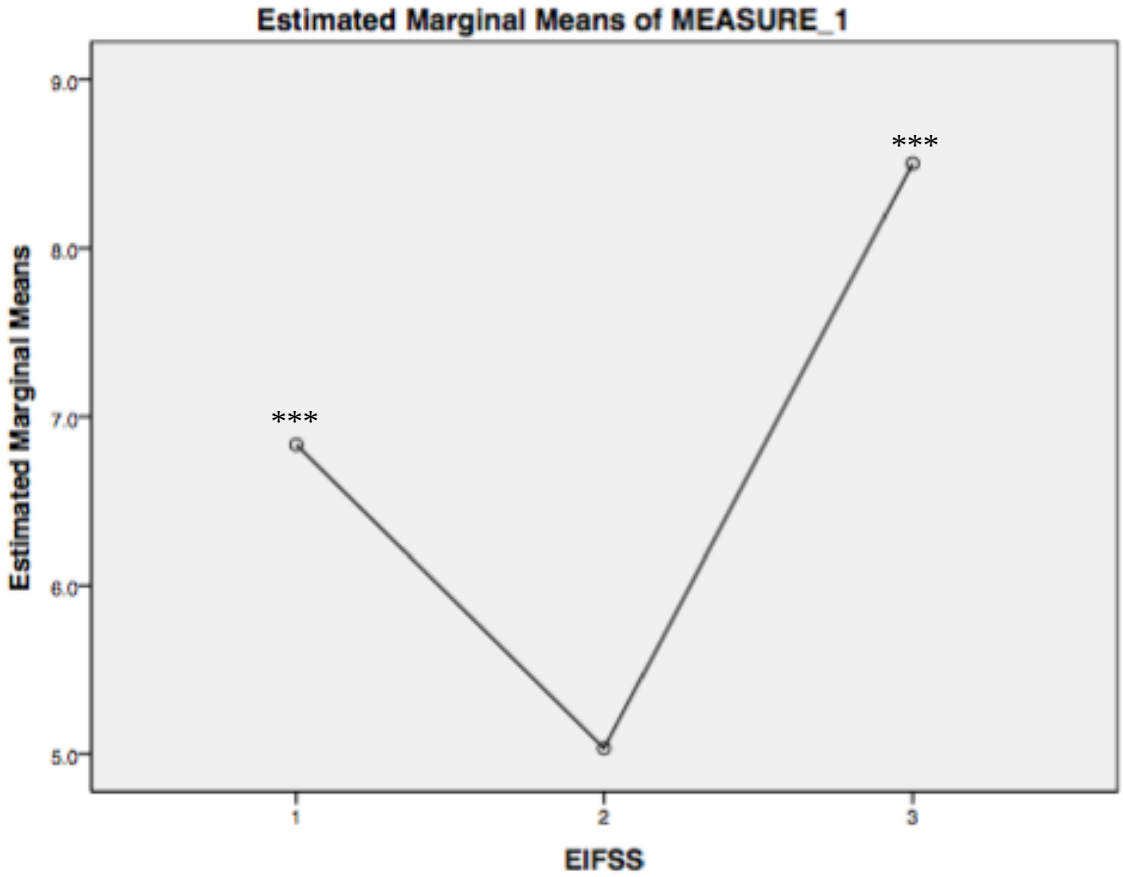
Table 4 presents a repeated measures ANOVA, which was calculated comparing the EFI's entire scale or all subscales combined at three different conditions: Television viewing, control, and music. No significant effect was found in the EFI scale ($F(2,58) = 2.230$, $p > .05$). In other words, the EFI showed no difference between the three conditions (Figure 2).



1 = Television Viewing, 2 = Control, 3 = Music

Figure 2. Comparison of EFI between music, television viewing, and control conditions. There was NS in the EFI scale as a whole between the conditions $p > .05$.

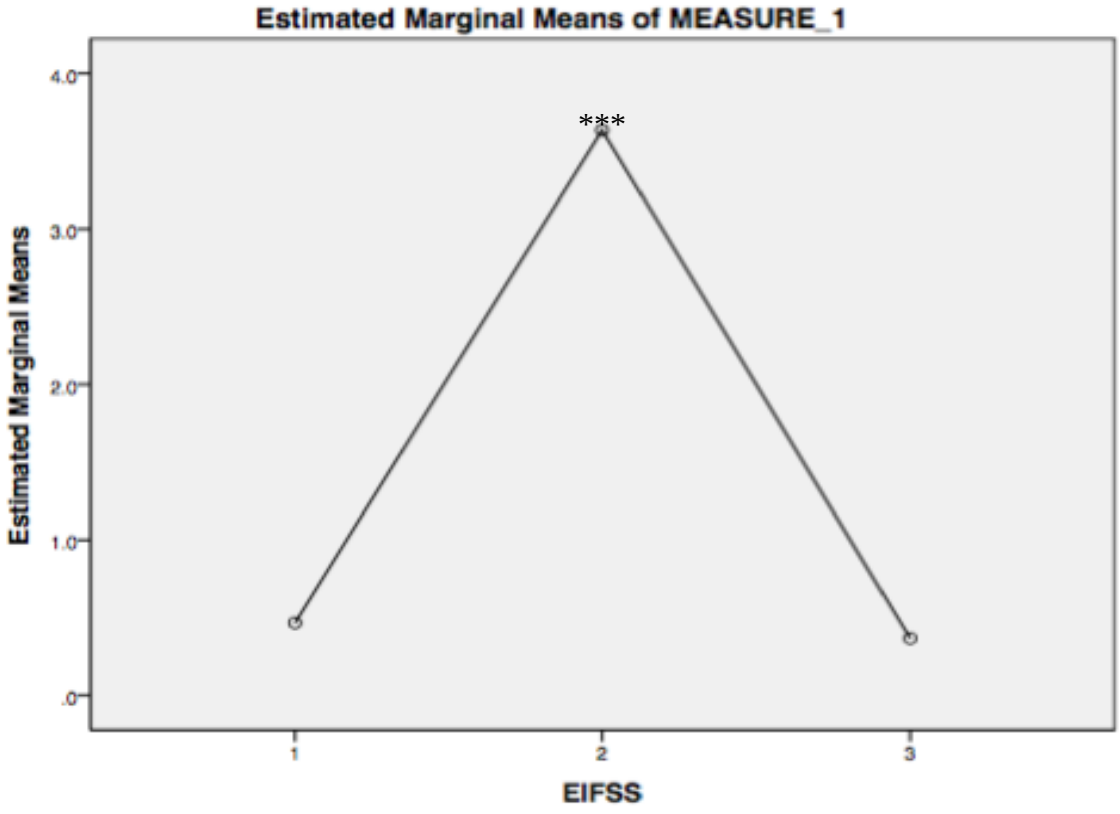
Table 4 presents a repeated measures ANOVA, which was calculated comparing the EFI Positive Affect at three different conditions: Television viewing, control, and music. A significant effect was found ($F(2,58) = 20.675$, $p < .001$). Follow-up protected *t*-tests revealed that positive affect increased significantly from music ($M = 8.5$, $sd = 2.610$) to television viewing ($M = 6.833$, $sd = 3.1632$). In other words, participants reported a significantly higher positive affect in the music and television viewing condition compared to the control (Figure 3).



