



## INFLUENCE OF PLYOMETRIC TRAINING ON SELECTED PSYCHOLOGICAL VARIABLES AMONG PHYSICAL EDUCATION STUDENTS

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### Abstract

*The purpose of the study was to find out the influence of plyometric training on selected psychological variables among physical education students. It was hypothesized that there would be significant differences on selected psychological variables due to the effect of plyometric training among physical education students. For the present study the 30 male physical education students from Alagappa University College of Physical Education, Karaikudi, Tamilnadu were selected at random and their age ranged from 18 to 25 years. For the present study pre test – post test random group design which consists of control group and experimental group was used. The subjects were randomly assigned to two equal groups of fifteen each and named as Group 'A' and Group 'B'. Group 'A' underwent plyometric training and Group 'B' has not undergone any training. The data was collected before and after six weeks of training. The data was analyzed by applying ANCOVA test. The level of significance was set at 0.05. cognitive anxiety, somatic anxiety and self confidence were assessed by CSAI II inventory. The plyometric training reduced cognitive anxiety among physical education students than the control group. The plyometric training reduced somatic anxiety among physical education students than the control group. The plyometric training increased self confidence among physical education students than the control group.*

**Key words:** Plyometric Training, Anxiety, Self Confidence, Physical Education Students.

### INTRODUCTION

Plyometrics enable a muscle to reach maximal force in the shortest possible amount of time. Plyometrics can be characterized by “quick, powerful movements using a pre-stretch or countermovement that involves the stretch-shortening cycle”. Such exercises include bounding, box jumps, depth jumps, standing and multiple jumps, and hops. The stretch-shortening cycle involves three phases eccentric contraction, amortization, and concentric contraction phases. The eccentric phase involves stretch of the agonist muscle group, while the concentric phase involves rapid shortening contraction of the same muscle group. Amortization, however, is the brief transition between the eccentric and concentric phases. The reason for performing plyometric exercises is to increase the power of subsequent movements, which is accomplished through the use of both the natural elastic components of a muscle and tendon and through the stretch reflex. A rapid eccentric muscle action stimulates the stretch reflex and the storage of elastic energy, which in turn increases the force produced during the subsequent concentric action. This is why the amortization phase must be as short as possible because if it is not, the stretch reflex will not respond and all of the stored elastic energy will be lost as heat.

Plyometrics are power improvement workouts designed specifically for athletes and advanced exercisers who have a well-conditioned body. Training with this mode of exercise increase muscular strength

and improve a specific skill whether it is to jump higher, jump longer, throw farther or hit harder. Systematic plyometric exercises follow a specific pattern of muscle contractions. These exercises use movements that develop the ability to generate a large amount of force quickly. The most common exercises from ordinary exercisers for this type are jumping rope, jumping jacks, throwing and catching ball on wall, and boxing with a punching bag. These are usually practiced under supervision by fitness experts or by athletes' coaches. There are techniques and rules to follow when training with plyometrics especially if you are training for a specific sport. Plyometrics involve maximal muscle contractions at the highest velocity possible. By using this type of training properly, physical performance can be improved. The purpose of plyometric training is to decrease the ground contact time of an athlete while sprinting, jumping, or kicking. Ground contact time can simply be seen as the phase of time that elapses while the eccentric contraction (stretch) of a muscle group is reversed and the concentric contraction (contract) of that group begins.

### METHODOLOGY

The purpose of the study was to find out the influence of plyometric training on selected psychological variables among physical education students. It was hypothesized that there would be significant differences on selected psychological

variables due to the effect of plyometric training among physical education students. For the present study the 30 male physical education students from Alagappa University College of Physical Education, Karaikudi, Tamilnadu were selected at random and their age ranged from 18 to 25 years. For the present study pre test – post test random group design which consists of control group and experimental group was used. The subjects were

randomly assigned to two equal groups of fifteen each and named as Group ‘A’ and Group ‘B’. Group ‘A’ underwent plyometric training and Group ‘B’ has not undergone any training. The data was collected before and after six weeks of training. The data was analyzed by applying ANCOVA test. The level of significance was set at 0.05.

**TABLE I  
VARIABLES AND TEST**

| S.No | Variables         | Questionnaire |
|------|-------------------|---------------|
| 1    | Cognitive Anxiety | CSAI - II     |
| 2    | Somatic Anxiety   |               |
| 3    | Self Confidence   |               |

## RESULTS

The findings pertaining to analysis of ANCOVA test between experimental group and control

group on selected psychological variables among physical education students for pre-post test respectively have been presented in table II to IV.

