Influence of Environment on the Somatic Development of Girls t the age of 7-14 from Podkarpackie Province

Adam BIELECKI [1]   Witold PÓŁTORAK [2]

[1] The Bronisław Markiewicz State School of Higher Vocational Education in Jarosław, Poland.
[2] Faculty of Physical Education, Rzeszow University, Poland (E-mail: witekpoltorak@gmail.com).

ABSTRACT

The main motive for undertaking of the subject of somatic development and environmental constraints is the alarming data provided by the literature. It proves that the level of average daily physical activity and effort among the contemporary population of children and young people is disastrous. It seems it would be worthwhile to contemplate the reasons of the prevailing physical passiveness, when at the same time it is judged as being of such obvious negative influence on human health. The main purpose of the research was to determine the relation between the socio-economic environment where children are raised and their somatic development. The research encompasses female pupils of primary and junior secondary schools in the number of 480 persons of the age of 7 to 14, 60 pupils per group. The research was conducted in schools located in three environments of the Podkarpackie Province in Poland. The basic parameters for descriptive statistics were calculated and then the analysis of variances (ANOVA) was performed. In the summary, it was also determined that comparative research regarding the environment may be very useful in analysis and evaluation of self-made educational systems for children and young people.

Key words: environment, somatic development, Podkarpacie Province

INTRODUCTION

Development of a human being should be considered as a dynamic process occurring in a specific frame of reference which is their environment. On the other hand, the environment is understood to be a totality of material and biological circumstances, essential for life and individual development of a given species. In other words, it is the place where the species or population stays for a longer period of time. Development of morphological features, rate of biological maturation, development of physical fitness and many other processes are the resultant of the influence of genetic and environment-related factors. Interaction of those factors is the cause for significant inter-individual variability characterizing human organisms. Genetic fundaments for this variability consist in, among other things: segregation of genes and their cooperation or mutations. The environment-related constraints should include the size of the place of residence, the climate – although its importance should not be overestimated, education level of the community, and size of the family and their material circumstances. This influence is particularly significant in the period of childhood when the environment should provide the organism with stimuli crucial for achievement of maturity. The extent of social stratification in Poland in the representative samples on the national level, encompassing all environments, from villages to small cities to big cities – were described on the basis of observation of large samples of school children and young people.

The main motive for undertaking of the subject of somatic development and environmental constraints is the alarming data provided by the literature. It proves that the level of average daily physical activity and effort among the contemporary population of children and young people is disastrous. It seems it would be worthwhile to contemplate the reasons of the prevailing physical passiveness, when at the same time it is judged as being of such obvious negative influence on human health. For it cannot be explained by continuous increase in activity in the area of creativity in dealing with various everyday concerns which consumes a person's energy to such an extent that there is too little of it left for everyday physical activity. It seems that one may talk of three reasons of prevailing physical passiveness: firstly, physical work – physical activity stopped being a vital necessity, second reason of physical passivity entering into the life style of the contemporary generations should be located in the widely understood commercialization of sport, and the third reason "of spreading of the phenomenon of physical passiveness" resides in the offer regarding human body provided by the post-modern consumer civilization [Pańczyk, Warchoł, 2007, 2008].

This means that sport and physical education has become, in most cases, the only form of exercise in which they participate. That is why the actions of the physical education teachers towards children and young people consist in, first and foremost, satisfying their developmental and health-related needs as well as shaping proper habits of participating in widely

understood goods of contemporary physical culture [Warchoł 2010]. Physical education should be treated as one of more important areas of educational influence on pupils. Those actions should also result in proper physical and somatic development of children and young people [Warchoł 2010].

From the research conducted in Poland, it follows that 77% of Polish young people watch television at least 2 hours a day and a whole 44% of boys and 33% of girls watch it 4 or more hours a day [Woynarowska 1996]. Large percentage of young people perform physical exercises in their free time too rarely and too short time. Therefore, it is not surprising that in this situation and with such a model of life created since childhood, only a small percentage of adults (around 6 %) undertakes any form of physical activity [Starosta 1995]. According to Raczek [1995], the phenomenon of hypokinesis causes a regress in physical fitness, especially in the area of fitness-related skills, which threatens adaptation skills. The socio-economic transformations, urbanization processes, ecological dangers etc., visible throughout the last ten years, cause noticeable changes in the area of development of somatic features and motor skills of the contemporary population. These changes do not proceed simultaneously, which was proven in, among other works, the research on the Krakow population [Żak, Szopa 1987, Żak 1991]. The trend in somatic development outlined above is accompanied by adverse changes in motor fitness consisting in patent deterioration of results from majority of tests – mainly investigating speed and stamina-related skills, and flexibility. The reason for this may be, among other things, a relatively small degree of participation of children and young people in extracurricular and out-of-school activities [Warchoł 2006]. The phenomenon of deepening regress in motor fitness of children and young people in the context of social stratification and deepening environment-related differences (city – village) worries the researchers who, in their popular science articles, often call to attention the dangerous degradation of Polish young people and lower "biological quality" of the population in the productive age.

