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Correlation of Parental Socioeconomic Status Indicators with Morphological and Motor Dimensions of Preschool Children

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A B S T R A C T

Measuring instruments for assessment of parental socioeconomic status, anthropometric characteristics and motor abilities were used in a sample of 643 preschool children aged 4–6 years and their parents, recruited from preschool institutions in several towns in Voivodina, Serbia. The aim was to analyze the correlation of parental socioeconomic status indicators with morphological and motor dimensions of preschool children. Study results showed the socioeconomic status of the children's families to be relatively homogeneous, with no statistically significant differences in any of the socioeconomic status indicators between families with male and female children. Male and female children differed significantly in the overall space of anthropometric and motor variables, and to a lesser extent in individual variables. The general morphological factor treated as the children's growth and development, and general motor factor were qualitatively comparable. The correlations of socioeconomic factor with general morphological and motor factors of the children were not statistically significant, with the exception of motor factor in 6-year-old male children, at elementary school enrolment. Study results suggested the differences in biological growth and development and motor development recorded in preschool children from Voivodina, Serbia, to be attributable to hereditary factor rather than socioeconomic and environmental factors. Inclusion of older children and use of more socioeconomic status indicators along with some additional indicators should probably yield more reliable results on the issue.

Key words: *socioeconomic status, morphological factor, motor factor, preschool children*

Introduction

The homogeneity of the child's anthropologic dimensions and interactions with close and extended environment determine the modality and intensity of the child's behavior in particular situations. Some of these dimensions are influenced by the genetic material inherited from the parents and ancestors, whereas others are more prone to the impact of the environment in which the child grows, develops, receives education and takes other active roles[1–4].

Some morphological dimensions are considered to be predominantly inherited (e.g., longitudinal skeleton dimensionality), whereas others are inheritable to a much lesser extent (e.g., body mass and volume, subcutaneous adipose tissue). Similar relations are also applicable to children's motoricity, although it cannot be differentiated to specific and relatively independent motor abilities in early childhood. Nevertheless, association between good parental motoricity or particular motor abilities and good motoricity in their child can already be noticed at an early age. In the domain of intellectual abilities, parental influence on their children's cognitive functioning is even more pronounced. The relations are considerably lower in the space of conative characteristics of the parents and children, pointing to their potentially greater influence on the children's behavior and on transforming one behavioral modality or intensity into another one.

Behaviorists and some other theoreticians of personality traits advocate the opinion that behavior is determined by external environment. According to behavioristic principles, behavior is almost completely determined by and learned from the environment, while the inherited mechanisms are very few; the general abilities of

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learning and bringing up are of utmost importance. Other theoreticians propose the personal factors such as personality traits are those that determine behavior. Bandura (1986, 1989)[5,6]; Bussey and Bandura (1999)[7]; Bandura (2001)[8]; Bandura et al. (2003)[9] believes that these attitudes are »too shallow and simple«, and triple reciprocal causation appears to be by far more realistic to consider instead. The main idea of this causation is interaction of personal factors (cognitive and emotional), environment and behavior. For example, our behavior and motivation frequently influence our environment. Thus, the environment exerts its impact upon us, while we also help determine our personal setting. Bandura strongly advocates the hypothesis that people's behavior can only be predicted by taking in consideration the overall situation or context of the individual's environment. In the early childhood, however, environmental impact is highly significant, parental educational level and social status in particular, along with the child's activities; therefore inheritance, although being very important in the child's growth and development, is not so predominant to be impossible to »restructure« or »impair«.

The appropriate procedure to be used on determination of the level of environmental and hereditary impacts and their interaction on the children's functioning efficiency and/or characteristics during growing up has yet to be identified. In scientific circles, there is a belief relying on some partial study results and facts based on daily experience that differences among children in industrialized countries should be primarily ascribed to inheritance. Inheritance is defined to a certain level, whereas environmental factors help or hamper achieve this level.

