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DIFFERENCES IN MOTOR ABILITIES OF CHILDREN IN RELATION TO GENDER AND AGE

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Abstract

Six motor tests were applied on a sample of 48 children (33 boys and 15 girls) 5 and 6 years of age (± 6 months), who attended sports school twice a week, in duration of one hour. The primary objective of this study was to determine differences in motor skills of preschool children. Results of multivariate multi-factor analysis of variance (MANOVA) show no statistically significant differences in the overall system of analyzed motor variables in relation to gender and age regarding the studied sample of children. Analysis of individual motor skills, using the procedure of univariate multi-factor analysis of variance (ANOVA), revealed no statistically significant differences in relation to gender and age factors. With respect to the age factor, a statistically significant difference was obtained for variables: 20 meters dash, obstacle course backwards and standing broad jump, in favor of the 6-year old children. With respect to the gender factor, a statistically significant difference existed only for the variable seated straddle stretch in favor of girls.

Keywords: preschool age/motor abilities/differences.

Introduction

Motor skills in young children are of general type (Bala, 1981; Nicin, Kalajdzic, & Bala, 1996). They can be affected in the preschool period, i.e. in the period of 4 to 7 years of age (Bala, Kis & Popovic, 1996; Lubans et al., 2010). Also, formation of motor habits can be affected in the preschool period, which depends on morphological characteristics that form the basis for later active engagement in sports, sports recreation, or simply for creating adequate capacity for various activities in old age (Bala, 2004). In addition to the morphological characteristics, motor skills and motor habits are also affected by both genetic and external factors. They primarily affect the overall growth and development of children (Bala, Kis, & Popovic, 1996).

Based on the studies of preschool age, of 4 to 7 years of age, it can be concluded that there are no statistical significant differences between boys and girls regarding motor skills (Stankovic, 1976; Pesic, 1984; Nicin, et al., 1996). However, some foreign authors (Keogh, 1965; Van

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Slooten, 1973, Frederick, 1977, according to Gallahue & Ozmun, 1998), authors from Slovenia (Reitmeier & Proje, 1990; Videmsek & Cemic, 1991; Planinsec, 1995; Reitmeier, 1997, according to: Cvetkovic, Popovic & Jaksic, 2007) as well as authors from the region (Peric, 1989 & 1991; Pejcic, 2001; Katic, Babin, Rausavljevic & Blazevic 1996; Kulic 2005; Bala, 2002, Bala, Popovic & Sabo, 2006) obtained the opposite results. The studies that have been conducted have indicated the superiority of boys in terms of motor skills. Boys were generally better in the manifestation of co-ordination, strength and speed, while girls were better in flexibility. Physical activities are associated with the level of motor skills in boys. Greater emphasis should be put on significance of engagement in physical activity in order to improve motor skills in preschool age (Temple, Crane, Brown, Williams, & Bell, 2014). Testing of motor skills is an important element of monitoring the motor development of children who are just starting or planning to engage in sports. Development of motor skills plays a major role in the overall development of the young organism.

The aim of the study was to determine statistically significant differences in motor skills of preschool children, depending on their gender and age.

Method

The sample of respondents consisted of 48 children (33 boys and 15 girls) members of Sports School "Kinesis" in Novi Sad, of 5 and 6 years of age (± 6 months). Children attended this school twice a week in duration of an hour. The following motor tests were applied: for evaluation of the running speed – 20 meters dash; for evaluation of body coordination – Obstacle course backwards; for evaluation of flexibility – Seated straddle stretch; for evaluation of explosive power – Standing broad jump; for evaluation of static power – Bent-arm hang; for evaluation of repetitive power – trunk lifting for 60 seconds (Bala, Stojanovic & Stojanovic, 2007).

For each motor variable and for each age group and gender, arithmetic mean (A) and standard deviation (S) were calculated, regarding the basic central and dispersion statistics. Method of multivariate multi-factor analysis of variance (MANOVA) was performed in order to test statistically significant differences of an overall system of motor variables between boys and girls of various ages. After that, a univariate multi-factor analysis of variance (ANOVA) was performed in order to determine differences for each individual motor variable.

Results

Multivariate multi-factor analysis of variance (MANOVA) revealed no statistically significant differences in the overall system of motor variables analyzed, regarding the gender and age of the children from the studied sample ($p = 0.73$) (Table 1).

