

Somatotype at the Growing up Period between 7 and 17 Years of Age

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The aim is to be elaborated a somatotype characterization of schoolchildren aged between 7 and 17 years that are representatives of a growing up Bulgarian generation living between the 20th and 21st centuries, and to be established the inter-sexual and inter-age differences during this growing up period as for the integral somatotype, so for its three components. On the base of 10 anthropometrical features for the 7-17 years old schoolchildren (1851 boys and 1787 girls) is elaborated a somatotypological characterization by the method of Heath-Carter. It is established that between 7 and 17 years the mean somatotype of the investigated adolescents from both sexes is relatively constant and doesn't change its belonging to the respective somatotype group as a whole. The separate somatotype components, however, change their values in the ages, most tangible after 13 and 14 years. These changes reflect the differences between both sexes concerning their body composition and body forms associated with the maturation of the children.

Key words: somatotype, schoolchildren, sexual differences, age differences.

Introduction

"...The somatotype represents physically every person as an entity. It points to us the importance of this "entity" and the unique morphological individuality of every person. Once again that every body part or an organ, even a cell are connected and depend on this "entity", termed somatotype" [1, 2, 3]. According to the method of Heath-Carter could be distinguished 13 somatotypes, four variants to Endomorph, Mesomorph and Ektomorph group respectively, and one Central somatotype. The somatotype in children and adolescents has been examined in Bulgaria basically in connection with sports during the 70s and 80s of the past century [4, 5].

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Material and Methods

The somatotype characterization is made on the base of data from a detailed mixed (longitudinal and transversal) anthropological investigation of 7-17 years old schoolchildren from Sofia lead during the period 1993-2001. For the assessment of somatotype are used the anthropometrical data from measurements of 3638 individuals (1851 in girls and 1787 in boys) distributed into 11 age groups for both sexes. The somatotype diagnosis is made according to the methods of Heath-Carter. Because of the mixed character of the study, the statistical analysis of the metrical data is made by the method of weighted mean value.

Results

General notion about the somatotype characterization in schoolchildren between 7 and 17 years of age gives the mean somatotypes (Table 1). The results display that: in **boys** — till 10 years of age the mean somatotype is from the Mesomorph group, at 11 and 12 years — the mean somatotype is Central and from 13 till 17 years it is a boundary type Mesomorph-Ectomorph; at **girls** the diversity of mean somatotypes is greater for the investigated period. At 7 and 8 years it is a Mesomorph-Ectomorph, at 9 and 10 years — a Central one, at 11 and 12 years the mean somatotype is a boundary type Endomorph-Ectomorph and between 13 and 17 it is constantly an Ectomorph-Endomorph.