Accordingly, analyzing the integral development in large samples of children it is very difficult to clearly distinguish the part referring to inheritance from the part the children acquire from the environment or the part the children form themselves through their activities in the process of their personal overall, integral development. Therefore, the present study was not focused on the partial role of each of these parts, but the appropriate state of children's development was considered as the real and integral product of all these factors within the study spaces of the children's morphological characteristics and motor abilities, also with due consideration of their parents' socioeconomic setting.

The parents' socioeconomic status can greatly influence the children's growth and development, their behavior in general and their engagement in physical activities, in particular at preschool and elementary school age. This primarily refers to the parents' position in the socialization, institutional and sanction subsystem, as the phenomenological model of social status is defined by Saksida and Petrovič (1972)[10]; in this model, the structure of social status is underlain by the entity position in the hierarchical network of social roles in the socialization, institutional and sanction subsystem, and subsequently elaborated most extensively in the studies by Hošek and Petrovič[11,12].

Indicators for the socioeconomic status assessment do not depend at all on the little subjects but on their parents and tutors because these are indicators of the parents' active status and the children's passive status. Therefore, the present study dealt with the active social status of the children's parents, based on the collection of indicators developed by Hošek through reduction of the SSMAXIP questionnaire[13]. Using these indicators, the phenomenological hierarchical model is evaluated at three levels.

The third level of highest, presuming the existence of a general socioeconomic status, i.e. a single dimension of a wide range. The second, lower level contains three dimensions of a narrower range and more specific structure, the following three subsystems: 1) institutional subsystem (assuming a hierarchical network of inter-related professional, social and political roles of the parents, which influence social differentiation among people; 2) socialization subsystem (defined by the degree of the individual's preparation for taking over certain position in the network of roles within the institutional subsystem); and 3) sanction subsystem (defined by the degree of social evaluation of roles in the institutional subsystem and consisting of the hierarchical network of social roles within the system of possession, consumption, and other measurable, mostly material effects of the position in the institutional subsystem).

The first level of the model is defined by social status dimensions of even narrower range, known as first (primary) line factors of socioeconomic status. At the first level of phenomenological model, the number of social status dimensions depends on the number of manifest social status characteristics on which data have been collected in a particular population or subject sample, and on the age of the population analyzed, in this case parents to preschool children. The number of primary factors ultimately depends on the mathematical-statistical model used on input data analysis and condensation of these data upon a small number of latent dimensions. More strict criteria of the mathematical-statistical model will produce a smaller number of significant and more reliable factors. The most important social status dimensions in parents to preschool children are:

- parental educational level (defined by degree, quality and extent of education and occupational qualifications)
- basic residential status (characteristics of the parents' native place and place where they lived by age 15)
- parental professional status (pointing to their position in the hierarchy of professional roles depending on the socioeconomic relations and social division of labor)
- parental social status (defined by their position in the hierarchical network of roles in social organizations et all levels that are not political, i.e. in scientific, professional, cultural, humanitarian, sports and other organizations)
- parental political status (defined by their level of possessing political power)

– basic economic status of the family (defined by the financial resources available and amount of material goods consistent with the normal living standards of the population where the study is being conducted)
– family lifestyle (defined by possession of the material goods that are not usual in the respective population at the current level of economic development) and
– current residential status of the family (defined by the characteristics of the place where the family is living now and determined by the type of residence).

Good analysis of the social characteristics can help comprehend properly the state and inter-relations of anthropologic abilities and characteristics of preschool children. It is based on the concept according to which the biologic, motor, mental, emotional and social development of children can be to a great extent explained by the family social status, along with genetic factors. It has been hypothesized that the parents' relationship towards male and female children varies with the children's growth and development within families of the same or very similar social status, and that the social status differs between those with male and female children. It is quite difficult to prove, however, studies can be so designed to search for the possible statistically significant differences in the family social characteristics according to children's sex. So, Hošek-Momirović and Bala (2007)[14] report on no statistically significant difference between the families with male and female children. The analysis included first level and then second level factors to point to the existence of a uniform generator of the social status of preschool children's families analyzed. This generator is responsible for controlled coordination of the action of the socialization-institutional subsystem with sanction subsystem of the overall social system of the study families.

