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Heart Rate Responses to Preferred Music During Progressive Cycling

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ABSTRACT

It is very important to get younger adults exercising because exercise will help to increase their quality of life. Once younger adults decide to start a fitness program, every effort needs to be made to keep them from dropping out. One way to accomplish this is to give them a workout that they enjoy and that they perceive to be beneficial to their well-being. In an aerobic exercise program, preferred music may be a major contributor to making a workout more enjoyable. It also provides the rhythm needed to promote continual movements that may help to increase the heart rate, therefore, increasing the intensity of the workout. Aerobic cycling training is the exercise of choice for many younger adults who decide to start a fitness program. Some studies indicated that music had a significantly positive effect, negative effect and no effect on heart rate. The combined results of all the studies that examined music's effect on heart rate were conflicting. Therefore, this study is to investigate preferred music's effect on heart rate during progressives cycle exercise. The purpose of this study was to examine the preferred music's effect on heart rate of untrained young adult's male's participation during progressive ergo meters cycling. The independent variable was music and the two music conditions were preferred music and no music. The dependant variable was the heart rate, which was measured with the use of beurer heart rate monitor PM45, Beurer GmbH. Germany. The participants were 15 untrained young adult's males that randomly selected from 20 students [Age (yrs): 24.65 ± 2.41 and BMI (Kg/m^2): 22.64 ± 2.58] in a stationary bike cycling class. During the first class session of the study, the participants learned how to use the heart rate monitors and how to exercise with stationary bike cycle (Elema – Schonander, EM.36, 1.1, FABISO3; Germany) based on the YMCA's sub maximal cycle test protocol without music. The firs workload set as warm up period [19]. During the next class session, preferred music condition was used. Finally, during last session no music was used. The exercises and order of exercise in each session was consistent. In order to determine if music had an effect on the subject's heart rate, heart rate was measured in last 30 second of each workload. A two-tailed independent samples t test indicated no significant differences in the heart rate scores in the three workloads between training & preferred music and training & no-music conditions. A one-way ANOVA for repeated measure indicated significant differences in the heart rate scores between three workloads in the training & preferred music (P≤0.001) and the training & no-music (P≤0.001) conditions. Significant increment of mean scores of heart rate in the training & preferred music and the training & no-music conditions associated with increment of workload and intensity of cycling and significantly differences between workloads. While this study included unique participants (untrained young adult males) and unique exercise program (progressive ergo meter cycling), it was expected that the results would indicate that the use of preferred music would have not a positive effect on heart rate, but increment of workload would have a positive effect on heart rate. The participants in this study showed no significant differences in heart rate when exercising to the preferred and no music conditions. The results from this study do not add evidence that the preferred music has a significant positive effect on heart rate during exercise. Future studies may shed more light on this issue.

Key Word: Music, Cycling, Heart Rate, Exercise.

INTRODUCTION

In the past decades, there has been an increased participation in activities to promote fitness. Aerobic exercises such as running and cycling have all been created to allow people who were not interested in other sports and exercises

[2, 17]. Aerobic physical activity helps in controlling obesity, stress, and hypercholesterolemia; reduces the risk of hypertension, diabetes, and coronary heart disease [6, 17, 33]. However, fitness professionals realize that for complete benefit it is important not only to recruit these participants in recreational programs, but also to retain them. Music has been suggested as an important component of mood enhancement and may help to make the workout more enjoyable and more beneficial for these individuals [10, 26]. Music may aid in fostering recall of pleasurable memories and this may help to block the unpleasant feelings that could surface while working out [14].

Music has been used in exercise classes for many decades. With the arrival of aerobics, music took on a more important role in providing a way for people to have more fun and enjoyment while exercising. Many exercise programs today use some type of music to enhance the physical and physiological responses of the participants. Music has the potential to affect people in a variety of ways. It can increase muscular energy, increase molecular energy, alter metabolism, influence heart rate, help to release emotions, relieve fatigue, speed recovery and healing after training, and stimulate thinking, sensitivity, and creativity [10, 30].

While music may contribute to an overall sense of enjoyment while exercising, it is also important to consider the specific effects music has on exercise participants. A determination needs to be made concerning the effects of music on how hard people actually exercise, how hard they perceive the exercise to be, and how good they feel while exercising. If the research indicates that there is a significant positive difference in performance or attitude during exercise with the addition of music, then the instructors may decide to use music during their classes. Additionally, instructors need to consider whether their choices of music make a difference on (a) how the participants feel during exercise and (b) how hard they exert themselves. If it is shown that there is not a significant difference in performance or attitude during exercise using either preferred or no preferred music, instructors may decide to use music that they themselves prefer and not have to worry that the class will suffer because of possibly choosing the wrong music.

