

ORIENTATION, DIFFERENTIATION, BALANCE AND RHYTHM ABILITY: A COMPARATIVE PROVE

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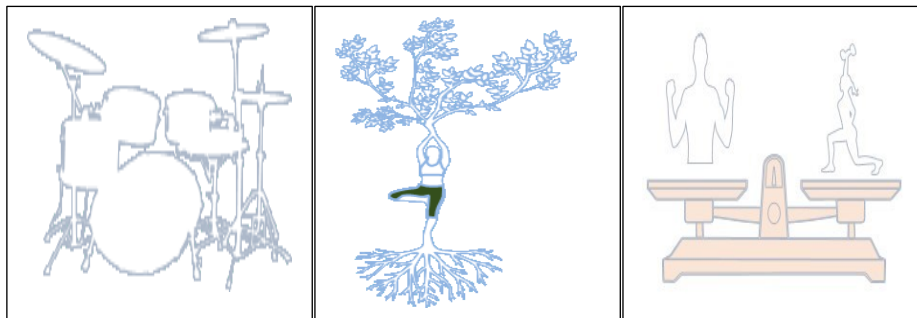
Abstract

Background: For many decades, coordinative abilities/melody has been utilized and studied as a support for physical and mental health. **Aim:** The aim of the Study was to assess Coordinative abilities among Sprinters, Throwers and Jumpers. This was a cross-sectional study that was conducted on total of 135 male subjects. **Material & Methods:** The Subjects selected were Collegiate athletes including Sprinters ($N_1=45$), Throwers ($N_2=45$) and Jumpers ($N_3=45$) (age: 26.08 ± 10.15 years; height: 176.35 ± 0.64 cm; weight: 77.32 ± 15.17 kg; BMI: 24.97 ± 5.18 kg/m²). The selected Coordinative abilities were Orientation Ability, Differentiation ability, Balance ability and Rhythm ability. The tests used for measuring these abilities were Numbered Medicine Ball Run test, Backward Medicine Ball Throw Test, Modified Bass Test & Straight and Rhythm Run Test respectively. **Statistical Analysis:** To compare the sample size (viz., $N=135$; Group-A: Sprinters ($n_1=45$), Group-B: Throwers ($n_2=45$), Group-C: Jumpers ($n_3=45$) on the basis of “Coordinative abilities” Analysis of Variance (ANOVA) was employed. After analyzing the data statistically. **Results:** Insignificant differences were found with regards to all of the selected variables (viz., Orientation ability, Differentiation ability, Balance ability, Rhythm ability). **Keywords:** Coordinative Abilities, Orientation. Differentiation, Balance, Rhythm, Sprinters, Throwers, Jumpers.

INTRODUCTION

Sport has become a part and parcel of our culture as it is being influenced and does influence all of our social institutions including education, economics, arts, politics, law, mass communication and international diplomacy due to which its scope is broad [1]. Coordinative skills need to be well developed for various situations such as learning skills fast, preservation of skills learned and benefiting from technical and tactical skills at maximum level [2]. At the age of 10–12 years old, the development of coordination is intense, allowing the rapid acquisition of the technical–tactical elements of handball, improving the reaction ability in different situations of collaboration or adversity, developing the anticipation spirit, and space-time orientation [3]. Researchers suggest that young people may improve mental acuity, skills, and strategies through physical exercise and supports the idea that cognitive performance improves with physical exercise that makes adolescents more efficient on reaction time tasks and more flexible on attention-orientation tasks [4, 5, 6]. Recent findings also highlight a significant role for coordinative exercise in improving academic performance [7]. Cognitive performance seems to be influenced by bilateral coordinative exercise that shows benefits even after short bouts of exercise, particularly on tasks that involve executive function [8, 9]. Coordinative exercise of both low and moderate intensities may also increase visuospatial perception, attentional resources, working memory and shorten the time needed

for neurocognitive processing [10]. These might be explained by the fact that the coordinative component of the movement increases synapses in important brain areas such as the cerebellum [11]. Complex movement patterns engage the cerebellum which affects areas such as attention and memory, functions that are affected by cerebellum [12]. Several research has indicated that working memory may benefit from coordinative exercise and reacts positively to environmental changes [13, 14, 15, 16]. Coordination abilities are understood as an externally visible manifestation of the control and regulation processes of the motor activity of the central nervous system [17].