1 = Television Viewing, 2 = Control, 3 = Music

Figure 3. Comparison of EFI subscale Positive Affect between music, television viewing, and control conditions. Television viewing and music had a significantly greater positive affect ***$p < .001$ than the control condition.

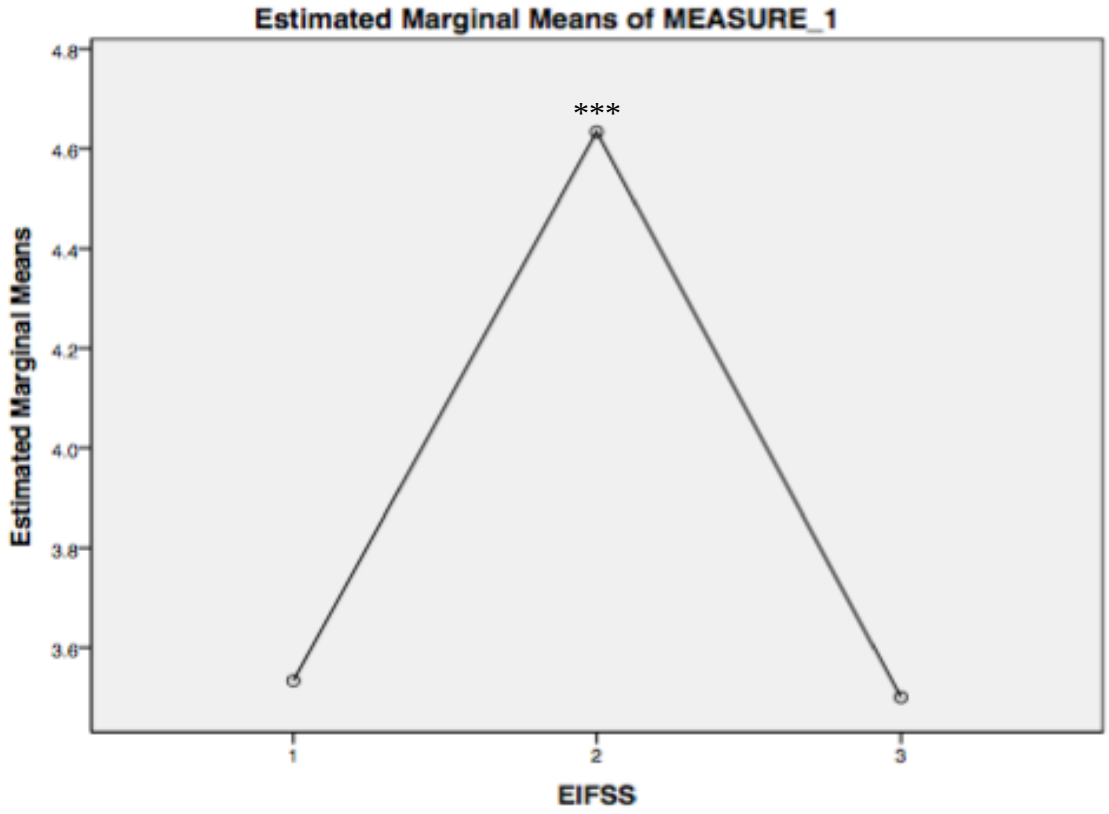
Table 4 presents a repeated measures ANOVA, which was calculated comparing the EFI Negative Affect at three different conditions: Television viewing, control, and music. A significant effect was found ($F(2,58) = 60.310$, $p < .001$). Follow-up protected t tests revealed that negative affect decreased significantly from music ($M = .37$, $sd = .890$) to television viewing ($M = .467$, $sd = .9732$). In other words, participants reported a significant negative affect in the control condition compared to the music and television viewing conditions (Figure 4).



1 = Television Viewing, 2 = Control, 3 = Music

Figure 4. Comparison of EFI subscale Negative Affect between music, television viewing, and control conditions. A significant difference was apparent ***$p < .001$. Control had a significantly greater negative affect than the television viewing and music conditions.

Table 4 presents a repeated measures ANOVA, which was calculated comparing the EFI Fatigue at three different conditions: Television viewing, control, and music. A significant effect was found ($F(2,58) = 3.883$, $p < .001$). Follow-up protected *t* tests revealed that fatigue decreased significantly from music ($M = 3.50$, $sd = 2.162$) to television viewing ($M = 3.533$, $sd = 2.3742$). In other words, participants reported significantly more fatigue in the control condition compared to the music and television viewing conditions. (Figure 5).



1 = Television Viewing, 2 = Control, 3 = Music

Figure 5. Comparison of EFI subscale Fatigue between music, television viewing, and control conditions. A significant difference was apparent ***$p < .001$. Control had a significantly greater fatigue than the television viewing and music conditions.

Table 4 presents a repeated measures ANOVA, which was calculated comparing the EFI Tranquility at three different conditions: Television viewing, control, and music. No significant effect was found in the tranquility ($F(2,58) = 2.423$, $p > .05$). In other words, tranquility showed no difference between the three conditions (Figure 6).

