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SOCIO-ECONOMIC STATUS OF THE CHILDREN AT THE TURN OF THE MILLENNIUM

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Absrtact: *The author gives an overview about growth and maturation status of the youth at the last decades of the twentieth century with special respect to the socio-economic status (SES) influencing the developmental process. Heritability of the children's growth pattern can be estimated between 72 and 88 per cent. During growth and maturation process of boys and girls, manifestation of growth process is influenced by environmental factors. Starting out from the scientifically proved and accepted fact that growth and maturation of children mirror the nutritional (and further also the biological) status of the population, the author gives a general overview about this problem. Based on his own growth studies carried out in Hungary, he demonstrates that the anthropometric traits (as objective measures) taken on growing children how quickly and how sensitively react the unreproducible social changes.*

Keywords: *Growth; Maturation; Growth pattern; Environmental effects; SES.*

Motto: A better world starts with children.

Introduction

The second half of the twentieth century was a period of running up of the biological sciences. Leading role was apprehended by biochemistry, genetics, and molecular biology. Beside these biological disciplines in fashion, several "classical" fields of biology falled into the background. This happened also with the (biological) anthropology, especially in some European regions.

Anthropology (with botany and zoology together) was a classical branch of biology dealing with evolution and variations of Hominids (chiefly Homo sapiens) in time and space. In the nineteenth century, hominid evolution was in centre of the scientists' interest, depending on findings of prehistoric archaeology and palaeontology. They turned to the living populations on basis of observations and statistical descriptions of scientists working in other fields (e.g. the Belgian Quetélet). In the twentieth century, elaboration of methods, e.g. somatometry was an elementary task, and (biological) anthropology became wider with sociological and demographic attitudes, especially in growth studies. That resulted better and better intensive studies carried out on living populations. The growth surveys called attention to one of the most interesting human biological phenomenon in the twentieth century, the *'secular trend'*.

Secular trend is long-term, systematic changes in a wide variety of anthropologic traits in successive generations of a population living in the same territory (Eiben 1988). Several parts of the phenomenon of the secular changes can be observed also in new-born babies, in childhood and in the young adult stage, as well as at the population level. In looking for the causes of this human biological phenomenon, one can take into account

the many-sided changes of our world: the growth process has been influenced by the slow change of the genetic equilibrium (mainly caused by migration all over the world) as well as by changes in environmental factors, especially the social ones (Eiben 1988).

After the WW II, this phrase "anthropology" enlarged, especially in the English-speaking world, comprehending many other branches of sciences, as ethnology, ethnography, folklore, sociology, demography, ethology, behaviour, etc., and "anthropology" divided for sub-branches as social anthropology, cultural anthropology, philosophical anthropology, theological anthropology, etc. This is the reason why we must point out the *original biological nature* of anthropology.

In this paper, the author will speak about *biological anthropology* or *human biology* of which one of the most flowering field is research of *growth and maturation of children*, and developing process and variations of *human physique*, as well.

Research of physical performance and fitness in children or in athletes is a complex task, using both natural historical and sociological methods. Beside of anthropometric techniques, we collect socio-demographic data of the background of the society influencing the biological process. There are, sciliset, well-known interrelationships between social strata and body size.

Auxological researches

Auxology (Greek, means: growth), a field of human biology. It works on the border line of biology and social sciences, using objective measures like body measurements and socio-demographic, -economic data as background information.

Growth and maturation is a complex biological process, influencing by inner (genetic) and outer (environmental) factors. It seems to be useful to sketch the most important factors here.

Genetic endowments (growth pattern)

The inner factors are *genetic endowments,* like sex, race, etc. In our recent knowledge, stature is determined by about 72–88% of genetic endowments. Similarly, the magnitude of sex differences must be under same genetic influence (Eiben 1994). Greulich (1951) found that retardation effects of war were stronger in boys than in girls. There are differences in growth pattern of different ethnical groups ("races"), too. It seems to be enough to refer the well-known differences in stature, in proportions, in tempo of growth and age at menarche/oigarche, etc. (see Eveleth and Tanner 1990, Bodzsár and Susanne 1998).

Verschuer (1934) described genes of growth of first, second and third order. The growth genes of first order control the division process of the zygote and then the beginning of cell differentiation. While those of second order regulate growth during embryonic life, and those of third order have a role in postnatal growth. As to the growth genes of first order, there is no difference within the human species. The growth genes of second order are race-specific ones, beginning with the 4^{th} foetal month differences as to races can be demonstrated. In the effect of the growth genes of third order already individual differences can be observed.

To make a gross assessment of the degree of hereditary, one can cite Lerner (1958). According to him, the phenotype (P) variation of a character consists of four components: the genotype (Ge) and environmental (E) variation, the correlation between these two, and the interaction of the two. This can be expressed by the following formula:

$$\Sigma_P^2 = \Sigma_{Ge}^2 + \Sigma_E^2 + 2r_{GeE} + f(GeE)$$

According to Thoma (1960), the following limiting values are obtained for the hereditability e.g. the menarcheal age: 88.2% > H > 72.2%. Taking into consideration the inaccuracy factors and amplifying the estimation for the growth process generally, one can merely state that heritability cannot be lower than 70% in value (Eiben 1977).

The child's physique (constitution) consists of the manifested part of the genotype and of such a part of the paratype (i.e acquired characteristics) which is a result of permanent adaptation to the external effects (and which depends also on genetic factors). The temporary status, i.e. condition does not belong to the constitution. (The lasting characteristics having only local importance and in their development the genetic endowments have no role, e.g. marks of injuries, passing children's diseases, etc.). All these are presented on a sketch compiled by the Hungarian scientist Szabó (1938) in Figure 1. Obviously, growth and somatic development is a phenotypically highly variable and genetically controlled process.

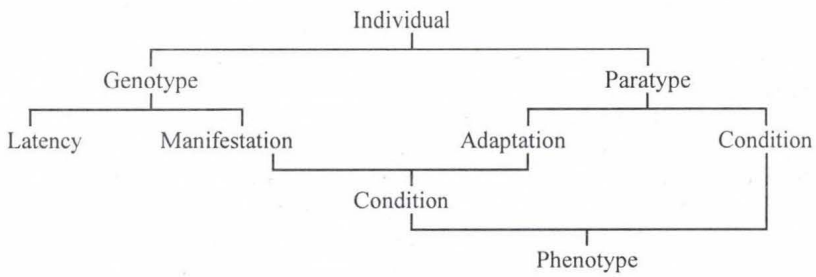

Fig. 1: Szabó's (1938) sketch about components of phenotype.

Environmental effects

The outer or environmental factors are (1) *physical* ones, such as the geographic position of the population, cosmic radiation, position of the settlement (angle of incidence), quality of soil (c.f. iodine-contents which is necessary to the thyroxin production), etc. The other sort of the environmental factors are (2) the *social* ones: a given social system, in which the population lives. This determines the most important circumstances, the welfare or poverty, well-nourished or undernourished people, level of medical care or public health (hygiene in general, vaccination, prevention and treatment), nutrition, level of communal supply, physical activity, traditions of folk/national customs, etc. All these result a characteristic *mode of life.* These factors can promote or hinder the manifestation of the growth pattern (Eiben 1988).

Dimensions of the childish body in a given age, time of sexual maturation, in summarising term: somatic development of the youth was one of the most interesting and mostly analysed problem of human biology ages ago. This process show many variations both in the population and between the populations. Out of the several environmental factors influencing growth and maturation of children, mentioned here, one of the (if not *the*) most important one is *nutrition.* The quality of environmental conditions, first of all hygiene and nutrition can determine the status of living in a population, the well-being of the individuals, families, and the society (Bielicki 1986, Susanne and Bodzsár 1998, Bodzsár 1999).

