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SECULAR CHANGES OF BODY MEASUREMENTS IN HUNGARIAN UNIVERSITY STUDENTS BETWEEN 1976–1985

G. Gyenis and *Gabriella Till*

Department of Anthropology, Eötvös Loránd University, Budapest, Hungary;
Polyclinic of Technical University, Budapest, Hungary

Abstract: The body development of first year students of the Technical University, Budapest has been investigated yearly from the 1974/75 academic year. In this paper the decennial changes in body measurements of 20 year old male students between 1976–1985 are analysed. All the investigated body measurements show a tendency to increase, except that of biiliocristal diameter. But there appear different trends in secular changes of body measurements according to the students' socio-economic status. The increase in the measurements of students with a father having a university or high school education level showed lower values than that of other students, and the changes in students born in Budapest also showed lower values than those who were born in the country.

Key words: Secular trend, Hungarian university students, Body measurements.

Introduction

The term of secular growth changes contains several phenomena. Among them the best known is the change of adult height, which is usually associated with increased growth maturity, earlier maturation and greater adult stature (Van Wieringen 1978).

The general trend of the secular changes can be well-represented by the data of military conscripts from different European countries, which show an increasing tendency of adult height during the last century (Tanner 1966, Van Wieringen 1978).

Among the factors determining body measurements the most important are the enviromental elements. Therefore the rate of the secular changes in different between social categories of the populations from these countries (Van Wieringen 1978).

One of the special strata of young adults is that of university student. They belong to an intellectually selected group, and they have usually grown up in better socioeconomic conditions, therefore, their average stature is higher than the conscripts' height, who represent the mean of the whole population of that age (Gyenis 1980, Olivier 1980).

The aim of this paper is to present data of decennial changes in body measurements of Hungarian students and the effects of two socioeconomic factors (place of birth and educational level of fathers) on it.

Material and Methods

In the Polyclinic of the Technical University, Budapest regular screening tests have been made for a long time on first and fifth year students to record their state of health and body development (Gyenis 1980, Till – Gyenis 1975). This paper is only concerned with first year students, who were measured in the second terms of the 1975/76–1984/85 academic years. More than ter thousand students were examined during this period, but only the data of the largest group, the 20 year old male students are analyzed here (N=6951). Among these students 39.8% were born in Budapest and 60.2% in other settlements and 44.4% of them had fathers with a high level of education (university or high school), which is more than 3 times higher than the national average in Hungary.

Results and Discussion

The majority of the measurements of the 20 year old male students show an increase, with the exception of the biiliocristal diameter and three skinfold measurements (Table 1). But there are some differences in the change of the measurements considering two socioeconomic factors: the birth place of the students and the educational level of their fathers.

Table 1. Mean and decennial changes (1976–1985) of measurements in total sample of Hungarian students and according to their birth-place

Body measurements	Total		Place of birth: Budapest		Country	
	$\bar{x}$	Changes	$\bar{x}$	Changes	$\bar{x}$	Changes
Height (cm)	176.9	2.1	177.3	1.1	176.6	2.7
Weight (kg)	68.9	3.2	69.5	2.3	68.5	3.8
Sitting height (cm)	92.8	1.5	93.0	1.2	92.7	1.6
Iliac spine height (cm)	100.1	0.9	100.4	0.3	99.8	1.3
Upper arm cf. (cm)	27.2	0.2	27.5	0.1	27.1	0.3
Chest cf. (cm)	91.5	0.7	91.8	0.6	91.4	0.7
Thigh cf. (cm)	54.1	0.1	54.5	−0.3	53.8	0.4
Calf cf. (cm)	36.4	0.5	36.6	0.4	36.3	0.6
Total arm length (cm)	78.8	1.1	78.8	0.9	78.7	1.3
Biacromial dm. (cm)	40.7	0.9	40.7	0.8	40.7	0.8
Transverse chest dm. (cm)	29.4	0.2	29.5	0.3	29.3	0.2
Biiliocristal dm. (cm)	28.6	−0.2	28.7	−0.3	28.6	−0.2
Skinfold biceps (mm)	4.4	−0.5	4.6	−0.8	4.2	−0.4
Skinfold triceps (mm)	10.8	0.7	11.2	0.1	10.4	1.1
Skinfold subscapula (mm)	12.6	−0.3	13.2	−0.8	12.2	0.1
Skinfold suprailiaca (mm)	17.3	−1.6	18.3	−2.5	16.7	−1.0

Students born in other settlements (in the country) show an „accelerated" trend as compared with those born in Budapest. The increase in their measurements is higher, or, at least, the decrease in some of them is smaller than in the other group, with the exception of the transverse chest diameter. It is remarkable, that the decrease of skinfold data is much greater among the students in Budapest than in the other group.