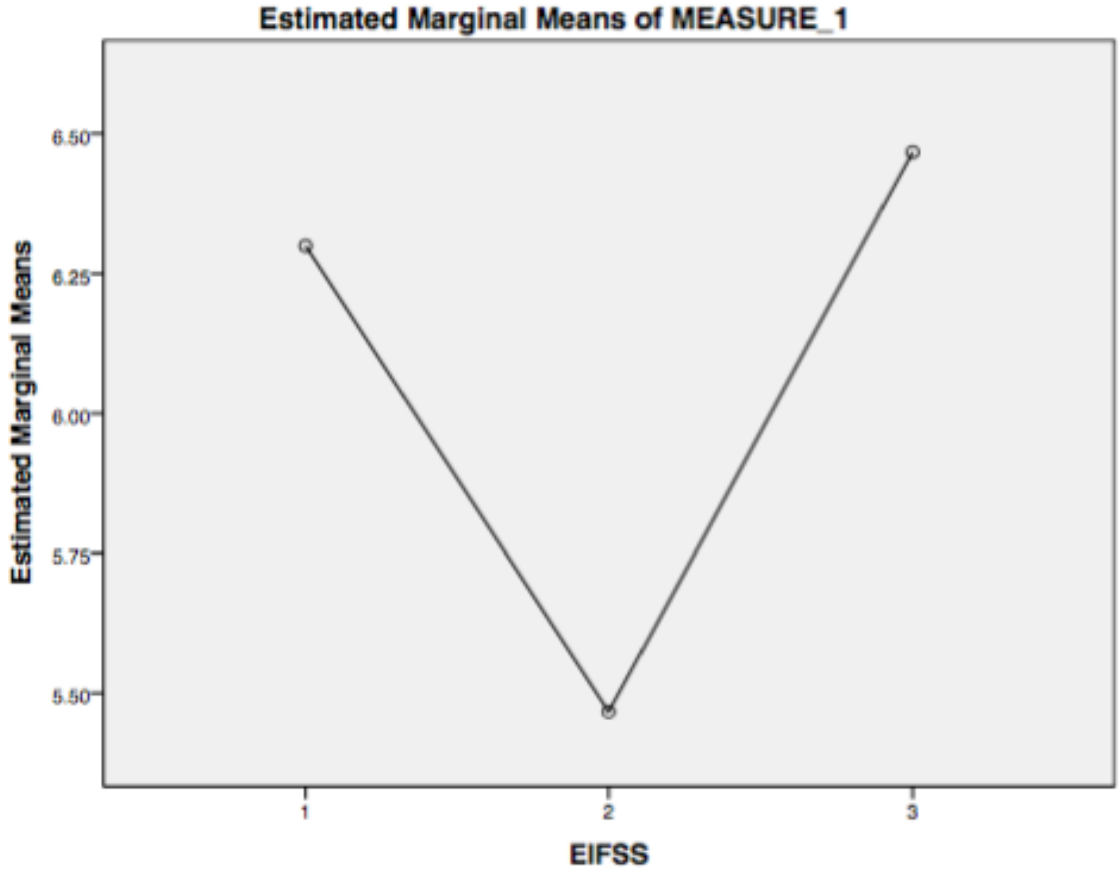


Figure 6. Comparison of EFI subscale Tranquility between music, television viewing, and control conditions. There was no significance in tranquility between the conditions $p > .05$.

Discussion

The objective of this study was to examine if there was a significant difference in enjoyment between music, television, and control during aerobic exercise. The participants were randomly assigned to complete three conditions: television viewing, music, and control during aerobic exercise for thirty-minutes each condition. Also, the PACES and EFI scales were utilized to measure enjoyment and feeling state across the three conditions (Gauvin & Rejeski, 1993; Moore et al., 2009; Lox et al., 2000). The reliability analysis for the PACES scale in this sample was performed for each study condition and the control α .548 and television α .668 were not significantly reliable, but the music α .712 was significantly reliable. Overall, the PACES scale has poor reliability, which could have affected the results. The reliability analysis for the EFI scale in this sample was performed for each study condition and all conditions were significant. The results for the EFI should trusted more because of the strong reliability in all conditions.

Distraction can divert time perception by decreasing the duration of time an individual believes he/she is immersed in a task (e.g. exercise) (Casilio, 2012), and distraction can also enhance preference or enjoyment of exercise (Loucks, 2000). Annesi (2001) concluded distraction can increase exercise duration in three ways. First, distraction increased preference or enjoyment of exercise. Second, distraction diverted time perception by decreasing the duration of time an individual believed he/she was immersed in a task (e.g. exercise). Third, distraction redirected the focus away from the exercise.

Music has been determined to be a positive distracter and can decrease perceived exertion (Elliott et al., 2004; Lin & Lu, 2013). Studies have shown perceived exertion did not make a difference between the various conditions (Edworthy & Warning, 2006; Elliot et al., 2004). Although many studies concluded that music can reduce RPE when exercising at moderate workloads. Other studies have concluded that music has little difference on RPE (Elliot et al., 2004). Overall, conclusions cannot be shown regarding the effect of music on physical activity and RPE and prior findings have been inconsistent (Elliot et al., 2004). Television viewing has not been researched to the extent music has been researched on distraction during exercise. But prior studies have showen that television viewing has promoted adherence, enjoyment, and a longer duration during aerobic activity compared to no distraction (Annesi & Mazas, 1997; Privitera et al., 2014).

The primary findings of this study included significant differences in three of the four subscales (i.e. positive affect, negative affect, fatigue, and tranquility) from the EFI feeling state scale. There was a significant difference in positive affect for the music and television condition compared to the control. Significant differences in negative affect and fatigue for the control condition compared to the music and television condition. There was no significant difference in tranquility between conditions. There were no significant differences in the physiological measurements (i.e. heart rate, METS, WATTS, RPE) and no difference in the PACES enjoyment.

A possible explanation for no difference in the physiological variables could be television and music does not impact an individual's aerobic exercise performance. In

other words, the music and television made no difference in enhancing the participant's aerobic exercise compared to the control condition. All participants were recreationally active and familiar with the elliptical and treadmill devises. Therefore, the exercise was not novel to anyone. Additionally, the participants were very familiar with the location of the experiment. Participants either had academic classes, exercised, or worked where data was collected. This familiarity may have established a level of comfort and which may have contributed no significance in the PACES and/or physiological measurements. However, these data indicated that for persons who exercise recreationally or for fitness, the use of music or television viewing has no effect on their exercise performance if these persons should forget to exercise without their preferred device.

The participants were self-selected volunteers who may have prior knowledge to the psychological benefits of exercise, which may influence the post-exercise affect (Szabo, Mesko, Caputo, & Gill, 1998). Since the participants had some knowledge of exercise, they were capable of understanding or in tune with their bodies, which may have resulted in no difference in the enjoyment. Even though participants complained about control condition they did not report it differently than the other conditions. A possible explanation may be that participants had knowledge of exercise and understood their exercise responses. Overall, there has been inconsistent findings of how distraction during exercise lead to pleasant mood changes during post-exercise (Privitera, Antonelli, & Szal, 2014; Russell et al., 2003).

Limitations are inevitable in any study. Therefore, they could not be controlled. Due to the availability of the participants and researcher the time of day might have had

an effect on the study outcomes. The participants did not have a consistent appointment time for each condition. The appointments varied in washout times and could have affected their enjoyment and feeling state. Ideally, participants should perhaps perform one session each week to minimize any carryover effects and ensure sufficient rest. Second, participants might not have given their best efforts during every condition because of lack of motivation. Third, this study required three 40-minute sessions which was time consuming on the participant. The time constraint could have caused a lack of motivation biasing the results. Another limitation was the validity of the Polar heart rate monitor. At times the heart rate monitor displayed inconsistent numbers; normally too high which inaccurately showed the participant's true heart rate. Fifth, participants self-reported on two scales and perceived exertion, which are subjective questions. Participants might have reported under or over exaggerated answers, although the crossover design should have helped reduce this possibility. Lastly, the sample was homogenous. All participants were active college students who were familiar to aerobic exercise. Although a homogenous sample size resulted in no difference in the physiological variables, which made no difference in enhancing the participant's aerobic exercise between the conditions.