**TABLE - II**

### COMPUTATION OF ANALYSIS OF COVARIANCE OF MEAN OF PLYOMETRIC AND CONTROL GROUPS ON COGNITIVE ANXIETY

|                                 | PTG   | CG    | Source of Variance | Sum of Squares | df | Means Squares | F-ratio |
|---------------------------------|-------|-------|--------------------|----------------|----|---------------|---------|
| <b>Pre-Test Means</b>           | 23.40 | 24.05 | <b>BG</b>          | 4.22           | 1  | 4.22          | 0.22    |
|                                 |       |       | <b>WG</b>          | 703.75         | 38 | 18.52         |         |
| <b>Post-Test Means</b>          | 20.15 | 22.75 | <b>BG</b>          | 67.60          | 1  | 67.60         | 4.60*   |
|                                 |       |       | <b>WG</b>          | 558.30         | 38 | 14.69         |         |
| <b>Adjusted Post-Test Means</b> | 20.39 | 22.50 | <b>BG</b>          | 44.54          | 1  | 44.54         | 9.72*   |
|                                 |       |       | <b>WG</b>          | 169.55         | 37 | 4.58          |         |

(Table Value for 0.05 Level for df 1 & 38 = 4.09 and for df 1 & 37 = 4.10 )

df- Degrees of Freedom

An examination of table - II indicated that the pretest means of plyometric and control groups were 23.40 and 24.05 respectively. The obtained F-ratio for the pre-test was 0.22 and the table F-ratio was 4.09. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 1 and 38. The post-test means of the plyometric and control groups were 20.15 and 22.75 respectively. The obtained F-ratio for the post-test was 4.60 and the table F-ratio was 4.09. Hence the pre-test mean F-ratio was significant at 0.05

level of confidence for the degree of freedom 1 and 38. The adjusted post-test means of the plyometric and control groups were 20.39 and 22.50 respectively. The obtained F-ratio for the adjusted post-test means was 9.72 and the table F-ratio was 4.10. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 37. The pre, post and adjusted post test mean values of plyometric and control groups, on cognitive anxiety are graphically represented in the figure I.