Today, it is a scientifically proved thesis that growth and maturation status of children is the best index of health and nutritional status of a community (WHO 1976, Tanner 1986, Eiben 1988). Based on this, Tanner (1981) introduced the concept '*epidemiological auxology*' when the growth survey concerns the whole population. These studies go back to many decades, however, some sporadic early studies pointed out certain social inequalities. Growth of children indicates extent of social inequality existing in a population. Results of growth studies can follow the temporal changes in the socio-economic conditions of a society or in some special subgroups of it. It is easy to understand that sociology utilised the results of the auxological studies. In hands of sociologists, auxological data serve as an instrument for monitoring the *socio-economic status* (further on SES) of a given human community, especially in an economically disadvantageous group.

The first 'modern' growth studies were carried out in the first half of the nineteenth century in England and France, dealing with height of children and age at menarche in girls. First signs of backwardness in growth and/or sexual maturation appeared in children of industrial workers. It was Villermé (1829) who very early on described the effects of social factors on the rate of growth of children and on final adult stature.

Based on the large English growth survey, Sir Francis Galton (1873–74) pointed out the differences in growth of two groups of 8–12 year-old boys and girls. Those who worked in a factory were smaller by about 3 cm than their counterparts who did not work in factory although also originating from worker families. The difference increased with age in both sexes. Based on the data of C. Roberts, Bowditch (1877) demonstrated that, across all ages, the sons of the labouring classes were shorter than those of the non-labouring classes. Pagliani (1879) published similar data: boys and girls of the well-to-do classes ('classe agiate') were on the average heavier and taller than those of the poverty-stricken ones ('povera').

In general, children living under better socio-economic conditions have consistently exceeded in growth and maturation their counterparts living under worse condition (the phenomenon of 'hysteroplasia', Rietz 1906). Ten years later, Pfaundler (1916) described the phenomenon of 'proteroplasia', i.e. the observation that urban children were taller, grew faster and matured earlier than their rural peers. (Eiben 1988, 1998). The genetic endowments can better manifest themselves under better environmental circumstances. Human biological researches confirmed that the decrease of differences in living standards in the different social strata results also decrease in the anthropometric characteristics of the different groups.

One can be agree with Fischbein (2001), who wrote "children's growth and development must be studied in a holistic perspective in order to understand the necessary environmental prerequisites which need to be present in order to assure optimal development for each child". We can add to this G. Kylén's (1988) postulation that man was always interacting with his environment and reality consisted of both material and experience.

Variations in growth process with social background

In his excellent essay, Bielicki (1986) expounded the two types of socially inducted variation in growth: *gradients* and *trends*. There are namely two basic categories of variations in question, the social gradients, and intergenerational changes which are effective simultaneously and jointly.

As the SES of subgroups in a society can differ, so body size and maturation status of children are different, too. These differences are based on educational level and profession of the parents, their income, number of family members, urban v. rural environment, etc. In a society, children of "upper" and "lower", or "better-off" and "less-well-off" social strata used to be different in their somatic status. Social variability used to be expressed not as a simple dichotomy but as a series of grades on an ordening scale. There used to be that the relationship between these variables and an index of growth is monotonic, e.g. height for age tends to increase with increasing parental educational level or with income of the family (Bielicki 1986). In this sense, Bielicki recommends the term *social gradients* which describes the nature of the above-mentioned variation in growth more accurately than does it the term 'social difference'. In this chapter this term will be used

As the other factor, it is necessary to mention the *intergenerational changes in growth* (that is the secular trend) toward greater body size, increased tempo of maturation (Tanner 1962, Roche 1979, Eiben 1988). This phenomenon is a phenotypic (means: somatic) response to improvement in living conditions (van Wieringen 1978, Malina 1979). Growth data serve as a good material for joint analysis of a gradient and a trend. Separate analysis of these does not result interpretable findings, only a comparison of different groups is realistic. Growth data are suitable for analysis of development of social strata. Such a comparative analysis made on two or more series of growth data from the same time period, can answer the following questions: "How do the effects of a specific social factor change in time?" Did the body measurements change over the last decades in a certain population? If yes, how, in which direction they did? Under what kinds of effects and for which factors did they change? "Are differences in parental educational level losing or gaining in importance as a 'stratifying agent' in a society?", etc. (Bielicki 1986, Eiben 1988).

Socio-economic status and body size

There are many studies about relationships between SES and body dimensions. The author intends to enumerate the most important and well studied point of view in this relations. It is not easy to do that. Some methodical difficulties used to be appeared. As it was mention, some factors studied have an effect simultaneously. For example, Bielicki et al. (1981) demonstrate, how strongly correlate the height of Polish conscripts as an index of growth and some traits of social environment. Three characteristics were taken into the analysis: urbanisation, i.e. largeness of the settlement (from great cities to small villages), fathers' educational level (from academic education or job normally requiring such education to primary educational level), and number of sibs (from one child in a family to six or more children in a family). The authors cited created a six-grade scale in each characteristics and they found that mean stature in their sample varied regularly with each of the social factors.

Bodzsár (2001), based on her Hungarian growth studies, called our attention to a recent phenomenon: between groups of children belonging to different social strata, differences in growth process (in first line in height) increase in the last decades.

Ethnic heterogeneity

The *ethnic heterogeneity* can make the problem more complicated. Relethford et al. (1983) reported that in the city of San Antonio (Texas, USA), skin colour (reflectance

data) among Mexican-Americans was found to be darkest in low-income, lighter in middle-income, and lightest in high-income sub-groups. This could be a strong inverse relationship between social strata and the rate of Amerindian admixture in the population studied (cited by Bielicki 1986). It is clear that this phenomenon is a result of not only environmental but also genetic effects. (There are historic backgrounds, probably an interplay of cultural barriers to intermarriage, different social mobility, a positive assortative mating, etc.). These two kinds of effects, i.e. genetic and environmental ones, can be additive and the social differences will be inflated. In an other case, however, two effects can cancel each other, thereby masking the existence of real social inequalities (Bielicki 1986).

Bielicki (1986) cited an other example, as ethnic heterogeneity produced an U-shaped social gradients. Shiloh (1960) and Belmaker (1982) studied Jewish girls in Jerusalem. Both of them found that girls of the middle class reached their menarche, breast development and pubic hair stages earlier than those from both the upper and lower classes. This unusual phenomenon was described as a "strong association between social class and ethnic groups". As an explanation was added that Jews in Israel in the upper class represented mainly the Euro-American origin and the lowest classes mainly the Jews from Northern Africa. The Jews from Near East spreaded over the social scale (Belmaker 1982).

In the end of the twentieth century, population of most countries are quite heterogeneous. In Europe, however, relative homogeneous populations live in Poland and in Hungary, i.e. practically no linguistic difference, and the ethnic-racial minorities are small. In both countries, after the WW II, there was a remarkable inner migration which made the population more homogeneous. Large growth studies were carried out in both countries. Several results of these studies will be cited in this paper.

Social mobility

There were observation about relationships between social mobility and body size more than 120 years ago. Parallel with development of capitalism, in the last decades of the nineteenth century thousands and thousands of people left their native country for America.

Boas (1911) observed that off-springs of the immigrants were well-developed, strong for their age, and matured earlier than the immigrants themselves. The American effects were the stronger the longer the parents lived in America before the birth of their child. In the second generation, in Boas' opinion, there were changes also in type toward the "American type". (A small human biological contributions to the term "melting pot"?)
In that time several scientists thought that tall persons have a greater spirit of enterprise than the shorter ones. It is an old hypothesis that tall persons are more likely to advance and/or less likely to regress in their socio-economic status (SES) than short counterparts. If it is true, one can suppose that social gradients in stature have a genetic component, also in an ethnically homogeneous population. And one can add to this the effects of positive assortative mating.