The present study was induced by the results reported by Mikalački, Hošek-Momirović and Bala (2006)[15] obtained in a sample of 364 parents to female elementary school children aged 7–11 from five towns in Voivodina. Twenty five status characteristics were used as parental social status indicators, while five indicators were used to assess the children's and their parents' physical activity. The aim of the study was to determine correlation of the parental social status and physical activity in female elementary school children. The latent structure of the parental social status and physical activity of the children and their parents was defined by the results of factor analysis, whereas the effect of latent dimensions of the parental status characteristics on their and their daughters' physical activity was determined by regression analysis. Study results suggested the favorable parental socioeconomic dimensions, in particular residential status of the family, engagement of both parents in sports activities and cultural level of the family, to have favorable impact on the children's physical activity. As previous studies had demonstrated that there was no statistically significant difference in the parents' social status according to sex of their children, it was presumed that the results obtained in this study could be extrapolated to male children as well.

TABLE 1
AGE AND SEX STRUCTURE OF STUDY SAMPLE

Age (yrs)	Sex	n	$\overline{X}$	SD
4	Male	57	4.47	0.24
	Female	66	4.55	0.25
	Total	123	4.51	0.25
5	Male	139	5.53	0.28
	Female	88	5.59	0.26
	Total	227	5,55	0.27
6	Male	144	6.49	0.29
	Female	163	6.50	0.28
	Total	307	6.50	0.28

The quality and level of the children's motor abilities are difficult to determine exclusively from their parents' assessment of the children's physical activity. Since morphological characteristics are known to significantly correlate with and influence the manifestation of motor abilities, the assessment of motor abilities should also be done in relation to the children's biologic growth and development, primarily anthropometric characteristics. Therefore, the authors embarked upon the present study to determine correlations of the parental socioeconomic status with the general morphological and motor dimensions of preschool children.

Materials and Methods

Subjects

Study sample included 643 preschool children and their parents from preschool institutions in Novi Sad, Sombor, Sremska Mitrovica and Bačka Palanka. The children were aged 4–6 years. There were 332 male and 311 female children. Children's age expressed in decimal years, arithmetic mean ($\overline{X}$) and standard deviation (SD) according to age and sex are presented in Table 1.

Measures and tests

The following measures and tests were performed:

1) The family socioeconomic status was assessed by the children's parents using the SSMAXIP questionnaire for collection of data on status characteristics of both parents (Hošek, 2004)[16]. The parents filled out the questionnaire for collection of data on status characteristics of both parents. Thus, the data collected referred to the active social status of the children's parents and passive social status of the children. Ten social status indicators were used in the study, as follows:
   – parental level of education: 1) father's level of education; 2) mother's level of education; 3) father's qualification; 4) mother's qualification
   – parental basic residential status: 5) type of father's residence in childhood; 6) type of mother's residence in childhood

– parental social status: 7) father's engagement in sports organizations; 8) mother's engagement in sports organizations
– family basic economic status: 9) size of apartment; and 10) monthly household income.

2) Anthropometric measurements in children, with anthropometric characteristics assessed according to the International Biological Program (IBP) method (Lohman, Roche, Martorell, 1988)[17]. The following set of anthropometric measures were used:
= assessment of skeleton dimensionality:
1) body height (mm)
= assessment of body mass and voluminosity:
2) body weight (0.1 kg)
3) chest girth (mm)
4) midarm girth (relaxed arm girth) (mm)
5) forearm girth (mm)
= subcutaneous tissue:
6) abdominal skinfold (0.1 mm)
7) subscapular skinfold (0.1 mm)
8) triceps skinfold (0.1 mm).

3) Motor testing of the children was performed according to recommendations published by Bala (1999a, 1999b, 2002a, 2002b)[18–21]. The following test battery were used on motor ability assessment:
a) assessment of the factor of movement structuring:
– movement stereotype restructuring: 1) obstacle course backwards (0.1 s)
– body coordination: 2) standing broad jump (cm), 3) 20-m dash (0.1 s)
b) assessment of the factor of functional synergy and tonus regulation:
– speed of frequency: 4) arm plate tapping (frequency)
– flexibility: 5) seated straddle stretch (cm)
c) assessment of the factor of motor unit excitation length:
– repetitive trunk strength: 6) crossed-arm sit-ups (frequency)
– static strength of the arms and shoulder girdle: 7) bent-arm hand (0.1 s).

