Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The main purpose of this investigation was to study the relationship of somatotype components viz. Endomorphy, Mesomorphy and Ectomorphy, to Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and Selected Motor Ability Variables among secondary school boys. The subordinate purpose was to develop a Multiple regression equation for the prediction of somatotype components based on Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and Selected Motor Ability Variables.

The subjects were one hundred male secondary school students of Kendriya Vidyalaya No. 1, Gwalior, who were selected randomly by using a table of random numbers.¹

The dependent variable were somatotype components i.e. Endomorphy, Mesomorphy and Ectomorphy. The somatotype ratings of the subjects were obtained by the Heath and Carter Anthropometric Somatotyping Method. The anthropometric variables used were Height, Weight; Skinfold Measurements at Triceps, Subscapular, Suprailiac and Calf Regions; Biepicondylar Diameters of Humerus and Femur; and Girths of Biceps and Calf.

The independent variables selected were personality traits, dimensions of self concept, Modes of reaction to Frustration and Selected Motor Ability Variables. The personality traits were measured by Jr- Sr. High School Personality Questionnaire (HSPQ) prepared by Kapoor and Mehrotra.


\[\text{3 Kapoor and Mehrotra, The Manual for Jr - Sr High School Personality Questionnaire, pp. 3-10.}\]
The dimensions of self concept were measured by Self Concept Questionnaire (SCQ) prepared and standardized by Saraswat. The Modes of Reaction to Frustration were measured by Nairashya Maapa (Frustration Test) prepared and standardized by Chauhan and Tiwari. The selected motor ability variables were Speed, Arm Strength, Abdominal Strength, Explosive Strength of Legs, Cardio-respiratory Endurance, Agility, Dynamic Balance, Trunk Flexibility, Spine Flexibility, Kinesthetic perception, Two Hand Coordination, Hand Reaction Time and Movement Time which were measured by 50 Yard Run, Pull-ups, Bent Knee Sit ups, Vertical Jump, Cooper's 9 Minute Run/Walk Test, Shuttle Run, Modified Bass Test of Dynamic Balance, Trunk and Neck extension Test, Bridge up Flexibility Test, Distance perception Test, Two Hand Coordination apparatus, Electronic Reaction Time apparatus and Nelson's Speed of Movement Test respectively.

The reliability of data was ensured by establishing the Instrumentation reliability, Tester reliability, reliability of Psychological and Motor Ability Tests and Subject reliability.


In order to find out the relationship of somatotype components i.e. Endomorphy, Mesomorphy and Ectomorphy separately to Personality Traits, Dimensions of Self Concept Modes of Reaction to Frustration and selected Motor Ability variables, Pearson's Product Moment Method of Correlation was employed. The combined contribution of Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and selected Motor Ability variables, each considered separately, to somatotype components i.e. Endomorphy, Mesomorphy and Ectomorphy was obtained through using Wherry Doolittle Method of Multiple correlation. Further a Regression Equations were developed to predict somatotype components on the basis of Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and selected Motor Ability variables. For testing the hypothesis, the level of significance was set at .05 level by referring to the tabulated value of 'r' at 98 degrees of Freedom.

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7 Steel and Torrie, Principles and Procedures of Statistics, p.301.

8 Clarke and Clarke, "Advanced Statistics with Application to Physical Education, p.60.


10 Ibid., p.453.
The analysis of data revealed significant relationships of Endomorphy component of somatotype to each of the following Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and selected Motor Ability variables: Factor A (r = .293), Factor C (r = .246), Factor E (r = .279), Factor Q₂ (r = .276), Social (r = .631), Intellectual (r = -.208), Resignation (r = .528), Shoulder Strength (r = -.283), Cardio-respiratory endurance (r = -.624), Trunk Flexibility (r = .362) and Spine flexibility (r = .823) at .05 level of confidence. The coefficient of correlation obtained between Factor B, D, F, G, H, I, J, O, Q₃, Q₄, Physical, Temperamental, Educational, Moral, Regression, Fixation, Aggression, Speed, Abdominal Strength, Leg Explosive Power, Agility, Dynamic Balance, Kinesthetic Perception, Two Hand Coordination, Hand Reaction Time and Speed of Movement and Endomorphy were not found statistically significant at .05 level of confidence.¹¹

