Chapter IV

ANALYSIS OF DATA AND RESULTS OF THE STUDY

The statistical analysis of data in order to determine the interrelationships among physical fitness, motor ability, health status and academic achievement of five hundred and ten higher secondary school boys belonging to different socio-economic groups i.e. upper strata, upper middle strata, lower middle strata and upper lower strata, are presented in this chapter.

For testing the significance of relationships among physical fitness, motor ability health status and academic achievement of higher secondary school boys belonging to four socio-economic groups mentioned earlier, the level of significance chosen was .05 as the research process adopted did not involve highly sophisticated equipments demanding the application of more stringent level of significance.

Findings

To ascertain the relationships among physical fitness, motor ability, health status and academic achievement of higher secondary school boys belonging to four socio-economic groups, the Product moment method of computing coefficient
of correlation was applied.

For statistical analysis the computer facilities available at the Department of Physics, Jiwaji University, Gwalior were used. A programme (Appendix E) was prepared for the computer to compute the coefficient of correlation. The data pertaining to these is presented in Tables 2 to 5.

**TABLE 2**

**INTERRELATIONSHIPS AMONG PHYSICAL FITNESS, MOTOR ABILITY, HEALTH STATUS, AND ACADEMIC ACHIEVEMENT OF HIGHER SECONDARY SCHOOL BOYS BELONGING TO UPPER STRATA**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Correlation (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Fitness and Motor Ability</td>
<td>0.732*</td>
</tr>
<tr>
<td>Physical Fitness and Health Status</td>
<td>0.052</td>
</tr>
<tr>
<td>Physical Fitness and Academic Achievement</td>
<td>-0.131</td>
</tr>
<tr>
<td>Motor Ability and Health Status</td>
<td>0.169</td>
</tr>
<tr>
<td>Motor Ability and Academic Achievement</td>
<td>0.004</td>
</tr>
<tr>
<td>Health Status and Academic Achievement</td>
<td>0.107</td>
</tr>
</tbody>
</table>

*Significant at .05 level

\[ r_{.05} (36) = .321 \]
Analysis of data in Table 2 reveals that in the upper strata there is a high positive relationship between physical fitness and motor ability (0.732), whereas insignificant relationships exist between physical fitness and health status (0.052), motor ability and health status (0.169), motor ability and academic achievement (0.004), health status and academic achievement (0.107) and physical fitness and academic achievement (-0.131).

The graphical presentation of the relationship between physical fitness and motor ability of subjects belonging to upper strata is presented in Fig. 2.
\[ r = 0.73 \]

Fig. 2. Relationship between Physical Fitness and Motor Ability in Upper Strata.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Correlation (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Fitness and Motor Ability</td>
<td>0.707*</td>
</tr>
<tr>
<td>Physical Fitness and Health Status</td>
<td>0.042</td>
</tr>
<tr>
<td>Physical Fitness and Academic Achievement</td>
<td>-0.112</td>
</tr>
<tr>
<td>Motor Ability and Health Status</td>
<td>0.055</td>
</tr>
<tr>
<td>Motor Ability and Academic Achievement</td>
<td>-0.106</td>
</tr>
<tr>
<td>Health Status and Academic Achievement</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Significant at .05 level

$r_{.05} (181) = .146$

Table 3 indicates that in upper middle strata there is high positive relationship between physical fitness and motor ability (0.707). The relationships between physical fitness and health status (0.042), motor ability and health status (0.055), health status and academic achievement (0.012), physical fitness and academic
achievement (-0.112) and motor ability and academic achievement (-0.106) are not statistically significant.

The graphical presentation of relationship between physical fitness and motor ability of subjects belonging to upper middle strata is presented in Fig. 3.

**TABLE 4**

INTERRELATIONSHIPS AMONG PHYSICAL FITNESS, MOTOR ABILITY, HEALTH STATUS, AND ACADEMIC ACHIEVEMENT OF HIGHER SECONDARY SCHOOL BOYS BELONGING TO LOWER MIDDLE STRATA

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Correlation (r)</th>
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</thead>
<tbody>
<tr>
<td>Physical Fitness and Motor Ability</td>
<td>0.765*</td>
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<tr>
<td>Physical Fitness and Health Status</td>
<td>-0.093</td>
</tr>
<tr>
<td>Physical Fitness and Academic Achievement</td>
<td>0.158*</td>
</tr>
<tr>
<td>Motor Ability and Health Status</td>
<td>-0.117</td>
</tr>
<tr>
<td>Motor Ability and Academic Achievement</td>
<td>0.162*</td>
</tr>
<tr>
<td>Health Status and Academic Achievement</td>
<td>0.071</td>
</tr>
</tbody>
</table>

*Significant at .05 level.

\[ r_{.05} (231) = .130 \]
From the analysis of data in Table 4 it is evident that there are statistically significant relationships between physical fitness and motor ability (0.705), physical fitness and academic achievement (0.455) and motor ability and academic achievement (0.142) in lower middle strata. Values of coefficients of correlation between physical fitness and health status (0.93), motor ability and health status (0.11), health status and academic achievement (0.071) were found to be significant at a .05 level of confidence.