Practical Application

The results of this research are beneficial to the general population, all fitness level individuals, personal trainers, and other researchers who are interested in enjoyment and feeling state during aerobic activity coupled with music or television viewing. The music and television had no effect on heart rate and RPE between the conditions: music,

TV, control. Therefore, music and television make no difference in the physiological effectiveness of aerobic exercise. Music and television does not increase an individual's exercise performance as much as the general public may believe. It may be more of a mental barrier that individuals believe they must have a positive distraction in order to have a successful workout. But that is not the case in the psychosocial results. There was a significant difference in the overall PACES scale. The control condition had a higher PACES enjoyment score vs. the television condition, but not the music condition. Most individuals have become reliant on electronic entertainment devices to alleviate the discomfort exercise might impose or to reduce boredom from exercise. Additionally, music and television had a significant positive affect on most EFI feeling state subscales and no music and television had a significant negative affect on feeling state on the EFI. Even though there were no differences physiologically between the conditions, there was a difference in positive feelings and negative feeling among the conditions.

Due to preliminary results of enjoyment and feeling state, further research will need to be conducted. If this study were to be repeated the researcher could have the participants complete a pretest and posttest of each PACES scale and EFI scale for each condition. Future studies should focus on a more generalized population. This study encompassed college-age participants, as did many prior studies (Lin & Lu, 2013; Lox et al., 2000; Mohammadzadeh et al., 2008; Privitera et al., 2014; Russell et al., 2003). Including diverse age groups like, adolescents, and middle-age or senior adults might be advantageous for future research studies.

Appendices

Appendix A

IRB Forms

Revised 07/05/2013 Page 1 of 7

IRB #
TO BE COMPLETED BY SPAR

Winthrop University

REQUEST FOR REVIEW OF RESEARCH INVOLVING HUMAN SUBJECTS
Institutional Review Board

RESEARCHER of RECORD: **Nicole Swank** COLLEGE/DEPARTMENT: **College of Education/PESH** PHONE NUMBER: HOME: **NA** WORK: **NA** EMAIL: CELL PHONE: ADDRESS: **211B West Center** STATUS: ☐ Faculty or Staff **(If a student, complete faculty advisor section)** ☒ Graduate Student ☐ Undergraduate Student	CO-RESEARCHERS: **Dr. Janet Wojcik, Dr. Chales Bowers, and Dr. Joni Boyd** FACULTY ADVISOR: **Dr. Janet Wojcik** ADVISOR PHONE: HOME: **NA** WORK: EMAIL: CELL PHONE: ADDRESS: **216 West Center**

TITLE OF RESEARCH: **The Effect of Music & Television Viewing on Enjoyment During Aerobic Exercise**

DATES OF THE RESEARCH PROJECT:

Approval Requested for Start Date: **11/11/2015** (The requested start date should be at least 2 weeks after the next scheduled meeting of the IRB)

End Date: **11/14/2016** (Maximum of one year; must be renewed annually)

IS THIS RESEARCH BEING FUNDED BY RESEARCH GRANT?

☐ YES; Sponsor:
☐ Funding Applied for; Sponsor:
☒ NO

1.	☒Yes ☐No Is this activity being carried out by student as a classroom assignment to be reviewed by the faculty member. ☒Yes ☐No Will the information gathered or developed in this activity be used in a presentation or publication outside of the classroom? If you checked yes to both questions above, please explain how the information will be used outside of the classroom: **The information will be used to potentially publish to a journal. Also, this research is for a Masters thesis.**
2.	INDICATE THE TYPES OF MEMBERS OF THE RESEARCH TEAM WHO WILL HAVE DIRECT CONTACT WITH HUMAN SUBJECTS: ☒ FACULTY MEMBER ☐ STAFF MEMBER ☒ UNDERGRADUATE STUDENT ☒ GRADUATE STUDENT ☐ OTHER; SPECIFY:

3.

A. BRIEFLY DESCRIBE THE PURPOSE OF THE RESEARCH IN NON-TECHNICAL LANGUAGE:
Examine if television viewing and music will increase enjoyment and decrease perceived exertion during exercise. In other words, researching if one experiences more enjoyment on either the treadmill or elliptical while either watching television or listening to music compared to not watching television or listening to music

B. DESCRIBE RESEARCH PROTOCOL OR METHODOLOGY TO BE USED: External stimuli during aerobic exercise is perceived to suppress perceived exertion, mitigate unpleasant emotions, and enhance work efficiency. The purpose of this study is examining if television viewing and music will increase enjoyment and decrease perceived exertion during exercise. Participants will include Winthrop students (ages 18-30) and will be pre-screened for BMI (18.5-30, not currently pregnant, and no orthopedic and chronic diseases. The design is a randomized crossover, meaning each participant will be tested 3 times in a different condition (TV, music, and control). Participants will select either the elliptical or treadmill to be tested on. While on the treadmill or elliptical the participant will listen to music, watch TV, or watch/listen to nothing. The researcher will measure heart rate, rates of perceived exertion, and METs (i.e. measures energy expenditure) every 5 minutes during the workout. After each scheduled workout the participant will complete two surveys. The Physical Activity Enjoyment Scale (PACES), which is a 16-item that begin with the stem "When I am physically active…". Participants will rate each item on a 5-point Likert-type scale (1 = "disagree a lot" to 5 = "agree a lot"). And the second survey is the Exercise-Induced Feeling Inventory (EFI), which is 12-items and you rate each item on a 5-point Likert-type scale (0 = "do not feel" to 4 = "feel very strongly").

4.

EXPLAIN BRIEFLY BUT COMPLETELY WHAT TASKS OR ACTIVITIES THE SUBJECTS IN THIS RESEARCH WILL BE DOING [If a survey/questionnaire is to be used, state how many questions will be asked and the expected time to complete the survey]: **Participants will be participating in three 30-minute workouts. They will be randomized in 3 different conditions while working out on either the elliptical or treadmill. The three conditions include, television viewing, listening to music, and no TV or music. They will come to each workout with a prepared playlist or TV program because they won't know what condition they are in until they arrive to their scheduled workout. The researcher will check their heart rate, METs, and rates of perceived exertion every 5 minutes they are on the cardio machine. The American College of Sports Medicine recommends a healthy adult exercises 30 minutes of moderate intensity for 5 days a week. After each 30 minute workout the participant will fill out a survey….Also, any undergraduate students recruited to assist with the study will have undergone the CITI training. Overall, the data will collet heart rate, METs, rates of perceived exertion, and two surveys from the Physical Activity Enjoyment Scale (PACES), which is a 16-item that begin with the stem "When I am physically active…". You rate each item on a 5-point Likert-type scale (1 = "disagree a lot" to 5 = "agree a lot"). And the second survey is the Exercise-Induced Feeling Inventory (EFI), which is 12-items and you rate each item on a 5-point Likert-type scale (0 = "do not feel" to 4 = "feel very strongly"). Participants will complete 2 different surveys 3 times each; a total of 6 times by the end of the study. The anticipated time to complete 2 surveys after one scheduled workout is 12 minutes; totaling 36 minutes after 3 scheduled workouts..**

5.

