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GENDER DIFFERENCES IN FUNDAMENTAL MOTOR SKILLS OF PRESCHOOL CHILDREN FROM BOSNIA AND HERZEGOVINA AND GERMANY

SPOLNE RAZLIKE U FUNDAMENTALNIM MOTORIČKIM SPOSOBNOSTIMA DJECE PREDŠKOLSKOG UZRASTA IZ BOSNE I HERCEGOVINE I NJEMAČKE

Kenan Kendić[1], Edina Šarić[2], Dževad Džananović[3]

[1]Kindergarten"Mainkrokodile GmbH, „Frankfurt", Frankfurt, Germany

[2]Faculty of Education and Rehabilitation, University of Tuzla, Bosnia and Herzegovina

[3]Faculty of Medicine, University of Tuzla, Bosnia and Herzegovina

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ABSTRACT

Aim of this research was to assess differences between genders in relation to fundamental motor abilities of children from Bosnia and Herzegovina and Germany. Sample of respondents was comprised of 79 children, 39 from Bosnia and Herzegovina and 40 from Germany. The Test of Gross Motor Development (TGMD-3) was used in order to evaluate set goal of this research. Univariate analysis of variance was applied for the purpose of checking the research objectives. Research results have shown that girls from Bosnia and Herzegovina have achieved better results on locomotion subtest than the boys from Germany and have achieved better results on ball control test in comparison to the girls from Germany.

Key words: fundamental motoric abilities, gender differences, locomotion, ball control.

ABSTRACT

Cilj istraživanja je bio procjeniti spolne razlike fundamentalnih motoričkih sposobnosti djece iz Bosne i Hercegovine i Njemačke. Istraživanjem je obuhvaćen uzorak od 79 ispitanika od čega je bilo 39 ispitanika iz Bosne i Hercegovine i 40 iz Njemačke. U svrhu provjere postavljenog cilja istraživanja primijenjen je Test za procjenu grubih motoričkih sposobnosti (TGMD-3). U svrhu provjere postavljenih ciljeva istraživanja primijenjena je Univarijatna analiza varijanse. Rezultati istraživanja su pokazali da zaključiti da djevojčice iz Bosne i Hercegovine ostvaruju bolje rezultate na subtestu lokomocija u odnosu na dječake iz Njemačke, te ostvaruju bolje rezultate na kontrola loptom u odnosu na djevojčice iz Njemačke.

Ključne riječi: Fundamentalne motoričke sposobnosti, spolne razlike, lokomocija, kontrola loptom.

[1] **Correspondence to:**
Kenan Kendić, Kindergarten"Mainkrokodile GmbH, „Frankfurt", Frankfurt, Germany
E-mail: keNoo49M@hotmail.com

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INTRODUCTION

It is common knowledge that motor development of a newborn until adulthood depends on the development of central nervous system. Development flow is determined by the genetic patterns of development and stimulation and environmental stimulation. Brain responds with complex automatic reactions to all stimulations that are received by receptor organs. Depending on the age of the child, reactions will return, but they appear in a certain order from birth. They are characterized by the development of postural reflex mechanisms that enable countering gravity and maintaining balance.

Motorics, as a term, include all forms of movement, i.e. dynamic stereotypes that a human being uses in order to master space and it includes phylogenetic and ontogenetic forms of movement (Findak, 1995). According to Neljak (2009), all children will start crawling, walking and running without instructions on their own.

Therefore, phylogenetically determined movement do not have first phase of adoption as they are not learned from the level zero.

