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A STUDY ON THE SECULAR TREND IN YOUNG ADULTS

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Abstract: *The possible manifestation of the secular trend were analyzed on the physique of students applying for admission to the University of Physical Education, Budapest, between 1972 and 1991. The variables studied were stature, body mass and the metric and plastic indices of Conrad's growth type. The subjects were successive cohorts of physically active young adults of whom 2322 were females and 2560 were males. Polynomial regression analysis of the yearly means gave a best fit for the linear model in most of the studied variables, but several of the higher order components were also significant. The results are also discussed in respect of the previous (15-years-long) analysis.*

Key words: *Secular trend; Young athletic adults; Polynomial regression models.*

Introduction

Since 1972 the body build characteristics of the students applying for admission to the University of Physical Education, Budapest, were recorded for every successive year. During the twenty-year period until 1991, the senior authors published some reports on the physique of these young adults and also on the phenomena attributable to the secular trend after 10 and 15 years of investigation (Mészáros 1979, Mohácsi et al. 1989/1990).

Secular trend was studied not only in the P. E. students but also in students from other universities from we had data on body build variables (Frenkl and Mészáros 1979, Gyenis and Till 1981, 1986).

In addition to the mentioned studies on the secular trend in Hungary, several reports are available on similar changes from abroad.

Of these, the one on the secular trend of the Belgian university students is comparable with ours in some respects (Claessens et al 1990). They followed up secular trend changes from 1951 to 1988.

The purpose of the present study was to analyze the secular trend changes in the students applying for admission to the University of Physical Education, Budapest, across a twenty year period, namely, between 1972 and 1991.

Material and Methods

The subjects were 2322 girls and 2560 boys aged between 18 and 20. The yearly distribution of the applicants in the two sexes is demonstrated in *Table 1.*

They represented a group of youth who were physically more active than the peer group in general since they wanted to become P. E. teachers, they were not elite sportsmen, though.

Body dimensions were recorded under laboratory conditions observing the recommendations of the IBP (Weiner and Lourie 1969).

The metric and plastic indices describing the growth type of Conrad (1963) were calculated by regression formulae.

Table 1. **The yearly distribution of the applicants in the two sexes**

Year	Females	Males
1972	124	111
1973	132	102
1974	112	127
1975	123	141
1976	120	112
1977	118	106
1978	102	160
1979	92	120
1980	81	101
1981	118	119
1982	112	114
1983	109	113
1984	99	108
1985	110	113
1986	126	137
1987	124	154
1988	131	159
1989	144	162
1990	131	162
1991	114	139
Sum total	2322	2560

After obtaining the yearly means and standard deviations for both sexes the trends for stature, body mass, and the Conrad indices were analyzed by orthogonal polynomials up to the fifth power. The recorded years of the application served as the independent variable.

Results and Discussion

Figure 1 shows the means and SDs of stature for the two sexes from 1972 to 1991. The values for the *stature* are scaled on the vertical axis. The open circles show the values of the girls while the bold circles demonstrate those of the boys.

In the lower part the significant components of the orthogonal polynomials can be seen along with the multiple correlation coefficients. In the series of stature means the linear trend was significant both for the girls and the boys.

In *Figure 2* the means and SDs for *body weight* are shown. A statistically significant linear trend of increase also could be proved for body weight in both sexes but the relationship seems to be less close, especially for the boys, as shown by multiple correlation.

Figure 3 shows the analysis of the successive *metric index* values. The scale on vertical axis refers to the linearity of the body build.

People having more linear body build are assigned a more negative number, stouter ones have more positive scores.

The girls showed a simple linear trend with a moderately high multiple correlation. In contrast, several higher-order orthogonal components also turned out to be significant in the boys, i.e. in addition to the linear trend the third, fourth and the fifth power components, as well.

The dominating trend of the changes was, however, the linear one. The multiple correlation in the boys showed a stronger relationship.

