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EFFECT OF SLOW AND FAST TEMPO OF MUSIC ON VO2 MAX AND RATE OF PERCIEVED EXERTION ON YOUNG ADULTS

Shilpa Jain[1], Sapna Dhiman[2] Dr Charu Sharma[3]
[1, 2] Assistant Professor, Delhi Pharmaceutical Sciences & Research University, New Delhi
[3] Assistant Professor, SBMN College of Physiotherapy, BMU

Background

Skinner B.F have developed the theory that one's behaviour is influenced by external factors, such as the environment. One motivating stimulus that may produce an increased drive is certainly **noise** which may have a facilitative effect on one's performance. The organisation of sounds with some degree of rhythm, melody and harmony is called **music**. Rhythm response, musicality, cultural impact, and association contribute to the motivational qualities of a piece of music. Aerobic training is associated with metabolic, cardiovascular and pulmonary adaptation which can be monitored by maximal oxygen consumption (VO_2 MAX).

Research Question
Is there any difference between the effects of fast and slow tempo of music on VO_2 MAX and Rate of perceived exertion (RPE) after 2 weeks of aerobic training?

Aim of the Study
To compare the effectiveness between stimulative music, sedative music and music silence

Hypothesis
There will be significant difference between the fast and slow tempo of music on VO_2 MAX and RPE

Null Hypothesis
There will not be significant difference between the fast and slow tempo of music on VO_2 MAX and RPE.

Sample Size
Thirty healthy volunteers with mean age 21.53 ± 2.45 participated in the study i.e. 15 girls and 15 boys

Study Design
The study design is experimental and comparative in nature

Selection Criteria

Inclusion criteria

1. Normal (physically and mentally fit) subjects between 18-26yrs of age.
2. Both male and female were taken as subjects.
3. Who did not participate in any form of exercise training during the course of study.

Normal BMI between 18.5-24.9 (BMI classification by W.H.O)

Exclusion criteria

1. Musculoskeletal disorders like any deformities or any soft tissue injuries.
2. Auditory disorders like tinnitus etc.
3. Psychological disorders
4. Subjects whose not interested in listening music
5. Not able to understand or respond