There is a well-known case, the Aberdeen study which demonstrated that out of daughters of skilled manual workers, the taller ones get better-qualified job than did the shorter ones. Similar selection was observed also in marriages. The sisters who came from higher qualified families (non-manual, skilled manual, unskilled manual workers) married with man with higher occupation status than did the shorter ones (Thomson 1959, Tanner 1966, 1978, cit. Bielicki 1986).

Age of parents

The age of parents, both father's and mother's at birth of their child is both genetic and social factor. There is close correlation e.g. between height of parents and their grown-up children. The picture can be more polished if father-son or father-daughter, as well as mother-son or mother-daughter connection makes the question of analysis. Correlation coefficients used to be between 0.4–0.8.

Authorised studies established that parents between 22 and 32 years of age produce children usually with optimal or nearly optimal biological endowments.

Birth order is connected with parental age. It is easy to understand that parents of first or second born child are usually younger than those of a sixth or seventh child.

Based on the Hungarian National Growth Study (thereafter HNGS) can be stated that children of very young (under 18 year of age) or even the relatively old (over 45 year) parents have handicapped life conditions. On the other hand, children of parents in optimal reproduction age are well-developed, strong for age, and early matured.

About the HNGS: in the early 1980s, a nation-wide representative cross-sectional growth and physical fitness study was organised and carried out by the present author and the first Hungarian growth standards were published (Eiben and Pantó 1986, 1987/88, Eiben et al. 1991). This project was based on a careful design, and in order to ensure a proportionate representation it involved about 120 communities. The sample was stratified for each region. It comprised 39,035 healthy, 3 to 18 year-old boys and girls, representing 1.5% of all Hungarian children and youth in that age group. The anthropometric programme was performed in great detail, including 18 body measurements. Scores in seven motor test and various kinds of socio-demographic data of the families were also recorded. This set of reference data serves as a basic standard (*'etalon'*) for Hungary and also for the whole Eastern-Central European region. This voluminous study, based on its large sample, presents also safe data to several aspects of SES.

Number of children in a family

Children of large families used to grow slower and mature later than those from smaller sibships. It is easy to understand that in a smaller family, the parents can give more food, more care, more love to their one child or two children than in a large sibship to six or more children. Family size determines the possibilities notably through income. If other factors are equal and income is divided per family member, members of large families receive less. (A "favourite child status" is rare in human families, but not unknown. Although in a short family where mother and her only child live together, the modest economic possibilities does not excite the somatic, and sometimes mental development of the child, if not hinder it.)

The similar findings were reported in Great Britain as 7 year-old British children were investigated (Tanner 1981) and also about 19 year-old Polish military conscripts (Bielicki 1986): children and young people coming from a large family were shorter than their counterparts from smaller families.

There are available data also of *age at menarche.* Eiben (1972) collected data (status quo method and probit analysis) of 15.229 girls in the middle 1960s in Western Hungary. Mean age at menarche (median) was Me=13.13 year, but menarcheal age of girls in three-member family (i.e. complete family: father, mother and child) was Me=12.88 year, while of those from a nine-member family it was Me=13.58 year.

Similar differences were found according to birth order of girls, too. Age at menarche of first-born girls was Me=12.96 year, however, that of sixth-born ones was Me=13.58 year (Eiben 1972). In Northern England in the 1960s, Roberts et al. (1971) found that age at menarche was influenced mainly through sibship size.

Profession of parents

Occupation used to be connected with educational level and both these characteristics of the parents influence the growth and maturation process of their children. Studies referring to this problem show generally a tendency from non-manual toward manual workers in industry, then manual workers in agriculture, further from skilled workers to unskilled ones. The educational level can be categorised from academic education through secondary school level to elementary one.

Based on the HNGS, the same tendency was observable. The sons of industrial and agricultural and other manual worker fathers showed very small differences in height, however, sons of white collar fathers (or better said non-manual workers) were the tallest. According to the mothers' profession, the same tendency was found: sons of non-manual worker mothers towered above all the other groups of the boys.

In girls, the tendency was again the same. Daughters of non-manual worker fathers were taller in all age groups than daughters of manual worker fathers, and the differences increased during prepuberty and puberty. According to the mothers' profession, the differences were larger, and they were remarkable also in early childhood (Eiben and Pantó 1988).

Table 1. Age at menarche in Hungarian girls according to profession of their fathers and mothers (medians in years, Eiben 1972).

Profession	Age at menarche according to profession of			
	fathers		mothers	
	n	Me	n	Me
White-collar	659	12.74	260	12.79
Clark	166	12.81	402	12.64
Employed	2528	12.91	1008	12.82
Light manual worker	4338	13.10	2345	13.01
Heavy manual worker	3270	13.26	260	13.20
Peasant	3282	13.34	1193	13.29
Housewife			9606	13.21

In the above mentioned Western Hungarian study on age at menarche, there were noticed differences according to profession of the parents. Age at menarche according to the profession of fathers and mothers showed a similar tendency (Table 1). It is worthy to mention that girls of peasant mothers and those of housewives have same age at menarche. In that time in Hungary, housewives in villages lived the heavy physical work of peasant life (Eiben 1972).

Educational level of parents

How does socio-economic/cultural background of the family influence the growth and maturation process and what significance has the educational level of the parents in it? The profession of the parents usually mirrors the place of the family in the social strata.

Since social factors have a significant effect on the growth process, the educational level of the parents is well worth studying in this relation.

The HNGS presents results also in this theme. Five categories were created from uncompleted elementary level to academic one (Eiben 1989).

The educational levels of the fathers and/or mothers as a respect of the analysis dissociate the sample remarkably. Means of height and other length measurements in the upper categories were above the national means and/or the 50th percentiles, in lower categories below them. Sons of fathers with uncompleted basic education (i.e. general school) were the shortest, sons of fathers with completed general school level were taller, sons of fathers with vocational training school level (without General Certificate of Education) were taller again, sons of fathers with secondary school level (with GCE) were still taller, and sons of fathers with high school or university level were the tallest. The higher the fathers' educational level the taller were their sons. In this groups also the pubertal growth spurt occurred earlier than in other groups of boys (Table 2). Means increased from SES category to SES category monotonically.

According to educational level of the mothers, boys showed a similar picture, and indeed, in sons of mother with low educational level, backwardness in growth and development were more evident (Table 2).

Table 2. Height in Hungarian boys according to the educational level of their fathers and mothers in cm (Eiben 1987), based on the HNGS (Eiben et al. 1991)

Educational level of the father*					year	Educational level of the mother*				
I	II	III	IV	V		I	II	III	IV	V
	96.3	97.0	98.7	99.1	3		96.6	97.4	97.6	99.5
100.2	101.2	103.0	103.3	104.3	4	99.0	101.8	103.2	103.3	104.4
107.4	108.6	108.8	110.0	110.4	5	105.7	108.1	109.1	110.2	110.4
113.4	114.1	115.8	116.9	118.1	6	112.2	114.5	116.7	116.5	118.5
119.8	121.8	122.0	122.9	123.8	7	119.1	121.6	122.4	122.8	124.3
124.9	126.3	127.3	128.4	129.5	8	124.7	126.4	127.9	128.6	129.6
130.3	131.7	133.2	133.8	134.9	9	129.7	131.8	132.9	134.6	135.4
134.7	137.7	138.7	139.4	140.3	10	134.6	138.0	138.6	139.9	140.3
139.5	142.4	143.6	144.1	145.2	11	140.5	142.2	144.2	144.4	145.4
145.3	147.1	149.3	150.1	152.0	12	144.9	147.8	149.6	150.7	151.9
152.4	153.7	155.6	157.6	157.8	13	152.5	154.2	156.8	156.9	158.4
159.0	162.2	162.5	163.5	164.9	14	158.9	162.0	163.4	163.6	165.3
164.9	168.0	168.7	169.7	171.1	15	165.5	167.7	169.1	170.1	171.4
169.3	171.4	172.4	173.3	174.5	16	169.0	171.2	173.1	174.0	174.4
171.5	172.7	174.4	175.2	176.1	17	170.5	173.1	174.9	175.8	176.3
172.6	173.3	175.2	176.8	176.7	18	172.2	174.4	175.1	176.6	177.0

* I: uncompleted basic school, II: completed general school, III: vocational training school, IV: secondary school, V: high school/university.

