

Social status of the family as a determinant of the development of lateralization, gross and fine motor skills in pre-school children

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Abstract—The paper first examined the complexity of the social status of the family and estimated the status of lateralization, gross and fine motor skills in children entering the first grade of the Elementary School, and then established the relationship between indicators of lateralization, gross and fine motor skills of children on the one hand and social status families on the other. The aim of the research is to determine whether and how the social status of the family affects the development of lateralization, gross and fine motor skills in preschoolers. In other words, this study should have found out whether the educational level of parents is the determinant of the development of lateral, gross and fine motor skills in children. The results obtained on a sample of 141 children confirm the assumption that the educational level of the parents affects some indicators of gross motor skills of children. The variance analysis showed that the differences between groups comparing the educational level of the mother and father and the parameters of the explosive power of the lower extremities are not random but significant. F-test values for long jump from $F=4.824$ with 2 degrees of freedom between groups and 139 degrees of freedom within groups and $p=.009$; and $F=3.384$ with 2 degrees of freedom between groups and 139 degrees of freedom within groups and $p=.003$, tell us of a difference that is statistically significant. In addition to this difference, it is established the difference within the group. From the presented results, their analyzes and discussions, the basic conclusion of the research is that some motor skills of children are determined by the social status of the family. It was found that the educational level of the mother and father was associated with the power of lower extremities. When it comes to fine motorism and lateralization, the obtained results do not give the right to claim that there is a connection between them and the educational level of the father and mother, although such a tendency can be noted by examining the results. However, it is not statistically confirmed.

Keywords— lateralization, gross and fine motor skills , preschool children.

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I. INTRODUCTION

THE family as a community of parents and children, is an essential factor in all development stages of the child.

The multiple connection of family members, and especially strong emotional relationships, enable a strong influence of parents on the development of the child, especially in the pre-school period. Examination of family variables and their impact on certain phases of development and personality of the child is justified for the reasons stated. Numerous thinkers and scientists in the field of philosophy, sociology, psychology, ethnology, pedagogy and other sciences deal with their discussions and research of the family and its role in child development. Based on the review of published works B. Stanojlovic [14] points out that the most explored is the area of socio-economic status of the family (material conditions, educational level of parents, employment of parents, housing conditions). The influence of the socio-economic status of the family on the development of the child is more intensively investigated in the world since the fifties of the last century, and somewhat later in our country. Many experts who deal with this issue in the developed countries of Western Europe and the US agree with the assertion that socio-economic status does not affect the same at all stages of child development. It was found that socio-economic status much less affects the development of a child in the prenatal age, and in the first six months of life. Later this role is rapidly growing up to six years [1].

The socioeconomic status of a parent can play a significant role in the development of different abilities in children, however, the majority of authors deal with its influence on the development of intelligence. Thus research [1] examine the interaction between the child's IQ in pre-school, prenatal status and socio-economic status of the child's family. Previous analyzes have found that socioeconomic status does not cause significant differences in children's intellectual development if there were no particular complications during childbirth. They found that the most crucial for the child is if there were any complications at birth and whether the child comes from a non stimulating background. By measuring a larger number of four-year-olds, they found poorer results for children of lower socioeconomic status. The fact is that a high socioeconomic status considerably more than lower can compete with certain innate defects [1]. Also, the author Toličić, investigated the role of somatic, psychological and social factors on the child's