Many studies have been conducted to determine music's effect on people's physical and physiological responses. These studies have had results indicate music does, indeed, have an effect on people. While music has been shown to affect people in a variety of ways, the focus of this literature review will be on how music affects people both physiologically and psychologically when exercising. Various aspects of the use of music during exercise have been studied. Researchers have examined the use of slow music, fast music, and no music [3, 9, 12, 16]; the use of music and no music [29, 23]; the use of self-selected music and no music [9, 18, 20, 22]; the use of different styles of music and no music [24]; and the use of preferred music and no preferred music [10, 21].

Many studies have been conducted that focus on whether the use of preferred music has an effect on aspects of exercise such as performance, heart rate and perceived exertion. Becker (1995) found that preferred music increased the performance levels of the participants on stationary bikes and walking exercises. The researchers concluded it was no preferred music that was a major factor as to why the participants did not make any improvements. Pates (2003) reported that the participants in their study improved their performance in the preferred music condition. Many studies indicated that performance was enhanced with the use of music; especially preferred music [10, 16, 34]. There are, however, many studies that have indicated the opposite results [13, 23]. More research is needed concerning the specific effects of music on exercise participants because results from previous studies are both inconclusive and conflicting.

Studies have also been conducted in an attempt to find out whether heart rate is affected by music. Beckett (1990) pointed out that music during walking had a significant effect on college students' recovery heart rate. The results from this study showed that music could help to improve recovery heart rate [4]. Uppal (1990) conducted a study on junior high school girls to determine whether music had an effect on increasing heart rate while exercising. Since it is important for the heart rate to be raised during exercise to get the maximum benefit, this factor is an important one to consider. The results of the study indicated that music was significantly effective at increasing heart rate [29]. Szmedra (1998) conducted study on men, ages 19 to 32, performing a treadmill exercise and concluded that exercising to headphone music significantly lowered the heart rate of the participants [25]. Copeland (1991) conducted a study on college students exercising on treadmills and reported that heart rate was significantly lower in the music condition (headphone music) as compared to heart rate in the no-music condition [8]. Yamashita (2006) concluded that there were no significant differences in the heart rate of the college students when exercising on a cycle ergo meter with or without music. The three conditions used in this study included preferred music, no music, and a control group [35]. Ferguson (1993) discovered that there were no significant differences in the heart rate of

the college students exercising on cycle ergo meters to fast rock music, slow classical music, and no music [12]. Potteiger (2000) found no difference in the heart rate of the physically active subjects' ages 18 to 30 exercising on a cycle ergo meter in the following music conditions: any music, fast music, classical music, and preferred music [22]. Szabo (1999) found no difference in the heart rate among university students exercising to no music, slow music, fast music, slow-to-fast music, and fast-to-slow music [24]. Patton (1991) conducted a study on participants in an aerobic dance class, finding no significant difference between the heart rate during preferred music and no preferred music [21]. Abraham (1999) concluded that there were no significant differences in the heart rate of the female college students performing a maximal graded treadmill walking exercise to fast tempo music, slow tempo music, and no music [1]. Finally Tenenbaum (2004) reported that the university students running in two different conditions (on treadmills and outside in a natural setting) had no significant differences in heart rate when exercising in the preferred music and the no-music conditions [26]. It is indicated by the research included in this review that there are conflicting results in regard to music's effect on the heart rate. Some studies indicated that music had a significantly positive effect on heart rate [7]; some studies indicated that music had a significantly negative effect on heart rate, and other studies have indicated that music had no significant effect on heart rate [5]. It appears, however, that when participants were either given a choice of music or were able to exercise to preferred music, the results indicated that music had a favorable effect on heart rate. The combined results of all the studies that examined music's effect on heart rate were conflicting. Therefore, this study is to investigate preferred music's effect on heart rate during progressives cycle exercise. Will there be a statistically significant difference in the heart rate of a group of younger males participating in progressive cycle exercise in the following music conditions: preferred and no music?

MATERIALS AND METHODS

The purpose of this study was to examine the preferred music's effect on heart rate of untrained young adult's male's participation during progressive ergo meters cycling. The independent variable was music and the two music conditions were preferred music and no music. The dependant variable was the heart rate, which was measured with the use of beurer heart rate monitor PM45, Beurer GmbH. Germany. The participants were 15 untrained young adult's males that randomly selected from 20 students [Age (yrs): 24.65 ± 2.41 and BMI (Kg/m^2): 22.64 ± 2.58] in a stationary bike cycling class. All the subjects were informed of their rights to anonymity and confidentiality. The Institutional Review Board for Human Subjects at The Islamic Azad University approved this study in March 2010. In order to participate in the study 15 the subjects signed an informed consent form. At the onset of the study, the subjects were not informed about the purpose of the study; they were only told that the results would help trainers to develop better strategies for improving methods of training. The research study was conducted at a local indoor aerobic club in the university during the spring of 2010. Before the testing began, the participants filled out a survey containing a list of five groups of Iranian music selections. They were asked to rate these groups of music from 1 (*least preferred*) to 5 (*most preferred*) and the music used in the preferred music condition was determined by using a number scale. During the first class session of the study, the participants learned how to use the heart rate monitors and how to exercise with stationary bike cycle (Elema – Schonander, EM.36, 1.1, FABISO3; Germany) based on the YMCA's sub maximal cycle test protocol without music. The firs workload set as warm up period [19]. During the next class session, preferred music condition was used. Finally, during last session no music was used. The exercises and order of exercise in each session was consistent. All subjects exercised alone in all two music conditions (preferred music, and no music) by used headphone. Data was collected from each section during three class sessions over a one week period. In order to determine if music had an effect on the subject's heart rate, heart rate was measured in last 30 second of each workload. In order to determine whether there were any statistically significant differences in the heart rate of subjects during cycle ergo meter exercise, a two-tailed independent samples t test was used for comparing of heart rate means between the training & preferred music group and the training & no-music group. A one-way ANOVA was used to determine whether there were any statistically significant differences at the .05 alpha levels in the heart rates of untrained young adult's males participation during progressive ergo meters cycle exercising to preferred music and no music conditions.