Taking into consideration the negative tendencies occurring in physical and motor development of children and young people and insufficient level of knowledge regarding results and consequences of this state of affairs, the above research ought to be considered as fully justified and purposeful.

The main purpose of the research was to determine the relation between the socio-economic environment where children are raised and their somatic development.

MATERIAL and METHODS

Research material

1. The research encompasses female pupils of primary and junior secondary schools in the number of 480 persons of the age of 7 to 14, 60 pupils per group.

2. The research was conducted in schools located in three environments of the Podkarpackie Province that is, in a big city of Rzeszow, small city of Łańcut and, due to small number of pupils, in three villages (Rakszawa, Markowa, Zarzecze).

3. The research encompassed three administrative districts: rzeszowski, łańcucki and przeworski.

4. The choice of localities was deliberate to represent variety of environments and afterwards the persons being the subjects of the research were selected randomly.

Research methods

1. The main research method used for the purpose of the work was the method of direct observation of the participators.

2. In all environments participating in the project, an identical research program was used.

3. The research was performed according to the adopted standardized research procedure.

4. The research started from a background survey concerning the precise date of birth.

5. Afterwards, measurement of the basic somatic parameters was conducted including: body height, body weight and BMI.

Statistical methods

Empirical material underwent due procedures of statistical analysis. The basic parameters for descriptive statistics were calculated and then the analysis of variances (ANOVA) was performed. The results gathered in this way are presented in this analysis. On their basis, the significance of the differences between average values was assessed.

RESULTS

Characterization of the researched group regarding their physical development on the basis of the analysis of selected somatic features

Analysis of the collected empirical material began from characterization of physical development conducted on the basis of comparison of values for selected somatic features. For each somatic feature, a separate analysis of variances was conducted with double classification for independent variables of age and environment, separately for researched girls.

The analysis concerned the following somatic features: body height, body weight and BMI index.

Detailed data including basic parameters of the main statistics and *post hoc* analyses are in the possession of the authors of the analysis. *Post hoc* analyses were also performed on the basis of which the significance of differences between average values in compared groups was assessed.

Body height of the girls

Analysis of the measured values of one of the basic somatic features that is the body height of the girls in the researched environments has shown that body height of the researched girls at the age of 7-8 was on similar levels, with the children from villages being slightly taller than children from the small and big city. This tendency maintained up to the age of 10. In later periods, that is: from 11 to 14 years of age, the differences in height reverse to the benefit of children from cities. In the end, the highest body height was reached by the girls from the small city, who were slightly taller than girls from the big city. The girls from the villages turned out to be the shortest. The achieved results are presented in a graphical form in picture 1.

As it results from the data presented in table 1, for the researched girls, the environment of origin is not a factor substantially statistically differentiating body height. Body height is, however, substantially different depending on the age of the girls (p<0.01). Joint effect (interaction) is also crucial for statistical purposes (p=0,0217).

Detailed data presenting differences in the values of the "body height" variable on the basis of *post hoc* analysis is also in the possession of the authors of the paper.