The same phenomenon was observed among the students in relation to the educational level of their fathers, as in the case of their birth-place (Table 2). An accelerated growth can also be seen in students with fathers of basic (primary), or middle (secondary) educational level. The students' measurements with fathers of high educational level have the lowest increase in value, moreover, in some measurements there is a decrease. The sum of the 4 skinfold measurements also show a tendency to decrease only among the students with fathers of high and middle educational level, while among the students with fathers of basic educational level, this value shows a slight increase.

In Table 3 the change in the average stature of 18–20 year old military conscripts from 11 Western-European countries is shown for the period between 1960–1980 (Chamla 1983) with the same data of 20 year old Hungarian students between 1976–1985. The highest increase appeared with the conscripts of Spain, Denmark and Holland, while Portugal showed the lowest value. The data of Hungarian students is close to the best developed group of western countries, but they do not represent the average population of the youth in Hungary, because the educational level of their fathers was higher than the national average in Hungary.

Table 2. Mean and decennial changes (1976–1985) of measurements in Hungarian students according to educational level of their fathers

Body measurements	Educational level of fathers					
	Basic		Middle		High	
	$\bar{x}$	Changes	$\bar{x}$	Changes	$\bar{x}$	Changes
Height (cm)	175.9	2.3	176.8	2.4	177.6	1.1
Weight (kg)	68.5	3.5	69.0	4.2	69.1	2.3
Sitting height (cm)	92.3	1.6	92.7	1.4	93.2	1.2
Iliac spine height (cm)	99.6	1.1	100.1	1.0	100.4	0.2
Upper arm cf. (cm)	27.2	0.3	27.3	0.5	27.3	−0.1
Chest cf. (cm)	91.6	0.7	91.7	1.2	91.4	0.3
Thigh cf. (cm)	53.9	0.3	54.2	0.4	54.2	−0.3
Calf cf. (cm)	36.3	0.6	36.5	0.7	36.5	0.2
Total arm length (cm)	78.6	1.1	78.8	2.0	78.9	0.5
Biacromial dm. (cm)	40.7	0.9	40.7	0.9	40.7	0.8
Transverse chest dm. (cm)	29.4	0.2	29.4	0.2	29.3	0.3
Biiliocristal dm.	28.7	−0.2	28.6	0	28.6	−0.4
Skinfold biceps (mm)	4.3	−0.3	4.5	−0.4	4.4	−0.7
Skinfold triceps (mm)	10.5	1.1	10.9	0.6	10.9	0.4
Skinfold subscapula (mm)	12.3	0.2	12.7	−0.2	12.7	−0.8
Skinfold suprailiaca (mm)	17.0	−0.5	17.5	−0.9	17.4	−2.8

Table 3. Changes of stature of conscripts in some Western European countries (Chamla 1983), with same data of Hungarian students

Countries	Period	Stature Former	Recent	Difference
West-Germany	1960–1978	174.9	178.0	+3.1
Belgium	1960–1979	172.55	175.3	+2.75
Denmark	1960–1980	175.4	179.8	+4.4
Spain	1960–1980	166.7	171.3	+4.6
France	1960–1979	169.98	173.86	+3.88
Italy	1960–1977	168.47	172.19	+3.72
Norway	1960–1980	177.15	179.5	+2.35
The Netherland	1960–1978	176.0	180.3	+4.3
Sweden	1960–1979	176.7	179.17	+2.47
Switzerland	1962–1977	173.1	175.5	+2.4
Portugal	1970–1980	166.6	167.1	+0.5
Hungarian students	1976–1986	175.3	177.4	2.1

Summarizing our results, two alternative conclusions may be drawn. Either, as a consequence of the general increase of living standards in Hungary, the effects of factors causing, growth retardation among the offsrings of formarly poor social classes are being eliminated, or the living standards of families with fathers of high educational level is not increasing to the same level as for families with lower educational level.

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Mailing address: Dr. Gyula Gyenis
ELTE Embertani Tanszék
Puskin u. 3. H–1088 Budapest, Hungary