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VARIATIONS OF PHYSIQUE IN FEMALE COLLEGE STUDENTS

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A b s t r a c t. Four groups of female students from Teachers' Training Colleges: in Debrecen (Eastern Hungary, n = 276), in Jászberény (Middle Hungary, n = 267), in Kecskemét (Middle Hungary, n = 241), and in Sárospatak (Northern Hungary, n = 285) were studied. All students were Hungarian and Caucasian; their age varied between 18 and 21 years. Based on a detailed anthropometric program, their body dimension and proportion were analyzed by means of ROSS—WILSON's (1974) unisex human phantom, and their somatotype determined by the Heath—Carter method.

The mean stature of the complete sample was 160.77 cm, the mean somatotype 5.79—3.17—2.04. Some geographic regional differences among the four groups were noted only in length measurements. The Jászberény-group was the tallest (161.04 cm). No significant differences were observed in other body measurements, proportions or somatotypes.

Key words: physique, body proportions, somatotype, female students, Debrecen, Jászberény, Kecskemét, Sárospatak.

Introduction. Material and Methods

Ever since SHELDON et al. (1940) carried out his classical examinations in university students, the variations of physique of juveniles and young adults can count upon the interest of human biologists.

The author of the present paper conducted her examinations in 1973 and 1974 founding herself on a detailed anthropometric programme, in the Debrecen (n = 276), Sárospatak (n = 285) and Jászberény (n = 267) Teachers' Training Colleges, as well as in the Kecskemét Training College for Kindergarten Teachers and Nurses (n = 241). The ages of the 1069 female students vary between 18 and 21 years, the mean of their ages is 19.58 years. All are Hungarians, Europids.

Results and Discussion

In Figure 1 the places are presented where the examinations took place. The samples originate from Eastern Hungary (Debrecen), Northern Hungary (Sárospatak) and Central Hungary (Jászberény, Kecskemét). It can be found that, as compared with data of earlier examinations conducted in Hungary, the stature has increased; the measure of the secular trend is similar to the one

Fig. 1: Sites of collection of the sample

in other European countries (RAJKAI—JANCSÓ 1955, RAJKAI 1957, 1965, EIBEN 1965, BARACS—FARMOSI 1976, EVELETH—TANNER 1977, COLLINS—WEINER 1977).

The tallest in the samples are the Jászberény girls ($\bar{x} = 161.04$ cm). Upon them follow the Sárospatak ones with a mean of 160.74 cm, the Debrecen ones ($\bar{x} = 160.50$ cm) and, finally, the Kecskemét ones ($x = 160.29$ cm). In mean stature there is no significant difference between the subgroups. On the other hand, in the measurements of stature length there are significant differences to be demonstrated. The female students from Debrecen and Sárospatak, i.e. from Northeastern Hungary do not significantly differ from each other, the values of their measurements are similar. The means of the Jászberény girls (Central Hungary) significantly differ from the former: their values of size and shape are higher.

Making use of the unisex human phantom (ROSS—WILSON 1974) the author conducted proportional analysis. The Jászberény subgroup differs from the others also as to proportions. A similitude in proportions of the Debrecen and Sárospatak groups can be demonstrated.

Figure 2 shows the z-transformation values of the measurements of lengths.

The differences appearing in the measurements and proportions of length are due to the fact that in the examined areas the ethnic structure of the population is different. Interbreeding, the discontinuance of the geographic determining effects could not dissolve the differences in these genetically so closely bound measurements to our very days. This difference in stature of the female college students come from various regions of Hungary can be compared with the results brought by a survey of males liable to conscrip-