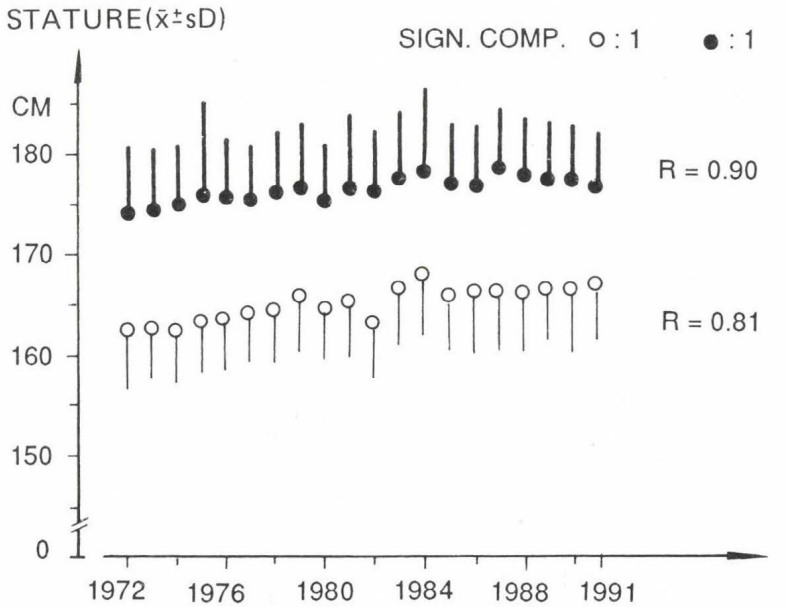

Figure 1: The means and SDs of stature of the applicants, where: bold circles – the results of the males; open circles – the results of the females. R = multiple correlation coefficient; sign. comp.: the results of the orthogonal polynomials

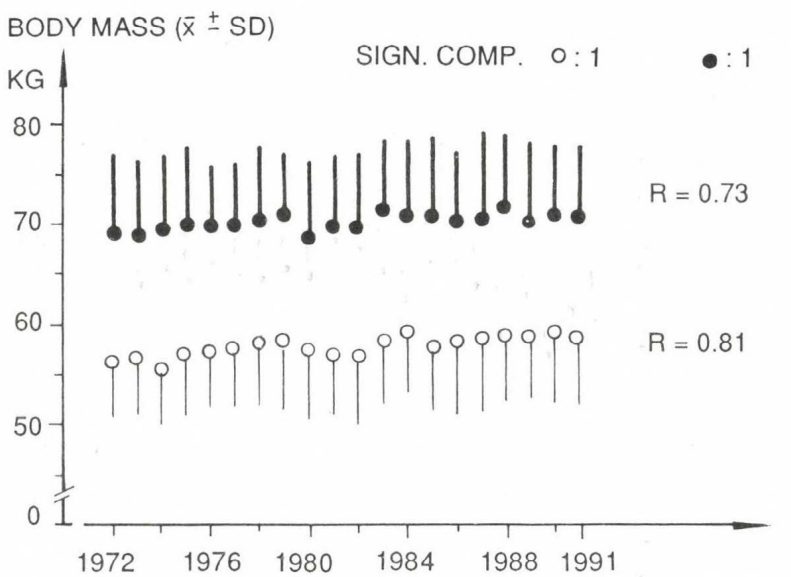

Figure 2: The means and SDs of the body mass in the two sexes. Abbreviations and the signs are the same as in Fig. 1

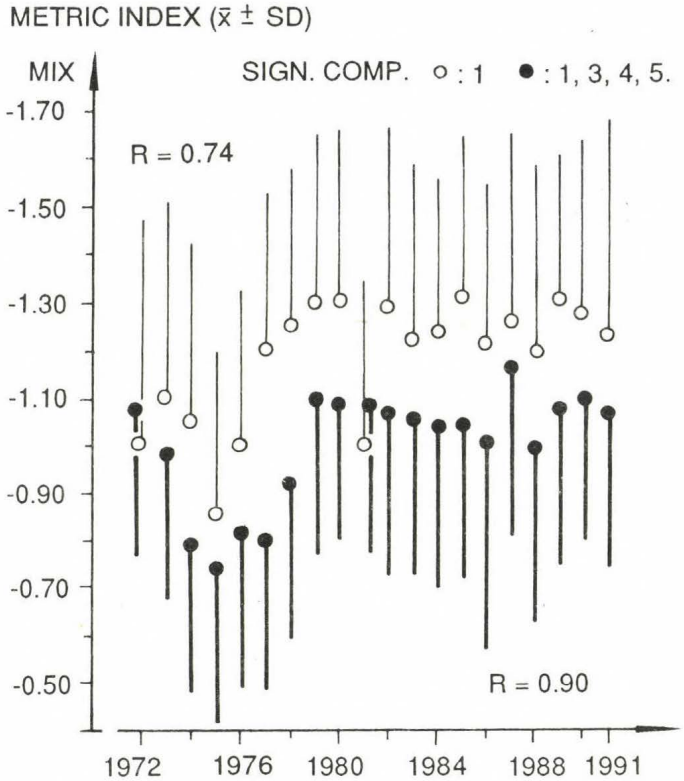

Figure 3: The means and SDs of the metric index values in the two sexes. Abbreviations and the signs are the same as in Fig. 1