RESULTS AND DISCUSSION

It was hypothesized that there would be no significant differences in heart rate in the training & preferred music and the training & no-music conditions. The mean heart rate scores in training & no-music condition were 112.66 ± 8.37 (bpm), 127.33 ± 12.88 (bpm), and 137.20 ± 15.78 (bpm) for 2^{nd}, 3^{rd}, and 4^{th} workloads; respectively. The mean heart rate scores in training & preferred music condition were 117.26 ± 9.93 (bpm), 133.20 ± 13.28 (bpm), and 142.40 ±

15.44 (bpm) for 2nd, 3rd, and 4th workloads; respectively. A two-tailed independent samples t test indicated no significant differences in the heart rate scores in the three workloads between training & preferred music and training & no-music conditions (see Table 1). A one-way ANOVA for repeated measure indicated significant differences in the heart rate scores between three workloads in the training & preferred music (P≤0.001) and the training & no-music (P≤0.001) conditions. Significant increment of mean scores of heart rate in the training & preferred music (P≤0.001) and the training & no-music (P≤0.001) conditions associated with increment of workload and intensity of cycling and significantly differences between workloads.

Table1. Two-tailed independent samples t test for equality of heart rate means between training & no-music and training & preferred music conditions (P≤0.05)

Variable	Workload	Groups	n	Mean	SD	t	df	sig
Heart rate	2nd	Training	15	112.66	8.37	1.372	28	0.181
		Training & Music	15	117.26	9.93			
	3rd	Training	15	127.33	12.88	1.228	28	0.230
		Training & Music	15	133.20	13.28			
	4th	Training	15	137.20	15.78	0.912	28	0.369
		Training & Music	15	142.40	15.44			

he purpose of this study was to determine the effect of preferred music on heart rate in a bike cycle exercise program. The review of the literature indicated that preferred music had a significantly positive effect, negative effect and no effect on heart rate. The results of the studies that examined music's effect on heart rate were conflicting. While this study included unique participants (untrained young adult males) and unique exercise program (progressive ergo meter cycling), it was expected that the results would indicate that the use of preferred music would have not a positive effect on heart rate, but increment of workload would have a positive effect on heart rate. The participants in this study showed no differences in heart rate when exercising to the preferred and no music conditions.

There were several limitations of this study. The first limitation was due to the participants being unable to listen to the music selections before rating them on a scale of 1 (*least preferred)* to 5 (*most preferred)*. Time constraints made it impossible for the participants to listen to all the music selections before the study began. The participants may not have been familiar with the names of the songs listed for each music group and, therefore, may not have been able to correctly rate the music group selections. The second limitation of the study had to do with not being able to get an accurate resting heart rate before the participants started exercise program. Obtaining an accurate resting heart rate would have helped to determine the actual increase of heart rate due to exercise. Because of the large number of participants in the class, it was difficult to get the participants to stop long enough to get an accurate resting heart rate. The third limitation was not requiring the subjects to complete a medical history before beginning the study. Even though the participants provided the instructor with a list of the medications that would affect their heart rate, a complete medical history would have added evidence that having chronic diseases does not affect the ability of subjects to accurately heart rate during exercise program. The results from this study indicate that instructor choice of music may not affect participant heart rate. Therefore, since research indicates that instructor enthusiasm is a very important element in enhancing participants' workouts, it may be more beneficial for instructors to choose music that motivates themselves than choosing music that they feel the participants would enjoy. Because little research has been conducted to support this belief, the best scenario would be for instructors to choose music that both they and their participants enjoy [11, 15, 27, 28, 31, 32].

CONCLUSION

The overall results of this study indicate that training & preferred music and training & no music conditions have the same impact on the heart rate of untrained young adult's male's participation during progressive ergo meters cycling. The results from this study do not add evidence that music has a significant positive effect on heart rate during exercise. A mixed-method research study that consists of both quantitative and qualitative methodology may better help to understand the extent to which music actually enhances participant benefits while exercising. Future studies may shed more light on this issue.

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