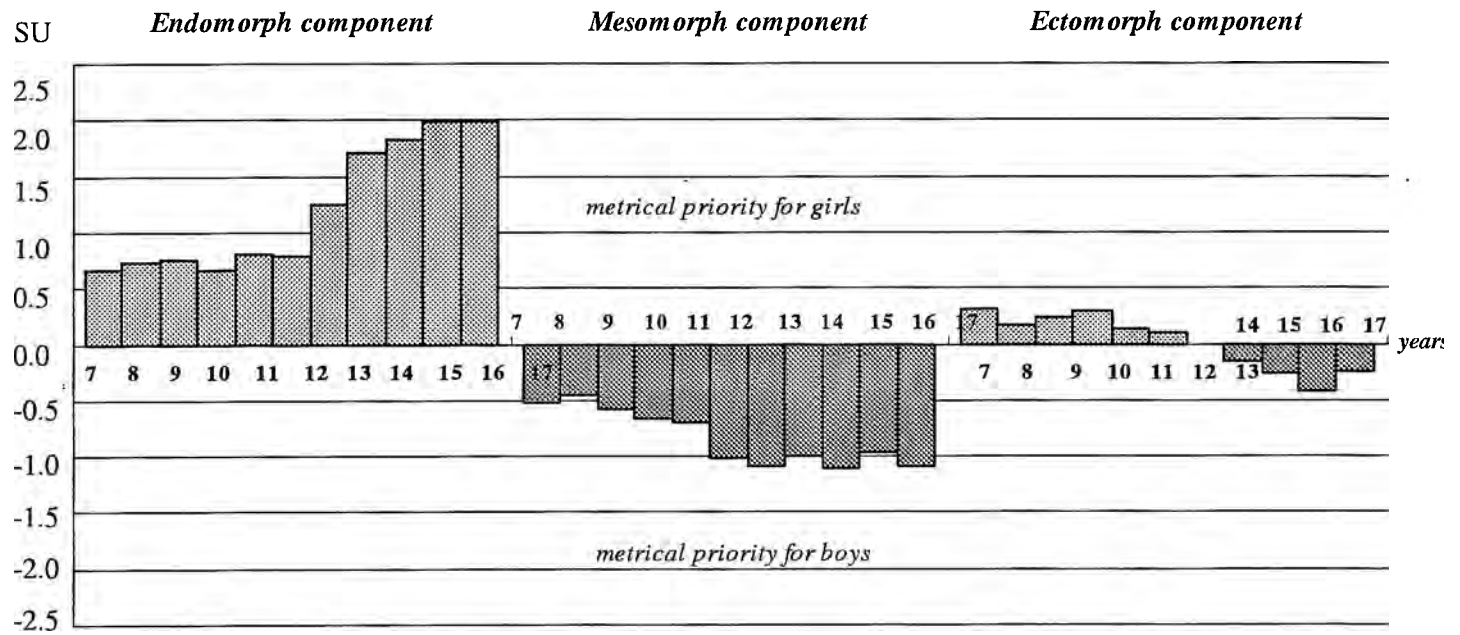
For the determination of somatotype diversity in the studied adolescents is analyzed the frequency of the 13 somatotypes in the separate ages (Table 2). Concerning the **Endomorph** somatotypes group for both sexes during the entire studied period the Mesomorphic Endomorph prevail (between 9,9% and 38,5%), its frequency being considerably bigger in girls. In them after 11 years the Ectomorphic Endomorph is presented well, while in boys it misses. The somatotypes from **Mesomorph** group was found more often in boys from all ages, the most high frequency being around 20% for 7 and 8 years old boys. In the girls the frequency of Mesomorph somatotypes is under 10% for the period between 7 and 11 years predominantly. From the **Ectomorph** somatotypes group in boys most frequent is the Mesomorphic Ectomorph — markedly between 14 and 17 years (up to 28,2%), slightly expressed in girls. This somatotype is under 10% till 13 years of age. In girls more frequently were found the Endomorphic Ectomorph and the Endomorph-Ectomorph. The **Central**

Table 1. Mean somatotypes between 7 and 17 years of age

Boys		Age	Girls	
component values En M Ec	mean somatotype		mean somatotype	component values En M Ec
3.32 - 4.45 - 2.79	Endomorphic Mesomorph	7	Mesomorph - Endomorph	3.99 - 3.92 - 3.10
3.25 - 4.38 - 3.21	Balanced Mesomorph	8	Mesomorph - Endomorph	3.99 - 3.93 - 3.38
3.28 - 4.13 - 3.33	Balanced Mesomorph	9	Central somatotype	4.03 - 3.55 - 3.56
3.28 - 4.23 - 3.50	Balanced Mesomorph	10	Central somatotype	3.94 - 3.56 - 3.80
3.28 - 3.91 - 3.70	Central somatotype	11	Endomorph - Ectomorph	4.09 - 3.21 - 3.83
3.51 - 3.99 - 3.71	Central somatotype	12	Endomorph - Ectomorph	4.29 - 2.98 - 3.81
3.31 - 4.08 - 3.92	Mesomorph - Ectomorph	13	Ectomorphic Endomorph	4.55 - 2.99 - 3.92
3.18 - 3.90 - 4.29	Mesomorph - Ectomorph	14	Ectomorphic Endomorph	4.89 - 2.90 - 4.14
3.31 - 3.96 - 4.14	Mesomorph - Ectomorph	15	Ectomorphic Endomorph	5.13 - 2.85 - 3.89
3.02 - 3.91 - 4.16	Mesomorph - Ectomorph	16	Ectomorphic Endomorph	5.00 - 2.95 - 3.74
3.19 - 4.05 - 3.90	Mesomorph - Ectomorph	17	Ectomorphic Endomorph	5.17 - 2.96 - 3.66