Body weight of the girls

The analysis of the next value from the basic somatic features in the group of girls – body weight – in the researched environments is presented in picture 2. The analysis of the results allows for a statement that from the age of 7 to 9 the girls from the villages had higher body weight than the girls from the big and small city. Past 10 years of age, there occurs a reversal of the trend to the benefit of the girls from the small and big city. The tendency maintains up to age of 13. Finally, at 14 years of age, the girls from the villages reached slightly higher body weight than the girls from the big and small city.
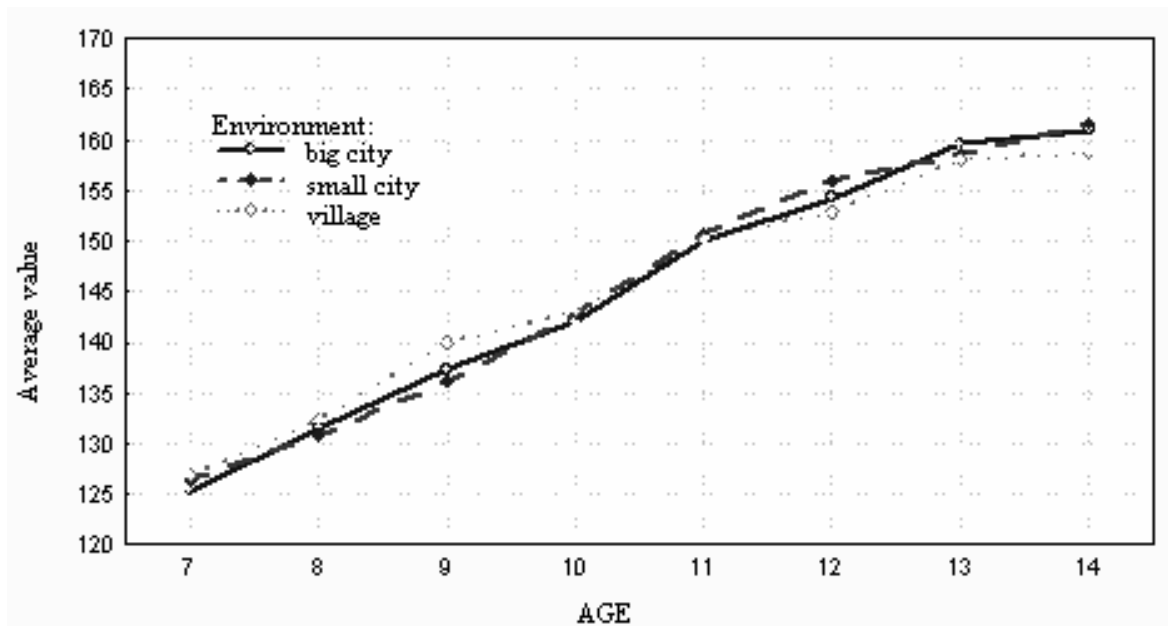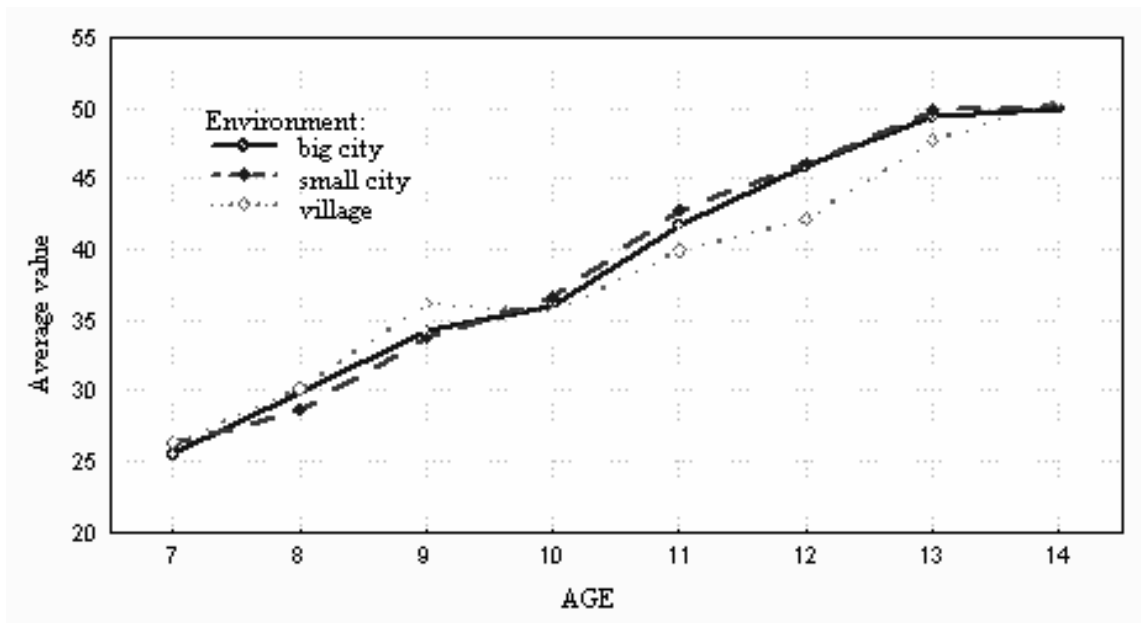