The motor tests employed in the study are briefly described below (for more detail see Bala et al., 2007)[22]:

1) Obstacle course backwards. The child has to walk backwards on all fours and cover the distance of 10 m, climb the top of the Swedish bench and go through the frame of the bench. The task is measured in tenths of second.

2) Arm plate tapping. For fifteen seconds the child has to tap alternately two plates on the tapping board with his/her dominant hand, while holding the other hand in between the two plates. The result is the number of alternate double hits.

3) Seated straddle stretch. The child sits on the floor, leaning against the wall, in straddle position and bows forward as far as possible. A straight-angle ruler lies down in front of the child and he/she reaches the scale with cm as far as he/she can. The result is the depth of the reach measured in cm.

4) Standing broad jump. The child jumps with both feet from the reversed side of Reuter bounce board onto the carpet, which is marked in cm. The result is the length of the jump in cm.

5) 20-m dash. On command »GO« the child standing behind the start line has to run 20 m as fast as he/she can to the end of the track (20 m). The children run in pairs. The score was the time of running, measured in tenths of second.

6) Crossed-arm sit-ups. The child lies on his/her back with his/her knees bent and arms crossed on the opposite shoulder. He/she rises into seated position and returns into starting position. The instructor's assistant holds the child's feet. The result is the number of correctly executed raises to seated position (no longer than 60 seconds).

7) Bent arm hang. The child under-grips the bar and holds the pull-up as long as he/she can (with the chin above the bar). The result is the time of the hold measured in tenths of second.

The reliability of these motor tests as composite tests with 3 items was previously analyzed in a sample of 64 male and female children aged 6–7 years by calculating the reliability α-coefficient (Spearman-Brown-Kuder-Richardson-Guttman-Cronbach) under the classic summation model. Good reliability coefficients were obtained for all these motor tests, as follows: obstacle course backwards 0.96; arm plate tapping 0.90; seated straddle stretch 0.97; standing broad jump 0.88; crossed-arm sit-ups 0.92; bent arm hang 0.91; and 20-m dash 0.86.

Data analysis

The socioeconomic status indicators were analyzed according to age and sex using contingency tables. Statistically significant difference was calculated for particular categories of each variable by use of χ^2-test. As the variables were of the ordinal type, they were first normalized by Blom's formula. Then the first principal component was defined by Hottelling's procedure to obtain the general socioeconomic factor.

The significance of differences in anthropometric and motor variables in each age group relative to sex was determined by multivariate (MANOVA) followed by univariate (ANOVA) analysis of variance to define the children's belonging to the same or different population. Upon determination of statistically significant differences, all other analyses were performed in separate for either sex. Thus, the first principal component (Hottelling's procedure), i.e. the general factor was calculated from the morphological and motor variables for male and female children in separate.

The procedure used to obtain the coefficients of Pearson's linear correlation was employed to determine correlations of the general socioeconomic factor with gene-

ral morphological factor and general motor factor, according to sex and age group.

Results

Results of the analysis of differences in the family socioeconomic variables of male and female children according to age groups (contingency tables are not presented for being rather space-consuming) showed no statistically significant difference between the male and female children families according to any of the socioeconomic variables in any age group. These results challenge some previous hypotheses on different parental relations to male and female children during their growth and development in the families of the same or very similar socioeconomic status, and on different social status of the families with male and female children. The present study confirmed the results reported by Hošek-Momirović and Bala (2007)[22] and obtained on a considerably greater number of socioeconomic indicators, where there was no statistically significant difference in the socioeconomic status between the families with male and female children. This study analyzed first-order factors and then second-order factors, which pointed to the existence of a unique social status generator in the preschool children families analyzed. This generator was responsible for controlled coordination of the socialization-institutional subsystem action with the sanction subsystem of the overall social system of the study families.

