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DOROTA TRZCIŃSKA
University School of Physical Education, Warsaw, Poland

PHYSICAL FITNESS OF CHILDREN AND YOUTH FROM REGIONS OF POLAND WITH VARIOUS DEGREES OF ENVIRONMENTAL CONTAMINATION

INTRODUCTION

The topical scope of the following paper refers to some determining conditions of the biological fitness of children and youth in Poland at the turn of the 20th century. In the work hereby, different bio-geographical conditions were accepted as the basic criteria of selecting and differentiating the areas of research. Having assumed the existing knowledge about the influence of the environment on human biological condition [1, 2, 3, 4, 5, 6], the following hypothesis was formulated: The breach of the natural environment's balance in regions of high degree of ecological contamination is not related to the lowered condition of physical fitness of school-children living in such regions.

METHODS

16,717 people – 8,339 schoolgirls and 8,378 schoolboys, aged from 7 to 19 years from the Warmia-Mazury, Podlasie, Lower Silesia and Silesia Provinces, took part in the research conducted in 1999. In the study the level of motor fitness was evaluated on the basis of the International Physical Fitness Test and results of the Cooper test. In the analysis of the results, the following statistical methods were applied: basic somatic characteristics, Student's t-test, standardization of data, global index of the social-economic status (SES), 2-factor analysis of variance (MANOVA) and Scheffe's test.

RESULTS

In the population of boys in most fitness trials of the International Test and in the Cooper run, those from the regions of low degree of ecological threat gained advantage over their counterparts from the contaminated regions. The lack of such regularity was observed only in 600m and 1000m runs (Fig. 1).

In the population of girls in 8 out of 10 conducted physical fitness trails, a considerably higher motor advantage of schoolgirls from ecologically safe regions over girls from Silesia was revealed. Differences of normalized values attained a very high level of statistical significance (Fig. 2).

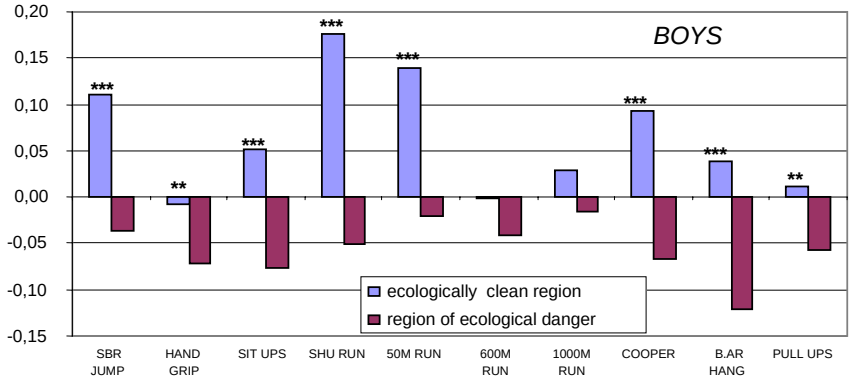

Figure 1. Normalized values of physical fitness trials of boys

Correspondence should be addressed to: Dorota Trzcińska, University School of Physical Education, ul. Marymoncka 34, 00-968 Warsaw, Poland, e-mail: dorota.trzcinska@awf.edu.pl

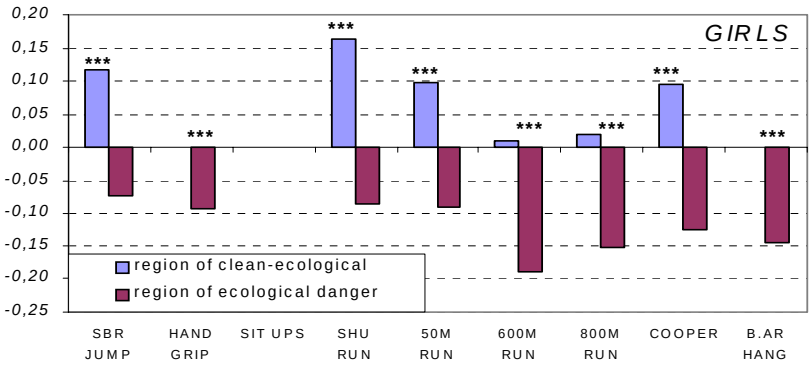

Figure 2. Normalized values of physical fitness trials of girls

Thanks to the use of the index of environmental kindliness there is a possibility to eliminate other than ecological, exogenous elements differentiating the conditions of growth of the examined population. Such procedure is a further step in the search of bio-geographical conditions determining the development and physical fitness of pupils from different regions of the country as far as the condition of natural environment is concerned. The different ecological situation of the selected regions affected the results of the following fitness trials of both sexes: standing long jump (Tab. 1, [7]), strength of the arm, 4x10 m run, and Cooper's test (Tab. 1). Besides, a similar relationship was recorded among girls in other run trials (Tab. 1), and in the population of boys in the body bends (Tab. 1) and in the pull-ups (Tab. 1, [7]).