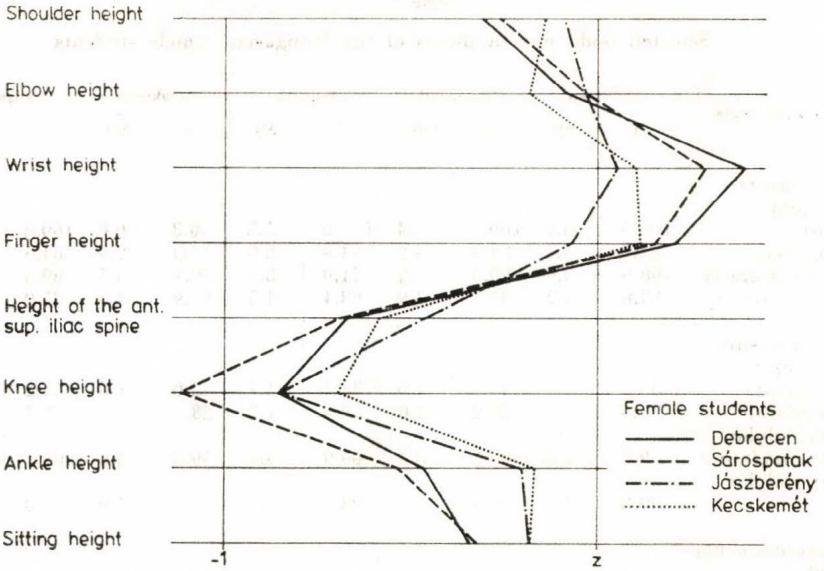

Fig. 2: **Proportional profile of length measurements of the female students**

tion (KÁDÁR—VÉLI 1971, 1974, 1977, NEMESKÉRI et al. 1977). Accordingly, in Hungary the statures of young adult population of both sexes differ by geographic regions. The differences appear more markedly with the males than with the females.

In the case of the measurements of width and circumference the author could not find such a tendency. These characters are much more determined by the environment and vary depending on it (Table 1).

The author determined the physique relying upon Heath—Carter's method (CARTER 1975). The mean values of the somatotype of the whole sample are: 5.79—3.17—2.04. As it appears from the distribution, the majority of the

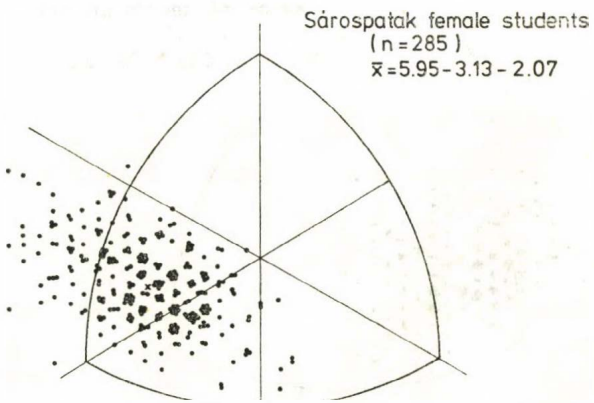

Fig. 3: **Somatotype of Sárospatak female students**

Table 1

Selected body measurements of the Hungarian female students

Body measurements	Debrecen		Sárospatak		Jászberény		Kecskemét		Together	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Length measurements (cm)										
Stature	160.5	5.9	160.7	5.4	161.0	5.8	160.3	6.0	160.8	5.7
Sitting height	84.2	3.1	84.3	3.2	84.9	2.9	84.9	2.9	84.5	3.0
Upper extremity	68.9	3.0	69.3	3.2	71.0	3.4	70.1	3.5	69.8	3.4
Lower extremity	87.8	4.2	87.5	3.9	88.4	4.5	87.9	4.5	87.9	4.2
Breadth measurements (cm)										
Bi-acromial	35.3	1.5	35.4	1.6	35.1	1.7	35.0	1.6	35.2	1.6
Bi-iliocristal	28.5	1.9	29.2	2.0	28.6	1.8	28.4	2.0	28.7	2.0
Bi-epicondylar humerus (mm)	59.8	2.8	60.8	3.2	60.9	3.4	59.8	3.6	60.3	3.3
Bi-epicondylar femur	90.8	4.8	92.0	5.3	93.6	5.6	91.6	4.9	92.0	5.3
Girth measurements (cm)										
Chest	82.0	4.5	83.5	4.5	82.0	4.3	81.1	4.5	82.2	4.5
Abdominal	77.2	5.8	78.2	6.5	76.9	6.4	77.6	6.5	77.5	6.3
Thigh	54.3	3.4	54.9	4.1	54.3	4.0	53.8	4.1	54.4	3.9
Arm (extended)	24.3	1.7	24.7	2.1	24.6	2.0	23.9	2.2	24.4	2.0
Skinfolds (mm)										
Triceps	19.6	5.2	21.4	5.4	22.4	5.3	23.2	5.0	21.6	4.9
Suprailiac	29.0	7.9	28.9	7.3	24.7	6.8	24.6	7.5	26.9	7.6
Weight (kg)	54.5	6.0	55.9	6.7	57.5	6.9	55.4	7.4	55.9	6.8
Somatotype										
Endomorphy	5.7	1.1	5.9	1.0	5.7	1.1	5.8	1.1	5.8	1.1
Mesomorphy	3.2	0.9	3.1	1.0	3.2	1.1	3.1	1.1	3.2	1.1
Ectomorphy	2.2	1.0	2.1	1.0	1.8	1.0	2.0	1.0	2.0	1.0

