

Review on relationship of somatotype variables with different motor fitness components of athletes

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Abstract:

Human Physique across the centuries has been the subject of discussion with the scientist, artist and even layman. However, it has not been possible for any of these to say clearly as to what physical characteristics are more suited to what type Performance task subjective judgment and hypothetical view have been expressed but there has been lack of empirical data to substantiate various theoretical viewpoints Perhaps no serious attempt has been made through either systematic or experimental study to relate performance with certain physical characteristics.

Key-words: Somatotype, motor fitness, speed, endurance, flexibility, balance

Introduction:

It is a million-dollar question that if one could point out very precisely as to what contributed by the way of physical characteristics to elite the performance in a game or sport. Most of the game and sports are based upon such fundamental skills that do require typical characteristics of physique so thickly associated with performance which relate to the Olympic levels of performance.

Sills and Everett (1952) studied the relationship of somatotypes with performance in motor and strength tests. Four hundred boys in the age group of 14 to 29 years as subjects were selected. They found that mesomorphs were stronger than the endomorphs, the endomorphs stronger than ectomorphs, the ectomorphs superior to the endomorphs in speed, agility and endurance, while the mesomorphs were superior to both endomorphs and ectomorphs in agility, speed and endurance it was also observed that excess body weight is a

handicap to endomorphs in the performance of physical tests considerations, therefore should be given to body types in formulating standard for achievements in strength and motor tests.

Radcliffin (1972) fourteen-year-old boys found the highest correlation between somatotype components and strength. The motor ability variables were negatively related to endomorphy. These correlations were -0.48 for physical fitness index; -0.43 for standing broad jump and -0.43 for total reaction time (negative connection).

Hawthorne (1961) studied the relationship of the structural and functional aspects of college men by correlating the ratings in the three components of the somatotype with scores in Roger's physical fitness index, vertical jump and Brace test of motor ability. It was observed that a real relationship did exist between mesomorphy and Roger's physical fitness index, endomorphy and Vertical jump and ectomorphy and motor ability as measured by the Brace test.

Parnell (1958) reported in the study that Oxford students who undertook strenuous exercises were generally well equipped to do so. They fell primarily in the mesomorphic classification, but it was reported that the central linear types were commonly athletic too. Where the muscularity components are related to each other than less than three, participation in sports activities becomes less common and participation in contact sports becomes rare. Peripheral ectomorphs, because of their lack of musculature, are likely to embarrass instructors of physical education: they may indeed swim, provided the water is very warm. The other half of the non-athletic world is populated by the peripheral endomorph with too little musculature proportionately for much activity. Relatively small bones and preponderance of soft tissue characterize them. Type 623 has much to carry but proportionately little to carry it within mechanical language, a power/weight ratio that is inadequate for quick acceleration or movement they, therefore being the very antithesis of type 263.

Borms (1966) compared the somatotype component rating of high and low strength groups of boys at 10, 13 and 16 years of age. Grouping for strength was based on a composite score comprising of Roger's strength index and physical fitness index and a mean of 11 – cable tension strength test. It was found that the higher gross strength groups at each age level were more mesomorphic than the lower strength groups and that the lower strength group was more ectomorphic than the other groups.

Morton (1967) with adolescent boys as subjects concluded that the motor ability variables were not significantly related to somatotype assessment. The three motor ability variables showed a consistently significant relationship with the ectomorphy, the variables standing broad jump, bar push-ups and physical fitness index.

A number of studies have been conducted in foreign countries involving somatotypes and anthropometric measures. Heath, Hopkins and Miller (1961) worked with a Japanese sample and reported, that it is evident that the fat and balanced somatotype are much rare and the 'muscular' somatotype much more frequent in the Japanese men than in the American men.

Hindmarch (1981) conducted a study entitled significance of physique maturational body size, body strength motor ability and reaction characteristics of 8-year-old boys. He found significant difference in the mean score of standing broad jump between the mesomorphs and the endomorphs. The mesomorphs were found to be superior in all the motor ability variables than the endomorphs.

Watson and O'Donovan (1977) studied the relationship of somatotype components to strength among 53 post-pubertal boys in the age group of 16 to 18 years. It was found that the strength index was related positively to the Sheldon somatotype rating for endomorphy and mesomorphy, and negatively to ectomorphy. The strength index was also found to be related positively to mesomorphy rating according to the Heath Carter method. The endomorphy and ectomorphy rating by this method, however did not exhibit any relationship strength.