DESCRIBE SUBJECTS FOR THIS RESEARCH, INCLUDING A STATEMENT OF WHO WILL BE RECRUITED AND THE ANTICIPATED POPULATION SIZE:
Subjects: Winthrop students between the ages of 18-30.
Recruited: PESH Physical Education classes like Pilates, beginning walking, raquetball.
Anticipated Population Size: 20-30

DO YOUR SUBJECTS INCLUDE ANY OF THE FOLLOWING:

☐ Yes	☒ No	Infants and children younger than 7 years?
☐ Yes	☒ No	Institutionalized mentally impaired people?
☒ Yes	☐ No	Students enrolled in your own classes?
☒ Yes	☐ No	Students enrolled at Winthrop University?
☐ Yes	☒ No	Prisoners?
☐ Yes	☒ No	Other special populations? Specify -

6.	DESCRIBE HOW SUBJECTS WILL BE RECRUITED FOR THIS RESEARCH: **Participants who meet the following criteria are included in the study: Winthrop students ages 18-30, BMI between 18.5-30, free from orthopedic problems and chronic diseases such as, coronary heart disease, diabetes, and lung disease, and currently not pregnant.** **Flyers: Displayed throughout the West Center.** **Email: Notifying all student through a listserv.** **Public Announcements: Going to PESH Physical Education classes and discussing my research in person.** **Collaboration: Working with Physical Education instructors to assist me in getting students to volunteer.**
7.	HOW WILL YOU ASSURE THAT PARTICIPATION OF THE SUBJECTS IS VOLUNTARY? **Participants will not be compensated. Participants will sign informed consent forms.**
8a.	CAN THE HUMAN SUBJECT BE DIRECTLY IDENTIFIED BY: *(For any responses of "yes" indicate in the space provided how the subject's privacy will be protected.)* ☐ Yes ☒ No Name on Response form; ☐ Yes ☒ No Photograph: ☐ Yes ☒ No Television/VCR/DVD tapes: ☐ Yes ☒ No Audiotape: ☐ Yes ☒ No Coded Research Forms: ☐ Yes ☒ No Detailed Biographical Data: ☐ Yes ☒ No Informed Consent, Assent or Parental Permission forms: ☐ Yes ☒ No Other:
8b.	If you checked yes to any item in 8a; then: ☐ Yes ☒ No Will personally identifiable data be shared with others outside of this research team? If you checked yes, please explain.
9.	THE RESEARCHER SHALL MAKE EVERY POSSIBLE ATTEMPT TO MAINTAIN CONFIDENTIALITY OF THE RESEARCH AND THE HUMAN SUBJECTS. IF FOR SOME REASON, THE RESPONSES, INFORMATION, OR OBSERVATIONS OF THE SUBJECT BECAME KNOWN TO PERSONS OTHER THAN THE RESEARCHERS, COULD THIS INFORMATION POTENTIALLY PLACE THE SUBJECT AT RISK OF: ☐ Yes ☒ No DAMAGE TO HIS/HER FINANCIAL STANDING? ☐ Yes ☒ No DAMAGE TO HIS/HER PRESENT OR FUTURE EMPLOYABILITY? ☐ Yes ☒ No CRIMINAL OR CIVIL LIABILITY? ☐ Yes ☒ No PSYCHOLOGICAL/EMOTIONAL PROBLEMS? EXPLAIN ANY "YES" ANSWERS AND STEPS THAT HAVE BEEN TAKE TO MINIMIZE RISK:
10.	ARE ANY OF THE TECHNIQUES LISTED BELOW INVOLVED IN THE RESEARCH? ☐ Yes ☒ No INVASIVE MEDICAL PROCEDURES? ☐ Yes ☒ No NON-INVASIVE MEDICAL PROCEDURES? ☒ Yes ☐ No STRENUOUS EXERCISE? ☒ Yes ☐ No OTHER PHYSICAL TESTING EXPLAIN ANY "YES" ANSWERS AND STEPS THAT HAVE BEEN TAKE TO MINIMIZE RISK: **Strenuous Exercise: Participants will complete 3 thirty-minute exercise bouts at their own pace on either the elliptical or treadmill. Participants can control their speed, so if they are feeling fatigue they can slow down their pace at anytime.** **Other Physical Testing: The Polar heart rate monitor works by measuring your heart rate with a transmitter placed over the heart, which is held in place by an adjustable strap that wraps around your chest. The transmitter detects electrical activity. The activity is relayed to a wristwatch which displays the heart rate in real time. Heart rate will be**

	taken every 5 minutes during their 30-minute exercise bout. **Rate of Perceived Exertion measures physical exertion on a scale from 6 (very, very light) to 20 (maximum exertion). RPE will be taken every 5 minutes during their 30-minute exercise bout. Participants will state how they feel on a scale of 6 (very, very light) to 20 (maximum exertion) every 5 minutes.** **Body Mass Index is taken as part of a pre-screening, which is calculating participants weight and height. Participants who have a BMI less than 18.5 (underweight) and more than 30 (overweight) are exempt from the study.**
11a	DESCRIBE HOW LEGALLY EFFECTIVE INFORMED CONSENT WILL BE OBTAINED AND ATTACH A COPY OF THE CONSENT FORM. IF MINORS ARE TO BE USED AS RESEARCH SUBJECTS, DESCRIBE PROCEDURES USED TO GAIN CONSENT OF THEIR PARENT(S, GUARDIAN(S), OR LEGAL REPRESENTATIVE(S). **The informed consent will be obtained before the participant's first exercise bout. The participant will complete the informed consent when they first arrive for their first exercise bout and it will be placed in their own folder that has a random number on it. Every participant will get assigned a random number. The folders which will contain the informed consent, health screening, PAR-Q, and scales will be placed in a locked cabniet.**
11b	**WAIVER OF SIGNED INFORMED CONSENT REQUIREMENT** TO REQUEST A WAIVER OF A SIGNED INFORMED CONSENT, COMPLETE THE FOLLOWING: ☐ The only record linking the subject and the research would be the consent document, and the principal risk will be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern. Section 46.117(c)1 ☐ The research presents no more than minimal risk of harm to the subjects, and involves no procedures, for which written consent is normally required outside of the research context. Section 46.117(c)2 ☐The research or demonstration project is to be conducted by or subject to the approval of state or local government officials and is designed to study, evaluate, or otherwise examine (i)public benefit or service programs; (ii)procedures for obtaining benefits or services under these programs; (iii)possible changes in or alternatives to those programs or procedures; or (iv)possible changes in methods or levels of payment for benefits or services under those programs; and the research could not practicably be carried out without the waiver or alteration. Section 46.116(c) ☐The research involves no more than minimal risk to the subjects, the waiver will not adversely affect the rights and welfare of the subjects, the research could not practicably be carried out without the waiver, and whenever appropriate, the subjects will be provided with additional pertinent information after participation. Section 46.116(d) **In cases where the documentation requirement is waived, the IRB may require the investigator to provide subjects with a written statement regarding the research.**
12.	STORAGE AND DISPOSAL OF DATA AND OTHER RESEARCH MATERIALS: A. How and where will the data and other research material be stored until no longer needed? **Hardcopy data and other research material will be stored in a locked cabinet in my advisor's office, which is locked. Electronic data will be stored on my office computer and my advisor's computer, which is password protected.** B. When will the disposal of data and research materials take place? **3 Years after March 2016.** *At a minimum, investigators must maintain research records for at least three (3) years after completion of the research. All records must be accessible for inspection and copying by authorized representatives of the IRB, any federal department or agency supporting the research, and sponsor, if any. (Source: 45CFR46.115) If the Principal Investigator is a student, then the faculty advisor will be responsible for the record retention. If you are a member of a professional association or society, you may be required by their practices to keep records longer than 3 years.*

