

Age at Menarche and Somatotype in Young Adults

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An attempt is made to correlate age at menarche with the somatotype in young adults. Data of 542 university students in Sofia, mean age 22,1 at the investigation (1986) are analysed according the permanent residence place. Somatotype is evaluated after Heath-Carter, age at menarche — by recalled age method. The results show high differences between students from towns (higher mean age at menarche, higher mesomorphy and endomorphy) and cities (lower mean age at menarche, lower mesomorphy and endomorphy). The differences can be traced also in their curves of correlation age at menarche-somatotype. These curves are opposed one to the other. The results set the limits of normal age at menarche in city residents from 11.25 to 14.24 years and show that the connection age at menarche-somatotype is more complicated than usually accepted.

Key words: age at menarche, somatotype, university students, young adult age, city-town differences.

Introduction

The interrelations of sexual maturation and somatotype have been object of various studies [1, 2, 6]. In such studies usually is looked for these relations in adolescence period. In present study an attempt is made to correlate age at menarche with the somatotype in young adults, when the processes of growth, development and maturation are more or less over. The interrelations of age at menarche and somatotype have been traced on the background of the urbanization level.

Material and Methods

For the purpose of this study the individual data of 542 young female students in Sofia universities (mean age 22.1 years in the moment of investigation — spring 1986) are analysed according the permanent residence place. They were near 9 years since their menarche (mean age at menarche 13.2 years). The students were classified according the population and the status of their residence place in 1975 census (the most close to their adolescence). The following groups have been used:

- 1) villages;
- 2) small towns (less than 25 thousands);
- 3) big towns (25 — 100 thousands);
- 4) cities (above 100 thousands);
- 5) Sofia — migrants (since it is possible that some of them have reported the place of temporary residence as a place of permanent);
- 6) Sofia — native born (born in Sofia).

Students' somatotype is evaluated after Heath-Carter's schedule [9, 12]. Data of age at menarche are collected by the recalled age method (retrospective). The crude mean values of the separate somatotype components by age groups have been adjusted by the method of moving average [10].

Results and Discussion

The analysis of the material has found significant differences between the subsamples as in the mean age at menarche (from 12.95 to 13.61 years, $p \leq 0.01$) but also in the separate components of the somatotype (endomorphy from 4.26 to 4.90, $p \leq 0.05$; mesomorphy from 3.46 to 4.40, $p \leq 0.001$; ectomorphy from 1.76 to 2.45, $p \leq 0.01$). As the reader can see, these differences are most sharply expressed in the mesomorphy (Table 1, Fig. 1). On the basis of these differences the investigated students can be divided in two major groups — girls from the towns and girls from the cities (including Sofia and the migrants in it). The students from towns show higher mean age at menarche combined with higher mesomorphy and endomorphy (Table 2) — mean somatotype mesomorph-endomorph. The students from cities show lower mean age at menarche combined with lower mesomorphy and endomorphy — mean somatotype mesoendomorph. These significant differences are present also if the somatotype is traced by age at menarche according the residence (Fig. 2). The curves of correlation between age at menarche and somatotype in city and town girls, which have been found, were completely different and opposed one to the other.

Table 1. Age at menarche and somatotype in the investigated students by residence

Residence	N		Age at menarche	Somatotype — components			Somatotype
				Endomorphv	Mesomorphv	Ectomorphv	
Village	36	M SD	12.95 1.67	4.90 1.70	4.12 1.19	1.76 1.03	Mesoendomorph
Small town	59	M SD	13.61 1.30	4.47 1.37	4.40 1.08	1.95 0.98	Mesomorph-endomorph
Big town	148	M SD	13.35 1.42	4.55 1.19	4.52 1.09	2.18 1.13	Mesomorph-endomorph
City	93	M SD	13.04 1.26	4.40 0.96	3.46 0.92	2.20 1.15	Mesoendomorph
Sofia (migrants)	72	M SD	12.95 1.17	4.26 1.39	3.47 0.96	2.45 1.08	Mesoendomorph
Sofia (native born)	134	M SD	12.97 1.25	4.54 1.43	3.52 1.12	2.28 1.18	Mesoendomorph
Total	542	M SD	13.15 1.34	4.50 1.37	3.91 1.15	2.19 1.13	Mesoendomorph