As the present study yielded no statistically significant differences in the variables analyzed, only the most important characteristics of the parents and families of the study children are listed below:

1) four-year vocational school (father 37.6% and mother 26.4%); and university degree (father 21.8% and mother 30.5%)
2) parent qualifications: skilled worker (father 16.3% and mother 10.2%); secondary education technician (father 18.7% and mother 11.6%); secondary education clerk (father 19.5% and mother 23.6%); and two-year degree worker at non-production workplace (father 22.1% and mother 33.6%)
3) type of parents' residence in childhood (up to age 15): village or small place that is not a seat of district (father 20.9% and mother 18.9%); small place or town that is a seat of district (father 21.8% and mother 22.4%); town with district court (father 26.3% and mother 25.0%); and republic or regional center (father 31.1% and mother 33.6%)
4) parental social status: no sports organization membership (father 11.4% and mother 21.8%); member of one or more sports organizations but with no specific function (father 56.3% and mother 56.9%); and member of the managing board in one or more sports clubs (father 18.0% and mother 14.0%)
5) basic family economic status: up to 10 m^2 *per* family member (16.0%); 11–15 m^2 (28.5%); 16–20 m^2 (29.1%); and 21–25 m^2 (12.9%); and the parents think the total monthly household income is: below the majority of other families (11.3%); and in line with most of other families (79.1%); rather high as compared with other families (7.8%).

The general socioeconomic factor was calculated for parents to male and female children for each age group (Table 2). Each factor explained around one third (33.33%) of total variability in each space of the socioeconomic variables analyzed. As expected, the variables assessing the parental educational status and basic economic status of the family contributed most to defining the factor structure. Detailed analysis of the real number and structure of the possible socioeconomic factors and structure of the general factors was not required for the objectives of the present study.

Arithmetic mean ($\overline{X}$) and standard deviation (SD) of the motor and anthropometric variables, and the significance of differences between male and female children in the overall variable space (F and P) and in individual variables ($a \leq 0.01$ and $b \leq 0.05$) are presented in Table 3. As the male and female children of all age groups differed

TABLE 2
PARENTAL GENERAL SOCIOECONOMIC FACTOR STRUCTURE IN MALE AND FEMALE CHILDREN

Variable	4 Year		5Year		6 Year	
	Male	Female	Male	Female	Male	Female
Father's educational level	0.73	0.79	0.82	0.75	0.82	0.75
Mother's educational level	0.84	0.81	0.78	0.64	0.76	0.83
Father's qualifications	0.71	0.81	0.86	0.75	0.80	0.74
Mother's qualifications	0.68	0.79	0.73	0.70	0.75	0.81
Father's residence in childhood	0.47	0.15	0.25	0.24	0.28	0.42
Mother's residence in childhood	0.45	0.14	0.22	0.36	0.43	0.34
Father's engagement in sports organizations	0.16	0.43	0.12	0.06	0.46	0.27
Mother's engagement in sports organizations	–0.15	0.32	0.12	0.14	0.31	0.28
Apartment size	0.68	0.35	0.31	0.46	0.31	0.25
Monthly household income	0.59	0.69	0.47	0.53	0.49	0.50
% of variance	35.25	35.18	30.57	27.69	34.01	32.67

statistically significantly in the overall variable space, it was an intriguing task to identify the variables and age group that yielded highly significant differences.

The 4-year-old male children had statistically significantly higher values in the variables of chest girth and obstacle course backwards, and age-matched female children in the variables of midarm girth, seated straddle stretch and crossed-arm sit-ups.

In the manifestation of motor abilities, male children generally showed statistically better results in the motor variables (Table 3) of 20-m dash, obstacle course backwards and standing broad jump, and female children in the variables of seated straddle stretch and crossed-arm sit-ups, however, only in the youngest age group. There was no significant difference in the variables of arm plate tapping and bent-arm hang.