success at school. In this work he showed that the psychological criteria (results on the tests of intellectual abilities) are significantly more related to the child's school success than the standard parameters used by pediatricians in assessing the somatic development of a child. For social criteria, he took a number of variables (number of children in the family, income per family member, housing conditions) and found that they significantly correlate with the child's success in school as well as with the results on the tests of intelligence. The research provides an important conclusion that it does not matter how much time parents spend together with the child, it is more important how they spend time with him, what are their ambitions, what emotional conditions are in the family, and what kind of educational methods they use [1]. Similarly is concluded in research [2], and in his work [3], concludes that the socioeconomic status of the family affects the success of children in school, but not on intelligence. On the other hand, there are indications that there is a certain correlation between the socioeconomic status of parents and the motor skills of children. In the study [4], the correlation between the socioeconomic status of parents and the level of physical activity of children was examined. Statistical analysis showed that there is a significant correlation between these two variables and only in boys. Also, the study [5] gives similar results, where the influence of the level of parenting on the healthy habits and physical activity of children is highlighted. Similar findings come from authors [6], [7]. In families where parents were educated, children more often exercised physical activity and had a healthier diet. Considering that children who are more likely to exercise physical activity have better results on motor tests [8], [9], we can conclude that there is a certain link between the level of parenting and motor skills of children. Thus, the study [10] shows that there are some differences in the performance of tests for the assessment of large and fine motorism in socioeconomic status, where children coming from better-rated socioeconomic environments showed better results than children from the weaker ones. In support of this, the authors in their research [11] conclude that children living in families with lower socioeconomic conditions have unhealthy habits, are less active and motoring unsuccessful than children of socially-developed families. With increasing standards of living, morphofunctional characteristics improves (accelerated development) [12], [13], [14]. On the other hand, in the research [15] there is a significant correlation between the level of mother's education and the motor performance of the child, while in the case of fathers this was not the case. Some research claim that occurrence of the acceleration in morphological somatic view may result in a reduced level of motor skills [16], [17], [18]. Authors find that the significant correlation between certain morphological and motor indicators in both sexes, but with negative influence, which indicates a disproportion between the level of physical development and the level of motor skills in certain periods of monitoring. He also noted that respondents of younger school age who had high results in the basic indicators of physical development had poorer results on motor tests, which confirms that the acceleration of growth is not sufficient in

quality if it is not accompanied by the appropriate motor, psychological and social development level.

The research so far have supported the fact that there is a significant correlation between the socioeconomic status of parents and the motor skills of children, but it can also be assumed that there is a trend for the results to vary in relation to the climate and the region where this research is carried out. The problem of this research is the relationship between indicators of social status of the family and indicators of physical development of children (motor skills and lateralization). The research was supposed to answer the question of the extent to which the social status of the family reflects on the development of gross, fine motor skills and lateralization of children entering school.

The aim of the research was to collect scientific data on the basis of which it is possible to determine how much the educational level of parents as a factor of development influences the development of lateralization, gross and fine motor skills for children entering the first grade of Elementary School. According to research problems and goals tasks were set : to collect data on the social status of the family which is supposed to affect the physical development of the child; collect data by measuring motor skills, indicators of speed, vigor, arm strength, foot power and general power; collect data by testing lateralization and fine motor skills. Collected data lead to mutual relations by statistical procedures. The study of motor skills, fine motorism and lateralization was supposed to enable the determination of their state, degree of interconnection and comparison of the results obtained with the findings of other researchers who had discussed the phenomena previously in some other tasks and in other populations.

Based on the defined subject of this work, taking into account the need and significance of the research, a general hypothesis has been set: it is assumed that the social status of the family is an important component of the development of lateralization, gross and fine motor skills of children entering the first grade of Elementary School.

II. RESEARCH DESIGN

From kinesiology research techniques in the work were applied:

- motor status estimation techniques - a battery of motor tests for the age of 5 to 7 years was used according to the description and instructions from methodology S. Ivanic [16].
- fine motor skills estimation techniques - fine motor skills tests: Marginal ornament and Special test;
- lateralization estimation techniques - lateralization test.

At the stage of collecting data on the educational level of parents as a factor of physical development of children, a questionnaire was used.

The sample for this research is preschool children. The research included four preschool groups of children from two preschool institutions. Due to the possible dropout of respondents, a larger sample of 141 children was formed. The study included healthy children without body anomalies, chronological age with a variation range of 1; 0; 27 days.

The basic characteristics of the sample of parents that were analyzed and the variables to which they were classified were the education of parents (father and mother).