FIGURE I

PRE AND POST TEST DIFFERENCES OF THE PLYOMETRIC AND CONTROL GROUPS ON COGNITIVE ANXIETY

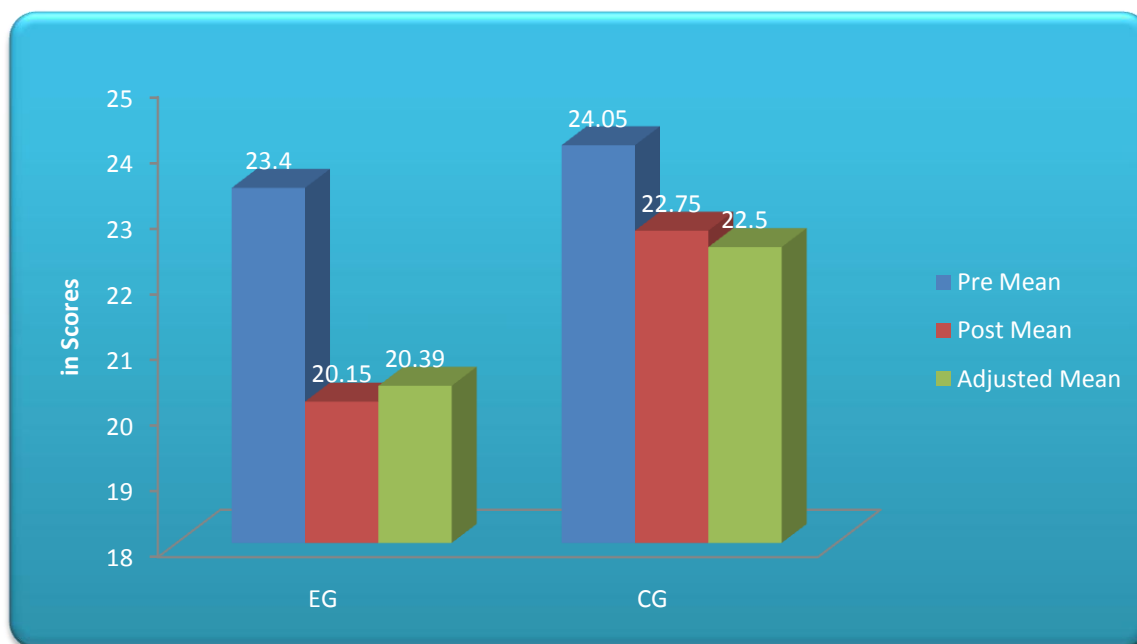


TABLE III

COMPUTATION OF ANALYSIS OF COVARIANCE OF MEAN OF PLYOMETRIC TRAINING AND CONTROL GROUPS ON SOMATIC ANXIETY

|                          | PTG   | CG    | Source of Variance | Sum of Squares | df | Means Squares | F-ratio |
|--------------------------|-------|-------|--------------------|----------------|----|---------------|---------|
| Pre-Test Means           | 23.15 | 23.40 | BG                 | 0.62           | 1  | 0.62          | 0.06    |
|                          |       |       | WG                 | 379.35         | 38 | 9.98          |         |
| Post-Test Means          | 19.65 | 21.50 | BG                 | 34.22          | 1  | 34.22         | 5.01*   |
|                          |       |       | WG                 | 259.55         | 38 | 6.83          |         |
| Adjusted Post-Test Means | 19.70 | 21.44 | BG                 | 30.17          | 1  | 30.17         | 6.06*   |
|                          |       |       | WG                 | 184.21         | 37 | 4.97          |         |

(Table Value for 0.05 Level for df 1 & 38 = 4.09 and for df 1 & 37 = 4.10)

df- Degrees of Freedom

An examination of table - III indicated that the pretest means of plyometric and control groups were 23.15 and 23.40 respectively. The obtained F-ratio for the pre-test was 0.06 and the table F-ratio was 4.09. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 1 and 38. The post-

test means of the plyometric and control groups were 19.65 and 21.50 respectively. The obtained F-ratio for the post-test was 5.01 and the table F-ratio was 4.09. Hence the pre-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 38. The adjusted post-test means of the plyometric and

control groups were 19.70 and 21.44 respectively. The obtained F-ratio for the adjusted post-test means was 6.06 and the table F-ratio was 4.10. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of

confidence for the degree of freedom 1 and 37. The pre, post and adjusted post test mean values of plyometric and control groups, on somatic anxiety are graphically represented in the figure II.

FIGURE II

PRE AND POST TEST DIFFERENCES OF THE PLYOMETRIC AND CONTROL GROUPS ON SOMATIC ANXIETY

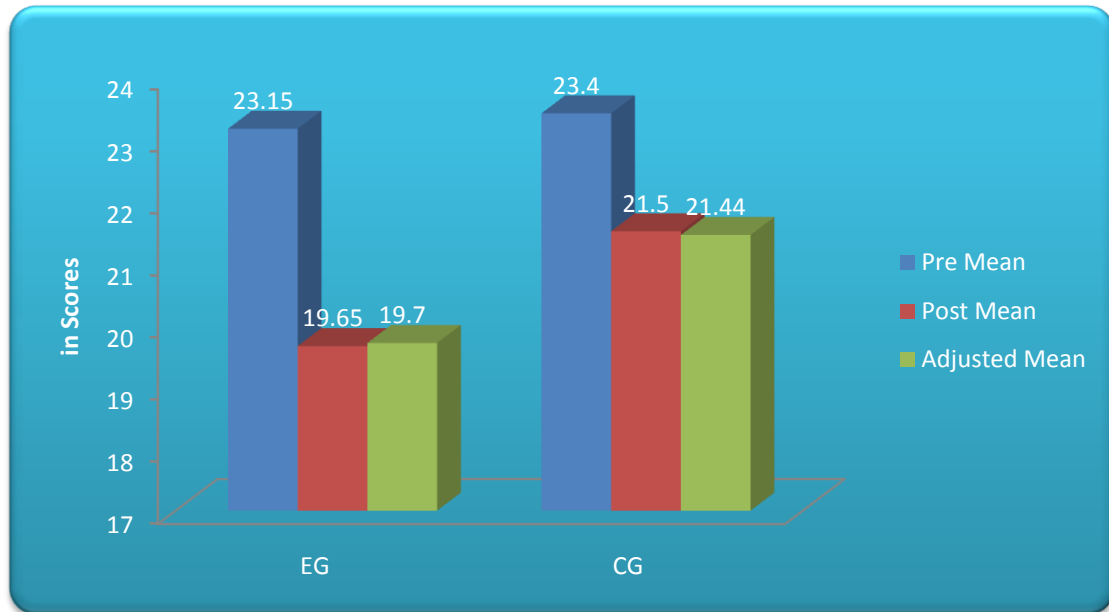


TABLE IV

COMPUTATION OF ANALYSIS OF COVARIANCE OF MEAN OF PLYOMETRIC TRAINING AND CONTROL GROUPS ON SELF CONFIDENCE

|                          | PTG   | CG    | Source of Variance | Sum of Squares | df | Means Squares | F-ratio |
|--------------------------|-------|-------|--------------------|----------------|----|---------------|---------|
| Pre-Test Means           | 28.60 | 27.85 | BG                 | 5.62           | 1  | 5.62          | 0.74    |
|                          |       |       | WG                 | 287.35         | 38 | 7.56          |         |
| Post-Test Means          | 30.20 | 27.50 | BG                 | 72.90          | 1  | 72.90         | 12.24*  |
|                          |       |       | WG                 | 226.20         | 38 | 5.95          |         |
| Adjusted Post-Test Means | 29.97 | 27.72 | BG                 | 49.57          | 1  | 49.57         | 15.04*  |
|                          |       |       | WG                 | 121.92         | 37 | 3.29          |         |