	C. How will data and research materials be disposed ? **Data and research materials will be shredded after 3 years.**
13.	INDICATE ON THE CHECK LIST BELOW, ANY DOCUMENTS THAT APPLY TO YOUR RESEARCH AND ATTACH TO THIS PROTOCOL A COPY OF THE APPLICABLE DOCUMENT.
	☒ SURVEY INSTRUMENT AND/OR INTERVIEW QUESTIONAIRE ☒ INFORMED CONSENT AGREEMENT ☐ PARENTAL OR GUARDIAN PERMISSION FOR A MINOR CHILD TO PARTICIPATE IN A RESEARCH STUDY ☐ ASSENT TO PARTICIPATE IN A RESEARCH STUDY (AGES 7-14 YEARS) ☐ ASSENT TO PARTICIPATE IN A RESEARCH STUDY (AGES 15 – 17 YEARS) ☐ COPIES OF ANY OTHER MAIL TO BE DELIVERED TO RESPONDENTS OR SUBJECTS (E.G. COVER LETTERS, SCRIPTS OF VERBAL INSTRUCTIONS, ETC.
14.	☐ Yes ☒ No — DO YOU CONSIDER THIS RESEARCH EXEMPT FROM REVIEW BY THE HUMAN SUBJECTS COMMITTEE? IF YES, Please check the reason for exemption from the list below:
a.	☐ Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (a) research on regular and special education instructional strategies; or (b) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods [45CFR46(b)(1)]
b.	☐ Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement) survey procedures, interview procedures or observation of public behavior, unless (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subject at risk of criminal or civil liability or be damaging to the subjects' financial standing , employability or reputation. [45CFR46(b)(2)] Research involving children (subjects that have not attained the age of 18 years) is not exempt under this category unless the research involves only the observation of public behavior and the researchers do not participate or impact the activities being observed. [45CFR46.401(b)]
c.	☐ Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior if (a) the human subjects are elected or appointed public officials or candidates for public office; or (b) federal statute(s) without exemption that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter. [45CFR46(b)(3)]
d.	☐ Research involving the collection study of existing data, documents, records, pathological specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. [45CFR46(b)(4)]
e.	☐ Research and demonstration projects which are conducted by or subject to the approval of a **Federal** department or agency heads, and which are designed to study, evaluate, or otherwise examine; (a) public benefit or service programs of Federal programs; (b) procedures for obtaining benefits or services under those Federal programs; (c) possible changes in methods or alternatives to those Federal programs or procedures; or (d) possible changes in methods or levels of payment for benefits or services under those Federal programs. [45CFR46(b)(5)]
f.	☐ Taste and food quality evaluation and consumer acceptance studies, (a) if wholesome foods without additives are consumed; or (b) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture. [45CFR46(b)(6)]

Certifications

By my signature below, I certify that each of the named co-researchers has accepted his/her role in this study. I agree to not begin any research activity on this study until written approval by the IRB has been received. I agree to a continuing exchange of information with the Institutional Review Board (IRB). I agree to obtain IRB approval before making any changes or additions to the project. I will provide progress reports at least annually, or as requested. I agree to report promptly to the IRB all unanticipated problems or serious adverse events involving risk to human subjects. A copy of the informed consent will be given to each subject and the signed original will be retained in my files, unless a waiver of a signed informed consent has

been granted.

I further certify that I have successfully completed the following Human Subjects Training Course:

- ☐ **CITI – Biomedical Research Investigator**
- ☒ **CITI – Social and Behavioral Research Investigator**
- ☐ **CITI – Undergraduate Researcher**
- ☐ **CITI – IRB Member**

Signature of Researcher *Date*

By my signature below, I certify that I have reviewed this research study and agree to counsel the student researcher in all aspects of the research study.

I further certify that I have successfully completed the following Human Subjects Training Course:

- ☒ **CITI – Biomedical Research Investigator**
- ☒ **CITI – Social and Behavioral Research Investigator**
- ☐ **CITI – IRB Member**

If Student Researcher; Signature of Faculty Advisor *Date*

Approval by Department Chair of Researcher of Record *(Dean, if Chair is the Researcher or if Chair is otherwise unable to review.)*	
I have reviewed this research study. I believe the research is sound, that the study design and methods are adequate to achieve the study goals, and that there are appropriate resources (financial and otherwise) available to the researcher. I support the study, and hereby submit it for further review by the IRB.	
Signature of Department Head or Dean	*Date*

Note: Do not use personal home addresses and phone numbers on Informed Consent, Assent, Parental Permission or Debriefing statements.

IRB 9/21/2007

Winthrop University
Informed Consent Agreement

Researcher: Nicole Swank ☒Graduate Student ☐Undergraduate Student

Faculty Advisor: Dr. Janet Wojcik Faculty Advisor's Position: Associate Professor for PESH

Title of Study: The Effect of Music & Television Viewing on Enjoyment During Aerobic Exercise

You are invited to take part in a research study. Before you decide to be a part of this study, you need to understand the risks and benefits. This consent form provides information about the research study. I will be available to answer your questions and provide further explanations. If you take part in this research study, you will be asked to sign this consent form. Your decision to take part in this study is voluntary. You are free to choose whether or not you will take part in the study. If you should decide to participate, you may withdraw from the study at any time.

Purpose of the research study:

Researching if you experience more enjoyment on either the treadmill or elliptical while either watching television or listening to music compared to not watching television or listening to music.