Endurance

Laubach, Hollering and Goulding (1971) studied the relationship of cardio-vascular endurance to somatotype components among 30 university men students. Two tests were used to measure cardio-vascular endurance, viz, the Harvard Step Test. Somototype rating were given according to the Heath and Carter Anthropometric method. Cardiovascular endurance as measured by the Harvard Step Test was found to be significantly related to endomorphy and positive by to ectomorphy. Contrarily endurance as measured by the Ohio Step Test was found to be unrelated to any of the somatotype components.

Miller (1971) after studying the relationship of 300 yard run time scores to ponderal index among 486 undergraduate students concluded that ponderosity of the body is a significant factor in the performance of the 300-yard run.

Spain, Nathan and Gells (1963) related the somatotype to coronary atherosclerotic heart disease and reached the conclusion that endomorphic mesomorphs have a higher prevalence of heart disease as compared to other categories of the somatotype.

Speed

Munroe (1965) reported that physique type did not seem to appear to be an important factor in motor ability elements of power, speed, agility or recreation time in twelve years old boys. No somatotype components were highly related to factor and relating to physical ability, although the endomorphy appeared to be a handicap in high physical accomplishment.

Tahamont (1979) Somatotype rating was given according to Heath Carter anthropometric method and anaerobic power was measured by the Margaria test. Statistically significant relationships were found between each of the somatotype components and anaerobic power. The multiple correlations between anaerobic power and the interactions of the somatotype component were not sufficiently high to be of practical value.

Herbelinck and Postma (1963) conducted a study of physical education majors in South Africa. The physical education major tends to be athletic types as described by Kretschmer. The relationship between body measurement and motor fitness was found to be insignificant except in between biceps girth and shot put ability. Mesomorphy was the most distinctive feature of a subject's somatotype. The Mesomorph was also superior in all motor fitness tests except in the sixty yards and the ectomesomorphs in all tests except in the shot put event.

Schreiber (1971) compared the anaerobic capacity of university athletes as it was influenced by their somatotype. It was found that mesomorphs and endomorphs have higher anaerobic capacities than other somatotype categories.

Flexibility

Sills and Everett (1953) compared the endomorphs, mesomorphs and ectomorphs in a male university, conducting tests of flexibility, endurance, speed, strength and agility. Each subject was selected as a member of one somatotype group on the basis of a high rating (5 to 7) for one component and low ratings (below 3) for the other two components. It was concluded that mesomorphs are superior to both, endomorphs and ectomorphs are superior to endomorphs in endurance, speed and agility. The inferiority of endomorphs and ectomorphs was identified with excess weight and inadequate strength respectively.

Dewskin (1968) compared the somatotype component scores of women enrolled in a flexibility programme with those of a reference group. Significant differences were found for all the three components.

Complete

Clarke and Peterson (1961) compared the somatotypes of boys aged 10 to 15 years and classified them into four categories of athletic ability as indicated by coaches ratings. The categories were Exceptional-III, Good-II, Regular participant-I and Non-participant-NP. Comparisons were made at two levels, viz., elementary school and junior high school. At elementary school level, 35.7 per cent of the boys in category III were mid-types, and 28.5 per cent each were mesomorphs and ectomorphs. No endomorphs and very few endo-mesomorphs were found in this category. Somatotypes of boys in category II were also distributed in a similar manner.

Balance

Van Galder (1971) Compared the cardio-vascular endurance, power, agility, balance, reaction-time and movement time scores of 100 men classified into five somatotype categories, viz., endomorphs, mesomorphs, ectomorphs, endo-mesomorphs and mid types. ANOVA followed by Scheffe's post hoc test revealed that endomorphs were inferior to the other group in cardio-vascular endurance, power, agility and movement time, and consequently it was concluded that success in tests assessing these qualities was less likely for endomorphs than for other body types.

Pere and Others (1954) conducted a study to investigate relationship between performance and physique of Finnish athletes. They reported that the followers to different branches of athletics do not differ appreciably as to their body constitution from except extreme group. He also reported that definite ideal type for a certain athletic event could be as just certain and that these athletes differed slightly in body build from other Finnish men of the same group.

Conclusion

Comparative studies have provided to be more conclusive than relationship studies. The endomorphs and endo-mesomorphs exhibited poor cardio-vascular endurance and a higher risk for coronary heart disease than ectomorphs and mesomorphs in almost all of the research report reviewed. The mesomorphs have exhibited good performance in strength events. They were found to be the best performers in most of the motor fitness variables.

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