This phenomenon was further expressed in girls, especially in daughters of fathers and mothers with low educational level who were the shortest, and in daughters of fathers and mothers with university degree who were the tallest, especially after puberty (Table 3).

Table 3. Height in Hungarian girls according to the educational level of their fathers and mothers in cm (Eiben 1987, based on the HNGS (Eiben et al. 1991)

Educational level of the fathers*					Age year	Educational level of the mothers *				
I	II	III	IV	V		I	II	III	IV	V
94.0	96.2	97.3	97.8	97.8	3		96.0	98.0	98.0	96.8
98.8	101.1	101.5	102.8	103.2	4	97.9	101.4	102.0	102.3	102.9
104.1	108.5	108.8	109.9	110.0	5	106.8	108.3	109.3	109.5	110.3
111.5	115.2	115.8	116.7	117.0	6	112.2	115.0	115.6	116.9	117.0
118.3	120.6	121.1	122.1	123.0	7	119.1	120.3	121.2	122.4	123.4
125.1	125.7	126.9	127.7	128.6	8	123.7	126.0	126.7	128.4	128.3
127.7	131.5	132.7	133.3	133.6	9	129.3	131.5	132.8	133.3	134.5
135.2	137.2	138.4	138.9	139.6	10	136.6	137.4	138.5	139.1	139.9
141.5	143.2	144.9	146.0	146.1	11	142.2	143.8	144.8	146.0	145.0
147.4	149.6	150.8	151.4	152.5	12	149.7	150.2	150.4	151.8	152.3
152.1	155.2	156.0	157.6	157.8	13	151.8	155.2	156.5	157.7	158.5
157.7	158.1	159.4	160.0	161.4	14	157.3	158.1	159.2	160.7	162.4
158.0	160.1	160.7	162.1	163.7	15	158.9	160.4	160.8	162.4	164.1
160.1	161.8	161.4	162.8	163.3	16	159.2	161.5	161.2	163.1	163.4
160.5	161.3	162.0	162.7	163.4	17	158.9	161.3	161.9	163.1	164.1
159.5	161.8	161.4	162.6	164.0	18	160.2	161.0	161.2	163.5	164.0

* I: uncompleted basic school, II: completed general school, III: vocational training school, IV: secondary school, V: high school/university.

So, the higher the educational level of the parents the taller their sons and daughters. These differences between the two extreme social groups (6–7 cm) were significant in both sexes (Eiben 1989). About same results were found at the Health Examination Survey in USA in the 1960s (Hamill et al. 1972).

The contribution of length of the lower extremity in making the higher stature was greater than that of sitting height. Means of all length measurements in boys and girls of mothers with low educational level, were distributed in a larger range than those according to fathers' educational level. The mother's educational level seems to be more of a determinative factor in this respect than the father's one (Eiben 1989)

In width and girth measurements of the trunk and the extremities and in skinfolds there were small differences, but an exact tendency was observed: children of less educated parents showed unfavourable biological (anthropometric) values of growth. This statement is especially reinforced by the means of the bicondylar width of the humerus, and in particular in early childhood and prepuberty (Eiben 1989).

Bodzsár's "Bakony Growth Study" which contains also a detailed proportional analysis of about 7000 rural boys and girls (age 6.5–14.5 year) of 23 villages in Bakony region (Western Hungary) corroborates these statements (Bodzsár 1991).

Onset of puberty showed the same tendency: age at menarche/oigarche in the lower categories was later by 1–2 and 5–7 months, respectively than in upper categories (Table 4) (Eiben 1989).

Table 4. Onset of puberty in Hungarian boys and girls according to the educational level of the parents (status quo, probit estimates, medians in years, based on the HNGS, Eiben 1987).

Educational level of the parents	Age at oigarche	Age at menarche
Fathers		
Uncompleted basic school	14.73	13.07
Completed general school	14.70	13.09
Vocational training school	14.66	12.99
Secondary school	14.58.	12.61
High school/university	14.27	12.44
Mothers		
Uncompleted basic school	14.66	12.93
Completed general school	14.57	12.99
Vocational training school	14.52	12.83
Secondary school	14.60	12.86
High school/university	14.08	12.67
The whole Hungarian sample	14.37	12.79

Most factors causing differences in socio-economic groups more or less correlate to each other, e.g. the educational level and profession, since the earlier one partly determines the latter one. This is the reason why it is so difficult to separate the effect of certain ecological factors. Higher educational level usually joins with better nutrition, better care of infants and children. Additionally, these parents usually use social services better than others.

For children and youth (in Hungary in any case) the educational level of the parents is a determinant. As it was demonstrated, the higher the educational level of the parents, both fathers and mothers, the taller are their sons and daughters. These differences in height usually can be observed already in early childhood, and during prepuberty and puberty they usually become more marked.

Profession of parents also influences the somatic developmental process of the children characteristically. The trend of tallness goes from agricultural manual workers through industrial and other manual workers to non-manual workers, as it was demonstrated in the earlier subchapter. However, profession of parents as an organising principle is less suitable to describe the family's standard of living, or to characterise the child-centredness of the family home. *The most important environmental factor seems to be the educational level.* The above demonstrated data can convince everybody that the cultural niveau is the most important social factor influencing growth and maturation of youth. Consequently, it seems important to point out the determinative role of mothers in creating a better cultural background of the family. This used to be mentioned as a *"net effect"*.

Urban v. rural environment

Urban and rural environmental differences in growth, sexual maturation of children have come into the focus of interest in the last decades. Today it is a statement in handbooks, based on experimental investigations, that "children in urban areas are usually larger and have a more rapid tempo of growth than children in the villages of the surrounding countryside" (Tanner 1989). In fact, urban children as a rule taller and heavier, and mature earlier than their rural counterparts (c.f. Pfaundler 1916). The obligate question of the epidemiological auxologists is, how the urban or rural environments effect the growth process of children.

According to Hamill et al. (1972) big cities can be characterised as settlements "sharing in common most of the following features: heavy industry, high population density, commerce, air and noise pollution, heavy automobile traffic, diversity of entertainment attraction, lack of open space, many cultural and educational opportunities, sophisticated medical centres and complex and active health departments, usually safe drinking water, an efficient system of waste disposal, and a plethora of asphalt, concrete and brick rather than vegetation. In many countries, moreover, urban population tend to differ from the rural ones in various parameters of SES. The former usually have proportionately more people with academic training and with highly specialised skills, as well as a greater proportion of small families and of families with high per capita income" (cit. Bielicki 1986).

In human biological and especially in auxological literature, there are several studies dealing with differences which occurred also in anthropometric traits in different social strata and/or in urban and rural people. Differences of mean height and weight (and also other characteristics) in children belonging to different socio-economic strata and/or living in towns or villages occur in almost all developed as well as in developing countries. Genetic endowments influencing the growth and maturation process can better manifest themselves under better environmental circumstances. The two points of view in growth studies, mentioned here, namely socio-economic factors and/or urban and rural environment overlap; in other words, it is not easy to separate their effects on the growth process. On the other hand, in many countries living conditions in towns tend to be more advantageous (i.e. better in some relations) than those in villages.