Table 1. Structure of the parents sample

<i>Educational background (mother)</i>	No.	%	<i>Educational background (father)</i>	No.	%
Completed Primary school	8	5.7	Completed Primary school	8	5.7
Completed Secondary school	100	70.9	Completed Secondary School	98	69.5
Completed College	33	23.4	Completed College	32	22.7
Total	141	100	Total	138	100

III. INTERPRETING THE RESULTS

Table 2. Descriptive statistical indicators for lateralization

<i>Lateralization</i>	<i>Number of respondents</i>	<i>Percentage (%)</i>
No	16	11.3
Personal	42	30.50
Personal and spacious	82	58.2
Total	141	100

The table shows that 141 children were tested with lateral testing. Out of that, sixteen children or 11.3% do not have lateralization, that is they are not either personally or spatially lateralized. Forty two children, or 30,50% have personal lateralization, while eighty-two children or 58,2% of the total number of children studied have personal and spatial lateralization.

Table 3. Descriptive statistical indicators for marginal ornament

<i>Marginal ornament</i>	<i>No of resp.</i>	<i>M</i>	<i>δ</i>	<i>SK</i>	<i>KU</i>	<i>Min. value</i>	<i>Max. value</i>
	141	2,30	0,57	- 1,28	1,622	0,20	3,00

Table 3 shows that 141 children were tested by Marginal ornament. Range of results in points is from 0.20 to 3 points. The arithmetic mean is 2.30 points, the standard deviation is 0.57 points. The results of the skewness $SK = -1.28$ and kurtosis $KU = 1.622$ show that the distribution of frequencies relative to the normal curve is negatively asymmetrical and leptokurtic.

The range of results for the Special test, expressed in points is from 0 to 12. The arithmetic mean is 5.92 points, the standard deviation is 2.71 points. Measures of deviation from

the normal distribution of skewness $SK = -0.11$ and kurtosis $KU = -0.425$ indicate the deviation of the obtained values on the histogram, and we conclude that our distribution is positively asymmetric and platykurtic to the normal curve. Five tests were used to evaluate individual segments of motor skills.

Table 5. Descriptive statistical indicators for motor skills

<i>Motor skills</i>	<i>No of resp.</i>	<i>M</i>	<i>δ</i>	<i>SK</i>	<i>KU</i>	<i>Min. value</i>	<i>Max. value</i>
<i>Hang in pull-ups max.120se</i>	141	16,90	13,67	1,586	2,260	0,10	61,00
<i>Standing long jump</i>	141	109,93	17,04	-0,210	0,130	60,00	157,00
<i>Throwing medicine ball of 1kg</i>	141	199,92	49,97	1,032	2,622	90,00	400,00
<i>Seated forward bend on the bench</i>	140	21,08	5,90	0,078	0,099	6,00	39,00
<i>Running at 30m from the flying start</i>	141	7,51	1,03	0,902	1,814	5,60	11,10

Evaluation of the development level of the motor status of children was carried out using five motor tests by which we evaluated the elementary motor skills, strength of the upper and lower limbs, overall strength, flexibility and speed. Analyzing the obtained statistical indicators of each separated motor characteristics, we can conclude that there are noticeable differences in individual average values (Table 5).

The measured strength of the upper extremities (arm and shoulder band) gives us the right to conclude that the results achieved in this task are quite weak. The strength of the lower extremities was well developed in the children studied, as indicated by the values of the obtained and analyzed statistical indicators. General strength as an essential physical property is well developed in the examined children. The obtained average values of vigor, flexibility give us the right to conclude that it is well expressed and developed in the majority of children. With the motor task-running at 30 m from the flying start, we carried out an assesment of the speed of the examined children and, based on the analyzed statistical data, found that the speed as an essential physical characteristics is at the level of average for the oldest age.

The obtained results of the research in terms of the level of education of parents and the influence of this variable within the family's social status on the development of gross and fine motority and lateralization are shown in the table, separately for the mother and for the father.

Table 6. Educational level of mother and parameters of lateralization

<i>Lateralization</i>			χ^2 -test	<i>Deg. of freedom</i>	<i>Sig. of differ.</i>
no	personal	spacious			
0	4	4			
13	31	56	3.308	4	0.508
3	8	22			

Table 7. Educational level of father and parameters of lateralization

<i>Lateralization</i>			χ^2 -test	<i>Deg. of freedom</i>	<i>Sig. of differ.</i>
no	personal	spacious			
0	4	4			
13	31	54	4192	4	0.381
2	8	22			

The significance of difference between mother's and father's educational background and the lateralization indicators were tested with a χ^2 -test.

