

# Effects of Continuous and Interval Running on Strength Endurance and Cardio Respiratory Endurance

---

**R.Karthikeyan,** and

**P.Karthikeyan,** Assistant Professors, Department of Physical Education and Sports Sciences, Annamalai University.

## Abstract

The purpose of the present study was to find the effects of continuous running and interval running on selected strength endurance and cardio respiratory endurance. For this purpose of the study, forty five subjects studying bachelor's degree in Department of physical education and sports sciences, Annamalai university, Annamalai Nagar, Tamil nadu were selected as subjects. The age group of 18 – 24 years were selected. They were divided into three equal groups of fifteen subjects each. In which group – I underwent continuous running, group – II underwent interval running and group – III acted as control, who did not participate in any special training. The experimental groups underwent their respective training programme for three days in a week for twelve weeks. The following variables namely strength endurance and cardio respiratory endurance were selected as criterion variables. The selected strength endurance and cardio respiratory endurance were tested by using bend knee sit ups and cooper's 12 min run/ walk test separately. The pre and post test data were collected with the subjects at prior to and after the training period on selected strength endurance and cardio respiratory endurance. The analysis of covariance (ANCOVA) was used to find out the significant difference, if any among the groups separately. Since, three groups were involved, whenever the obtained 'F' ratio for the adjusted post test was found to be significant, the scheffe's test was applied as post hoc test to find out the paired mean differences. In all the cases .05 level of confidence was fixed to test the significance, which was considered as an appropriate. It was concluded from the results that the continuous running and interval running groups have improved selected strength endurance and cardio respiratory endurance significantly.

**Key Words:** Continuous and interval running, strength endurance, cardio respiratory endurance

## Introduction

J.P. Thomas says that "physical education is education through physical activities for the development of total personality of the child and its fulfillment and perfection in body mind and spirit". Butcher considers physical education as "an integral part of total education process which has its aim the development of physically, mentally, emotionally and socially fit citizen through the medium of physical activities which have been selected with a view of realizing these out come.

## **Methodology**

The purpose of the study was designed to examine the effect of continuous and interval running on strength endurance and cardio respiratory endurance. To achieve this purpose of the study, forty five men students studying bachelor's degree in Department of Physical Education and Sports Sciences, Annamalai University, Annamalai Nagar, Tamil nadu were selected as subjects were randomly selected as subjects. They were divided into three equal groups. Each group consisted of the fifteen subjects. Group I underwent continuous running and Group II underwent interval running for three days per week for twelve weeks. Group III acted as control who did not undergo any special training program apart from their regular physical education program. The following variables namely strength endurance and cardio respiratory endurance were selected as criterion variables. The selected strength endurance and cardio respiratory endurance were tested by using bend knee sit ups and cooper's 12 min run/ walk test separately. All the subjects of three groups were tested on selected dependent variables at prior to and immediately after the training program. The analysis of covariance (ANCOVA) was used to analyze the significant difference, if any among the groups. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered as an appropriate.

## **Analysis of the Data**

The influence of continuous and interval running on each criterion variables were analyzed separately and presented below.

## **Strength Endurance**

The analysis of covariance on strength endurance of the pre and post test scores of continuous running group interval running group and control group have been analyzed and presented in Table I.

**Table-I**  
**Analysis of Covariance of the Data on Strength Endurance of**  
**Pre and Post Tests Scores of Continuous Running,**  
**Interval Running and Control Groups**

Test	Continuous Running Group	Interval Running Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained 'F' Ratio
<b>Pre Test</b>								
Mean	37.40	37.60	37.27	Between	0.85	2	0.425	0.47
S.D.	0.95	0.80	0.998	Within	38.13	42	0.91	
<b>Post Test</b>								
Mean	43.53	40.73	37.40	Between	282.84	2	141.42	147.31*
S.D.	0.98	0.77	0.88	Within	40.27	42	0.96	
<b>Adjusted Post Test</b>								
Mean	43.19	40.42	37.39	Between	274.62	2	137.31	143.03*
				Within	39.31	41	0.96	

\* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively).

The table I shows that the adjusted post-test means of continuous running interval running group and control group are —, — and — respectively on strength endurance. The obtained "F" ratio of — for adjusted post-test means is more than the table value of — for df — and — required for significance at .05 level of confidence on strength endurance. The results of the study indicated that there was a significant difference between the adjusted post-test means of continuous running group, interval running group on strength endurance.