One of the earliest study in Hungary after the WW II was carried out by Eiben (1956) who investigated 14–19 year-old secondary school boys originating from the city Debrecen (East Hungary) or from the surrounding villages. Height and weight of the 14–18 year-old urban boys were greater (by 0.3–4.2 cm, and 0.3–5.3 kg) than their rural counterparts. Chest circumference of the 14–18 year-old urban boys was larger (by 0.2–2.8 cm) than that of rural ones; however, in the 19 year-old age group the rural boys were greater (by 1.5 cm) in this respect. In grip strength, the 14–17 year-old urban boys produced a better performance (by 0.3–5.1 kg) but at the age of 18–19 years, the rural boys were stronger (by 0.5–0.7 kg). In BMI means, there was no remarkable difference between the two subgroups investigated. Eiben showed that in the 1950s, in Eastern Hungary, growth and maturation of urban boys preceded the rural ones by about 1–2 year. The 15 year-old rural boys were behind of the urban ones in all anthropometric characteristics and up to the age of 17 years, also in physical power. This negative difference, however, disappeared later. At the age of 18–19 years, the rural boys surpassed their urban counterparts in muscular power.

Similar data were found also by Bodzsár in her Bakony Growth Study mentioned above. These 6.5–14.5 year-old rural children, both boys and girls, were shorter and lighter than the Hungarian national reference values (HNGS, Eiben et al. 1991), and differences increased with age (Bodzsár 1991).

In the Polish conscripts survey in the middle 1970s, Bielicki et al (1984) found that height deceased monotonically with decreasing population size of the town. These authors described that the size of the population of a locality may be taken as a measure of the degree of urbanisation.

An other data were published by Gyenis and Till (1986) who found that male university students of the Budapest Technical University came from Budapest families (i.e. from the capital of Hungary) were higher than those who came from different towns and villages of the county.

Hulanicka (1990) reported on the heights and weights of pre-pubertal and pubertal Wroclaw and Warsaw boys (age 13.5–15.3, N=6969). In both cities, the same sources of variation in stature were detected, related to some SES factors, such as parental educational level, occupation, origin, member of children per family, etc. Boys from the extreme categories of SES factors showed the same distance in stature in the two independent samples from Wroclaw and from Warsaw, a difference of about 2.5–3.6 cm.

Similar to the former surveys, gradient associations of children's height and weight with the degree the urbanisation of the subjects' settlement persisted in 1988 (Hulanicka et al. 1990). In comparison with 1978, their 1988 sample revealed an increase of height in children from all the examined environments, but in contrast to the former period, this increment has not been uniform for all age groups for children from town and big cities. In the latter, the increments were 1.5–1.7 cm, while in rural boys it was 2.4 cm. Children born at the end of the 1970s and whose early childhood coincided with the economic recession, did not diverge in height from their 1978 coevals (Hulanicka et al. 1990)

Hulanicka et al. (1990) have published other growth data on 6 to 18 year-old Polish boys and girls, based on their growth study carried out in the late 1980s. The earliest maturers were girls from the big cities (age at menarche, Me=12.96 years), followed by those from towns (Me=13.4 years) and villages (Me=13.53 years). Rural girls from a certain region reported menarche on average 1.02 years later the Warsaw girls. A deceleration in the age trend of menarche was found in the 1988 sample of girls as compared to those in the 1978 cohort, mostly from those environments where a concurrent inhibition of the secular trend in the height of pre-pubertal children was also noted. This was an additional fact in favour of the hypothesis connecting economic recession with demographic data. In other words, the biological effects of an economic crisis were observed here.

The already cited HNGS, a growth and physical fitness survey, carried out in the first half of the 1980s, offers a good occasion to analyse the differences in growth and physical fitness of boys and girls according to the size of their dwelling place (Eiben et al. 1991, Eiben et al. 1996).

Growth and maturation of the Hungarian boys and girls in the 1980s were much more influenced by the socio-demographic status, the mode of life, or in other words, by the 'cultural background' of the family (e.g. educational level of the parents) than by other factors (e.g. genetic endowments). Urban boys and girls were taller, heavier, their rate of growth was faster than their rural counterparts. Breaking down the sample according to *settlement size* brought to light further differences. Means of height, weight, and other length, width, and girth measurements were invariably greater with increasing settlement

size. Figure 2 shows the means plotted against the Hungarian national growth curves (the first Hungarian "growth standards", Eiben and Pantó 1986, Eiben et al. 1991).

The urban boys and girls in Hungary were taller than the rural ones. Urban means in both sexes were above the 50th percentiles. Rural boys and girls, especially during the years of puberty, falled behind the 50th percentiles. In 15 year-old boys and girls, the difference was about 3–4 cm. Practically in all age groups, there was a significant difference between urban respectively rural boys and girls. The pubertal growth spurt in urban boys and girls occurred by about one-and-a half year earlier than in their rural counterparts (Eiben et al. 1996).

The same trend could be observed in body mass. The urban boys and girls were heavier in almost all age groups than the rural ones. Mean values of urban boys and girls were above the 50th percentiles, while the rural ones hardly reached the 50th percentiles. Most differences were significant.

Means in width measurements of the trunk in the urban boys and girls were higher than in the rural subjects. In skeletal width (bicondylar of humerus and femur) the urban boys and girls were more robust than their rural counterparts. This phenomenon were already observed in early childhood, and the difference increased during puberty. In girth measurements, both in trunk and extremities, urban boys and girls have higher mean values, i.e. urban boys and girls seemed to be stronger than their rural counterparts. The average skinfolds were thicker in urban boys and rural girls. In both sexes, the differences were pronounced at the age of 15–16 years, i.e. in boys at the end of puberty, in girls after puberty. The higher skinfold means of girls may be explained by two factors: in villages, there are less facilities for systematic sports, i.e. physical activity of rural children means probably less sport but more participation in housework or agricultural work. On the other hand, in rural nutrition (at least in Hungary) carbohydrates and fats preponderate. Finally, in girls "cosmetic slimming" has to be taken into account (Eiben and Pantó 1987/88).

Physical fitness: In all strength tests boys usually performed better than girls. As far as muscular endurance was concerned, performances of the boys and girls were nearly the same, especially in early childhood. Thereafter, performance of boys increased gradually with age. In girls, however, it increased slower and at a decreasing tempo, and became stable at a low level at age 13, a relatively early age (Barabás 1989, Eiben et al. 1991), coinciding with the age at menarche (Eiben 1988).

In hand grip strength scores the rural boys and girls performed significantly better than the urban ones. Few differences existed between urban and rural children in the standing broad jump test. In the 12-min endurance run, significant differences were only found in a limited number of age groups. In other tests, medicine ball push, sit-ups, 60–m dash, urban children performed clearly better than those coming from rural areas. The urban boys and girls can be characterised by a larger body and a more linear structure. One would expect increased levels of performance in tests of strength with greater body size, but the shorter rural children surpassed urban ones in hand grip strength scores, and moreover, they had even similar results in the standing broad jump (Barabás 1989, Eiben et al. 1991).

Just as Asmussen's (1973) findings, physical performance was influenced by body structure and strength increasing with height. This seemed to be the case in boys as long as height increased with age. In girls, however, although height increased up until their age of 16 years, the age before they reached their adult height, their strength development had stabilised at about 13 years of age.