Variables

Independent variables

1. Stimulative (fast) music
2. Sedative (slow) music

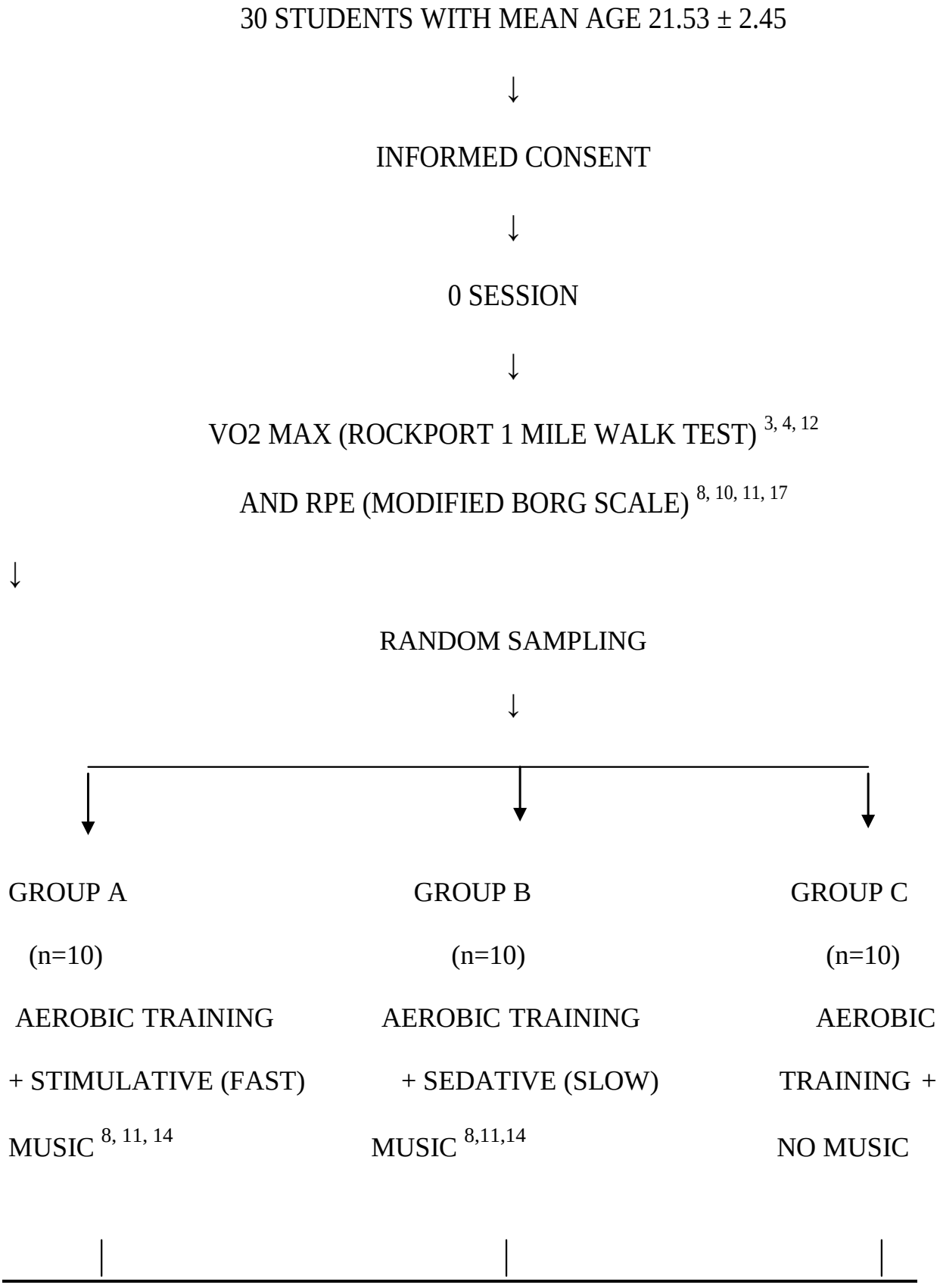
Dependent variables

1. Maximal oxygen consumption (VO_2max)
2. Rate of perceived exertion (RPE)

Instrumentation

1. Motorized Treadmill
2. Finger Pulse Oxymeter
3. Weighing Machine
4. Depth caliper
5. MP3 Player
6. Stop Watch

Protocol


30 STUDENTS WITH MEAN AGE 21.53 ± 2.45
INFORMED CONSENT
0 SESSION
VO2 MAX (ROCKPORT 1 MILE WALK TEST) [3, 4, 12]
AND RPE (MODIFIED BORG SCALE) [8, 10, 11, 17]
RANDOM SAMPLING
GROUP A (n=10) AEROBIC TRAINING + STIMULATIVE (FAST) MUSIC [8, 11, 14]
GROUP B (n=10) AEROBIC TRAINING + SEDATIVE (SLOW) MUSIC [8,11,14]
GROUP C (n=10) AEROBIC TRAINING + NO MUSIC

AEROBIC EXERCISE

INTENSITY- 60%-70% VO_2 MAX

DURATION- 20 MINS[10, 11, 16], WITH EXTRA 5 MINS OF WARMUP

AND 5 MINS OF COOL DOWN (TOTAL 30 MINS)

FREQUENCY- 3 TIMES/WEEK FOR 2 WEEKS

(TOTAL 6 SESSIONS) [1, 2, 7]

Need of Study

- This study will serve to temper athlete's pre-fight anxiety, reduce tension, and create an inner state of calm and tranquillity and will make the training sessions more pleasurable.
- The reduced perception of effort will automatically extend the exercise duration while greatly enhancing in-task affect and enjoyment.
- The lyric reinforces the need for athletes to push their boundaries and improves their motor skills.

Data Analysis

- One way ANOVA has been performed comparing the mean of VO_2 max and RPE at 0 session between group A, B, and C.
- Also (0-6) session mean differences of VO_2 max and RPE was compared between group A, B and C, through one way ANOVA.
- Post hoc test to identify the best group among the three
- Paired t-test has been performed for comparing the VO_2 max and RPE between 0 and 6 sessions within the groups i.e. A, B, and C.
- Significance level has been selected as 0.05

Result

Table 1: Comparison of mean value for VO2 max at 0 and MD (0-6) Sessions be-tween Group A, Group B and Group C (ANOVA)

VO_2 max	GROUP A vs. Group B vs. Group C	
	F value	P value
0 Session	3.201	P < 0.05
MD (0-6) Session	9.868	P < 0.05
Significance		S

Table 2: comparison of mean value for VO2 max at MD (0-6) Sessions between Group A, Group B and Group C (Post Hoc)

MD VO_2MAX (0-6) SESSION	GROUPS	SIGNIFICANCE
	A vs. B	S
	A vs. C	S
	B vs. C	NS

Table 2: Comparison of mean value for RPE at 0, 6 and MD (0-6) Sessions between Groups A, Group B and Group C (ANOVA)

RPE	GROUP A vs. Group B vs. Group C	
	F value	P value
0 Session	1.593	P > 0.05
6 Session	0.249	P > 0.05
MD (0-6) Session	1.564	P > 0.05
Significance		NS