Picture 1. Comparison of average values for height of girls at the age of 7-14 depending on the environment
Source: Analysis by the authors on the basis of conducted research

Table 1. Variances analysis with double classification for dependent variables of age and environment in the research regarding body height of the girls (1- environment, 2 – age, 12 – interaction)

	df Effect	MS Effect	df Error	MS Error	F	p-level
1	2	5,372	1416	41,351	0,130	0,87818
2	7	28397,615	1416	41,351	686,747	**0,00000**
12	14	78,982	1416	41,351	1,910	**0,02167**

Source: Analysis by the authors on the basis of conducted research

Picture 2. Comparison of average values of the body weight of girls at the age of 7-14 years depending on the environment. Source: analysis by the authors on the basis of conducted research

Table 2. Variances analysis with double classification for dependent variables of environment and age in the research regarding body weight of the girls (1- environment, 2 – age, 12 – interaction)

	df Effect	MS Effect	df Error	MS Error	F	p-level
1	2	54,637	1416	56,497	0,967	0,38045
2	7	13528,735	1416	56,497	239,460	**0,00000**
12	14	78,659	1416	56,497	1,392	0,14878

Source: analysis by the authors on the basis of conducted research

The final results of the calculations revealed that there was no statistically significant differentiation effect depending on the environment where the girls live. What did turn out to be of significance was the effect of differentiation depending on the age ($p<0,01$). Interaction was also statistically insignificant. Detailed results of calculations are presented in table 2. Detailed data presenting differences in values of the "body weight" variable based on the *post hoc* analysis are held by the authors of the analysis.

BMI index in the group of girls

In the conducted research, apart from height and body weight specified above, the analysis concerned also the values of the BMI index reached by the girls. Picture 3 below presents the results received. Their analysis indicates that at the age of 7 the girls from the small city and villages reached very similar BMI indexes, the index for the girls from the big city, however, was slightly lower. At the age of 8, the highest index was reached by the girls from the big city and the lowest by the girls from the small city. A significant moment of differentiation in the researched environments, to the benefit of the girls from cities, took place after the age of 9 and it maintained up to the age of 13. Finally, at the age of 14, the highest BMI index was characteristic for the girls from the villages, second highest for the girls from the big city and third for the small city.

On the basis of the conducted statistical analysis, it can be stated that there was no significant differentiation effect depending on the environment. However, what turned out to be significant was the differentiation effect depending on the age ($p>0,01$). The interaction was also of no significance. Detailed analysis of the received results is contained in table 3. Detailed comparison presenting results of the analyses of the differences between the values of the "BMI" variable with the *post hoc* analysis are held by the authors.
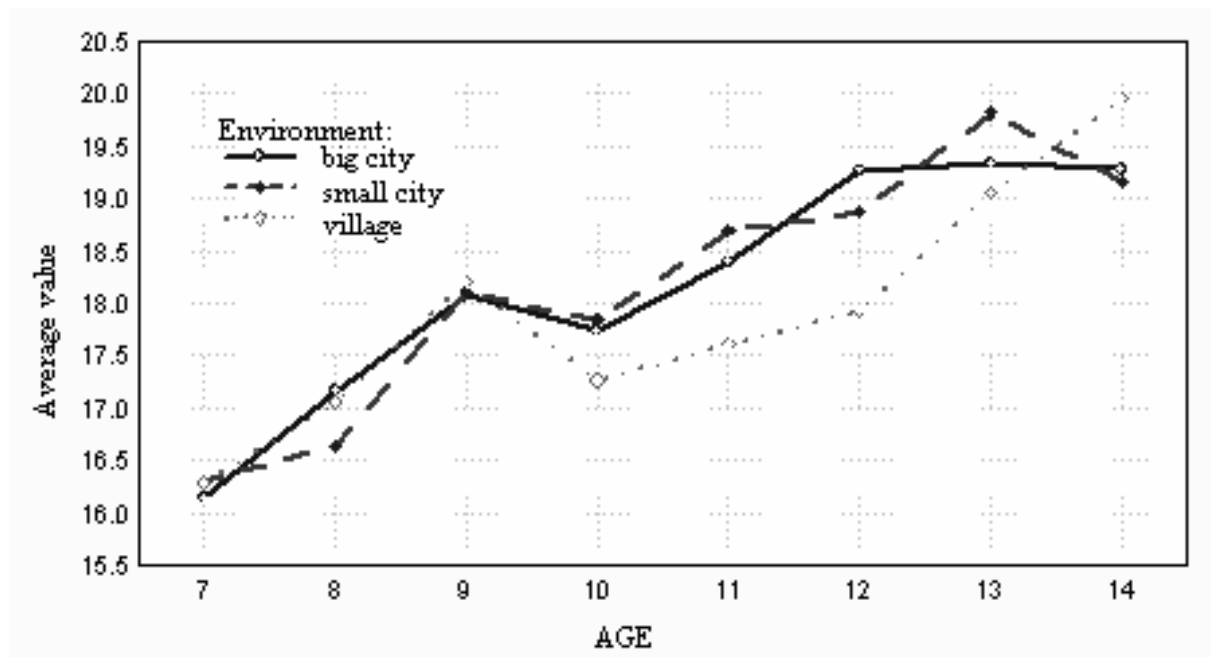
Picture 3. Comparison of average values of the BMI indexes for girls at the age of 7-14 depending on the environment.
Source: analysis by the authors on the basis of conducted research