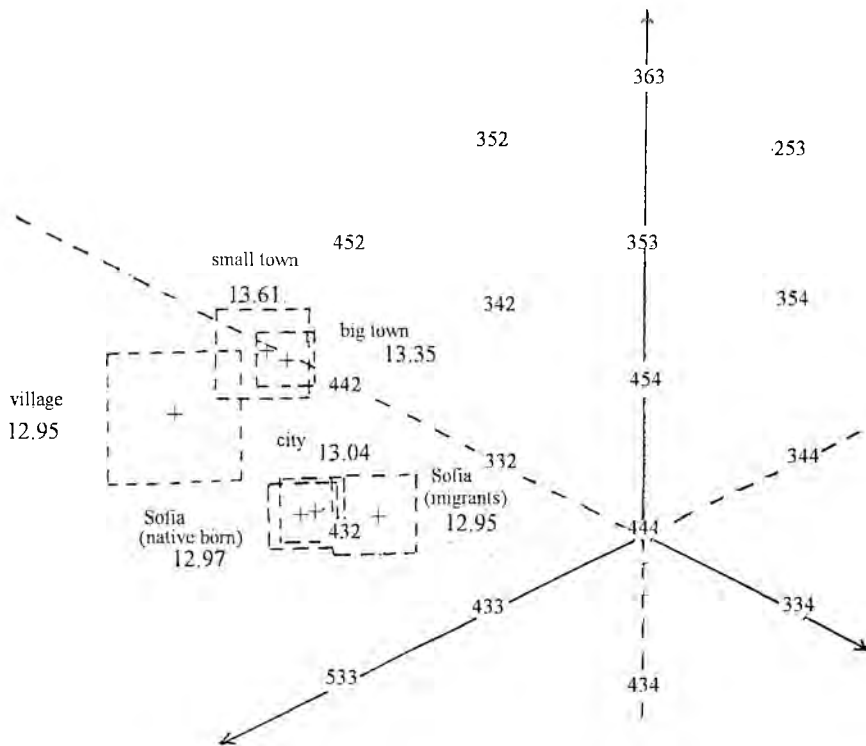


Fig. 1. Mean somatotype ($M \pm m$) and mean age at menarche by residence

Table 2. Age at menarche and somatotype in the investigated students by united groups

Residence	N		Age at menarche	Somatotype — components			Somatotype
				Endomorphy	Mesomorphy	Ectomorphy	
Village	36	M	12.95	4.90	4.12	1.76	Mesoendomorph
		SD	1.67	1.70	1.19	1.03	
Town	207	M	13.42	4.53	4.49	2.11	Mesomorph-endomorph
		SD	1.39	1.24	1.06	1.09	
City	299	M	12.99	4.43	3.49	2.30	Mesoendomorph
		SD	1.23	1.29	1.02	1.15	
Total	542	M	13.15	4.50	3.91	2.19	Mesoendomorph
		SD	1.34	1.37	1.15	1.13	

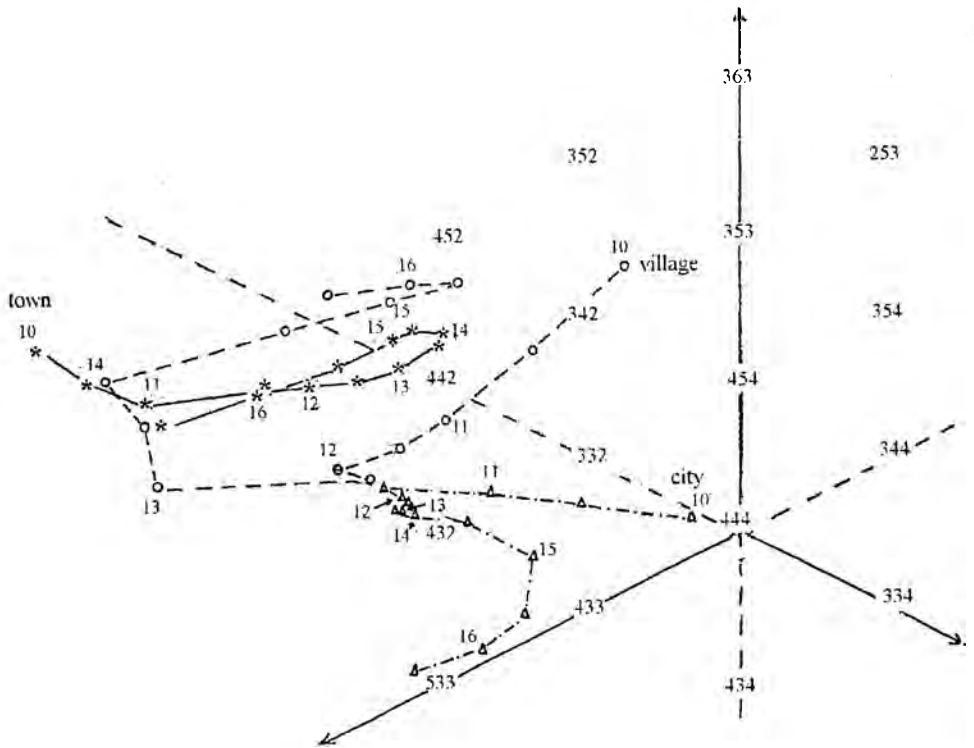


Fig. 2. Somatotype by age at menarche and residence

The small subsample of students — rural residents has an intermediate position. They are closer to the city residents in mean age at menarche (12.95 years) and in the general description of their somatotype (mesoendomorph), but in the values of every separate somatotype component are closer to the town students (Table 2). The composition of this subsample has some specific peculiarities, which have been discussed in details in our former paper and explain the early upset of menarche [11]. It can be presumed that the similarity of their somatotype to the somatotype of city students is due to the reasons discussed in the cited paper. If we analyse the somatotype by age at menarche in village students, we come to a curve similar to the curve in city students, but shifted to the curve in town students.