The Multiple correlation (Wherry Doolittle Method) was computed to determine those Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and selected Motor Ability variables which contribute most significantly to Endomorphy. The results of Multiple

¹¹Ibid.
correlation in the case of personality traits indicated that personality factor A (1), Factor E and Factor Q₂ correlated better or in other-wards contributed most significantly to Endomorphy (C) as the computed value of 0.504 (Rₐ. 15.12) was found to be significant at .05 level of confidence.

The results of Multiple correlation in the case of self concept Dimensions has disclosed that social (2) and intellectual (6) Dimensions correlated better with Endomorphy (C) as the computed value of .641 (Rₐ. 26) was found to be significant at .05 level of confidence.

While analysing the combined contribution of Modes of reaction to frustration, the Resignation (3) and Regression (1) correlated significantly to Endomorphy (C) as the computed value of .533 (Rₐ. 31) was significant at .05 level of confidence.

The Multiple correlation applied in the case of Motor Ability Variables indicated that Spine Flexibility (9) and Cardio-respiratory Endurance (5) taken together correlated significantly to Endomorphy (C) as the computed value of Q .905 (Rₐ. 95) was found to be significant at .05 level of confidence. The Multiple Regression Equation were developed for personality traits, Dimensions of Self
concept and Motor Ability Variables (C) as given Below:

Personality Traits: \( X_C = 0.346 X_1 + 0.313 X_5 + 0.264 X_{12} - 11.43 \)

Self Concept: \( X_C = 0.278 X_2 - 0.183 X_6 - 72.532 \)

Motor Ability Variables: \( X_C = 0.134 X_9 - 0.002 X_5 - 1709.17 \)

The analysis of data on the case of Mesomorphy, revealed significant relationship of Mesomorphy to each of the following personality traits, Dimensions of Self Concept, Modes of Reaction to Frustration and Selected Motor Ability Variables: Factor A \( (r = 0.538) \), Factor F \( (r = 0.631) \), Factor J \( (r = 0.516) \), Factor O \( (r = 0.396) \), Physical \( (r = 0.518) \), Social \( (r = 0.290) \), Educational \( (r = 0.393) \), Fixation \( (r = 0.673) \), Speed \( (r = -0.536) \), Shoulder Strength \( (r = 0.268) \), Abdominal Strength \( (r = 0.390) \), Leg Explosive Power \( (r = 0.498) \), Cardio-respiratory \( (r = 0.670) \), Agility \( (r = -0.298) \), Dynamic Balance \( (r = 0.499) \), Trunk Flexibility \( (r = 0.460) \), Spine Flexibility \( (r = 0.290) \), Two Hand Coordination \( (r = -0.392) \) and Speed of Movement \( (r = 0.223) \), at .05 level of confidence. Whereas coefficient of correlation obtained between factor B, C, D, E, G, H, I, Q_2, Q_3, Q_4, Temperamental, Moral, Intellectual, Regression, Resignation, Aggression, Kinesthetic Perception, Hand Reaction Time and Mesomorphy were not found statistically significant at .05 level of confidence.
The Multiple correlation (Wherry Doolittle Method) was computed to determine those Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and selected Motor Ability variables which contributed most significantly when taken together to Mesomorphy. The results of Multiple correlation in the case of personality traits indicated that factor F (6), Factor A (1) and Factor J (10) correlated better or in other words contributed most significantly to Mesomorphy (C) as the computed value of .912 ($R_C$, 6 1 10) was found to be significant at .05 level of confidence.

The results of Multiple correlation in the case of Self concept Dimensions has disclosed that Physical (1), Educational (4), and Social (2) contributed most significantly to Mesomorphy (C) as the computed value of .630 ($R_C$, 1 4 2) was found to be significant at .05 level of confidence.