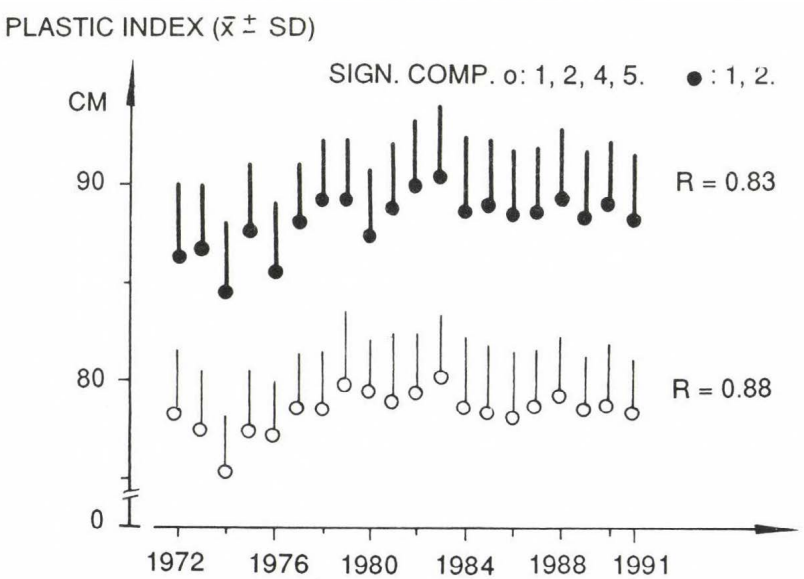

Figure 4: The means and SDs of the plastic index values in the two sexes. Abbreviations and the signs are the same as in Fig. 1

Figure 4 shows the values for the *plastic index* in the two sexes. The series of the means did not follow a simple trend as shown by the significance tests. In the girls the quadratic component was the main one.

Besides, the linear trend of the changes, the fourth and the fifth power fits were also significant.

As for the boys, however, the linear trend was dominant with an important quadratic contribution.

When speaking about secular changes and trends, we have to take into account all the effects that would modify body build.

Such influences may come from our natural, as well as social environment (Eiben 1988, Eiben and Pantó 1981).

In our study we tried to describe the nature of such changes in young adults, namely in the students applying for admission to the University of Physical Education.

In this preselected group we supposed we could confirm the existence of some trends as continuations of our former findings demonstrated 10 and 5 years before.

In the majority of studies on the secular trend body height and weight are the most often analyzed factors (Mészáros 1979, Mohácsi et al. 1989/1990).

As regard of stature as well as body mass a significant linear trend was found for both the girls and the boys during the twenty years studied.

These results corroborate thus our previous data reported for the 15-year period (Mohácsi et al. 1989/1990).

The trend for the metric index in the boys contained several higher-order components, though the main trend was linear one toward the more negative values. The results in the girls showed a simple linear trend of decrease only.

When a trend shows a multicomponent nature, it is more advisable to think it over and try to interpret it very carefully.

Since the main component was the linear change, it seems that the linearity of the body build in the boys increased with some oscillations along that line.

We are not sure that it can be explained easily and exactly by reasons, other than random fluctuation.

In the plastic index it was the group of the girls where such phenomena were found.

The dominant component was the quadratic trend in the girls, but the linear, fourth and fifth power components also contributed to it significantly.

In the boys the main linear trend was coloured by a significant quadratic component.

In our previous report concerning the 15-year period, the most marked component was a linearly increasing trend. The dominance of the quadratic component in the present material means that during the last five years the formerly linear increase in the plastic index of the girls levelled off.

Our results allow the conclusion that the existance of the linear trend could be demonstrated in every studied parameter (Gyenis and Till 1986). The situation is the same also when observing data from abroad (Claessens et al. 1990). In that investigation also a significant linear trend of changes in the body build characteristics was reported during that period simirlarly to our findings.

It was only the girls' plastic index in which the quadratic was the main significant component.

These observations agree with the most of our former results and demonstrate a continuation of the secular trend.

The essence of these is that young male adults have become taller and more robust, but slightly more linear.

The young adult females of our material also grew taller, heavier and more linear, but their increase of robustness came to an end.

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