The structure of the general morphological factor in particular age groups of the male and female children is presented in Table 4. As the general morphological factor was more important in male children of all age groups and was explained by a greater amount of total variability, it suggested the growth and development in this period to have been more coordinated in male than in female children. The variables of body weight, chest girth,

TABLE 3
DIFFERENCES IN ANTHROPOMETRIC AND MOTOR VARIABLES BETWEEN MALE AND FEMALE CHILDREN

Variable	Sex	Age (yrs)					
		4		5		6	
		$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Body height (mm)	Male	1101.7	49.3	1171.9	57.3	1232.5[b]	56.5
	Female	1085.3	47.3	1164.7	57.8	1215.3	65.2
Body weight (0.1 kg)	Male	192.4	30.1	220.4	39.2	252.6[b]	54.9
	Female	186.9	28.9	216.3	34.2	237.2	53.7
Chest girth (mm)	Male	553.3[b]	30.2	571.6	36.3	598.5[a]	51.2
	Female	541.8	32.2	564.2	38.2	571.8	51.0
Midarm girth (mm)	Male	179.2	19.7	187.5	20.3	197.9	26.2
	Female	182.8[b]	18.5	191.5	20.8	195.5	20.3
Forearm girth (mm)	Male	174.8	13.6	181.2	13.7	189.9[b]	17.2
	Female	174.3	11.4	180.0	12.9	180.9	14.9
Abdominal skinfold (0.1 mm)	Male	68.0	37.0	69.5	40.1	77.3	55.7
	Female	74.0	35.1	82.5[b]	49.4	80.2	48.0
Subscapular skinfold (0.1 mm)	Male	60.7	19.6	61.4	25.2	69.3	39.1
	Female	67.6	19.6	75.4[a]	36.0	70.6	30.1
Triceps skinfold (0.1 mm)	Male	85.3	23.8	88.1	29.6	93.7	42.3
	Female	95.2	26.8	100.4 [a]	31.1	98.1	33.8
20-m dash (0.1 s)	Male	61.5	8.0	53.7[a]	6.3	49.4[a]	5.2
	Female	62.3	8.1	56.6	7.4	51.7	5.4
Obstacle course backwards (0.1 s)	Male	398.9[b]	146.1	310.0 [b]	100.7	261.0[a]	105.7
	Female	482.4	219.8	343.7	101.8	297.3	99.6
Arm plate tapping (freq.)	Male	12.1	2.5	15.1	3.5	17.3[b]	3.8
	Female	12.0	2.6	15.1	3.1	16.5	3.1
Seated straddle stretch (cm)	Male	33.0	7.4	35.0	6.5	36.8	7.3
	Female	36.5[a]	6.3	40.1[a]	7.0	42.5[a]	7.4
Standing broad jump (cm)	Male	85.7	18.6	107.2 [b]	18.1	119.2[a]	17.6
	Female	83.1	18.4	100.9	17.6	111.8	17.7
Bent-arm hang (0.1 s)	Male	57.9	64.5	99.0	106.8	140.8	140.5
	Female	71.9	72.3	97.5	77.6	155.2	120.7
Crossed-arm sit-ups (freq.)	Male	10.6	7.6	18.7	9.3	23.6	8.42
	Female	15.1[a]	9.0	20.4	9.0	24.7	9.3
		F=4.44 p=0.00		F=12.45 p =0.00		F=16.39 p =0.00	

[a] $p \leq 0.01$, [b] $p \leq 0.05$

forearm girth and midarm girth were found to have major influence on defining general growth and development in male children, whereas in female children it held true for all variables except for body height, however, with somewhat lower coefficients as compared with male children. At this age, body height had lowest influence on defining general morphological factor in both male and female children.

This minor sex difference in the structures could be explained by the non-adipose body mass containing less water and more protein and potassium, and having higher density in male children of this age. This in turn reflects on the muscle and bone mass, which then manifests as a sex difference. On the other hand, total body fat increases in the first few years of life, whereby female children tend continuously to have a higher percentage of body fat in total body mass as compared with male children.