Since, three groups were compared whenever the obtained "F" ratio for the adjusted post test was found to be significant, the scheffe's test was applied as post hoc test to find out the paired mean differences, if any and it was presented in tableI- A

**Table-I (A)**  
**The Scheffe's Test for the Differences between**  
**Paired Means on Strength Endurance**

Continuous Running Group	Interval Running Group	Control Group	Mean differences	Confidence interval value
43.19	40.42	-	2.77*	1.18
43.19	-	37.39	5.80*	1.18
-	40.42	37.39	3.03*	1.18

\* Significant at .05 level of confidence.

The table I- A showed that the mean difference values between continuous running group and interval running group, continuous running group and control group and interval running group and control group on strength endurance were —, — and — respectively which were greater than the required confidence interval value — at .05 level of confidence. The results of the study showed that there was a significant difference between continuous running group and interval running group, continuous running group and control group and interval running group and control group on strength endurance.

#### Cardio Respiratory Endurance

The analysis of covariance on cardio respiratory endurance of the pre and post test scores of continuous running group, interval running group and control group have been analyzed and presented in Table II.

**Table II**  
**Analysis of Covariance of the Data on Cardio Respiratory Endurance**  
**of PRE And Post Tests Scores of Continuous Running,**  
**Interval Running and Control Groups**

Test	Continuous Running Group	Interval Running Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained 'F' Ratio
<b>Pre Test</b>								
Mean	1536	1539.67	1541	Between	201.07	2	100.54	0.183
S.D.	26.41	20.04	20.99	Within	23093.3	42	549.84	
<b>Post Test</b>								
Mean	1564	1550	1542.3	Between	3621.07	2	1810.54	3.35*
S.D.	24.71	20.25	22.20	Within	22703.3	42	540.55	
<b>Adjusted Post Test</b>								
Mean	1563.99	1549.3	1540.33	Between	5302	2	2651	42.83*
				Within	2537.43	41	68.89	

\* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for — and — and — and — are — and — respectively).

The table II shows that the adjusted post-test means of continuous running group, interval running group and control group are —, — and — respectively on cardio respiratory endurance. The obtained “F” ratio of — for adjusted post-test means is more than the table value of — for df — and — required for significance at .05 level of confidence on cardio respiratory endurance. The results of the study indicated that there was a significant difference between the adjusted post-test means of continuous running group, interval running group on cardio respiratory endurance.

Since, three groups were compared whenever the obtained “F” ratio for the adjusted post test was found to be significant, the scheffe’s test was applied as post hoc test to find out the paired mean differences, if any and it was presented in table II- A

**Table II - A**  
**The Scheffe’s Test for the Differences between Paired Means on Cardio Respiratory Endurance**

<b>Continuous Running Group</b>	<b>Interval Running Group</b>	<b>Control Group</b>	<b>Mean differences</b>	<b>Confidence interval value</b>
1563.99	1549.3	-	14.69*	7.82
1563.99	-	1540.33	23.66*	7.82
-	1549.3	1540.33	8.97*	7.82

\* Significant at .05 level of confidence.

The table II - A showed that the mean difference values between continuous running group and interval running group, continuous running group and control group and interval running group and control group on cardio respiratory endurance were —, — and — respectively which were greater than the required confidence interval value — at .05 level of confidence. The results of the study showed that there was a significant difference between continuous running group and interval running group, continuous running group and control group and interval running group and control group on cardio respiratory endurance.

**Conclusions**

1. There was a significant difference among continuous running group interval running group and control group on strength endurance and cardio respiratory endurance.
2. And also it was found that there was a significant improvement on selected criterion variables such as strength endurance and cardio respiratory endurance due to continuous running and interval running.

**References**

- Bompa, Tudor O. **Periodization Training for Sports**. Champaign, Illinois; The Human Kinetics Publishers, 1999.
- Broota, **Experimental Design in Behavioural Research**. Delhi: Wiley Eastern Limited, 1994.
- Clarke, H. Harrison. **Application of Measurement to Health and Physical Education**. Englewood Cliffs, New Jersey : The Prentice Hall Inc., 1976.
- Dintiman, George Blough et al., **Sports Speed**. Champaign, Illinois: The Human Kinetics Publishers, 1998.
- Johnson, Barry L. and Jack K. Nelson, **Practical Measurements for Evaluation in Physical Education**. Delhi : The Surjeet Publications, 1982.
- Marteyev, **Fundamentals of Sports Training**. Moscow : Progress Publishers, 1981.
- Murray, **Return to Fitness**. London : Anchor Brendon Publishers, 1986.
- Reilly et al., **Physiology of Sports**. Great Britain: St. Edmunds Bery Press, 1990.
- Singh, Ajmeer. et al., **Essentials of Physical Education**. New Delhi : Kalyani Publishers, 2003.
- Singh, Hardayal. **Science of Sports Training**. New Delhi : D.V.S. Publications, 1997.