For many decades, music has been utilized and studied as a support for mental health-with applications ranging from general mood elevation and stress reduction to clinical interventions designed. Research indicates that music-based approaches to mental health care can increase patients' likelihood of accessing care while reducing its costs. Studies also suggest that mental health treatments that incorporate music may advance health by delivering benefits long associated with arts exposure and participation, such as increased social connectivity, additional health-enhancing behaviors, and the promotion of identity and resilience.

MATERIAL AND METHODS

SAMPLE

One Hundred Thirty-Five male collegiate athletes Sprinters ($N_1=45$), Throwers ($N_2=45$) and Jumpers ($N_3=45$) (age: 26.08 ± 10.15 years; height: 176.35 ± 0.64 cm; weight: 77.32 ± 15.17 kg; BMI: 24.97 ± 5.18 kg/m²) were selected for the purpose of the current study. The participants participated in the study voluntarily and all the subjects were also informed about the objective and protocol of the study and utmost care was taken for maintaining the privacy of their personal information. The distribution of the subjects is shown as:

Table-1: Distribution of subjects

Sprinters (N ₁ =45)			Throwers (N ₂ =45)			Jumpers (N ₃ =45)		
100	200	400	Shot Putters	Javelin Throwers	Discus Throwers	Long Jumpers	High Jumpers	Triple Jumpers
15	15	15	15	15	15	15	15	15

Table-2: Male subject's demographics of age, body height and body weight.

Variables	Sample Size (N=135)			
	Total (N=135)	Sprinters (N ₁ =45)	Throwers (N ₂ =45)	Jumpers (N ₃ =45)
Age	17.45±1.207	17.77±1.379	17.6±1.286	16.97±0.722
Body Height	168.4±5.624	168.64±5.661	168.42±5.638	168.13±5.687
Body Weight	60.38±4.862	59.66±7.329	60.33±2.812	61.15±3.037

The G*Power 3.1.9.7 software was used in the to compute statistical power analysis. The protocol of power analysis is presented in Figure-1:

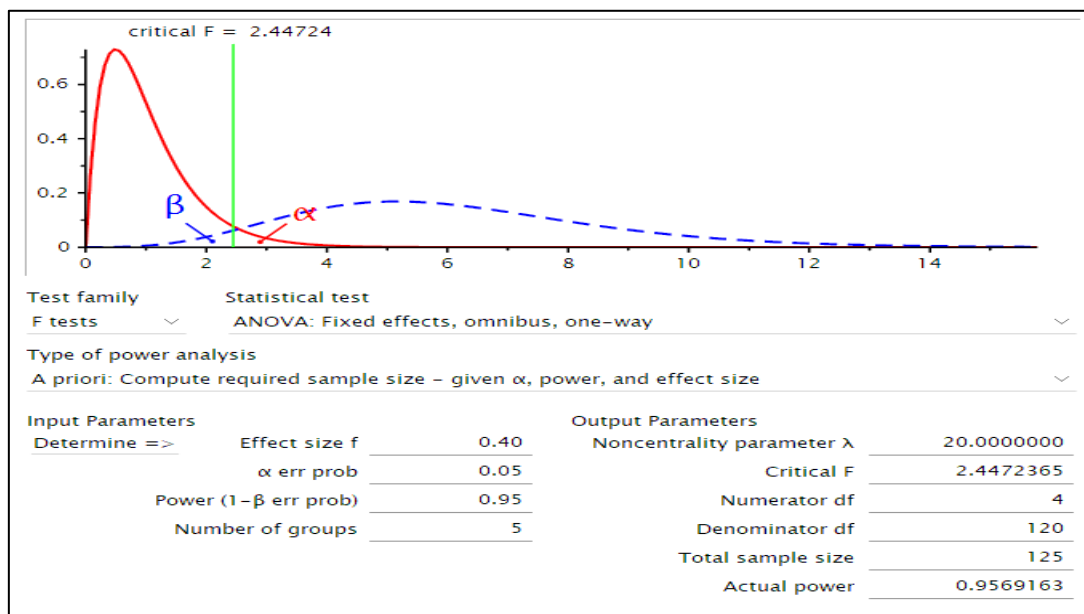


FIGURE-1: PROTOCOL OF POWER ANALYSIS.

Coordinative Abilities:

Orientation ability:

- **(Numbered Medicine Ball Run Test)** - Measured by Numbered Medicine Ball run test and was measured in 1/10 of seconds.