Procedures or methods to be used in the study:

You will be participating in three 30-minute workouts. You will be randomized in 3 different conditions while working out on either the elliptical or treadmill. The three conditions include, television viewing, listening to music, and no TV or music. You will come to each workout with a prepared playlist or TV program because you won't know what condition you are in until you arrive to your scheduled workout. The researcher will check your heart rate, METs, and rates of perceived exertion every 5 minutes you are on the cardio machine. The American College of Sports Medicine recommends a healthy adult exercises 30 minutes of moderate intensity for 5 days a week. This study requires you to exercise on the treadmill or elliptical self-paced three times for 30 minutes; a total of 1 hour and 30 minutes. Between you and the researcher you will schedule your three 30-minute workouts. After each scheduled workout you will complete two surveys. The first survey is the Physical Activity Enjoyment Scale (PACES), which is a 16-item that begin with the stem "When I am physically active…". You rate each item on a 5-point Likert-type scale (1 = "disagree a lot" to 5 = "agree a lot"). The second survey is the Exercise-Induced Feeling Inventory (EFI), which is 12-items and you rate each item on a 5-point Likert-type scale (0 = "do not feel" to 4 = "feel very strongly"). This study will be some what of a time commitment. However, you will be assisting the researchers in their important study.

Possible Risks/Benefits Associated with Participating in Study:

Possible risks include, fatigue, light headedness, loss of breath, soreness, injury from cardio machine, sweating, muscle soreness. Also, if any injury occurs during the study you must go through your own insurance. Possible benefits is helping researchers understand how people enjoy exercise.

Possible Costs/Compensation Associated with Participating in Study:

There is no cost to participate in the study in that they are not paying any fees. Any injury that requires medical care will need to be followed up by the participant and paid through your own insurance.

Number of questions in the survey/questionnaire and anticipated time to complete the survey/questionnaire: You will complete 2 different surveys 3 times each; a total of 6 times by the end of the study. The anticipated time to complete 2 surveys after one scheduled workout is 12 minutes; totaling 36 minutes after 3 scheduled workouts. The first survey is the Physical Activity Enjoyment Scale (PACES), which is a 16-item that begin with the stem "When I am physically active…". You rate each item on a 5-point Likert-type scale (1 = "disagree a lot" to 5 = "agree a lot"). The second survey is the Exercise-Induced Feeling Inventory (EFI), which is 12-items and you rate each item on a 5-point Likert-type scale (0 = "do not feel" to 4 = "feel very strongly").

Right to withdraw from the study:

You have the right to withdraw from the study without penalty.

Privacy of records or other data collected in the study:

All records and data, such as, PAR-Q, health history, surveys will be visible to only the researcher (Nicole Swank) and Advisor (Dr. Janet Wojcik). All participant names will be assigned a random number. In other words, numbers cannot be traced to a name of the participant.

Questions – contact information:

If you have any questions about this study, you may contact me using my Winthrop email account: Nicole Swank

Or through my faculty advisor:
Address: 216 West Center
Work Phone: Email:

You may also contact:
Deborah Broome, Compliance Officer 803-323-2398 broomed@winthrop.edu
Sponsored Programs and Research
Winthrop University
Rock Hill, SC 29733

Signatures:

By signing this consent agreement, you agree that you have read this informed consent agreement, you understand what is involved, and you agree to take part in this study. You will receive a copy of this consent form.

_____ _____
Signature of Participant Date

_____ _____
Signature of Researcher Date

Debriefing Form

Thank you for participating in our *Effect of Music & Television Viewing on Enjoyment During Aerobic Exercise* study!

External stimuli during aerobic exercise is perceived benefit a number of ways, such as, perceived to suppress perceived exertion and physical pain, enhance work efficiency and increase physical performance, and mitigate unpleasant emotions and promote exercise motivation. The purpose of the study is to examine if television viewing and music will increase motivation and enjoyment and decrease perceived exertion during exercise. The true purpose of this study is to examine enjoyment and perceived exertion during aerobic activity. More specifically, participants are randomized in 3 conditions, television, music, and control. Participant's perceived exertion, METs and heart rate will be measured throughout the 30-minute exercise bout. Lastly, participants will complete an enjoyment and motivation scale.

If you are interested in learning the results of this study, please contact the researchers after Monday, April 25.

Researchers:

Nicole Swank

If you have any concerns regarding this study, please contact the faculty advisor or the Director of Sponsored Programs and Research.

Faculty Advisor:
Dr. Janet Wojcik

Sponsored Programs & Research:
Deborah Broome, Compliance Officer
(803) 323-2398
broomed@winthrop.edu

If anything about this survey caused you to feel uncomfortable, health and counseling services are available to you on the 2nd floor of Crawford. You can reach Counseling Services at (803) 323-2233 or get information at http://www.winthrop.edu/hcs/counselingservices-home.htm. All counseling services are free and confidential.

Appendix B

Health History & PAR-Q

Health History Screening Form (American Heart Association)

Assess your health status by marking all *true* statements

History
You have had:
___ a heart attack
___ heart surgery
___ cardiac catheterization
___ coronary angioplasty (PTCA)
___ pacemaker/implantable cardiac defibrillator/rhythm disturbance
___ heart valve disease
___ heart failure
___ heart transplantation
___ congenital heart disease

Symptoms
___ You experience chest discomfort with exertion
___ You experience unreasonable breathlessness
___ You experience dizziness, fainting, or blackouts
___ You experience ankle swelling
___ You experience unpleasant awareness of a forceful or rapid heart rate
___ You take heart medications

Other health issues
___ You have diabetes
___ You have asthma or other lung disease
___ You have burning or cramping sensation in your lower legs when walking short distance
___ You have musculoskeletal problems that limit your physical activity
___ You have concerns about the safety of exercise
___ You take prescription medications
___ You are pregnant

If you marked any of these statements in this section, consult your physician or other appropriate health care provider before engaging in exercise. You may need to use a facility with a ***medically qualified staff****.*

Cardiovascular risk factors
___ You are a man ≥45 yr
___ You are a woman ≥55 yr
___ You smoke or quit smoking within the previous 6 mo
___ Your blood pressure is ≥140/90 mm Hg
___ You do not know your blood pressure
___ You take blood pressure medication
___ Your blood cholesterol level is ≥200 mg · dL^{-1}
___ You do not know your cholesterol level
___ You have a close blood relative who had a heart attack or heart surgery before age 55 (father or brother) or age 65 (mother or sister)
___ You are physically inactive (*i.e.*, you get <30 min of physical activity on at least 3 d per week)
___ You have a body mass index ≥30 kg · m^{-2}
___ You have prediabetes
___ You do not know if you have prediabetes

If you marked two or more of the statements in this section you should consult your physician or other appropriate health care as part of good medical care and progress gradually with your exercise program. You might benefit from using a facility with a ***professionally qualified exercise staff****[a] to guide your exercise program.*

___ None of the above

You should be able to exercise safely without consulting your physician or other appropriate health care provider in a self-guide program or almost any facility that meets your exercise program needs.