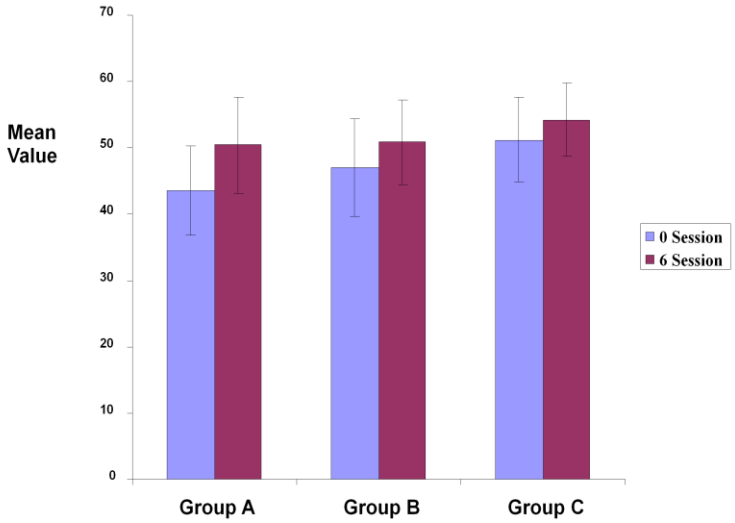
Table 3: Comparison of mean value for VO2 max at 0 and 6 session within Group A, Group B and Group C (Paired t test)

VO_2 max	GROUP A		GROUP B		GROUP C	
	t value	P value	t value	P value	t value	P value
0 Vs. 6 Sessions	-10.483	P < 0.05	-5.211	P < 0.05	-5.740	P < 0.05
significance		S		S		S

Table 4: Comparison of mean value for RPE at 0 and 6 days within Group A, Group B and Group C (Paired t test)

RPE	GROUP A		GROUP B		GROUP C	
	t value	P value	t value	P value	t value	P value
0 vs. 6 Sessions	7.201	P < 0.05	4.122	P < 0.05	3.558	P < 0.05
Significance		S		S		S

Comparison of mean value of VO2 max at 0 and 6 sessions within Group A, B and C



Discussion

Study has been performed on "effect of different musical tempo on aerobic performance in young adults"

⇩

On comparing VO2 max between the groups A, B & C significant difference was found in ONE WAY ANOVA and group A proved to be most effective in post hoc test

⇩

Supported Literature

⇩

Mariagrace Flint (2010) "faster tempo would cue people to move faster"

⇩

Simpson and Karageorghis (2005) "400-metre sprint performance in synchrony with music was superior to performance with a no-music control condition"

⇩

Elliott D (2007) "motivational music increased arousal"

⇩

Gregory Young (2003) "positive effect of music on task performance"

⇩

On comparing VO2 max within the groups A, B & C significant difference was found in paired t-test between pre and post training sessions

⇩

On comparing RPE between the groups A, B & C non-significant difference was found in ONE WAY ANOVA

⇩

Supported literature

⇩

Karageorghis and Terry (1999) "motivational asynchronous music did not influence perception of effort"

⇩

Non-supported literature

⇩

A Szabo & L.J Hoban (2004) "volleyball players rated the effort lower in the fast-music training session than in the control session"

⇩

On comparing RPE within the groups A, B & C significant difference was found in paired t-test between pre and post training sessions

⇩

LOGICAL REASONING

Music alters emotional and physiological arousal [8, 9]

⇩

Results in excitation of sympathetic nervous system [13]

⇩

Fast tempi are associated with higher arousal levels than slow tempi [9]

⇩

Diverts mind from sensations of fatigue, hence promoting positive mood state

⇩

Enhancement of attainment of outflow

⇩

Synchronization of music regulates movement and prolongs performance [14]

⇩

Enhance perception of self-confidence & improves endurance

Limitations of the study

1. Sample size is small

2. Study is limited to a particular age group only
3. Electronic timing would have improved the reliability of times
4. The sessions of aerobic training could have been increased to get optimum results.
5. Variability in language and preference of songs among subjects made track selection a difficult task.

Relevance to clinical practice

- application of motivational music could be extended to elite sports people, in particular track athletes and cyclists who can use music to regulate effort exertion.

- valuable in the domain of public health

Future Scope of the Study

1. The effect of different musical tempo can also be seen on athlete's aerobic performance.

2. There can be separate group for females and males with adequate sample size that to compare the gender difference.

3. Work can be done on other qualities of the music such as melody, rhythm, style and instrumentation.

4. Effect of synchronous and asynchronous music can be differentiated.

5. Effect of musical qualities can be seen on athlete's anaerobic endurance.

Conclusion

- ❑ fast upbeat music can be used to increase the motivation to performance as it effectively eliminates exercise-induced fatigue and fatigue symptoms caused by monotonous work

- ❑ slow sedative music have positive effect on calmness, muscle relaxation and distraction from thoughts.

- ❑ But there is no significant difference in fast and slow music on rate of perceived exertion