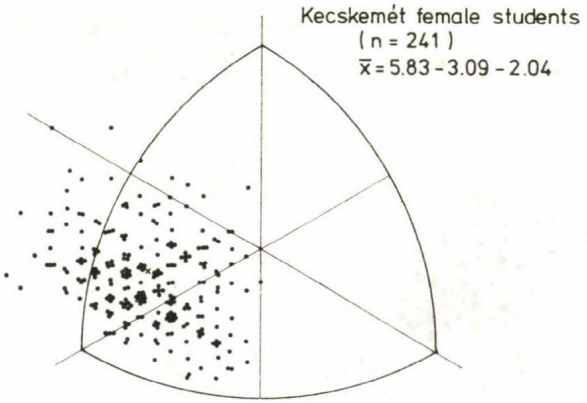

Fig. 4: Somatotype of Kecskemét female students

students is mesomorphic-endomorphic. The mean value of the Ist component is highest among the Sárospatak (5.95) and Kecskemét (5.83) girls. The means of the Jászberény and Debrecen subgroups agree. Still, the identical means cover different body structures: in the Jászberény girls there is more fat on the upper armes and back (subscapula), while with the Debrecen subgroup it is the fat deposits of the pelvic (suprailiac) region that are more marked.

The means of the IInd component are nearly identical in each subgroup. As to absolute values, the mean of the Jászberény group is the highest (3.24). The data of the wrist- and ankle circumferences as well as the bicondylar width indicate that the bony system of this group is stronger than that of the others. True, as to measurements of circumference, they follow after the Sárospatak girls, still while with the latter subcutaneous fat occurs in greater quantity, the lower values of circumference cover larger masses of muscles.

The values of the IIIrd component show that the Debrecen girls are the most ectomorphic ones of the surveyed individuals (Figures 3, 4, 5 and 6).

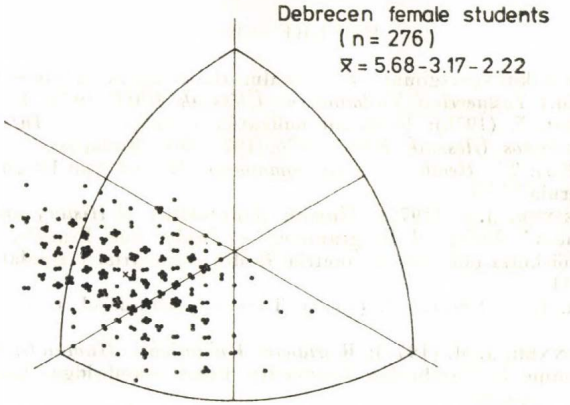

Fig. 5: Somatotype of Debrecen female students

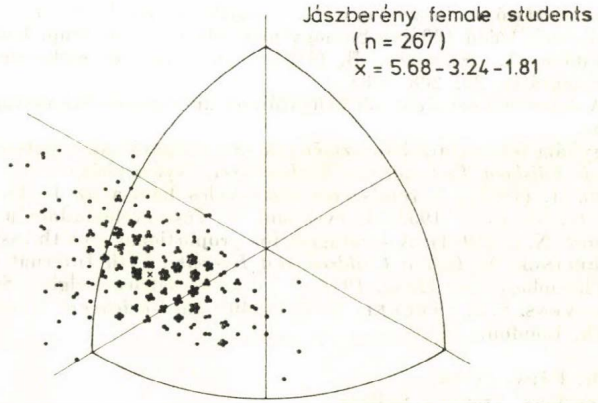

Fig. 6: Somatotype of Jászberény female students

The results of the surveys taken in Hungary (ABÁD 1976, FARMOSI 1976, EIBEN et al. 1974) indicate that the means of the somatotypes of the subgroups examined by the author surpass those of the other Hungarian college students in the first place in the Ist component, while, as regards the IInd component their mean is lower. This means that the female students of the Teachers' Colleges are "more fatty" and less muscular than the female university students of nearly identical age.

Summing up what has been set forth above: among subgroups by geographic regions of Hungarian female college students there are differences in body measurements, in body proportions and in components of the physique to be demonstrated. However, significant differences unambiguously only appear in the measurements of length. In other body measurements the variation among the subgroups is considerable, and it is difficult to demonstrate a tendency.

The differences are dimming, the effect of the improving environmental factors points toward further levelling-up.

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