While analysing the combined contribution of Modes of Reaction to Frustration, the Fixation (2) and Regression (3) correlated significantly to Mesomorphy (C) as the computed value of .693 ($R_C$, 2 3) was significant at .05 level of confidence.

The Multiple correlation applied in the case of Motor Ability variables indicates that Cardio-respiratory
Endurance (5), Trunk Flexibility (8), and Dynamic Balance (7), taken together correlated significantly to Mesomorphy (C) as the computed value of $0.934 (R_C.587)$ was found to be significant at 0.05 level of confidence.

The Multiple Regression Equations were developed for Personality Traits, Dimensions of Self Concept and Motor Ability Variables which are given below:

**Personality Traits:**

$$X_C = 0.640 X_6 + 0.684 X_1 + 0.462 X_{10} - 10.04$$

**Self Concept Dimensions:**

$$X_C = 0.20 X_1 + 0.134 X_4 + 111 X_2 - 28.49$$

**Motor Ability Variables:**

$$X_C = 0.243 X_5 + 0.204 X_8 + 0.113 X_7 - 1728.11$$

The analysis of data in the case Ectomorphy, revealed significant relationship of Ectomorphy component to each of the following Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and selected Motor Ability variables: Factor C (.661), Factor D (.287), Factor Q₃ (.238), Factor Q₄ (.412), Physical (.631), Temperamental (.468), Aggression (.479), Speed (-.268), Leg Explosive Power (.260), Cardio-respiratory Endurance (.482) and Speed of Movement.
(.380) at .05 level of confidence. Whereas coefficient of correlation obtained between Factor A, B, E, F, G, H, I, J, O, Q₂, Social, Educational, Moral, Intellectual, Regression, Fixation, Resignation, Shoulder Strength, Abdominal Strength, Agility, Dynamic Balance, Trunk Flexibility Spine Flexibility, Kinesthetic perception, Two Hand Coordination, Hand Reaction Time and Ectomorphy were not found to be statistically significant at .05 level of confidence.

The Multiple correlation (Wherry Dollittle Method) was used to determine those Personality Traits, Dimensions of Self Concept, Modes of Reaction to Frustration and Motor Ability variables which contribute most significantly when taken together to Ectomorphy. The results of Multiple correlation in the case of Personality Traits revealed that Factor C (3), Factor Q₃ (13), and Factor Q₄ (14) correlated better or in other words contributed most significantly to Ectomorphy (C) as the computed value of .942 (Rₐ, 3 13 14) was found to be more than the tabulated value of .199 required to be significant at .05 level of confidence with 96 degrees of freedom.

The results of Multiple correlation in the case of Self Concept Dimensions has clearly revealed that Physical(1) and Temperamental (3), Correlated most significantly to Ectomorphy (C) as the computed value of .820 (Rₐ, 1 3) was
found to more than the tabulated value of .198 with 97 degrees of freedom at .05 level of confidence.

While analysing the combined contribution of different modes of Reaction to Frustration, the Aggression (4) and Fixation (2) were found to be most significantly related to Ectomorphy (C) as the computed value of .480 (R_c, 4 2) was much more than the tabulated value of .198 required to be significant at .05 level with 97 degrees of freedom.

The Multiple correlation applied in the case of Motor Ability variables indicated that Cardio-respiratory Endurance (5), Speed of Movement (13) and Speed (1), taken together correlated most significantly to Ectomorphy as the computed value of .722 (R_c, 5 13 1) was found to be much more than the tabulated value of .199 needed to be significant at .05 level of confidence with 96 degrees of Freedom.