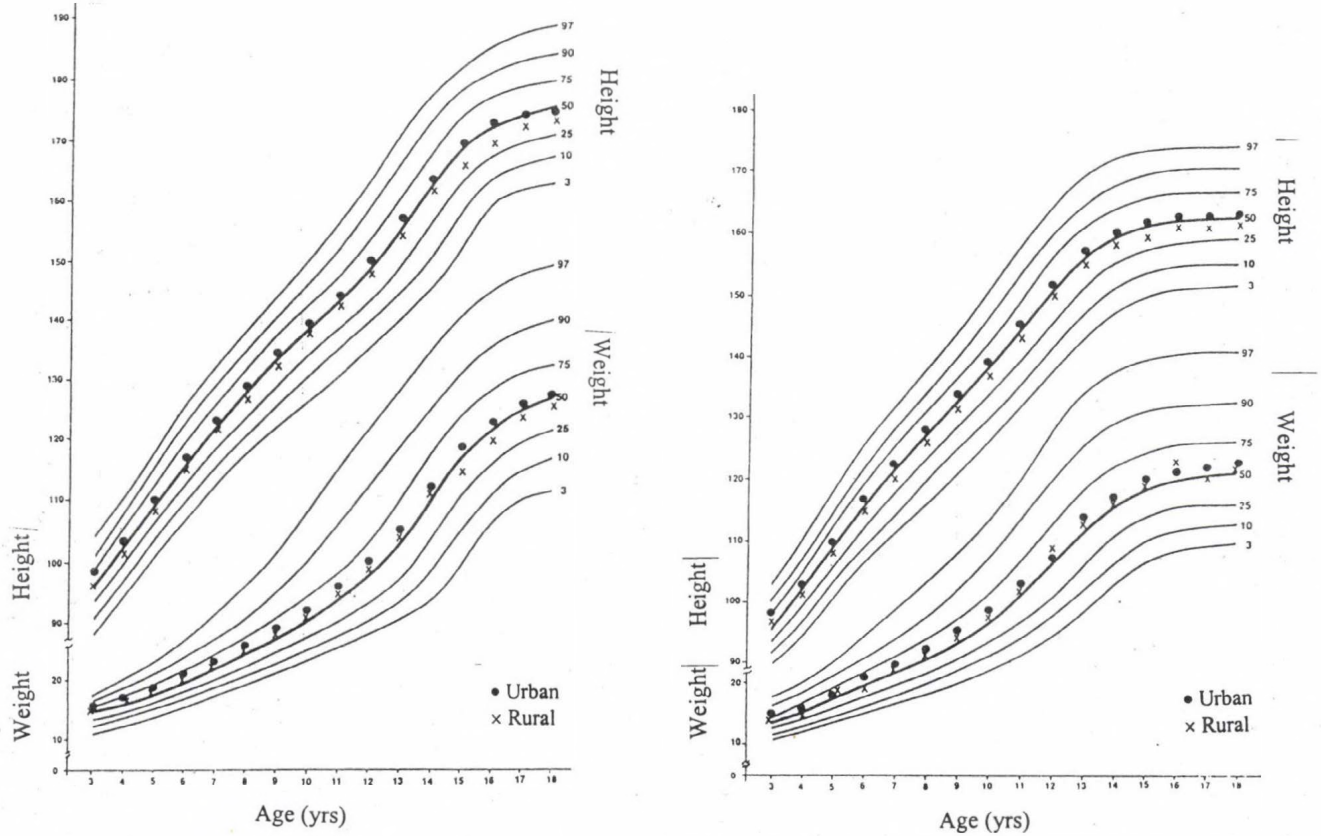

Fig. 2: Mean values of height (cm) and weight (kg) of urban and rural children investigated within the Hungarian national Growth study (Eiben et al. 1991).

Obviously, in the last decades, in many regions of the world, there has been a certain difference in mode of life in towns and villages. In Hungary, however, in the 1950s, there was a political will to eliminate the disadvantageous difference prevailing in rural areas. Forced urbanisation proved to be unfounded, the political ambition got into a tangle. Differences in urban and rural modes of life can be observed even today, all over the world, and these differences affect also childhood. Parents with higher education levels tend to live in towns. Although the majority of these people in Hungary live from a modest salary, they better exploit the possibilities given. This is true for nutrition, medical care and treatment, physical education and sports or even extra activities, e.g. music or languages, etc. offered to the children. The highly educated parents motivate their children to participate at these regulate activities (Eiben et al. 1996).

The better life-conditions in towns are positive, well-perceptible factors influencing growth and maturation of children. They promptly effect work and the children's organism is highly susceptible to them. In the 1980s, it was repeatedly proved in Hungary that the advantageous environmental factors promoted manifestation of growth pattern while the disadvantageous ones stopped or retarded it (Eiben 1988). It is obvious that childhood (including prepuberty and puberty) is the most sensitive life-period for environmental effects like socio-economic factors presented by the urban and/or rural mode of life. All these results demonstrated the significance of well-planed and systematic physical education and sports in schools, and even in nurseries.

The last question in this subchapter is, how it would be possible to create equal chances in growth and physical fitness for the urban and rural youth. It is rather an economic and social-political than a human biological problem. Auxologists have had an ambition to call the politicians' attention to this problem, to elaborate a better and more equitable distribution, a better and well-considered health and welfare politics as well as a fair youth-politics for a long time.

Living conditions

In the preceding pages, it was illustrated that educational level and profession of the parents, sibship size, income of the family, largeness of the settlements interrelated each other, however, to collect perfectly reliable data of income is very difficult (if not impossible). As a bridging solution of the problem, at the above-mentioned Western Hungarian menarche study, the ratio of living-room per family member, as an index, offered itself. Proportions of living room dissociated the sample. Age at menarche in girls who lived alone or with one person, i.e. possessed minimum 0.5 room, was Me=12.90 year. In girls having one-third of a room, median was Me=13.18 year. In girls living to four or five in a room, have an age at menarche Me=13.22 year, and finally, in girls living to six or more persons together, the menarche appeared latest, Me=13.41 year. As a reminder, the median of the whole sample was Me=13.13 year (Eiben 1972).

This finding seemed to refute the opinion of some psychologists that in a crowded flat, where all episodes of the family happen in presence of the children, especially pre-pubertal boys and girls, promote an earlier sexual maturation. Human biological findings are inconsistent with this. One must not forget, of course, that a crowded flat means large sibship size, usually not very high educational level of the parents, less income, etc. All these factors can hinder the growth process.

Economic background of secular growth changes

One can safely state today that secular trend is a world phenomenon (for definition, see the Introduction of this chapter) which remarkably depends on SES of the society. So, it seems to be useful to add or repeat some details to this problem. The most attractive phenomena of it are the faster tempo of growth, higher stature in a certain age, and an earlier sexual maturation. In other words, secular trend shows a systematic phenotypic deviation of off-springs from their parents, i.e. trend toward increased adult stature. Children tend to outgrow their like-sexed parent.

Secular changes in growth are in a strong connection with economical changes of a society: they are analogue in kinds and direction to be differences in better-off and less well-off social strata. The biological changes (i.e. in growth) used to go hand in hand with changes of certain social changes. Some temporary reversals of these changes are in close coincidence with periods of economic deterioration, namely: secular changes can not be realised in economically stagnant society (Bielicki 1986).

The results of the *Körmend Growth Study* (thereafter KGS) illuminate some aspects of these questions. (KGS was cited by W. D. Ross, as "one of the most ambitious secular trend investigation" (Ross and Ward 1982), and in other place "KGS is a classical secular trend study".)

