

# SOCIAL CLASS DIFFERENCES IN BODY HEIGHT AND MENARCHEAL AGE IN POST-WAR POLAND

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**Abstract:** Massive data on body height and menarcheal age, collected by Polish anthropologists between the mid-1950's and late 1970's, yield a picture of marked socio-economic contrasts. Secular changes have been substantial in both characters. Some contrasts in menarcheal age have declined, but no such tendency appears in the data on body height. Clear-cut social gradients exist both within the urban and within the rural population. Attention is drawn to the particularly low position of peasants. Social class differences in nutrition, perhaps also in morbidity, physical work load, and psychological stresses, are probably responsible for the maintenance of social gradients in physical growth. The possibility that such gradients have a genetic component is briefly considered.

*Key words:* height, menarcheal age, social class differences, nutrition, selective social mobility.

Massive data on school-children and military conscripts, collected by Polish anthropologists in the mid-1950's, mid-1960's, and late 1970's, indicate that social class differences in body size and maturation rate have been marked in Poland throughout the post-war period. In what follows, a summary will be given of the results of several recent studies of social gradients in body height and menarcheal age in Poland; detailed accounts of these findings, with documentation and references, are currently being prepared for publication, or are already in press, in several journals.

## 1. Body height

An analysis of variation of body height among 13 thousand military conscripts, all born in 1957 and examined in 1976, shows that body height decreases regularly (monotonically) with A. decreasing occupational-educational status of the father, B. decreasing size of the city or town of residence, and C. increasing number of sibs. A three-factor analysis of variance shows that each of these 3 environmental factors has a significant effect on body height after the effects of the other two factors are partialled out. Factor B has the strongest effect, factor A the weakest (though statistically significant). In conscripts who are big-city dwellers, have college-educated fathers, and have no more than one sibling, mean height is 176.6 cm; in rural conscripts whose fathers are farmers and who have 5-or-more sibs, mean height is 170.4 cm. The difference between these two socio-economic extremes is thus 6.2 cm and is equal exactly to 1.0 SD of height in the total sample (BIELICKI, SZCZOTKA and CHAR-

ZEWSKI 1981). The difference would be even larger if the "uppermost stratum" were represented by boys from one-or-two-children families of the Warsaw intelligentsia who in 1978 were found to average 178.5 cm at the age of 18 years (CHARZEWSKI 1981). One of the striking results of the analysis of the material of conscripts is the very low position on the body height scale of rural conscripts from peasant families: even when sibship size is held constant — sons of peasants turn out to be shorter than e.g. sons of small-town semi-skilled manual workers, and shorter even than sons of rural unskilled manual workers. It has been shown by analysis of variance that — in terms of main effects — the condition of being a peasant reduces mean height more than the condition of being a rural dweller, and also more than the condition of being a member of a 6-or-more-children family.

A similar picture emerges from analyses of a sample of 24 thousand school-children examined in 1978. At all age classes from 7 through 18 years, and in both sexes, children from Warsaw, Łódź, and Wrocław (the three largest Polish cities, each with a population of well over 0.5 million) are taller than children from small towns in the ca. 10 thousand inhabitants category, and the latter are taller than their age-mates from villages surrounding these small towns (WALISZKO et al. 1980). What makes the above pattern noteworthy is the fact that the difference in height between small-town children and children from neighbouring villages are of similar magnitude as the corresponding differences between small-town children and their big-city age-mates.

Social class contrasts in height prove greatest at adolescence. At the age of 14 years sons of college-educated fathers from big cities and from one-or-two-children families were, in 1978, on average 11 cm (!) taller than their rural age-mates from peasant families with four-or-more children. The 11 cm difference equals nearly 1.4 SD of height among big-city boys of that age.