The obtained values of the χ^2 -test (tables 45 and 46), $\chi^2=3308$ и $\chi^2=4192$ are not statistically significant, and it can be concluded that the educational level of parents as individual variables within the social status of the family does not affect the parameters of lateralization of children starting the first grade of elementary school.

Table 8. Educational level of mother and parameters of fine motor skills

<i>Parameters of fine motor skills</i>	<i>Edu. level of mother</i>	<i>No. of resp.</i>	<i>M</i>	δ	<i>F-test</i>	<i>Deg. of freedom</i>	<i>Sig. of differ.</i>
Marginal ornament	Basic	8	2.32	0.56			
	Secondary	100	2.29	0.58	0.027	2	0.974
	Tertiary	33	2.27	0.53			
Special test	Basic	8	6.37	2.26			
	Secondary	100	5.99	2.72	0.363	2	0.696
	Tertiary	33	5.60	2.81			

Table 9. Educational level of father and parameters of fine motor skills

<i>Parameters of fine motor skills</i>	<i>Edu. level of mother</i>	<i>No. of resp.</i>	<i>M</i>	δ	<i>F-test</i>	<i>Deg. of freedom</i>	<i>Sig. of differ.</i>
Marginal	Basic	8	2.05	0.53	0.814		0.445

ornament	Secondary	98	2.31	0.60			2
	Tertiary	32	2.32	0.46			
	Basic	8	6.75	2.12			
Special test	Secondary	98	5.80	2.69	0.715	2	0.491
	Tertiary	32	6.28	2.92			

The obtained results show that the educational level of parents as individual variables within the social status of the family is not significantly related to the parameters of fine motor skills of children who should start the first grade of primary school. The variance analysis showed that the differences between the groups and within the groups are random and are not statistically significant.

Table 10. Educational level of mother and parameters of gross motor skills

<i>Parameters of motor skills</i>	<i>Edu level of mother</i>	<i>No. of res.</i>	<i>M</i>	δ	<i>F-test</i>	<i>Degree of freedom</i>	<i>Sig of differ</i>
Hang in pull-ups	Basic	8	10.47	6.45			
	Secondary	100	18.10	14.25	1679	2	0.190
	Tertiary	33	14.78	12.69			
Standing long jump	Basic	8	93.12	9.74			
	Secondary	100	111.75	17.13	4824	2	0.009
	Tertiary	33	108.51	16.08			
Throwing medicine ball	Basic	8	167.5	48.91			
	Secondary	100	200.25	46.66	2029	2	0.135
	Tertiary	33	206.81	57.91			
Seated forward bend on the bench	Basic	8	22.37	5.97			
	Secondary	100	20.82	6.07	0.381	2	0.684
	Tertiary	33	21.54	5.47			
Running at 30m	Basic	8	7.66	0.92			
	Secondary	100	7.43	1.08	1003	2	0.370
	Tertiary	33	7.41	0.87			

Table 11. Educational level of father and parameters of gross motor skills

Parameters of motor skills	Edu level of father	No. of res.	M	δ	F-test	Degree of freedom	Sig of differ
Hang in pull-ups	Basic	8	16.02	13.7	1.34	5 3 2	0.264
	Secondary	98	16.20	12.6		9	
	Tertiary	32	20.55	16.5		1	
Standing long jump	Basic	8	106.8	13.0	3.38	7 1 4 2	0.037
	Secondary	98	107.8	16.6		1 3	
	Tertiary	32	116.5	18.4		9 0	
Throwing medicine ball	Basic	8	200.1	61.6	0.07	2 7 2 2	0.931
	Secondary	98	198.9	47.2		2 3	
	Tertiary	32	202.3	57.2		4 2	
Seated forward bend on the bench	Basic	8	19.50	6.88	0.30		0.739
	Secondary	98	20.93	6.09		3 2	
	Tertiary	32	21.20	5.37			
Running at 30m	Basic	8	7.23	0.58	0.35		0.704
	Secondary	98	7.46	1.04		2 2	
	Tertiary	32	7.56	0.89			

Table 13.