Motor development occurs in cephalo-caudal and proximal-distal directions. The cephalo-caudal direction indicates that the child first controls the movements of the head, then the body, and only then the lower limbs, while the proximal-distal direction indicates that the child can first control the parts of the body closer and only then further away from the spine (Neljak, 2009). Early motor activities are a foundation for development basic movements and natural forms of movement that occur between ages of 2 and 7. Basic movements are the foundation for motor skills and occur in all children. Likewise, basic movements are the foundation for sport skills. Basic skills are developed in three phases: in starting phase base

Basic skills are developed through three phases: in the initial phase, rough coordination and the basic flow of movement are achieved - the child tries to perform a set of movements, but lacks the preparatory and final components; in the basic or transitional phase, fine coordination and differentiation of movements are achieved - the child has more control over the necessary movements, but they do not yet form a connected whole; and it is only in the mature phase that stabilization is achieved, all the component parts of the movements become well integrated into a harmonious and determined action i.e. a skill.

What determines characteristics of child's movements, such as nimble, fast and precise, are motor abilities (Starc et al., 2004). The research has shown that third period of motor development is the most delicate and it includes fundamental motor abilities that encompass preschool period and early school age of a child (Sabo 2002; Cvetković, Popović and Jakšić, 2007 cited in Mehmedinović et al., 2022). Fundamental motor skills are basic goal-directed movement patterns that are an integral part of advanced movement skills (Clark & Metcalfe 2022).

According to Findak and Prskalo (2004), motor skills are defined as latent motor structures that are responsible for a practically infinite number of manifest reactions and can be measured and described. According to Petz (1992), they are a foundation for development and perfecting certain types of movement and motoric skills. At birth all abilities are just potentials that are yet to be developed. Motor abilities, as other abilities, are determined by inherited factors, but their development depends on the conditions child is growing in.

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In other words, child that is limited in its movement will not develop into a good runner, even if it has an inborn potential (Starc et al., 2004).
Basic motor skills that can be developed in preschool age are: coordination, balance, general precision, general strength, general endurance, flexibility and speed of reaction to sound and visual stimuli. Coordination, in its various manifestations, is the most important motor ability of a child. It is naturally connected to the other abilities of the child because all the abilities of the child, including motor skills, do not develop individually but as a whole (Neljak, 2009).
Given that motor skills are important for preschool children, the goal of the research is to assess whether there are gender differences between children from Bosnia and Herzegovina and Germany.

MATERIAL AND METHODS

Sample of participant

Research included a sample of 79 respondents. Total sample was divided into 2 subsamples. First subsample of 39 respondents was comprised of children of preschool age from preschool institution "Montesori" in Tuzla, out of which 16 were males and 23 females. Second subsample of 40 respondents was comprised of children of preschool age from preschool institution "Mainkrokodile GmbH Frankfurt" Germany out of which 16 were males and 24 females.

Measuring instruments

For the purpose of checking the research hypotheses, the Test for the assessment of gross motor skills was applied (Ulrich, 2019). The test consists of 13 assessment variables that are divided into two subtests. The first subtest is locomotion, while the second subtest is ball hitting skills. The test yields 4 types of results: raw results, percentiles, standard results and age equivalent. For the purposes of this research, standard results are shown.

Data processing methods

The research data was processed using the parametric analysis method. The basic statistical parameters of the measure of central tendency and the measure of dispersion were calculated, and the results were tabulated. Univariate analysis of variance was used to verify the research objective. Research data was processed in the statistical package SPSS 20 for Windows.

RESULTS AND DISCUSSION

Table 1 shows the results for gross motor abilities test. The metric characteristics of the test for the assessment of gross motor skills are satisfactory. This was obtained in the research "Metric characteristics of the test for the assessment of gross motor skills" by Mehmedinović, Bratovčić, Kuduzović, Avdić, Kožljak (2021). Table 1 shows that arithmetic mean for standard result from subtest locomotion for boys from Bosnia and Herzegovina is 15,56 ± 3,42, while for boys from Germany it was 10,25 ± 3,61.

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Minimum and maximum for boys from Bosnia and Herzegovina was ranging from 7 to 17 and for boys from Germany it was ranging from 2 to 15. Results indicate that arithmetic mean for standard score for locomotion test for girls from Bosnia and Herzegovina was 13,39 ± 1,95 and for girls from Germany it was 11,46 ± 2,43. Minimum and maximum results for girls from Bosnia and Herzegovina was ranging from 9 to 17 and for girls from Germany it was ranging from 6 to 15.