Secular increases of body height have been marked in postwar Poland. For the age range 7—18 years such increases were of the order of 2.0—3.0 per decade during the period between 1955 and 1978. Yet a detailed comparison of the 3 post-war mass surveys of school-children (1955, 1966, and 1978) leads to the surprising conclusion that urban-rural differences in height have shown little or not tendency to decline during that period: in boys at ages 7 through 14 years the differences between big cities and small towns, as well as those between small towns and the countryside were in 1978 somewhat larger than in 1966, and in 1966 they were larger than in 1955, i.e. they have actually increased! (BIELICKI, WELON and WALISZKO 1981). If differences in body height between social groups within an ethnically homogeneous population are any indication at all of inequalities in living standards — then the above findings can be taken as evidence that social policies in post-war Poland have failed to achieve one of their main declared goals, that of reducing the gap in living standards between urban and rural families.

## 2. Menarcheal age

A similar comparison of the data of the three post-war national surveys suggest that social distances in menarcheal age, unlike those in body height, have shown a tendency to decrease. During the period 1955—1978 mean age

at menarche declined from 14.3 to 13.4 years in rural girls, from 13.9 to 13.2 years in small-town girls, and from 13.4 to 12.8 years in big-city girls. However, urban-rural differences are still marked; rural girls in 1978 had a mean (13.4) years which big-city girls had already attained in the mid-1950's; rural girls from Suwałszczyzna (North-East Poland), examined in 1978, had a mean of 13.7 years, almost a year above the 1978 Warsaw mean (ŁASKA—MIERZEJEWSKA 1981).

Clear-cut social gradients in menarcheal age exist in Poland among urban and among rural girls. In two studies carried out in 5 counties in 1968 and again in 1978 a consistent pattern emerged: menarche was earliest in daughters of rural non-farmers, intermediate in daughters of "part-time farmers" (men who combine small-scale farming with a salaried job in industry) and lowest in daughters of full-time farmers (peasants); it is important to note that this order of means persists also when father's education and number of sibs are held constant (ŁASKA—MIERZEJEWSKA 1971, and unpublished data). Thus, the more a rural family relies on farming as a source of income — the more delayed the daughters' sexual maturation!

Studies of menarcheal age carried out in two Polish cities, Warsaw, and Wrocław (population 1.5 and 0.6 million, respectively), collected in 1966 and again in 1976 (sample size ca. 6000 school-girls in each case) show a typical increase of mean ages with decreasing occupational and educational status of parents, and with increasing family size (MILICEROWA 1968, WALISZKO, unpublished). Both cities have shown the same amount of secular change during that decade: in Warsaw the general mean declined from 13.0 to 12.8, and in Wrocław from 13.2 to 13.0, so that the difference between the two populations has not changed. However, some contrasts seem to have declined since the mid 1960's. E.g. in Warsaw in 1976 no difference was found in menarcheal age of daughters between college-educated and high-school-educated parents (MILICEROWA and PIECHACZEK, unpublished). In Wrocław during the 1966—1976 decade menarcheal age decreased, generally speaking, more in the lower than in the upper social groups; the result, again, was some attenuation of social contrasts. E.g., in the group "both parents unskilled manual workers" the mean declined from 13.5 to 13.0 years, in the group "both parent not more than elementary education plus basic vocational school" it declined from 13.3 to 13.0 years, while in the group "father high-school or college education" the mean (12.9 years) has not changed (BIELICKI, WELON and WALISZKO 1981).

### Discussion

It is evident that none of the "factors" in terms of which anthropologists usually describe socio-economic stratification, and which have been shown to have a statistical effect on body size or maturation rate — i.e. neither the educational or occupational status of parents, nor family size, nor the degree of urbanization of the place of residence, nor even annual income per member of household — can affect physical growth directly. Rather, such "factors" must be viewed as influencing growth via some other environmental stimuli with which the factors are correlated. Four types of such stimuli can be considered: nutrition, disease, physical work load, and growth-influencing psycho-

logical stresses. Of these, by far the best documented is the role of nutrition; and though socio-economic stratification in Poland (as in many other countries) probably involves differences in all four aspects of the child's environment, it is possible that the existence of social gradients in body size and maturation rate is ultimately due primarily to differences in nutrition. E.g., rural children in Poland often participate in work on the farm, and often have to walk several kilometers to school, so that their average work load is probably significantly greater than that of their urban age-mates; however, there is no evidence that intense physical work can affect growth independently of nutrition, e.g. that it can stunt growth or delay menarche in *adequately nourished* children.

