Effects of Different Genres on the Rate of Perceived Exertion and Heart Rate while Warming Up

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ABSTRACT

The purpose of the present study was to investigate the effect of different types of genres (music) on Rate of Perceived Exertion (RPE) and Heart Rate (HR) while warming up. For this purpose, 28 candidates were volunteered. The repeated measures design was used for the study by counterbalancing the treatments. The initial treatment was the control treatment (no music) and later three groups workout counterbalance by treatment. The RPE and HR after warm-up were collected as data. Statistical test of descriptive studies was done. Repeated measures ANOVA, was performed independently on RPE in HR. The results showed significant difference between treatment. Descriptive statistics show that RPE is low for Motivational Music (MM). Electronic Dance Music (EDM) has higher HR but less RPE compared to the no music condition. Silent Music (SM) has higher RPE then MM and HR are almost equal to MM and lower than EDM and no music. In generally it can be concluded that motivational songs have aerogenic capacity to reduce RPE. EDM music has higher pulse rising capacity. SM has calming capacity.

Keywords : *Music, Genre, Rate of Perceived Exertion, Heart Rate, Warming Up*

Introduction

Mankind has revealed the motivational role of music on performance of different moves centuries ago. Many of athletes of track and field, ice skiing, cycling etc. are occasionally observed wearing earphones or headphones while being focused on potential events (Keihani and Shariatpanahi, 2008). Results of the recent studies show that music is applied in sports in four main ways including: 1) Simultaneous with performance of activity; 2) Asynchronous with performance of activity; 3) Prior to performance of activity and while warming up and 4) Music therapy.

With respect to the great effects of warming up on performance of athletes, researchers have been continuously endeavouring to find solutions for improvement of quality of

warming up. As it was mentioned, one of these methods which have been significantly employed during the past few years is using music while warming up. (Lanzino et al, 2001) used applied playing music while warming up on optimization of athletes' mental states prior to main events.

Different types of music differ in genre, rhythm, intensity, and pitch. However, the entire most recent studies have revealed a calming effect for music. In addition, it has been turned out that music can create a state of awareness and motivation for those who play sports that require less focus, attention and free from distractibility. Considering the motivational role of music, subjects take more joy from exercising and the former increases the athletes' interest in participation in exercises that require more strength and power (Crust and Clough, 2006). In spite, there are almost none researches in India, which have investigated the effects of different genres (types) of music on rate of perceived exertion and heart rate of individual while warming up for exercise or further physical activity. This trend can be helpful for development of related fields of study and therefore, the present research is aimed providing answer to this question: What are the effects of different genres (types) of music on rate of perceived exertion and heart rate while warming up.

Methodology

The study is a quasi-experimental using a repeated measures design. The treatment of different music genres (types) was given three times on same warm up routine. Between treatments there was time-period of five to seven days for washout effect. There were three groups for counter-balancing the treatment.

Sample

Population of present study consisted of students of Master of Physical Education, Bachelor of Physical Education and some interested outsiders ageing between 18 to 28 years. The sample of the study was volunteered individuals for the study (N=28). The individuals were briefed about the procedure study to be conducted.

Music preferences

There were three musical treatments in this research, Motivational Music (MM), Silent Music (SM) and Electronic Dance Music (EDM). Since musical preference is a personal issue. The music tracks selected for treatment were from personal experience of researcher and expert suggestions. Music tracks were made by mixing various music tracks according to category that is motivational and silent songs. Four to five songs were mixed approximately about 1 to 1:30 minutes of each track. Total length of track was approximately 7 minutes. For EDM a famous trance of Toni Igy, Astronomia was played.

Tools

Two tools were used in the study.

- **Rate of perceived exertion (RPE) :** The 10-point scale of rate of perceived exertion was used to describe the maximum exertion occurred while performing the warm-up. The participants reported their RPE after the warm-up.
- **Heart rate (HR) :** The heart rate was measured immediately after the warm-up. Heart rate was measured for 10 seconds and then converted into beats per minute.

Research Procedure

This research implements a counterbalanced repeated measures design. Three groups were given all treatments of music genres (types) at different sequence of genres. The briefing about RPE was done before each treatment. The gap between each treatment of music was approximately five to seven days. Volunteers were not informed about treatment to be given while warming up. The music of treatments was played using same speaker and on same volume at each treatment.

Statistical methods

Data analysis was done using descriptive and inferential statistics. Descriptive statistics consist of average and standard deviation. Inferential statistics was done considering the data hypothetically as a normal distribution. Repeated measures ANOVA test was done using MS Excel software at significance of 0.05%.