The structure of each general motor factor was very similar according to age and sex of study children (Table 5). Older age groups had a slightly better structure; however, the existence of any significant sex differences was quite difficult to demonstrate. Similar results have also been reported by Bala and Katić (2009b)[23]. In preschool children, the general motor factor is mostly defined by the ability to perform coordinated and fast activities, however, with a lower proportion of the energy component. There is a lower contribution of flexibility, which in this age regularly occurs as a separate factor, and some authors ever presume that flexibility may fall within the space of motor abilities (e.g., Bala, Jakšić and Katić, 2009)[24].

Inter-correlations of the isolated general factors in male (Table 6) and female (Table 7) children revealed that there was no statistically significant correlation between the socioeconomic factor and the children's general growth and development (general morphological factor) in any age group. A significant positive correlation between the socioeconomic and motor factors was only observed at the age of six years in both male and female children. A pattern of negative correlation between the morphological and motor factors was evident throughout the three age groups, reaching statistical significance only at the age of six years in male children, whereas in female children the correlations of these two factors were

TABLE 4
GENERAL GROWTH AND DEVELOPMENT STRUCTURES IN MALE AND FEMALE CHILDREN

Variable	Age (yrs)					
	4		5		6	
	Male	Female	Male	Female	Male	Female
Body height	0.62	0.56	0.58	0.49	0.64	0.65
Body weight	0.92	0.91	0.94	0.93	0.96	0.82
Chest girth	0.89	0.86	0.92	0.94	0.94	0.76
Midarm girth	0.93	0.87	0.89	0.88	0.92	0.83
Forearm girth	0.88	0.92	0.94	0.90	0.96	0.83
Abdominal skinfold	0.83	0.84	0.88	0.88	0.91	0.90
Subscapular skinfold	0.84	0.78	0.85	0.86	0.91	0.88
Triceps skinfold	0.82	0.81	0.84	0.83	0.91	0.83
% of variance	72.44	69.12	75.30	72.80	81.70	67.19

TABLE 5
GENERAL MOTOR FACTOR STRUCTURE IN MALE AND FEMALE CHILDREN

Variable	Age (yrs)					
	4		5		6	
	Male	Female	Male	Female	Male	Female
20-m dash	–0.68	–0.74	–0.76	–0.58	–0.71	–0.73
Obstacle course backwards	–0.40	–0.56	–0.66	–0.74	–0.80	–0.68
Arm plate tapping	0.59	0.58	0.48	0.55	0.58	0.41
Seated straddle stretch	0.52	0.15	0.55	0.59	0.31	0.23
Standing broad jump	0.70	0.74	0.83	0.81	0.84	0.85
Bent-arm hang	0.48	0.52	0.49	0.53	0.41	0.45
Crossed-arm sit-ups	0.54	0.65	0.57	0.55	0.55	0.57
% of variance	32.24	35.21	40.14	40.01	39.40	35.67

TABLE 6
INTERCORRELATIONS OF GENERAL SOCIOECONOMIC, MORPHOLOGICAL AND MOTOR FACTORS IN MALE CHILDREN

Variable	Age (yrs)					
	4		5		6	
	1	2	1	2	1	2
1 Socioeconomic factor						
2 General morphological factor	0.03		0.00		0.00	
3 General motor factor	0.11	0.00	0.04	–0.14	0.19[b]	–0.25[a]

[a] $p \leq 0.01$, [b] $p \leq 0.05$

independent. Male children with average and less developed morphological factor showed better motoricity than taller and bigger male children with greater amounts of subcutaneous fat. These results are consistent with those reported by Bala, Jakšić and Katić (2009)[24].

Discussion and Conclusion

The present study was based on a hypothesis that proper analysis of social characteristics can help acquire comprehensive information on the state and inter-relations of the general growth and development and general motoricity in preschool children. The hypothesis relied on the concept according to which the biological and motor development of children can to a great extent be explained by the family social status, along with genetic factors. As the authors could not compare the parental genetic impact on the children's biological and motor development, the study was based on the well known and verified facts that the child's growth and development as well as the development of his/her motor abilities are influenced by a very complex interaction of endogenous and exogenous factors. The endogenous factors include genetic, hormone and sex factors, while parental, i.e. family socioeconomic status is one of the crucial exogenous factors.