Data on social class differences in nutrition in Poland are not extensive. Official statistics published in the 1970's by G.U.S., the Central Statistical Office, and based on analyses of family budgets in a stratified sample of ca. 8000 households, indicate that per capita consumption of food items which are principal sources of animal protein, calcium, and vitamins (meat, eggs, butter, cheese, fruits, and vegetables) decreases markedly with decreasing annual income per person in the household and with increasing number of persons in the household. Also, the system of food distribution has consistently favoured the big cities over medium and small towns; e.g., it has recently been disclosed that during the second half of the 1970's the 8 largest urban centers, accounting for a little over 20 per cent of the population of Poland, were receiving as much as 50 percent of the total meat supply distributed by the government for domestic consumption. The above facts seem to support the presumption that such factors as parental education and occupational status, number of siblings, and degree of urbanization influence growth to a large extent via nutrition. On the other hand, analyses of the G.U.S. data fail to show any inferiority of peasant households compared to households of salaried workers with regard to per capita consumption of the most valuable food items; in fact, one of the recent studies indicates that during the period 1973-1976 average daily per capita intake of animal protein, plant protein, carbohydrates, calcium, iron, and vitamins A, B<sub>1</sub>, B<sub>2</sub>, and C was for each of these nutrients actually *higher* in peasant households than in households of salaried workers (SEKULA et al. 1980). This result is intriguing; if the shorter stature and delayed maturation of peasant children and youth is *not* caused by poorer nutrition — then by what is it caused?

It should be stressed that the population of post-war Poland (unlike that of pre-war Poland) is ethnically highly homogeneous, with practically no racial, linguistic or religious minorities. It seems therefore logical to assume that the above-described social gradients in body size and maturation rate are a result of inequalities in living conditions rather than a reflection of inter-group genetic differences resulting from some association between socio-economic status and ethnic origin. However, the possibility cannot be discarded a priori that some of the observed social class differences do have a genetic component: it should be kept in mind that genetic differences between social classes can arise, and be maintained, even in an ethnically homogeneous society — for example as a result of *selective social mobility*. If e.g., tall individuals were for some reason more likely than short ones to move upward on the socio-economic scale, or more likely to migrate from villages to cities, then the observed social gradients in stature, or the urban-rural differences in stature, might in part be genetic rather than purely phenotypic. A few studies carried out

in Scotland, West Germany, Belgium, and Poland suggest that body height in those populations may indeed be subject to this sort of selection. It is tempting to try to interpret in terms of this hypothesis the above-noted fact that in post-war Poland social class distances in menarcheal age seem to have declined, whereas analogous distances in body height have not. Perhaps maturation rate, a "transient" and "less visible" phenotypic character of an individual, is neutral from the point of view social selection whereas height is not; hence class differences in menarcheal age are "free to decline" in response to a reduction of economic contrasts within the society, whereas a similar tendency in body height is counteracted by selective social mobility.

The possibility of differential social mobility of certain genotypes is *not* proposed here as an alternative explanation of the existence of social class differences in growth. It remains the present writer's conviction that if "genetics" (in the above sense) plays any role at all in the emergence and maintenance of social gradients in body size and maturation rate, its role is of minor importance as compared with the role of the "plastic response" of the growing organism to certain kinds of environmental pressures. That is the gradients described in the present paper are primarily (perhaps exclusively) "economic" in origin: they are direct consequences of the fact that environments provided to children by families belonging to different socio-economic strata differ markedly in the degree to which such environments inhibit the full realization of the genetically programmed "growth potential" of a child. To use J. M. TANNER's expression (TANNER 1978, p. 114) — data on children's growth can serve as an excellent, quantitative measure of *classlessness* of a society. Viewed in this perspective, Poland — unlike, for example, Norway or Sweden — appears to be still very far from the "classless" condition.

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