The KGS is a series of repeated cross-sectional growth studies, carried out in the small Western Hungarian town Körmend in 1958 (K-58), in 1968 (K-68), in 1978 (K-78), in 1988 (K-88), and in 1998 (K-98). Goals of the KGS were (1) to obtain insight into somatic developmental status of Körmend children expressed by body measurements; (2) to obtain an answer to the question whether these body measurements had changed during the decades; (3) if yes, how and in which direction; (4) under what kind of influences and for which factors they changed; and (5) whether the phenomena observed in Körmend, correspond to general trend, especially to the secular growth changes existing in Hungary? (Eiben 1988, 1994).

During the decades of the KGS, Körmend developed from an agricultural village (with 7500 inhabitants) into an industrialised town (12.500 inhabitants) its population increased and its infrastructure improved remarkably. As a consequence, the number of boys and girls investigated within the framework of the KGS also changed proportionally. The author of the KGS aimed at completeness, all healthy boys and girls in the town between 3 and 18 years of age were involved. Sample size in K-58 was N=1656, in K-68 N=1736, in K-78 N=2420, in K-88 N=2867, and in K-98 N=2079. The anthropometric programme was detailed (23 body measurements). In girls, also data on age at menarche were collected with status quo method. Measuring tools and techniques were certain internationally standardised ones (for details, see Eiben and Tóth 2000). The author obtained data concerning the socio-economic background of the child's family.

The remarkable changes in the mean values of the most important body measurements occurring the decades of the KGS are shown in Figure 3. Height and weight means are plotted against the Hungarian national reference data, i.e. percentile curves (HNGS, Eiben et al. 1991). One can see the low means of the K-58 which – though sited near to 50^{th} percentiles in early childhood – are between the 25^{th} and 50^{th} percentiles and even at the 25^{th} percentiles during and after puberty. On the other hand, means of K-88 and even K-98 are all above the 50^{th} percentiles. Survey of these figures point out how low the means of K-58 can be qualified today.

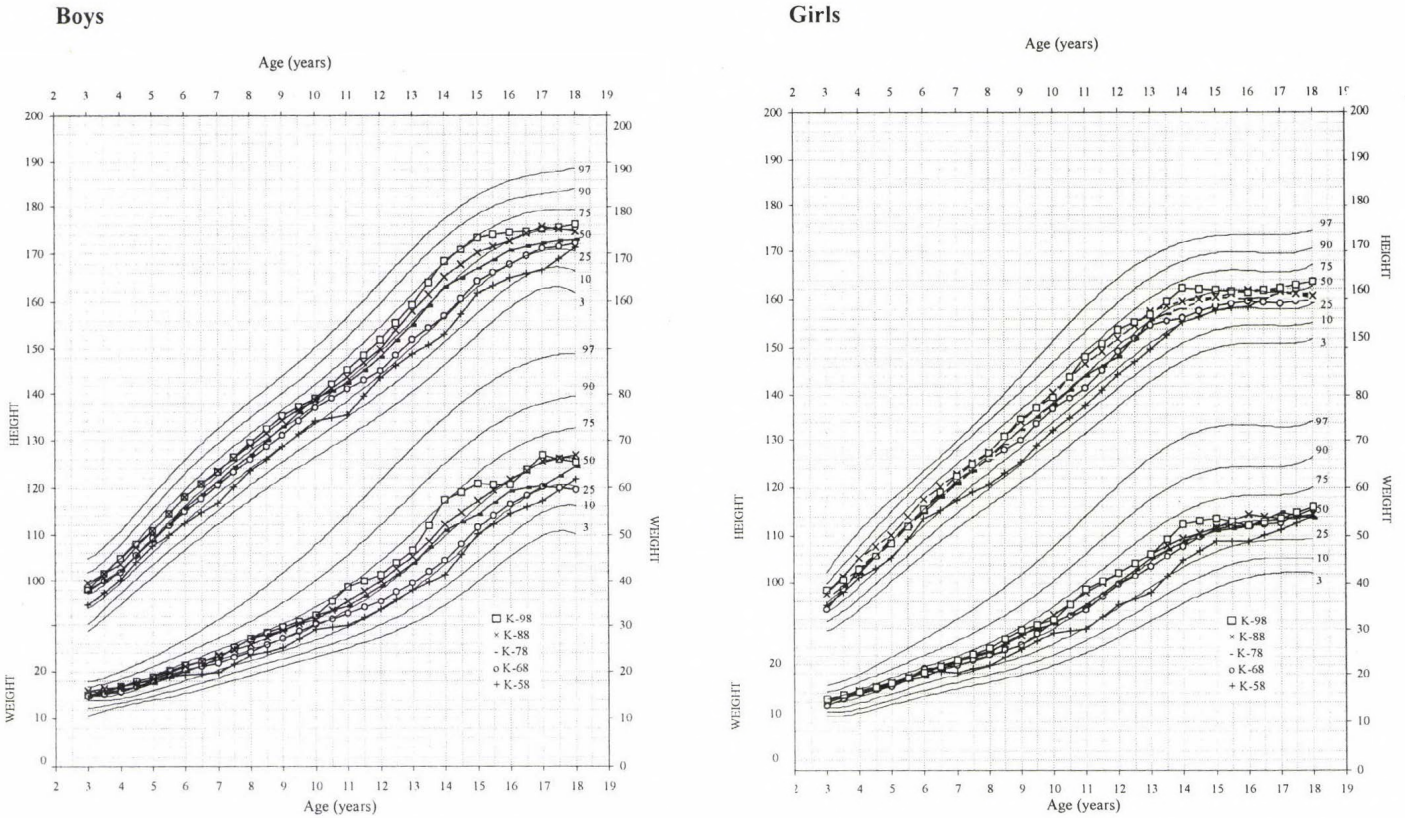

Fig. 3: Height (cm) and weight (kg) of Körmend children (Eiben and Tóth 2000).

Another conspicuous feature of all height curves is their trend. In spite of the mentioned low values of K-58 and relatively high values of K-88 and K-98, the youngest age groups are usually at the 50th percentiles. By the end of early childhood, however, the Körmend curves run flatter than their reference counterparts. This lagging trend of curves can be well perceived at the end of puberty. It seems as if Körmend boys and girls in the early period of their growth process were "well developed" and later the became "less developed" as compared to the "average". This phenomenon may be explained by the fact that boys and girls in secondary school are not exclusively Körmend-inhabitants; they partly originated from the surrounding villages. Ever since the edition of Pfaundler's (1916) book, a mind on backwardness in growth and development of rural children compared to urban ones, belonging to the same population, has been well-known (phenomenon of 'proteroplasia'). This is partly related with the later onset of puberty in rural boys and girls.

Returning to the unexpected low means of height and weight in 11 year-old boys and girls in the K-58, we have to notice that these children are only slightly heavier than the 10 year-old ones. An explanation for this phenomenon is quite obvious: the 11 year old boys and girls of the K-58 sample were born in 1946/47, therefore they were conceived in 1945/46. These children – originated from a very difficult period after the World War II, having parents who has been in poor health, being in poor biological status, receiving poor nutrition, etc. – could not counterbalance or eliminate the initial biological handicap.

Also, a very small difference in height, 1.4 cm, was observed between the 10 and 11 year-old boys in K-58. The difference between the same two age groups of girls, however, is 5.3 cm, which can be qualified as usual in female prepuberty or puberty. The unfavourable environment only damaged the growth pattern in height of boys (frail gender?). In girls, however, the growth pattern seems to be intact, inasmuch that 11 year-old girls have already entered their period of pubertal growth spurt (or in case of a cross-sectional study, better said "quasi peak of pubertal growth spurt").

An other interesting detail to secular growth changes: the length of transition prepuberty-puberty, when girls are temporarily higher than their male counterparts, changed noticeable. The "quasi peak of growth spurt" appears earlier in girls than in boys, an expected finding. This period, however, appeared earlier and became short over the decades of the KGS. Changes in means refer to a positive secular trend. The transition period appeared in K-58 between 11 and 14 years of age, in K-88 and in K-98 between 10 and 12 years of age. The transition period is only three year today as compared with four years, observed earlier.