Graphical plots for relationships between physical fitness and motor ability, physical fitness and academic achievement, and motor ability and academic achievement are given in Figures 5 and 6.

Fig. 3. Relationship between Physical Fitness and Motor Ability in Upper Middle Strata.
From the analysis of data in Table 4 it is evident that there are statistically significant relationships between physical fitness and motor ability (0.765), physical fitness and academic achievement (0.158) and motor ability and academic achievement (0.162) in lower middle strata. The values of coefficient of correlation between physical fitness and health status (-0.093), motor ability and health status (-0.117) and health status and academic achievement (0.071) are not found to be significant at .05 level of confidence.

The graphical presentation of relationships between physical fitness and motor ability, physical fitness and academic achievement and motor ability and academic achievement of subjects belonging to lower middle strata are given in Figures 4, 5 and 6.
Physical Fitness

Fig. 4 Relationship between Physical Fitness and Motor Ability in Lower Middle Strata.
Physical Fitness

Fig. 5. Relationship between Physical Fitness and Academic Achievement in Lower Middle Strata.
Fig. 6. Relationship between Motor Ability and Academic Achievement in Lower Middle Strata.
TABLE 5

INTERRELATIONSHIPS AMONG PHYSICAL FITNESS, MOTOR ABILITY, HEALTH STATUS, AND ACADEMIC ACHIEVEMENT OF HIGHER SECONDARY SCHOOL BOYS BELONGING TO UPPER LOWER STRATA

<table>
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<tr>
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<tr>
<td>Physical Fitness and Academic Achievement</td>
<td>-0.072</td>
</tr>
<tr>
<td>Motor Ability and Health Status</td>
<td>-0.019</td>
</tr>
<tr>
<td>Motor Ability and Academic Achievement</td>
<td>0.127</td>
</tr>
<tr>
<td>Health Status and Academic Achievement</td>
<td>-0.033</td>
</tr>
</tbody>
</table>

\[ r_{0.05 \ (54)} = 0.264 \]

Table 5 indicates that relationships among physical fitness and motor ability (0.233), physical fitness and health status (0.059), motor ability and academic achievement (0.127), physical fitness and academic achievement (-0.072), motor ability and health status (-0.019) and health status and academic achievement (-0.033) are not statistically significant among the subjects belonging
to upper lower strata.

The graphical presentation of relationships between physical fitness and motor ability, physical fitness and academic achievement and motor ability and academic achievement of subjects belonging to upper strata, upper middle strata, lower middle strata and upper lower strata are given in Figures 7, 8 and 9.

**Discussion of Findings**

It is evident from the findings that there is a statistically significant relationship between physical fitness and motor ability in the case of the three socio-economic groups, namely, upper strata, upper middle strata and lower middle strata. This finding appears to be relevant because physical fitness and motor ability are interrelated even though their theoretical concepts are different. There is an overlapping of motor components in both which gives an indication that a person having good physical fitness may also rank high on the scale of motor ability. The available literature indicates controversial results. Hill\(^1\) in his study, has pointed

\(^1\)Hill, *Dissertation Abstracts International*, p.3759.
Fig. 7. Comparison of Relationship between Physical Fitness and Motor Ability in Different Socio-Economic Groups.
Fig. 8. Comparison of Relationship between Physical Fitness and Academic Achievement in Different Socio–Economic Groups.
Fig. 9. Comparison of Relationship between Motor Ability and Academic Achievement in Different Socio-Economic Groups.
out that there is no relationship between physical fitness and motor ability, whereas Lane⁴ has very clearly pointed out that a significant relationship exists between physical fitness and motor ability. Therefore, the findings of the present study are in agreement with the conclusion arrived at by Lane. With regards to upper lower strata the relationship between physical fitness and motor ability is not found to be statistically significant. This finding is not found to be in consonance with the existing notion that these two concepts are closely related. The possible reason for not obtaining a significant relationship could be that physical fitness measures the absolute qualities which are found to be uniformly distributed across the population. On the other hand, motor ability measures one's acquired ability to perform well in a wide range of activities. The investigator is of the opinion that family traditions, environmental factors, living style, opportunities and educational background have positive influence on physical fitness and motor ability. Subjects belonging to upper lower strata being

⁴Lane, Completed Research in Health, Physical Education and Recreation, p.67.
one of the underprivileged sections of the society and hence are deprived of the opportunities available to the subjects belonging to higher socio-economic groups, this may be considered as the reason for not obtaining a significant relationship between physical fitness and motor ability for them.