Differentiation ability:

- **(Backward Medicine Ball Throw Test)** - Scoring is measured as: Medicine ball touching the mat = 1 point: Medicine ball touching the circle line = 2 points: Medicine ball inside the circle = 3 points: Medicine ball touching the ball (2 kg medicine ball kept at the center of the circle) = 4 points. Points were decided considering the 1st pitch of the ball.

Balance ability:

- **(Modified Bass Test)** - The Scoring was the time taken in seconds to complete the course was taken as the score. At the lane time the subjects who failed to complete the task were not given further trial and no score was awarded.

Rhythm ability:

- **(Straight and Rhythm Run Test)** - The Scoring was the difference between the timing of 1st and 2nd attempt.

Table: 3 The Criterion Measures

Variables	Test	Unit
Orientation ability	Numbered ball run	Seconds
Differentiation ability	Backward medicine ball throw	Point
Balance ability	Long nose ball walk	Seconds
Rhythm ability	Sprinting at given rhythm	Seconds

STATISTICAL ANALYSIS

To compare the selected co-coordinative abilities among Sprinters, Throwers and Jumpers belonging to various colleges of Amritsar one-way Analysis of Variance (ANOVA) was used and the level of significance was fixed at 0.05 level. To find out the significant difference among the mean Scheffe’s Post-hoc test was administered.

RESULTS

Table-4: Analysis of Variance (ANOVA) results with regards to Orientation ability among Sprinters, Throwers and Jumpers.

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.008	2	.004	.008	.993
Within Groups	69.371	132	.526		
Total	69.379	134			

It is evident from Table-4 that results of Analysis of Variance (ANOVA) among various sport groups (Sprinters, Throwers and Jumpers) on the variable Orientation ability were found statistically insignificant ($P>0.05$). Since 'F' ratio was not found statistically significant, therefore, there is no need to apply the post hoc test.

Table-5: Analysis of Variance (ANOVA) results with regards to Differentiation ability among Sprinters, Throwers and Jumpers.

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.126	2	3.563	.453	.637
Within Groups	1037.867	132	7.863		
Total	1044.993	134			

It is evident from Table-5 that results of Analysis of Variance (ANOVA) among various sport groups (Sprinters, Throwers and Jumpers) on the variable Differentiation ability were found statistically insignificant ($P>0.05$). Since 'F' ratio was not found statistically significant, therefore, there is no need to apply the post hoc test.

Table-6: Analysis of Variance (ANOVA) results with regards to Balance ability among Sprinters, Throwers and Jumpers.

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.172	2	2.586	1.333	.267
Within Groups	256.135	132	1.940		
Total	261.306	134			

It is evident from Table-6 that results of Analysis of Variance (ANOVA) among various sport groups (Sprinters, Throwers and Jumpers) on the variable Balance ability were found statistically insignificant ($P>0.05$). Since 'F' ratio was not found statistically significant, therefore, there is no need to apply the post hoc test.

Table-7: Analysis of Variance (ANOVA) results with regards to Rhythm ability among Sprinters, Throwers and Jumpers.

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.186	2	.093	2.456	.090
Within Groups	5.002	132	.038		
Total	5.188	134			

It is evident from Table-7 that results of Analysis of Variance (ANOVA) among various sport groups (Sprinters, Throwers and Jumpers) on the variable Rhythm ability were found statistically insignificant ($P>0.05$). Since 'F' ratio was not found statistically significant, therefore, there is no need to apply the post hoc test.

DISCUSSION

The results of this study reveals that there was no significant difference found on selected Coordinative abilities (viz., Orientation ability, Differentiation ability, Balance ability and Rhythm ability). In other words, we say that the Sprinters, Throwers and Jumpers didn't varied much and exhibited similar performance in different tests (viz., numbered ball run, Backward medicine ball throw, modified bass test and Straight and Rhythm run test). A comparative study conducted on selected coordinative and motor abilities among female athletes of selected International schools of Pune reveals that Significant difference was found in case of orientation ability and differentiation ability while as no significant difference was found in case of rhythmic ability and reaction ability [1]. Another study conducted on effect of eye-hand coordination on motor coordinative abilities of tribal adolescents reveals that Tribal adolescent girls exhibited superior hand eye coordination as compared to tribal adolescent boys [18]. A critical study on comparison of coordinative abilities and leg explosive strength among tall and short inter-collegiate volleyball players reveals that there is no significant difference in Reaction Ability Test between Inter-Collegiate Volleyball players [19].

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CONFLICT OF INTERESTS.

The authors declare no conflict of interest.

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