The Multiple Regression Equations were developed for Personality Traits, Dimensions of Self Concept and Motor Ability variables which are as follows:

Personality Traits:

\[ X_C = 2.669 \times_3 + 2.216 \times_{13} + 1.134 \times_{14} - 6.08 \]
Self Concept Dimensions:

\[ x_{C_1} = 0.244 \times 1 + 0.180 \times 3 - 52.42 \]

Motor Ability Variables:

\[ x_{C_2} = 0.223 \times 5 + 0.177 \times 13 - 0.146 \times 1 - 1704.11 \]

**Conclusions**

Within the limitations identified and on the basis of the results of the study the following conclusions were drawn:

**Endomorphy**

1. The Personality Traits namely Warmheartedness, easily affected by Feelings, Obedient and Accommodating and Undisciplined and Careless of Protocol (Factor A, C, D and Q2) were significantly related to Endomorphy.

2. The Social Self Concept was significantly related to Endomorphy in a positive direction whereas Intellectual Self Concept was also significantly related but in a negative direction.

3. The Resignation Mode of Reaction to Frustration was significantly related to Endomorphy.

4. Among the Motor Ability variables namely, Shoulder Strength, Cardio-respiratory Endurance, Trunk Flexibility
and Spine Flexibility were significantly related to Endomorphy.

5. Personality Factor B, D, F, G, H, I, J, O, Q₃ and Q₄ were not found to be significantly related to Endomorphy.

6. Among the self concept dimensions namely Physical, Temperamental Educational and Moral seems to have no significant relationship to Endomorphy.

7. The Regression, Fixation and Aggression Modes of Reaction to Frustration are not found to be significantly related to Endomorphy.

8. Among Motor Ability variables namely Speed, Abdominal Strength, Leg Explosive Power, Agility, Dynamic Balance, Kinesthetic Perception, Two Hand Coordination, Hand Reaction Time and Speed of Movement are not found to be significantly related to Endomorphy.

9. Amongst Personality Traits, Factor A (Warmheartedness) E (Obediency) and Q₂ (Socially Group Dependent) contribute most significantly to Endomorphy component.

10. The Social and Intellectual Dimensions of Self Concept were found to contribute most significant to the Endomorphy.
11. Among the Modes of Reaction to Frustration, Resignation and Aggression are found to contribute most significantly to the Endomorphy.

12. Among the Motor Ability variables namely Spine Flexibility and Cardio-respiratory Endurance contributed most significant to Endomorphy component.

13. It is possible to predict Endomorphy component on the basis Personality Traits, Self Concept Dimension and Motor Ability Variables.

14. It is not possible to predict Endomorphy Component on the basis of Modes of Reaction to Frustration.

Mesomorphy

1. The Personality Traits namely Warmheartedness, Enthusiastic, Zestful and Self Assured (Factor A, F, J and O) are significantly related to Mesomorphy.

2. The Physical, Social and Educational Dimensions of Self Concept are significantly related to Mesomorphy.

3. The Fixation mode of Reaction to Frustration is found to be significantly related to Mesomorphy.

4. Among the Motor Ability variables namely Speed, Shoulder and Abdominal Strength, Explosive Power of Legs,
Agility, Dynamic Balance, Trunk and Spine Flexibility, Two Hand Coordination and Speed of Movement are found to be significantly related to Mesomorphy.

5. The Personality Factor B, C, D, E, G, H, I, Q₂, Q₃ and Q₄ seems to have no significant relationship to Mesomorphy.

6. Among the Self Concept Dimensions namely Temperamental and Moral are not found to be significantly related to Mesomorphy.

7. The Regression, Resignation and Aggression Modes of Reaction to Frustration are not found to be significantly related to Mesomorphy.

8. Among the Motor Ability variables namely Kinesthetic Perception and Hand Reaction Time seems to have no significant relationship to Mesomorphy component.

9. Among Personality Factor F (Enthusiastic), A (Warmhearted) and J (Zestful) contributed most significantly to Mesomorphy.

10. The Physical, Educational and Social Dimensions of Self Concept contributed most significantly to Mesomorphy.

11. Among the Modes of Reaction to Frustration namely Fixation and Resignation contributed most significantly to Mesomorphy.
12. Among the Motor Ability variables, Cardio-respiratory Endurance, Trunk Flexibility and Dynamic Balance contributed most significantly to Mesomorphy.

