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A Comparative Study of Speed Reaction Time and its Relation with Some Selected Anthropometrical Measures of Active and Sedentary College Students

Dr. Asish Paul
Department of Physical Education, Jadavpur University, Kolkata, India

Abstract **– The growth of anatomical structure in association with the different coordinative components of physical fitness influences the economy of movement pattern. The purpose of the study was to compare one such coordinative component with some anthropometric measures of active and sedentary college student. The measured criteria were the speed reaction time, standing height, sitting height and lower limb length. The mean of Speed reaction time (sec.), Standing Height (cm.), Sitting Height (cm.) and Lower Limb Length (cm.) of active and sedentary group were 7.91, 153.33, 73.22, 76.22 and 9.16, 157.75, 77.74, 79.01 respectively. Among these the differences in case of speed reaction time and sitting height were significant. All the co-rrelation co-efficient between speed reaction time and standing height and lower limb length in case of active group and sedentary group were moderately negative and not significant. No such definite conclusion may be drawn from the above results although the moderate negative correlation coefficient between speed reaction time and lower limb length indicated that the lower limb length hinders the reaction time and thus the speed performance.**

Keywords **– Speed, Reaction Time, Anthropometric Measures, Active, Sedentary.**

I. INTRODUCTION

Performance means to get into action as much higher degree as possible. In adulthood the very person after completing the three stages growth, development and maturation entered in the stage of readiness where he/she became able enough to execute the performance after getting a continuous training. To understand the nature of adulthood as revealed by their biologic, psychologic and social needs it is of utmost importance to establish their educational development also. Genaraly considering the physical growth characteristics it has found that the strength, endurance, reaction time, perception ability are the main determinant factors which guide the movement pattern.

Fitness is the ability to perform work satisfactorily under specific condition. Physical fitness is the ability to perform physical work in full enjoyment with economic efforts and having some extra energy for emergency. Physical fitness can be divided in to two parts, health related physical fitness and performance related physical fitness. Speed reaction time is a co-coordinative component of performance related physical fitness. In case of speed reaction time with an adequate stimulus muscles are excited and the excited muscle contract. This is immediately followed by relaxation. The record of this will produce a simple muscle curve has a total duration of about 0.1 sec., which comprises of latent period (0.01 sec.), period of contraction (0.04 sec.) and period of relaxation (0.05).

The general Anthropometrical measures are depending upon the genetic factor. Research findings shows that speed reaction time significantly related to standing height and lower limb length. Further it has been shown moderate negative co-rrelation between speed reaction time and two anthropometrical measures i.e., standing height and lower limb length. Still now no such concrete experimental data is available to show the relationship between speed reaction time and standing height as well as with lower limb length. The main purposes of this study were to find out the existing status of speed reaction time of active and sedentary students, to find out the relation of speed reaction time with standing height, to find out the relation of speed reaction time with lower limb length.

Parizkova, (1961) and Cureton, et. al., (1975) found that the association of age, body size and body composition with physical performance has to vary from low to moderate depending on several characteristics of the investigation. A number of researchers have demonstrated that body size and body composition are major aspects of physique, related to physical performance in pre-pubescent children (Slaughter et al., 1982). Lotter and Williard S. (1960) studied two movements basic to sport skills, a modified baseball throw, and a foot kicks on 105 college men. Individual differences in ability to move an arm or leg quickly were found to be uncorrelated with reaction time for these movements. There was only a moderately high correlation between the reaction ability of the right and left legs and between right and left arms. The reliability of individual differences was high in all of the measures. Huntley and Charles Troy (1974) selected 161 first, second and third grade students to study the effects of selected activities upon physical fitness and motor ability. Three experimental activity programmes; basic movement, rhythmic activities, and gymnastic were selected. Prior to this each student was tested for agility, body reaction time and hand reaction time. Means, standard deviations, correlated 't' values and significance levels were computed. It was concluded that body reaction time is affected by participation in basic movements and rhythmic activities. Whitely et. al. (1980) found relationship between individual differences in strength, speed and mass in an arm movement. Two experiments were performed on college men in which lateral arm movement of approximately 90 degrees involving about four feet of hand travel, was made at maximum speed. The movement time the effective arm mass and static dynamometer

strength of the muscles was measured for each subject. It was concluded that there is no significant correlation between static strength in action, speed and mass in an arm movement.

II. Materials and Methods

In this study the researcher made an attempt to evaluate and compare the Speed reaction time and the two anthropometrical variables of the adult college going girls at the age group of almost 22-25 yrs. Fourty students were taken as the subjects of this study. Among them 20 were active that took part in regular exercise and 20 were sedentary, never engaged in activity. The active students were taken from the State Institute of Physical Education for Women, Hastings House, Alipur, Kolkata and the rest 20 were taken from Surendranath College, Barracpore, 24pgs.(N). The subjects were selected randomly.

III. Design of the Study

The measured criteria were the Speed reaction time by 50 mtr. dash, Standing height (in cm.), Sitting height (in cm.) and Lower Limb Length (in cm.). One group was the students of physical education training institution, naturally engaged themselves in practice but the other group was the students of general degree college were sedentary. The present researcher has not taken any consideration about daily food intake quantity, status of life style or any other personal, family or social matter. With the help of one physical education teacher and three other assistants the tests were administered and the measurements were taken. The field surface was grassy and the subjects were run in bare foot. Other measurements were taken one by one in the classroom. Data were taken from two colleges in very respective day and the total time taken was near about 2 hrs. daily. It was collected in the late winter season (February – March) when the temperature was nearly about 15-16^{o} C (min.) & 20-25^{o} C (max.), humidity was very low.