The results show that the arithmetic mean for the standard score from the ball-hitting subtest for girls from Bosnia and Herzegovina is 13.78 ± 1.88 compared to girls from Germany, which was 10.79 ± 2.89. The minimum and maximum scores of girls from Bosnia and Herzegovina ranged from 11 to 18, and girls from Germany ranged from 5 to 16.

Table 1**.** The results of the comparative analysis in relation to the gender of the respondents and the results obtained on the observed subtests

Variables		N	M	SD	SG	MIN	MAX
Standard score locomotion	Boys B&H	16	12,56	3,42	0,86	7,00	17,00
	Girls B&H	23	13,39	1,95	0,41	9,00	17,00
	Boys Germany	16	10,25	3,61	0,90	2,00	15,00
	Girls Germany	24	11,46	2,43	0,50	6,00	15,00
Standard score ball hitting skills	Boys B&H	16	13,50	3,16	0,79	8,00	18,00
	Girls B&H	23	13,78	1,88	0,39	11,00	18,00
	Boys Germany	16	9,75	3,89	0,97	4,00	17,00
	Girls Germany	24	10,79	2,89	0,59	5,00	16,00

Table 2 shows results of Univariate Analysis of Variance used to determine differences between more than 3 groups of respondents. In this research first group of respondents were boys and second group were girls from Bosnia and Herzegovina. Third and fourth groups were boys and girls from Germany. Based on the results obtained from Univariate Analysis of Variance, we can conclude that there is a statistically significant difference between boys and girls in relation to standard locomotion result ($F = 4.47$; $p = 0.06$), as well as standard result for hitting the ball skills ($F = 8.70$; $p = .000$).

Table 2. Univariate Analysis of Variance

Variables		SK	df	PSK	F	p
Standard score	Between groups	105,626	3	35,209	4,473	**,006**
	Within groups	590,374	75	7,872		
	Total	696,000	78			
Standard score	Between groups	225,129	3	75,043	8,701	**,000**
	Within groups	646,871	75	8,625		
	Total	872,000	78			

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Based on the results of the Scheffe test, it can be concluded that girls from Bosnia and Herzegovina achieve better results in locomotion at the statistical significance level of 0.05 compared to the boys from Germany. This does not coincide with researches where it was concluded that boys are superior in most tests (Džinovic et al., 2019; Cvetkovic et al., 2007; De Privitellio et al., 2007). Also in the research "Gender differences in motor skills in preschool children" by Kelemen Laura, Ivana Nikolić, 2020, it was shown that boys achieve better results in the area of motor skills, which is contrary to the results of this research. The results of the Scheffe test showed that boys from Bosnia and Herzegovina achieve better results in object control skills than boys from Germany at the 0.05 level of statistical significance. Girls from Bosnia and Herzegovina at the 0.05 level of statistical significance achieve better results in object control skills compared to girls from Germany.

Table 3. Scheffe test results

Variables	Gender		MD	SG	p
Standard score locomotion	Female B&H	Boys B&H	0,83	0,91	,844
		Boys Germany	3,14*	0,91	**,011**
		Girls Germany	1,93	0,82	,144
	Male B&H	Girls B&H	-0,28	0,96	,993
		Boys Germany	3,75*	1,04	**,007**
		Girls Germany	2,71	0,95	,050
Standard score ball hitting skills	Female B&H	Boys B&H	0,28	0,96	,993
		Boys Germany	4,03*	0,96	**,001**
		Girls Germany	2,99*	0,86	**,010**

CONCLUSION

Based on the obtained results, we can conclude that girls from Bosnia and Herzegovina scored better on locomotion subtest in comparison to boys from Germany and scored better on object control test in comparison to girls from Germany. These results, that go in favor of girls require additional research which would include additional moderator variables in order to determine, if for example time spent outside of physical activity of children, contributes to the differences observed.

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