Table 1. Results of the analysis of the variances of physical fitness of children and youth

Physical fitness trials	Effect of listed factors (boys)	Effect of listed factors (girls)
bend trunk	1, 2	1
standing broad jump	1, 2	1, 2
hand grip	1, 2	1, 2
sit ups	1-2	1
bent arm hang	1-2	1, 2, 1-2
50 m dash	1, 2, 1-2	1, 2
long run (600 m)		2
long run (1000/800 m)		1, 2
pulls up on a bar	2	–
4x10 m shuttle run	1, 2	1, 2
Cooper's run	1, 2	1, 2

1 – social-economic factor, 2 – ecological factor, 1-2 – interaction

In pull-ups – in the International Test of Physical Fitness prepared exclusively for boys – the "autonomous" influence of the ecological factor was demonstrated (Tab. 1). It is the only trial carried out by the male part of the examined population from the region of low contamination of the natural environment, in which no such kind of relationship was observed. The best results were obtained by boys from the regions characterized by a low degree of the natural environment's contamination and by average socio-economic conditions of growth [7]. In the population of girls, the only physical fitness trial, with regard to which the "autonomous" influence of the ecological factor was revealed, turned out to be the 600m run (Tab. 1). One of the four attempts of physical fitness, with regard to which the effect of the ecological factor together with the effect of socio-economic condition in both sexes was recorded, is the standing long jump (Tab. 1). In both boys and girls, the best results were obtained by those subjects who enjoyed the best bio-geographical and socio-economic conditions of growth, and the worst results were achieved by schoolchildren from regions of a high degree of environmental contamination and with low SES [7].

Summing up the analysis of the inter-regional differences in the fitness of the youth examined in 1999, and taking into account the index of the economic-social status, it can be concluded that in the population of boys no relationships between the bio-geographical conditions of growth and the level of their somatic development was revealed. However, there was a directly proportional dependence between more favorable conditions of the natural environment and better results of 6 out of 11 physical fitness trials. In the female subjects a visible effect of the ecological factor, both on the somatic development, as well as on the physical fitness, was recorded. More favorable bio-geographical conditions reveal a relationship with seven physical fitness trials. Beside the bio-geographical conditions, the majority of the obtained results demonstrated a parallel impact of socio-economic factors.

DISCUSSION

The assumed hypothesis of the study was not confirmed. As a result of the evaluation of the significance of differences of normalized values, the advantage of schoolboys and schoolgirls from the regions of Warmia and Mazury over their peers from Lower and Upper Silesia was recorded in the large majority of physical fitness trials from the international test and Cooper's test. This refers to boys and girls alike. The principal and most numerous results are the ones that prove higher fitness levels in regions characterized by more favorable ecological conditions. On the basis of the recorded level of kinetics of the investigated population of schoolchildren and the set of measurements obtained in the provinces with different degrees of environmental contamination, it is possible to state that the physical fitness of youth growing in unfavorable bio-geographical conditions is worse in comparison with their peers living in regions of low ecological contamination. The obtained results were surprising, especially those testifying to the interregional differences in physical fitness observed in both sexes and strongly pronounced among girls. It seemed that the natural and ecological values were insufficient elements of the environment in order to obtain a substantial improvement of the quality of life, so that it would be reflected in the positive indices of health in the population of Polish schoolchildren. Revealing the forces differentiating environmental factors is less significant in boys because of the effects of the compensating factors, one of which is considered to be motor activity. It is possible to assume that the observed image of differentiation of physical fitness of girls is a factual reflection of the negative influence of contamination of the natural environment, whereas in boys it is reduced by the effects of the physical activity factor. The performed analysis makes it possible to formulate the following conclusions:

1. Besides the obvious relationships between the degree of environmental contamination and the state of health of the region's inhabitants, differences in the fitness of the young people living in ecologically different regions can also be observed. Consequently, it seems that unfavorable bio-geographical conditions of growing up remain significantly related with the negative health image of the young generation, as well as with its positive standards, which include among others physical fitness.
2. In the interregional image of biological conditions of the population examined in 1999, similar regularities concerning physical fitness for boys and girls can be observed. The recognition of similar tendencies in the functional properties of both sexes, as well as the confirmation of interregional differences, while taking into account the modifying effect of the social-economic factor, makes the positive influence of favorable bio-geographical conditions of growth on the kinetic level of the selected population of schoolchildren highly possible.
3. The results demonstrated the importance of bio-geographical conditions of growth in the development of physical fitness in the new Polish social, economic and political reality of the 1990s.
4. The alarming observations about the deteriorating physical fitness of schoolchildren from selected regions of the country should be taken into account in formulation of the social policy. It is justified and indispensable that the state and local authorities should pay more attention to the youth from ecologically contaminated regions.

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