In age at menarche, there was remarkable changes, too. The K-58 median, Me=13.53 year was the most delayed value in Hungary (and in Central-Europe) that time (Bottyán et al. 1963). The median in K-68, Me=12.75 year, was a markedly early value, difference compared with the K-58 was about 9 months. Later on, the decreasing trend of medians stopped then it turned up-wards: in K-78 Me=12.80, in K-88 Me=12.93, and in K-98 Me=12.95 year. This reminds of Dann and Roberts's (1984) finding obtained in their Swansea sample, as well as Prebeg's (1998) data from Zagreb (Croatia).

The results of the KGS show that Körmend boys and girls became greater and matured earlier from decade to decade. They were taller and heavier, but their trunk became narrower. In structure of their extremities, their muscle mass scarcely changed. The fact that during the period of the KGS means of girth measurements did not show any increasing trend and that the mass of the subcutaneous fat gained at the same time indicates an unfavourable phenomenon, the weak developmental condition of the

musculature of Körmend boys and girls. As a measure of pressing necessity. Responsible leader of the town Körmend started with a purposeful action improving the possibilities of physical activity.

Looking for reasons of the above mentioned defectiveness, changes in *mode of life* can be found in Körmend. The former agricultural large village has developed into a relatively well industrialised town. Generally speaking, *urbanisation* has transformed the settlement. Population number has increased by 50 percent, partly as a consequence of *immigration* of people from the surrounding villages. A social regrouping has happened. A remarkable improvement of *medical care* occurred: from K-58 to K-88 medical capacity increased with 100–150 percent. The general quantitative and qualitative development of preventive and therapeutic health care began to exert a favourable effect on the biological development of Körmend youth.

Changes in *nutrition* are striking. The preponderantly fat and carbohydrate nutrition has been replaced by a balanced diet rich in protein. A high portion of animal protein and vegetables was characteristic in canteen meals of the nurseries and schools. On the other hand, obesity is an existing problem at a large scale.

Some improvement also occurred in *infrastructure of communal supply* (electricity, water system, and gas supply 100 percent, drainage in K-58 practically no, in 1998 absent 40 percent). This inducted certain improvement in *living conditions*: flats and schools have been modernised.

Much has changed in *interpersonal relationship* within the educational process of pupils. In K-58, a remarkable portion of the teachers only had college qualification; today the university qualification is generally characteristic.

Physical activity of Körmend boys and girls also changed in quality and quantity. In K-58 several pupils in the older classes shift of the general schools and many boys and girls of the secondary schools were from the surrounding villages, and they had to ride to school daily by bicycle. Now, they live in comfortable students' homes in Körmend. In the K-58 boys and girls had to participate in heavy peasant work of their parents. Today they can practise various sports in an up-to-date gymnasium (Eiben 1988, 1994).

All these biological changes follow by some sociological, psychological problems. As a consequence of earlier sexual maturation in one hand, and a longer period of school education on the other hand, the gap between sexual maturation and possibility to create existence of a young citizen increased.

All these biological, socio-economic, demographic changes led to a *differentiation in social layers*. The well-known trend characteristic for the 1970s and early 1980s of Hungarian society, i.e. influx of people from agriculture to industry, the unskilled worker's progress to a skilled worker, from employee to intellectual was also observed in Körmend. As a consequence, the (relative) population genetic equilibrium slightly changed, first of all due to migration during the last decades. Heterosis is presumably at work. There are, however, some human biological problems. Quite conceivable, all these changes can be reduced to multiple causes. Their effect on growth and maturation of boys and girls can be displayed in different ways. The question emerges whether the growth-maturation pattern has been modified in Körmend or the phenomenon is a manifestation of a change in the genetic programme. Genetics of growth is not known in all details.

From follow up of such a complex human biological feature like stature or a sophisticated genetic pattern like growth, one can safely assume that the joint effect of several factors otherwise loosely linked can be analysed by multifactorial approach. The idea shared by many authors, that the minute effects of several factors influencing stature

can make up half a centimeter if summed, is an over simplification of the problem, and it may be even misleading (Frézal and Bonaiti-Pellié 1978). Another fact rendering research even more difficult is that the socio-economic status of individuals originating from different populations is hardly comparable, in addition, such family members having no genetic relationship have a common microenvironment (Garn and Baily 1978). It seems to need new projects and strategies in human population genetical research to clarify these problem.

In the light of these few thoughts it seems probable that in addition of a minimal influence of migration on the growth/maturation pattern, the changes in growth and maturation have greatly been inducted by the improvement of environmental factors. This has helped the genetic programme, i.e. the innate growth pattern to be manifested to a higher degree, and all these led to a more favourable biological development of Körmend boys and girls.

What is the correct interpretation of these beneficial signs?

It seems that Körmend boys and girls gain access to their genetical growth and development potential. This is in accordance with the general human biological trend observed in Hungary and other countries in Europe. *A positive secular trend has manifested* in Körmend children. The results of the KGS (objective anthropometric data) documented the *human biological effects of unreproducible social changes exactly and with a very quick response.*

Any changes in the future?

A human biologist used to receive such question: "Whether the accelerated growth of children and/or their early maturation is good or not?" The answer is not simple. It is well-known that nothing can happen in a human organism what has no genetic basis, e.g. stature is determined genetically, but the environment influence it, either in positive or negative direction. The most valuable part of the human organism is the genetic information which includes the instructions referring to the genetic structure and chemical composition on the organism to further the human growth pattern. All this is recorded in the chromosomes. Consequently, genetic information is fixed not in classical rigid structure but in a molecular system formed as a combination of atoms The environmental factors, in first. line the socio-economic ones, influence the manifestation of the growth pattern. We know that evolution of Homo sapiens did not stop. The slow evolution in our centuries is influenced by rather sociological then biological environmental factors. Many scientists think that Homo sapiens already reached his biological limits or he is very near to this.

Why then is man so large a size? Why is he 170 cm tall? Because there is a vast amount of information recorded in each of his cells about what man is. Man is of his actual size because he is clever. Although he does not see the atoms constituting him with the unaided eye, he does understand their operation, and thus the genetic basis of his own existence (Eiben 1981).

Coda

The nature of the above presented findings suggest that various agencies and authorities responsible for the youth in general, for public health and welfare, fitness and working capacity of the population should care for the implementation of the tasks identified by the growth studies, carried out in all over the world.

The world programme *"Health for all by 2000"*, declared by the WHO and

UNESCO, should primarily engage the youth for a fulfilment of the slogan.

In 1948, Gabriela Mistral said: *"We are guilty of many errors and many faults, but our worst crime is abandoning the children, neglecting the foundation of life. Many of the things we need can wait. The child cannot. Right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him we cannot answer 'Tomorrow'. His name is 'Today'*

What happened during the last half-a-century in this relation? Everybody must think it over.

The results of growth studies call attention to another aspect of growth and development. The UN declaration of human rights (1959), stating that all children have the inalienable right to grow in peace, under optimal circumstances, prescribes that despite the extremely difficult economic situation in post-communist Eastern-Europe, no efforts helping children to normal growth, balanced nutrition, better infrastructure, improved medical care or schooling can be regarded too expensive expressed in finances, time and human energy. All these cannot be postponed to future in the hope of coming economical prosperity. We must optimise all factors influencing growth and development of children, first of all, social factors have to be continuously improved, especially in Eatern-Central Europe, in the so-called "countries-in-transition". We must grip after our possibilities now. We must not forget: *Children grow up only once.*

*

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