Table 3. Variances analysis with double classification for dependent variables of age and environment in the research regarding the BMI index of the girls (1 - environment, 2 – age, 12 – interaction)

	df Effect	MS Effect	df Error	MS Error	F	p-level
1	2	9,313	1416	7,647	1,218	0,29615
2	7	230,882	1416	7,647	30,194	**0,00000**
12	14	7,376	1416	7,647	0,965	0,48770

Source: analysis by the authors on the basis of conducted research

Conclusions: In the course of the analysis of the results of research conducted on the group of girls at the age of 7-14, it was determined that the environment, differently than in the case of age of the subjects, does not significantly statistically differentiate the basic somatic features.

In the summary, it was also determined that comparative research regarding the environment may be very useful in analysis and evaluation of self-made educational systems for children and young people. Therefore, it seems justified to continuously observe somatic and motor development of girls in the context of environment-related changes.

REFERENCES

1. Pańczyk W., Warchoł K. (2008) *W kręgu teorii, metodyki i praktyki współczesnego wychowania fizycznego*, Wydawnictwo UR, Rzeszów.

2. Pańczyk W., Warchoł K., *Wychowanie fizyczne wobec wyzwań cywilizacji konsumpcyjnej*, „Lider" SZS, IK, 2007, nr 3.

3. Raczek J. (1995) *Hipokinezja i jej skutki jako problem współczesnej cywilizacji.* (in:) *Nauki o kulturze fizycznej wobec wyzwań współczesnej cywilizacji,* (Ed.) B. Chmielowski, AWF, Katowice.

4. Starosta W. (1995) *Model wszechstronnej edukacji motorycznej polskiego dziecka w rodzinie*, Międzynarodowe Stowarzyszenie Motoryki Sportowej, Warszawa.

5. Szopa J. i współautorzy (2000) *Wstęp do antropologii*, AWF, Katowice.

6. Warchoł K. (2006) *Pozalekcyjne i pozaszkolne formy aktywności fizycznej dzieci na przykładzie wybranych szkół woj. podkarpackiego,* „Wychowanie Fizyczne i Zdrowotne" WSiP, Warszawa, nr 5.

7. Warchoł K. (2010) *Postawy nauczycieli wychowania fizycznego do zawodu – próba refleksji teoretycznej i praktycznej* „Wychowanie Fizyczne i Zdrowotne" WSiP, Warszawa, nr 9.

8. Warchoł K., *Wybrane zagadnienia z pedeutologii wychowania fizycznego*, PWSZ Krosno 2010.

9. Woynarowska B. (Ed.) (1996) *Zdrowie młodzieży szkolnej w Polsce i innych krajach*. Instytut Matki i Dziecka, Warszawa.

10. Żak S. (1987) *Czynniki rozwoju morfologicznego w zróżnicowaniu sprawności fizycznej 11-12-letnich dziewcząt i chłopców,* „Wychowanie Fizyczne i Sport" WSiP, Warszawa, nr 3.

11. Żak S. (1991) *Zdolności koordynacyjne dzieci i młodzieży z populacji wielkomiejskich na tle wybranych uwarunkowań somatycznych i aktywności ruchowej,* AWF, Kraków..