13. It is not possible to predict Mesomorphy on the basis of Modes of Reaction to Frustration.

14. It is possible to predict Mesomorphy on the basis Personality Traits, Self Concept Dimensions and Motor Ability variables.

Ectomorphy

1. The Personality Traits namely easily affected by Feelings, easily Excitable, Careless of Social and Tensed (Factor C, D, O₃ and O₄) are found to be significantly related to Ectomorphy.

2. The Physical and Temperamental Dimensions of Self concept are significantly related to Ectomorphy.

3. The Aggression Mode of Reaction to Frustration was found to be significantly related to Ectomorphy.

4. Among the Motor Ability variables namely Speed, Leg Explosive Power, Cardio-respiratory Endurance and Speed of Movement are found to be significantly related to Ectomorphy.
5. The Personality Factor A, B, E, F, G, H, I, J, O and Q₂ seems to have no significant relationship to Ectomorphy.

6. Among the Self Concept Dimension namely Social, Educational, Moral and Intellectual are not found to be significantly related to Ectomorphy.

7. The Regression, Fixation and Resignation Modes of Reaction to Frustration seems to have no significant relationship to Ectomorphy.

8. Among the Motor Ability variables namely Shoulder and Abdominal Strength, Agility, Dynamic Balance, Trunk and Spine Flexibility, Kinesthetic Perception, Two Hand Coordination and Hand Reaction Time, Seems to have no significant relationship with Ectomorphy.

9. The Personality Factor C, (Affected by Feelings) Q₃ (Careless of Social Rules) and Q₄ (Tensed) contributed most significantly to Ectomorphy.

10. The Physical and Temperamental Dimensions of Self Concept contributed most significantly to Ectomorphy.

11. Among the Modes of Reaction to Frustration, Aggression and Regression are found to contribute most significantly to Ectomorphy.
12. Among the Motor Ability variables, Cardio-respiratory Endurance, Speed of Movement and Speed are found to contribute most significantly to Ectomorphy.

13. It is not possible to predict Ectomorphy on the basis of Modes of Reaction to Frustration.

14. It is possible to a great extent to predict Ectomorphy on the basis of Personality Traits, Self Concept Dimensions and Motor Ability variables.

Recommendations

In the light of the results of this study it is recommended that:

1. Somatotype ratings may be used for the purpose of classifying students into groups for instruction and competition in different Motor Ability variables.

2. The Mesomorphy has proved to be an most ideal and desirable component of somatotype for achieving success in Motor Ability tests.

3. The predominance of Endomorphy component has not proved to be an ideal somatotype component for games and sports.
4. The Ectomorphy has proved to be most desirable component only in Speed, Explosive Power and Endurance events.

5. It is also recommended that Personality Traits, Self Concept Dimensions and Motor Ability variables may be used to predict the somatotype component.

6. While concentrating on psychological make up of the each somatotype component it is recommended that slow down programme of physical education should be provided for those children who has the predominance of Ectomorphy as they are found to be more tensed, frustrated, easily affected by feeling and careless of social rule. Apart from this they should be put to play in team games to develop social relations. On the other hand, intensively fast programme of physical education should be designed for Endomorphs.

7. It is recommended that norms for various motor ability test may be constructed which allow for differences in body build. It may not be logical to expect a person with excessive Endomorphic component to achieve the same level of success in Motor ability test like Mesomorphy.

8. It is recommended to conduct a similar study by using various age levels among boys and girls and if behaviour is shown to be consistent with a particular
somatotype components, the teacher of physical education will be better able to understand and meet individual needs and will increase the chances of success.

9. A similar study may be conducted in which the performance of the subjects may be compared after classifying them purely on the basis of predominantly somatotype component.

10. It is recommended that similar study may be taken by using more sophisticated criteria for rating each somatotype component and using more number of subjects from all over India.

11. It is recommended that similar study may be conducted to assess relationship between somatotype components and blood groups.