Table 2. Somatotype's frequency (%) between 7 and 17 years of age

Years of age – boys											Somatotype	Years of age – girls										
7	8	9	10	11	12	13	14	15	16	17		7	8	9	10	11	12	13	14	15	16	17
9.9	14.3	21.8	22.2	24.9	24.0	24.4	21.0	21.0	15.2	16.1	Mesomorphic Endomorph	29.4	28.0	33.3	33.7	32.8	33.7	35.3	30.4	29.7	35.2	38.5
0	0	0	0	0.6	1.2	1.2	1.4	0.8	0.8	0.8	Ectomorphic Endomorph	0.6	0.5	2.7	3.2	5.4	6.3	11.4	16.7	25.4	17.2	21.5
0.6	1.1	1.1	1.1	2.2	3.5	0.6	1.4	1.6	0.8	2.5	Balanced Endomorph	6.8	5.5	7.1	4.8	8.3	14.2	13.0	13.0	13.0	14.1	14.1
12.7	6.9	6.4	7.9	9.4	8.8	6.7	2.9	5.6	5.3	5.1	Mesomorph - Endomorph	11.9	11.0	9.3	7.0	5.9	1.6	1.6	2.2	1.4	2.3	1.5
22.1	11.6	13.3	7.4	5.0	4.7	6.1	4.3	6.5	6.8	10.2	Endomorphic Mesomorph	8.5	7.7	2.7	3.2	0.5	1.6	1.1	0	1.4	0	0
12.2	15.9	12.8	12.2	6.1	8.2	8.5	5.1	6.5	10.6	10.2	Ectomorphic Mesomorph	2.3	1.6	1.1	1.6	0	0	0	0.7	0	0	0
21.5	19.0	9.6	10.1	8.3	6.4	6.1	7.2	6.5	5.1	5.9	Balanced Mesomorph	9.0	4.9	4.4	4.3	1.0	0	0.5	0	0	0	0.7
12.7	13.8	9.0	13.8	9.4	9.4	11.6	9.4	8.1	12.1	11.9	Ectomorph - Mesomorph	8.5	9.3	3.3	5.9	2.9	1.1	0.5	0	1.4	0.8	0
0	0	0.5	0	0.6	2.9	2.4	3.6	16	3.0	2.5	Endomorphic Ectomorph	2.8	2.2	7.1	7.0	14.2	11.6	16.3	15.2	13.0	13.3	11.1
3.9	9.5	13.3	14.8	22.7	19.3	20.1	29.0	28.2	27.2	23.7	Mesomorphic Ectomorph	7.3	6.6	7.7	7.0	4.9	2.1	4.3	0.7	0	0	0.7
2.2	2.6	4.3	5.3	6.6	4.1	6.1	6.5	10.5	6.8	9.3	Balanced Ectomorph	6.8	12.1	11.5	13.9	11.8	14.7	6.5	6.5	2.2	3.9	2.2
0.6	0	1.1	0.5	0	0.6	1.2	1.4	0	0.8	0	Endomorph - Ectomorph	0.6	1.6	3.3	3.7	6.9	7.9	6.0	10.1	7.2	10.2	7.4
1.7	5.3	6.9	4.8	4.4	7.0	4.9	6.5	3.2	4.5	1.7	Central	5.6	8.8	6.6	4.8	5.4	5.3	3.3	4.3	5.1	3.1	2.2



* the negative sign shows metrical priority for boys

Fig. 1. Sex and age differences in the values of somatotype components

somatotype frequency is relatively low for both sexes, and during the youth it could be found more rarely.

Against the base of relatively slight changes of the mean somatotype between 7 and 17 years, the values of separate somatotype component change themselves considerably (Table 1, Fig. 1). For all ages between 7 and 17 years the **Endomorph** component have bigger values in girls, the sexual differences being better expressed (up to 2 SU) after the 14 year, i.e. at the end of their puberty and post puberty ages. The **Mesomorph** component throughout the whole period under study has bigger values in boys. The sexual differences are better expressed from the 13 year on, when the Mesomorphy in boys is round or over 1 SU greater. Nevertheless that during the entire studied period the sexual differences of the values for **Ectomorph** component are comparatively small, the age differences are indicative of the specificity for both sexes transformation of body composition and body forms, which transformation is connected with the sexual maturity. Till 13 years of age the girls are more Ectomorphic, i.e. they are more lengthened. At 14 years boys and girls have equal values of the Ectomorph component (round 4 SU), and between 14 and 17 years, the Ectomorphy is already greater in boys that illustrate the formation of a more lengthened forms in them characteristic for the adult man.

Conclusions

The mean somatotype of the investigated adolescents from both sexes is relatively constant and doesn't change its belonging to the respective somatotype group as a whole; during the entire studied period, boys are more Mesomorphic and less Endomorphic, while girls — the opposite more Endomorphic and less Mesomorphic.

In contrast to the unchangeable mean somatotype, the separate somatotype components change their values most tangible after 13 and 14 years of age. These changes reflect the specific for both sexes changes in body composition and body forms connected with their sexual maturation: in boys after 13 year the Mesomorphy increase more markedly and less but specific — the Ectomorphy; for girls most characteristic is the increment of Endomorphy after 14 years of age.

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