The findings of the study further indicate that there is no relationship between physical fitness and health status, motor ability and health status and between health status and academic achievement with regard to all the socio-economic groups employed in the study. The possible cause for obtaining insignificant relationship between physical fitness and health status may be that the technique employed in the present investigation to measure the health status considered only two factors, namely sitting height and weight which are considered to be important factors for performance in a variety of sporting activities but they do not seem to influence the scoring on the test items measuring physical fitness. In case the determination of health status was done by other means i.e., clinical method, pathological method, observation method etc., a different result might have been obtained. A similar explanation could also be given for obtaining insignificant relationship between motor
ability and health status. The possible reason for the absence of relationship between health status and academic achievement might be that the two factors, namely, sitting height and weight, adopted for obtaining health status did not apparently influence the mental abilities of a person in terms of academic achievement. Cowell\(^3\), in his investigation, did not fully explain the relationship between health and academic achievement. Zimmerman's\(^4\) investigation indicates the need for further research on health factors as predictors of academic performance. Brown and others\(^5\), in their study, have very clearly pointed out that the health problems were moderately related to academic variables. Chinn's\(^6\) study showed that the relationship between health status and academic achievement

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\(^3\)Cowell, *Dissertation Abstracts International*, pp. 2572-2573.

\(^4\)Zimmerman, *Dissertation Abstracts International*, p. 117.


is unclear and needs further investigation. His finding moderately supports the assumption that health problems are related to academic achievement.

Analysis of data also revealed that there is no significant relationship between physical fitness and academic achievement and between motor ability and academic achievement with regards to upper strata, upper middle strata and upper lower strata whereas with regards to lower middle strata the relationships between physical fitness and academic achievement and between motor ability and academic achievement were found to be statistically significant.

The findings indicating no relationship between physical fitness and academic achievement are in agreement with the conclusion reached by Buckellew\textsuperscript{7}, Harold\textsuperscript{8},

\textsuperscript{7}Buckellew, Completed Research in Health, Physical Education and Recreation, p.83.

\textsuperscript{8}Harold, Research Quarterly, p.250.
Bruce⁹, Hays¹⁰, McCollum¹¹, Fahrner¹², Gross¹³, Mc
McMillan¹⁴, Giauque¹⁵, Mack¹⁶, Jones¹⁷ and Leathers¹⁸.
The findings also indicate no significant relationship

⁹Bruce, Completed Research in Health, Physical Education and Recreation, p.89.

¹⁰Hays, Completed Research in Health, Physical Education and Recreation, p.90.

¹¹McCollum, Completed Research in Health, Physical Education and Recreation, pp.41-42.

¹²Fahrner, Completed Research in Health, Physical Education and Recreation, p.50.

¹³Gross, Completed Research in Health, Physical Education and Recreation, p.65.


¹⁵Giauque, Research Quarterly, p.269.

¹⁶Mack, Completed Research in Health, Physical Education and Recreation, p.87.

¹⁷Jones, Completed Research in Health, Physical Education and Recreation, p.55.

between motor ability and academic achievement for upper strata, upper middle strata and upper lower strata. These findings are consonant with the results arrived at by Blaylock\textsuperscript{19}, Page\textsuperscript{20}, Hawkes\textsuperscript{21}, Johnson\textsuperscript{22} and Appleton\textsuperscript{23}. The obvious reason for physical fitness and motor ability not to have a significant relationship with academic achievement may be that both physical fitness and motor ability are physical concepts whereas academic achievement mainly involves mental faculties of the individual. The performance of tasks involved in measurement of physical fitness and motor ability do not have much bearing on the mental capabilities, thus indicating absence of relationship between physical fitness and academic achievement and between motor ability and academic achievement.

\textsuperscript{19} Blaylock, Completed Research in Health, Physical Education and Recreation, p.157.

\textsuperscript{20} Page, Completed Research in Health, Physical Education and Recreation, p.79.

\textsuperscript{21} Hawkes, Completed Research in Health, Physical Education and Recreation, pp.38-39.

\textsuperscript{22} Johnson, Research Quarterly, pp.57-59.

\textsuperscript{23} Appleton, Research Quarterly, p.156.
In as much as academic achievement of lower middle strata has been found to be significantly related to both physical fitness and motor ability, it gives rise to a very interesting situation which points out that subjects belonging to this group might have been trying constantly to compare and compete with the subjects of higher socio-economic groups in order to enjoy a respectable status within the society. Probably subjects of this group utilize all possible opportunities and avenues which are moderately available to them. The subjects of lower middle strata might be putting in greater efforts in tasks involving physical fitness, motor ability and academic achievement in order to enjoy a respectable position within their peer groups.

**Discussion of Hypotheses**

The latter hypothesis stated in the study that there will be a significant relationship between physical fitness and motor ability has been accepted with regard to upper strata, upper middle strata, lower middle strata and not accepted in the case of upper lower strata.

The hypothesis that there will be no significant relationship between physical fitness and health status, physical fitness and academic achievement, motor ability
and health status and motor ability and academic achievement is accepted with regards to upper strata, upper middle strata, lower middle strata and upper lower strata except that, in the case of lower middle strata where physical fitness and academic achievement and motor ability academic achievement have been found to be related each other the hypothesis is not accepted.