Parameter	Educational level of mother	The differ. of arithm. means	Significance
Standing long jump	1-2	-0.941	0.98
	1-3	-9.718 *	0.020
	2-3	-8.77 *	0.029

The table shows that the differences within the group is the highest in the second and third groups, and statistically significant, so it can be concluded that the educational level of mother and father in some way is connected to the development of explosive power of the lower extremities as a parameter of motor skills. The data show that the average values of the tested parameters of motor skills of children entering the first grade of primary school are higher, if their parents are more educated.

IV. CONCLUSION

When it comes to the educational level of the family as a factor in the development of motor skills (gross and fine motor skills) and lateralization, the problem that occurred is the fact that the educational level of parents as an indicator of social status considering general poverty in our country is less reliable than in other countries where social status depends more on the level of education. However, it can be assumed that the education of parents determines, to a certain extent, their behavior towards children, that is, the success of exercising the parental role in terms of contributing to the child's growth and development. The results of the study show that the educational level of mother and father is related to the development of some motor skills in children. It was found that the strength of lower extremities was determined by the educational level of mother and father. The difference is significant at the level of 0.009 for the task of standing long jump. It is interesting to note that this difference between the first and the second group is at the level of 0.006, and between the first and the third at the level of 0.04 in favor of mothers with high and higher education. The influence of the educational level of father, as a result of the same task, indicates a significant difference at the level of 0.05 in favor of high and higher education. Based on the data, it can be concluded that the average values of some of the tested parameters of motor skills in children entering the first grade of primary school are better if their parents are of higher educational level. By speculating on the above results, it is only possible to assume that the educational level of mother is more connected with the indicators of the physical development of children, because in our culture, mothers deal with children more, in particular with their diet, care, hygiene, health and other categories, which undoubtedly have a reflection on physical growth and development, that found its statistical confirmation, when providing indicators of this growth and development with the educational level of mother. There is logic in the assumption that more educated mothers better meet the children's needs, which should be checked

The results of the research (Tables 10 and 11) show that the educational levels of mother and father are more or less related to the development of some motor skills of children before entering Primary school. Analysis of variance showed that the differences between groups of educational levels of mother and father and parameters of explosive power of the lower extremities are not random but significant. F-test values for long jump from $F = 4824$ with 2 degrees of freedom between groups and 139 degrees of freedom within groups and $p = 0.009$; and $F = 3384$ with 2 degrees of freedom between groups and 139 degrees of freedom within groups and $p = 0.003$, speak of the difference that is statistically significant.

In addition to this difference, it is determined the difference within the group shown in Tables 13 and 14.

Table 12.

Parameter	Educational level of mother	The differ. of arithm. means	Significance
Standing long jump	1-2	-18.62 *	0.006
	1-3	-15.39 **	0.04
	2-3	3.23	0.59

by special research. The educational level of mother, as indicated by the results and conclusions of the research [19], [20] has an impact on students' success, primarily because of the greater assistance she provides to children in learning. Relying on the research of the mentioned authors our research has also shown that the educational level of mother has a greater influence from the educational level of father on the development of motor skills. It is natural to expect that mothers with more time, support, and motivation, provide specific and immediate help to children, and have the influence on both physical and on the overall development. Of course, help is better if the educational level of mother is higher and can be directly related to the development of children in general.

Analyzing the results of the research on the influence of the educational level of parents (mother and father) on the indicators of fine motor skills and lateralization, we did not determine the statistical significance of their connection. The analysis of the results shows that, as the parents are more educated, their children have better average values of the parameters tested, with no significant statistical correlation. Considering the influence of the educational level of parents as individual variables within the social status of the family on the components of physical maturity and the readiness of children to go to school, we can conclude that the hypothesis is partially confirmed. It was found that considering the motor skills, the strength of the lower extremities was determined by the educational level of father and mother. Connection is statistically significant. There was no statistically significant connection between the educational level of parents and indicator of fine motor skills and lateralization.

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