IV. Results and Discussions

The collected data were analyzed statistically to arrive into definite conclusions. In case of anthropometrical measures there were three criterions such as standing height, sitting height and lower limb length. The results of the anthropometrical measures presented first and then the fitness variable presented and discussion made according to the set criteria. The subjects of the study were two groups of students of two different colleges of almost same age group. One group was active group denoted as Sa and the other was sedentary denoted as Ss.

Table 1: Mean S.D. and comparison of means of measures of two anthropometrical dimensions of the two groups.

Measures	Mean & S.D. (Sa)	Mean & S.D. (Ss)	‘p’ value
Speed reaction time (sec.)	7.91 ± 1.32	9.16 ± 1.89	0.02*
Standing Height (cm.)	153.33 ± 7.43	157.75 ± 8.24	0.08
Sitting Height (cm.)	73.22 ± 3.56	77.74 ± 4.78	0.001*
Lower Limb Length (cm.)	76.22 ± 4.95	79.01 ± 5.23	0.09

* Significant at 0.05 levels

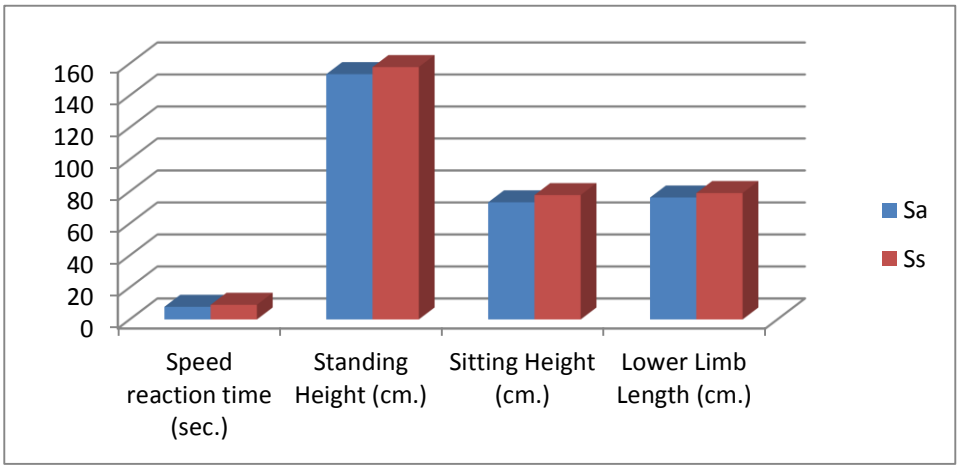

Fig.1. Graphical representation of mean of different variables in two different groups

Table 1 showing that the mean standing height of Sa group was 153.33 m with a standard deviation of 7.43cm.and that of Ss group was 157.75 m. with a standard deviation of 8.24cm. Since the means were not equal it was necessary to compare the two means by ‘p’ value at 0.05 level of significance. Then it may be concluded that the two groups were significantly different from each other in respect of their speed reaction time and sitting height. Mean lower limb length of group Sa was 76.22 cm. with a standard deviation of 4.95cm. and that of group Ss was 79.01cm. with a standard deviation of 5.23cm. After statistical analysis of the data of table-1 of

the two anthropometrical measures it has appears that so far the stature and structural peculiarity are concerned, the subject of the two classes were almost homogeneous. Teeple and Massey (1976) has shown that the average height of 11 and 12 years old boys were 147.6 and 152.4 cm and the mean sitting height were 77.0 and 79.2 cm. Slaughter et al. (1982) have shown that the mean height of the 10.0 – 10.9 and 11.0 – 11.9 years of American boys were 144.1 and 147.8 cm. Bhatnagar et al (1990) observed that the average sitting height of 11 and 12 year old boys as 64.24 and 64.70 cm.

Table 2: Co-efficient of correlations ('r' values) between the dependent & independent factors of the two groups.

Dependent variables & Independent measures	Speed Reaction Time	
	Sa	Ss
Standing Height (cm.)	-0.09	-0.27
Lower Limb Length (cm.)	-0.43	-0.39

From table no. 2 it was clear that the co-rrelation co-efficient of the two anthropometric measures with the speed reaction time bears too low negative value. Although the values in case with lower limb length bears some moderate characteristics without any significance.

The Childs growth and development includes an inter-related expression of physical, cognitive, social psychology and motor aspects. Several studies reported that severe nutritional restriction experienced currently by many children in third world countries, particularly in terms of protein calories, result in significant reduction in height and weight as well as muscle mass and bone density compared to children of high socio-economic status. While all young children exhibit an inherent orderly sequence of events in postural and locomotors development, the time that each occurs varies considerably. In case of boys running, jumping and throwing performances increase throughout the period of adolescence and is associated with continued growth in height and body weight and an increase in the proportion of lean weight to body weight. This general pattern of growth, development and performance may be clearly envisaged among the subjects of the present study.

V. Conclusion

No such conclusions can be drawn from the findings. Although the co-rrelations were negative but the values were to low to draw any definite conclusions. Generally it may be concluded that the lower limb length hinders the speed reaction time performance.

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Author's Profile

Dr. Asish Paul
Physical Education and Sports Management Professional, Dept. of Physical Education, Jadavpur University, Guest faculty, Dept. of Sports Management, IISWBM, Kolkata,
E-mail: asp_f2000@yahoo.com,
Mob.: 09831710942