Results

Results of rate of perceived exertion (RPE):

Table 1 : Descriptive Statistics of RPE (N=28)

	Minimum	Maximum	Mean	Std. Deviation
Motivational RPE	5.00	8.00	5.500	0.923
Silent RPE	5.00	8.00	6.857	0.756
EDM RPE	6.00	8.00	7.000	0.544
No music RPE	6.00	8.00	7.000	0.667

Descriptive statistics of rate of perceived exertion (RPE) of individuals (N=28) while warm up with different music treatments is shown in above table. Motivational music treatment has average RPE of (mean ± SD) 5.5 ± .923 with minimum RPE of 5 and maximum RPE of 8. Silent music treatment has average RPE of 6.86 ± .756 with minimum

RPE of 5 and maximum RPE of 8. EDM treatment has average RPE of 7.0 ± .544 with minimum RPE of 6 and maximum RPE of 8. No music treatment has average RPE of 7.0 ± .667 with minimum RPE of 6 and maximum RPE of 8.

Table 2 : ANOVA of RPE

Source of Variation	SS	Df	MS	f	P-value	F critical
Between Groups	44.68	3	14.89	27.53	0.00	2.688
Within groups	58.42	108	0.54			
Total	103.10	111				

In above table 4.2 for RPE, the obtained F value (27.53) for treatments exceeds the critical F value at 0.05 level of significance. Therefore, the obtained F (27.53) for RPE is declared highly significant. The 'P' value is 0.00, which means there is significant difference. It can be concluded that there is significant difference between the treatments.

Results of heart rate (HR):

Table 3 : Descriptive Statistics of HR (N=28)

	Minimum	Maximum	Mean	Std. Deviation
Motivational RPE	120.00	156.00	136.71	9.28
Silent RPE	120.00	156.00	137.57	11.18
EDM RPE	132.00	168.00	145.50	9.60
No music RPE	132.00	156.00	143.14	8.59

Descriptive statistics of heart rate of individuals (N=28) is shown in above table. Motivational music treatment has average heart rate of (mean ± SD) 136.71 ± 9.289 with minimum heart rate of 120 beats per minute (BPM) and maximum of 150 BPM. Silent music treatment has average heart rate of 137.57 ± 11.186 with minimum heart rate of 120 beats per minute (BPM) and maximum of 156 BPM. EDM treatment has average heart rate of 145.5 ± 9.609 with minimum heart rate of 132 beats per minute (BPM) and maximum of 168 BPM. No music treatment has average heart rate of 143.14 ± 8.596 with minimum heart rate of 132 beats per minute (BPM) and maximum of 156 BPM.

We can see there is difference between the means of the treatments. To check the significant difference between the treatments repeated measures ANOVA was used for further analysis.

Table 4 : ANOVA of HR

Source of Variation	SS	Df	MS	f	P-value	F critical
Between Groups	1709	3	569.66	5.38	0.001	2.688
Within groups	11415.43	108	105.69			
Total	13124.43	111				

In above table for HR, the obtained F value (5.389) for treatments exceeds the critical F value at 0.05 level of significance. Therefore, the obtained F (5.389) for RPE is declared highly significant. The 'P' value is equal to 0.0017, which means there is significant difference. It can be concluded that there is significant difference between the treatments.

Result of comparison of the heart rate and rate of perceived exertion at each treatment:

Table 5 : Average HR and RPE

	Motivational	Silent	MBM	No Music
HR	136.71	137.57	145.5	143.17
RPE	5.43	6.86	7	7

From above table 5 and figure 1 we can see HR and RPE for the same treatment and can compare within treatment. The heart rate and rate of perceived exertion of motivational music is less compared to EDM and no music treatment. RPE of motivational music is far less than silent music. HR of EDM music is highest and higher than no music but they have same RPE. Heart rate of silent music is far less compared to EDM and no music treatment, but RPE of silent music is slightly less than EDM and no music treatment.

Discussion

Warm up before any physical activity is a necessary activity to be performed. Warm up makes individual physically and mentally ready for further activity. Much research had been done to improve warm up. Nowadays it can be seen music in any activity. The effect of music has been researched for more than a decade by many researchers. Various genre of music has certain effect on their rhythm. As RPE can directly relate to tiredness while performing activity. HR can represent to intensity of the warm-up activity performed. For this reason, the present study has tried to investigate the effects of listening to different genre (types) of music on RPE and HR. Our observations in this study related to RPE and HR showed that motivational songs have lower RPE and moderate level of HR compared to other conditions. EDM increased HR and keeping RPE equal to no music condition. (Karageorghis et al. 1996) investigated different types of predetermined music on grip strength. They used stimulative and sedative music

in which stimulative music was characterized by 134 beats per min, whereas sedative music measured 90 beats per min and found stimulative music to have a positive effect on strength. (Sabaghian and Hafezi 2013) carried out a study named as effects of motivational music during exercising on performance of teenage swimmer females. They investigated the effects of motivational music on performance of 30 elite female swimmers and concluded that no significant difference existed among the experimental and control group in terms of performance.

Conclusion

The purpose of the study was to investigate the effect of different genre (types) of music on RPE and HR while warming up. It can be concluded that motivational music has a significant effect on RPE and HR. EDM music raises HR and somewhat reduces the RPE than control condition (no music). In generally, it can be concluded that motivational songs have ergogenic capacity to reduce RPE. EDM music has higher pulse raising capacity. Silent music has calming capacity. So, it can be suggested that motivational music can be played while warming up before activity.

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