[a]Professionally qualified exercise staff refers to appropriately trained individuals who possess academic training, practical and clinical knowledge, skills, and abilities commensurate with the credentials defined in *Appendix D*.

Physical Activity Readiness Questionnaire (PAR-Q) and You

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly:

YES	NO		
☐	☐	1.	Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
☐	☐	2.	Do you feel pain in your chest when you do physical activity?
☐	☐	3.	In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4.	Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5.	Do you have a bone or joint problem that could be made worse by a change in your physical activity?
☐	☐	6.	Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7.	Do you know of any other reason why you should not do physical activity?

If you answered:

YES to one or more questions

Talk to your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want – as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- Start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- Take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

Delay becoming much more active:

- If you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- If you are or may be pregnant – talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed use of the PAR-Q: Reprinted from ACSM's Health/Fitness Facility Standards and Guidelines, 1997 by American College of Sports Medicine

Appendix C

Recruitment Flyer

PARTICIPATE IN AEROBIC ACTIVITY RESEARCH FOCUSING ON ENJOYMENT AND PERCEIVED EXERTION

- Are you a male/female Student between the ages 18-30?
- Is you BMI 18.5-30?
- Are you free from orthopedic problems and chronic diseases such as, coronary heart disease, diabetes, and lung disease?
- Are you currently NOT pregnant?

For additional information or to participate in our study,

Contact Nicole Swank:

If you meet the above criteria, please contact us to see how you can help us examine the effects of enjoyment and perceived exertion during aerobic activity.

Participants will schedule three 30-minute aerobic workouts on the treadmill or elliptical while either listening to music, watching TV, or no electronics.

Appendix D

Data Collection Form

M or F Participant ID Number:

The Effect of Music & Television Viewing on Enjoyment During Aerobic Exercise

Type of cardio machine: Treadmill Elliptical

Type of condition: Television Control Music

Age: Weight: Height: BMI:

Age-predicted max HR (220-age): 85% age-predicted max HR:

Type of cardio machine

	RPE	Heart Rate	METs	WATT
5 min				
10 min				
15 min				
20 min				
25 min				
30 min				

Treadmill

Speed:

Incline:

Distance:

Elliptical

Cross Ramp:

Resistance:

Distance:

Appendix E

Physical Activity Enjoyment Scale and

Exercise-Induced Feeling State Scale

Condition: Participant ID Number:

The Physical Activity Enjoyment Scale (PACES)

Directions: Please use the following scale to indicate the extent to which each statement below describes how you feel at this moment in time. Record your responses by circling the appropriate number.

Stem: When I am physically active…

	Disagree a Lot	*Disagree Slightly*	*Agree Moderately*	*Agree Strongly*	*Agree a Lot*
1. I enjoy it	1	2	3	4	5
2. I feel bored	1	2	3	4	5
3. I dislike it	1	2	3	4	5
4. I find it pleasurable	1	2	3	4	5
5. It's no fun at all	1	2	3	4	5
6. It gives me energy	1	2	3	4	5
7. It makes me sad	1	2	3	4	5
8. It's very pleasant	1	2	3	4	5
9. My body feels good	1	2	3	4	5
10. I get something out of it	1	2	3	4	5
11. It's very exciting	1	2	3	4	5
12. It frustrates me	1	2	3	4	5
13. It's not at all interesting	1	2	3	4	5
14. It gives me strong feeling of success	1	2	3	4	5
15. It feels good	1	2	3	4	5
16. I feel as though I would rather be doing something else	1	2	3	4	5

Condition: Participant ID Number:

Exercise-Induced Feeling States Scale

Directions: Use the following scale to indicate the extent to which each word below describes how you feel at this moment in time. Record your responses by circling the appropriate number.

	Do Not Feel	*Feel Slightly*	*Feel Moderately*	*Feel Strongly*	*Feel Very Strongly*
1. Upbeat	0	1	2	3	4
2. Calm	0	1	2	3	4
3. Energetic	0	1	2	3	4
4. Tired	0	1	2	3	4
5. Peaceful	0	1	2	3	4
6. Miserable	0	1	2	3	4
7. Worn-Out	0	1	2	3	4
8. Relaxed	0	1	2	3	4
9. Fatigued	0	1	2	3	4
10. Discouraged	0	1	2	3	4
11. Enthusiastic	0	1	2	3	4
12. Crummy	0	1	2	3	4

Appendix F

Raw Data

ID	GENDER	MACHINE	AGE	WEIGHT	HEIGHT	BMI	MAXHR-220	MAXHR-85
5001	2	2	21	140.75	5'6	22.7	199	169.15
5002	2	1	20	122	5'3.5	21.3	200	170
5003	2	2	19	117	5'6	18.9	201	170.85
5004	2	1	19	126	5'3	22.3	201	170.85
5005	2	2	21	149.1	5'5	24.8	199	169.15
5006	1	2	19	178	6'2.5	22.5	201	170.85
5007	2	1	18	123.6	5'2.5	22.2	202	171.7
5008	1	1	19	168.2	5'8.5	25.2	201	170.85
5009	2	2	19	123	4'11	24.8	201	170.85
5010	2	2	20	127.4	5'4	21.9	200	170
5011	2	2	21	138.5	5'8	21.1	199	169.15
5012	2	1	21	143	5'4	24.5	199	169.15
5013	1	1	22	205.6	6'2	26.4	198	168.3
5014	2	2	21	136.2	5'2	24.9	199	169.15
5015	1	1	21	190	5'8	28.9	199	169.15
5016	1	1	25	154.6	5'10	22.2	195	165.75
5017	1	2	26	220.4	6'2	28.3	194	164.9
5018	2	2	21	129.8	5'1.2	24.4	199	169.15
5019	1	2	22	146.4	5'5	24.4	198	168.3
5020	2	2	27	123	5'1.5	22.9	193	164.05
5021	1	1	22	201.4	6'6	23.3	198	168.3
5022	2	1	21	142.6	5'8	21.7	199	169.15
5023	1	1	23	166.6	6'1	22	197	167.45
5024	1	2	22	176.8	5'8	26.9	198	168.3
5025	1	1	21	201.3	5'10	28.9	199	169.15
5026	2	2	21	160	5'9	23.6	199	169.15
5027	1	1	21	174.6	5'7	27.3	199	169.15
5028	2	1	21	155.6	5'2	28.5	199	169.15
5029	1	1	22	177	5'9	26.1	198	168.3
5030	1	1	19	182.8	5'7	28.6	201	170.85
	M-1	Treadmill-1						
	F-2	Elliptical-2						

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