Univariate multi-factor analysis of variance (ANOVA) revealed statistically significant differences between children regarding the manifestation of motor skills. When we take into account only the age factor it may be noted that there is a statistically significant difference for the variables: 20 meters dash, obstacle course backwards and standing broad jump (older age group, both in boys and girls, achieved better results for all three variables). However, if we observe the arithmetic means (AS) it can be noticed that older boys achieved better results than the younger in all variables except Seated straddle stretch, while older girls were better than younger also in all variables except in Bent-arm hang. Analysis of the gender factor, revealed statistically significant difference only for the variable of seated straddle stretch (girls were more successful in both age groups than boys) while other variables showed no statistical significance.

Depending on the factors of gender and age, it can be concluded that there were no statistically significant differences between boys and girls of various age regarding any of the variables.

Table 1 Descriptive statistics and results of the analysis of differences between boys and girls

		5 years		6 years		Factor					
						Gender		Age		Gender-age	
Variable	Gender	AM	D	AM	D	f	p	f	p	f	p
20 meters dash (0.1 sec)	Boys	53.77	4.36	50.95	4.15	0.28	0.60	5.74	**0.02**	0.13	0.72
	Girls	55.00	3.46	51.20	4.52						
Obstacle course backwards (0,1 sec)	Boys	234.00	48.14	200.25	59.14	0.10	0.76	6.99	**0.01**	0.50	0.48
	Girls	251.80	58.03	193.30	44.41						
Seated straddle stretch (cm)	Boys	35.08	6.71	35.50	6.06	4.01	**0.05**	0.78	0.38	0.46	0.50
	Girls	37.80	6.76	41.00	5.96						
Standing broad jump (cm)	Boys	114.62	12.27	122.15	12.23	0.48	0.49	9.96	**0.00**	2.20	0.15
	Girls	104.80	9.56	125.70	19.26						
Bent-arm hang (0,1 sec)	Boys	135.92	88.34	145.85	109.02	2.18	0.15	0.11	0.97	0.10	0.76
	Girls	200.60	119.6	188.00	134.09						
Trunk lifting (freq.)	Boys	18.15	8.92	22.30	7.31	0.83	0.37	2.22	0.14	0.16	0.94
	Girls	20.60	4,39	25.20	12.93						

Factor	F	P
Gender	1.33	0.27
Age	2.16	0.06
Gender-age	0.60	0.73

F = F-test for univariate analysis of variance; p = significance level for univariate analysis of variance; F = multivariate analysis of variance; P = level of significance in the multivariate analysis of variance

Discussion

By looking at the statistical significance of differences between the genders, it can be seen that girls achieved better results for the variable Seated straddle stretch which is confirmed by previous studies (Van Slooten, 1973, Frederick, 1977, according to Gallahue & Ozmun, 1998; Peric, 1991; Gallahue & Ozmun , 1998; Kulic 2005; Bala, et al., 2006; Jankovic, 2014). Girls more often practice playing that requires less dynamic, more precise movements, higher concentration of attention, greater amplitude of motion (flexibility). It is also considered that the female population is more flexible than male from the age of five until adulthood (Haubenstriker, Zefelt, & Branta, 1997 by: Haibach, Greg, & Collier, 2011). Lower manifestation of flexibility in boys may be explained by the activities they engage in: jumping, crawling, climbing, hanging, lifting, carrying, running and the like. Practicing these activities contributed to the greater development of motor skills such as coordination, strength and speed, and reducing flexibility. Differences in motor abilities of children with regard to gender obtained in this study were

expected, due to the specificities of activities the children are interested in and involved in during the pre-school age, as well as gender differences.

Bala, et al. (2006) suggest that differences in motor skills between boys and girls of preschool age occur because of the "motor potential capacity", as well as other factors that help this capacity to develop and manifest, as shown on this sample of children. In addition, the differences between boys and girls in motor space can be explained by the higher trend of growth and development of boys compared to girls, and reduced elasticity of muscles in boys (Cvetkovic, et al., 2007).

Differences in motor abilities in relation to age, within this sample of children, are confirmed by research results (Temple et al., 2014). The authors believe that the duration of physical activity is responsible for the successful mastering of motor habits in older children, which is a result of faster flow of pulses from cortex to the muscle effectors. It is known that each performance of exercise at this age can have a positive impact on motor skills, and it has come true in this sample of children, because older children have exercised longer in the Sports School.

Teachers and coaches working with children of this age, are recommended to form homogeneous groups according to criteria based on the abilities of children, because there is no statistically significant difference in relation to gender and age of pre-school children. Therefore, it is necessary for experts to, instead of assessment of "standardized", monitor and assess progress in terms of development. Thus, the impact on the motor skills of preschool children through planning and systematic work is of great importance for the further development of their motor skills. The differences obtained are valid only for the tested sample, and it is not possible to generalize the data. For more detailed follow-up it is necessary to conduct a longitudinal study with a much larger sample of children.

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