(Table Value for 0.05 Level for df 1 & 38 = 4.09 and for df 1 & 37 = 4.10 )

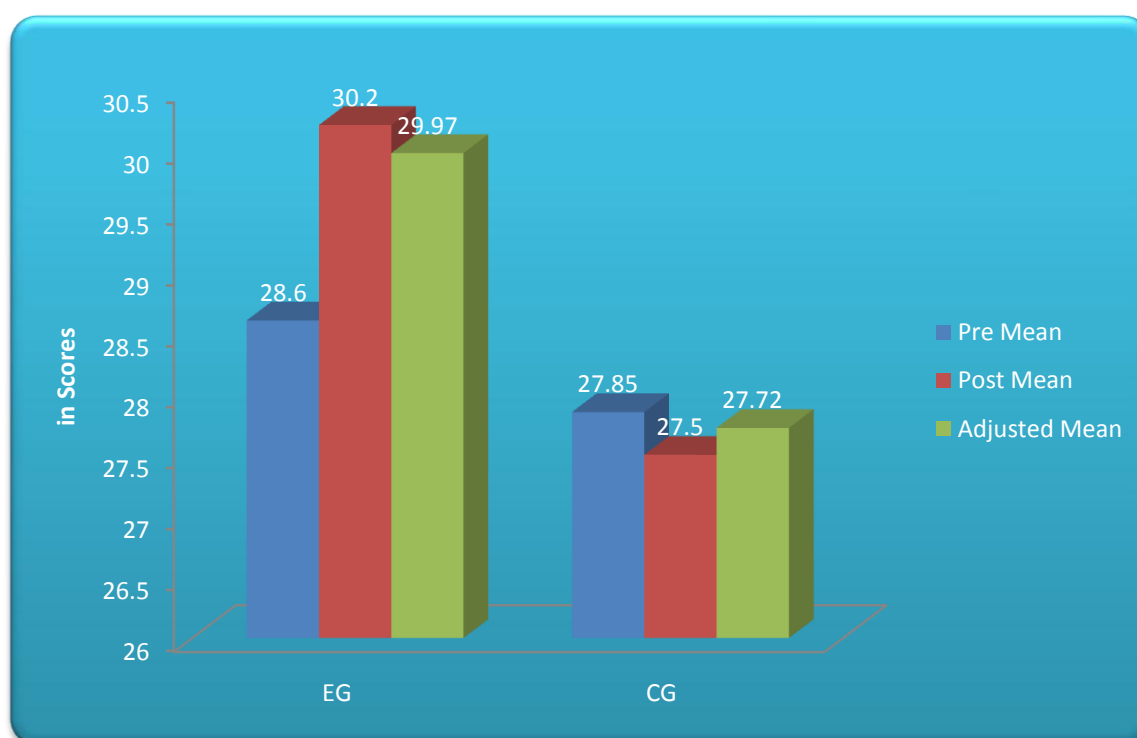
df- Degrees of Freedom

An examination of table IV indicated that the pretest means of plyometric and control groups were 28.60 and 27.85 respectively. The obtained F-ratio for the pre-test was 0.74 and the table F-ratio was 4.09. Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 1 and 38. The post-test means of the plyometric and control groups were 30.20 and 27.50 respectively. The obtained F-ratio for the post-test was 12.24 and the table F-ratio was 4.09. Hence the pre-test mean F-ratio was significant at 0.05

level of confidence for the degree of freedom 1 and 38. The adjusted post-test means of the plyometric and control groups were 29.97 and 27.72 respectively. The obtained F-ratio for the adjusted post-test means was 15.04 and the table F-ratio was 4.10. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 37. The pre, post and adjusted post test mean values of plyometric and control groups, on self confidence are graphically represented in the figure III.

**FIGURE III**

**PRE AND POST TEST DIFFERENCES OF THE PLYOMETRIC AND CONTROL GROUPS ON SELF CONFIDENCE**



**CONCLUSIONS**

On the basis of findings and within the limitations of the study the following conclusions were drawn:

1. The plyometric training reduced cognitive anxiety among physical education students than the control group.
2. The plyometric training reduced somatic anxiety among physical education students than the control group.
3. The plyometric training increased self confidence among physical education students than the control group.

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