It is interesting that the city residents with age at menarche from 11.5 to 14 years (more strictly from 11.25 to 14.24 years) show practically the same somatotype — 4.56 : 3.52 : 2.20 (Table 3, Fig. 2). Variations can be found only in students with earlier or later age at menarche. These both cases present lower endomorphy and higher ectomorphy. In author's opinion these are the limits of the normal age at menarche in a city population (11.25 to 14.24 years). Around the middle of this interval (12.75 years) concentrate the data of mean age at menarche in city and well urbanised populations in Bulgaria and in whole Eastern Europe in the last quarter of 20th century [4, 7, 8].

Table 3. Periodisation of the age at menarche and somatotype in the investigated students by united groups

Residence	Age at menarche	N		Somatotype components			Somatotype
				Endomorphy	Mesomorphy	Ectomorphy	
City	< 11.24	25	M SD	3.80 1.20	3.52 0.81	2.70 1.05	Mesomorph-endomorph
	11.25-14.24	232	M SD	4.56** 1.43	3.52 1.04	2.20* 1.15	Mesoendomorph
	14.25 <	42	M SD	4.05* 1.29	3.30 1.01	2.57* 1.12	Mesoendomorph
Town	< 11.24	14	M SD	5.89 1.46	4.46 1.31	1.32 0.64	Mesoendomorph
	11.25-13.24	75	M SD	4.64* 1.14	4.33 1.56	2.12*** 1.05	Mesomorph-endomorph
	13.25-15.24	101	M SD	4.20* 1.13	4.66 1.02	2.30 1.12	Endomesomorph
	15.25 <	17	M SD	4.88* 1.24	4.15(*) 1.07	1.62* 1.02	Mesoendomorph
Village	< 12.74	15	M SD	4.10 1.50	3.77 1.03	2.00 1.07	Mesomorph-endomorph
	12.75-14.24	13	M SD	6.00** 1.65	3.96 1.42	1.08** 0.61	Mesoendomorph
	14.25 <	8	M SD	4.62* 1.25	5.06* 0.42	2.44** 0.94	Endomesomorph

* - $P < 0.05$; ** - $P < 0.01$; *** - $P < 0.001$, (*) - $P < 0.10$ in comparison to the former subsample by age at menarche

As far as city residents cluster in three subgroups (with early, medium and late menarche), in town residents can be traced four subgroups. These with early menarche (less than 11.24 years) present a strongly expressed endomorphy (5.89) and their mean somatotype is mesoendomorph. In students with menarche from 13.25 to 15.24 (named conventionally "later than medium") is very typical that the mesomorphy is more expressed than the endomorphy (besides the lower endomorphy). Thus their mean somatotype is endomesomorph. Such predomination of the mesomorphy is not typical for the female somatotype in general. It distinguishes them from the group with menarche "earlier than medium" (11.25 to 13.24 years) with mean somatotype mesomorph-endomorph. At last in town residents with menarche later than 15.25 years can be found a higher endomorphy.

Despite their small number, village residents divide also in three subgroups with statistically significant differences between them: with early (less than 12.74 years), medium (12.75-14.24 years) and late menarche (over 14.25 years). They are similar to the city residents in this fact that in the medium group can be found again the girls with the highest endomorphy and the lowest ectomorphy and mean somatotype mesoendomorph, and in the girls with early menarche the mean somatotype is mesomorph-endomorph. In the group of village girls with late menarche, however, a similarity to the town girls with menarche "later than medium" can be found (a mesomorphy higher than endomorphy and mean somatotype endomesomorph).

In the literature usually is given a simple relation between age at menarche and somatotype — earlier maturation correlates higher endomorphy [1]. The somatotype of students with early menarche in both early maturing samples (city and village residents — mesomorph-endomorph) deviates from such type of relationship. The somatotype of the late maturing girls from the towns (mesoendomorph) also falls out of such relationship.

Such a relation cannot explain also the differences in the somatotype and in the age at menarche according to the residence. The results of the present study show that the connection between age at menarche and somatotype is more complicated than usually accepted. It is possible that the correlation is under social environment influence too. The Heath-Carter schedule (according to its authors themselves) belongs to the group of somatotyping methods which estimate the phenotypic (i.e. present) somatotype, and not to the methods, which attempt to assess the constitutional, unchanging pattern of somatotype [3]. Probably no significant differences should be found by urbanisation level if a somatotype schedule assessing the stable ecologically constitution has been used, for example the schedule of Shtefko-Ostrovsky or of Kadanoﬀ — Jordanoﬀ [5]. A higher mesomorphy in town and village girls than in city ones has been found in this study. A similar phenomenon has been found for this period in a comparison of the somatotypes of adolescents from Sofia and Smolyan and explained on the basis of the higher motor activity of the children and youth in the smaller town [6].

As a conclusion, the author considers that the relationship between social environment, sexual maturation terms and somatotype (in adolescence and after its termination) needs additional studies.

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