Results of the study revealed the socioeconomic status of the study children's parents to be quite uniform across the Voivodina towns where the measurements and survey were performed. This homogeneity reduced the variability in almost all socioeconomic variables, which had a substantial role in obtaining statistically null correlations with the general morphological and motor factors. The authors carried out a series of tests by factor analysis and canonic correlation analysis of the socioeconomic, anthropometric and motor variables of study children according to sex and age groups and in the study sample as a whole (these results are not presented), which yielded results identical to those presented. All these results indicated the study children's biological and motor development to be independent of their parents' socioeconomic status. These findings could be extrapolated to the entire Voivodina region.

In conclusion, differences in the biological growth and development and in motor development of preschool children should be ascribed to inheritance rather than socioeconomic and environmental factors. Inheritance is defined by a predetermined level, and environmental factors can help or hinder achieving this level. The authors believe that these differences among children, as well as the correlations analyzed and probably the related impact occur at an older age because the socioeconomic factors exert their influence longer than the manifestation of genetic factors.

Future studies should preferably also include older children and more socioeconomic status indicators, along with some additional indicators. It appears to be necessary because, besides the conditions analyzed in the present study, the parental and family socioeconomic status implies an array of conditions that may significantly influence the children's living conditions. These conditions primarily refer to living comfort and hygiene, dietary

TABLE 7
INTERCORRELATIONS OF GENERAL SOCIOECONOMIC, MORPHOLOGICAL AND MOTOR FACTORS IN FEMALE CHILDREN

Variable	Age (yrs)					
	4		5		6	
	1	2	1	2	1	2
1 Socioeconomic factor						
2 General morphological factor	–0.13		–0.21		0.11	
3 General motor factor	0.20	–0.14	0.18	–0.12	0.28[a]	–0.11

[a] $p \leq 0.01$

habits, presence of illnesses, physical and other activities, etc.

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POVEZANOST INDIKATORA SOCIO-EKONOMSKOG STATUSA RODITELJA I MORFOLOŠKIH I MOTORIČKIH DIMENZIJA PREDŠKOLSKE DJECE

SAŽETAK

Na uzorku od 643 predškolske djece u dobi od 4 do 6 godina iz predškolskih ustanova nekoliko gradova u Vojvodini (Srbija) i njihovih roditelja primijenjeni su mjerni instrumenti za procjenu socio-ekonomskog statusa roditelja, antropometrijskih karakteristika i motoričkih sposobnosti. Analizirala se povezanost indikatora socio-ekonomskog statusa roditelja i morfoloških i motoričkih dimenzija predškolske djece. Rezultati istraživanja su pokazali da je socio-ekonomski status obitelji djece relativno homogen, te nije bilo statistički značajnih razlika ni u jednom indikatoru tog statusa između obitelji koje su imale dječake u odnosu na obitelji koje su imale djevojčice. Dječaci i djevojčice su se značajno kvantitativno razlikovali u cjelokupnom prostoru antropometrijskih i motoričkih varijabla, ali u manjoj mjeri u pojedinačnim varijablama. Generalni morfološki faktor, koji se tretirao kao rast i razvoj djece, te generalni motorički faktor bili su kvalitativno slični. Korelacije socio-ekonomskog faktora i generalnih morfoloških i motoričkih faktora djece nisu bile statistički značajne, osim s motoričkim faktorom dječaka u šestoj godini, odnosno pred polazak u školu. Autori zaključuju da razlike između djece predškolskog uzrasta analiziranog područja (Vojvodina, Srbija) u biološkom rastu i razvoju i motoričkom razvoju treba više pripisati nasljeđu nego socio-ekonomskih faktorima, odnosno okolini u kojoj djeca žive. Autori smatraju da bi se realniji rezultati mogli dobiti ako bi se u budućim istraživanjima obuhvatila i starija djeca, te da se uključi više indikatora socio-ekonomskog statusa, uz još neke dodatne indikatore.