Motor creativity of five to six year old children

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Abstract

Motor talented child is a child who masters rough motor skills well and correctly and uses it for sports achievements and achieves above-average sports results. Talent does not show itself. The best way to discover motor creativity is a multidisciplinary approach. The research presents a way to detect motor talent using the TCAM test. Assuming that children find it easier to express their thoughts through movement, Torrance designed the TCAM (Thinking Creatively in Action and Movement) test in 1981. The TCAM test is a valid and reliable instrument with which it is possible to measure creative movement in preschool children. Four motor tasks with different sports equipment (ball, small balls, jump rope, gym ring) allow the evaluation of three aspects of motor creativity: fluency, originality and flexibility. The main purpose of the research was to investigate in more detail the motor creativity of preschool children. The non-random sample represents 167 children aged 3 to 6 years. 82 (49,1 %) children are female and 85 (50,9 %) are male. A causal-non-experimental research method and a quantitative data collection technique were used. The measuring instrument represents the TCAM test of creative thinking, where the fluency, originality and flexibility of four motor tasks are evaluated in four movement tasks: guiding the ball from point A to point B, throwing small balls in the basket and various movements with jump rope and gym ring. Based on the t-test for independent samples, it was found that there was no statistically significant difference in motor creativity in preschool children according to gender and age ($p > 0.05$). The findings of our research can be help to kindergard teacher to encourage children to creative ways of movement.

Key words

motor development; motor fluency; originality and flexibility; TCAM

Introduction

In modern Western societies, most children living in an urban area do not have free spaces and opportunities for motor play, they are also protected by parents who drive them to school and play with them indoors. All this leads to a greater connection of children with information and communication technologies. These cause children to become less active, and in the long run there is also a decrease in creative thinking. Constant physical activity is essential for the normal growth and development of children, especially in early childhood, when learning through the body and movement is a major part of a child's learning. Early childhood physical education is an ideal period for fostering a healthy lifestyle and a positive attitude towards exercise and movement, it can also be a bridge between a child's need for motor play game and creative expression and formal approaches to learning in kindergartens and schools. In 1981, Vygotsky (cited in Ourda, Gregoriadis, Mouratidou, Grouios, & Tsorbatzoudis, 2017) hinted that the establishment of motor development affects creativity and that one process can be developed through another. Learning is more effective when children give something their meaning, which they gain through

experimentation, asking questions and finding solutions. A representative result of motor development and creativity is motor creativity, which can be described as a child’s effort to create movements that enable the solution of motor problems (Ourda et al., 2017). Wyrik (1968, cited in Sturza Milić, 2014) states that motor creativity is the ability to create numerous and original motor responses to a stimulus. Most of the known concepts of motor creativity are based on Guildford's theory and the divergent factor of production, which includes fluency, originality and flexibility. Preschool children in the sensorimotor and preoperative period find it easier to express creativity through movement and symbolic games (Bournelli, Makri, & Mylonas, 2009). Creativity is a complex syndrome, which emerges from cognitive, affective, social, and physical areas, the use of creative teaching in physical and sports activity to help to the kindergard teacher in creating a learning environment focused on children’s physical, cognitive and social development.(Zachopoulou et al., 2006). The basic mechanisms of creative behavior determine performance in implementation of motor tasks (Hüttermann et al., 2018). Trevlas et al. (2003) discussed the connection between motor play and motor creativity among preschool children and is motor-creative, which means that it is currently creating new patterns of movement. Such a child has a more developed ability of divergent thinking, which is considered to be the result of creative and critical thinking. Renzulli (1994; cited in Sturza Milić, 2014) believes that children's motor creativity is poorly studied, although it is considered to be one of the most valued human qualities. It is common knowledge that children are creative by nature, but creativity also depends on the environment and intrinsic motivation. Torrents et al. (2021) state that, compared to other areas in the field of movement and sport, the study of encouragement creativity is ignored. Sturza Milić (2014) emphasizes that reduced physical activity has a negative impact on quality of life. No-encouragement of motor abilities can lead to reduced motor creativity and generally poorer development of the child.

What exactly is motor creativity? Torrance (1981; cited in Dominguez et al., 2015) designed the TCAM (Thinking Creatively in Action and Movement) test, assuming that children find it easier to express their thoughts through movement. Four motor tasks (Ball, Little ball, Jump drop, Gym ring) enable the evaluation of three aspects of motor creativity: fluency, originality and flexibility. Fluency is defined as the ability to come up with new ideas and is measured as the number of relevant responses made (Dominguez et al., 2015), Is the total number of different responses to stimuli (Trevlas et al., 2003). Originality is defined as the ability for new, unique, or unusual motor responses (Dominguez et al., 2015), is the uniqueness of the answer in relation to the answers of the whole sample (Trevlas et al., 2003). Flexibility is the diversity of responses based on changes in meaning, interpretation, use of an object (Trevlas et al., 2003), is a quick change of perspective or. from the point of view of solving or rapidly changing the approach and strategy (Marentič Požarnik, 2000).

The TCAM test is a valid and reliable instrument to measure creative movement in preschool children, this test aso yielded adequate internal consistency for measuring the dimensions of children’s motor creativity (Zachopoulou, Makri and Pollatou, 2009).

The purpose of the study was to determine whether there is a difference in motor creativity between the gender and between different ages (3-4 years and 5-6 years) of preschool children. The TCAM (Thinking Creatively in Action and Movement) test was used.

Methods

The TCAM test is a valid and reliable instrument with which it is possible to measure creative or. creative movement in preschool children. Four motor tasks with different sports equipment (ball, small balls, jump rope, gym ring) were used. The results allow the evaluation of three aspects of motor creativity: fluency, originality and flexibility. The performance of the task was evaluated by three evaluators. The result (number of performances of different motor tasks) is the average score of all three evaluators. To verify differences between two groups by gender (Table 1) and two groups by age (Table 2), an Independent Samples t-Test (p) was used. As the strength of the relationship between two variables in a population was used Cohen's d effect size.

Table 1. Sample by GENDER according to AGE

	Frequency	Percent	
age 3-4 years	**27**	**16.2**	
girls	*12*	*14.6*	
boys	*15*	*17.6*	
age 5-6 years	**140**	**83.8**	
girls	*70*	*85.4*	
boys	*70*	*82.4*	
Total	**167**	**100.0**	
girls	*82*	*100.0*	
boys	*85*	*100.0*	

Table 2. Sample by AGE according to GENDER

	Frequency	Percent	
girls	**82**	**49.1**	
age 3-4 years	*12*	*44.4*	
age 5-6 years	*70*	*50.0*	
boys	**85**	**50.9**	
age 3-4 years	*15*	*55.6*	
age 5-6 years	*70*	*50.0*	
Total	**167**	**100.0**	
age 3-4 years	*27*	*100.0*	
age 5-6 years	*140*	*100.0*	

Results

Statistically significant difference in age ($p < .01$) was shown in fluency when using the ball, Effect Size is large ($d > 0.5$). For other aspects of creativity, there is no statistically significant difference in motor creativity by age when using different props (Table 3) .

Table 3. Difference in TCAM scores by AGE						
TCAM	task	age years	Mean	Std. Dev.	p	Cohen's d
Fluency	Ball	3-4	3.59	1.89	.000***	-.964
		5-6	5.84	2.40		
	Little ball	3-4	2.68	1.00	.503	-.141
		5-6	3.07	2.95		
	Jump drop	3-4	4.49	2.10	.844	.042
		5-6	4.22	6.86		
	Gym ring	3-4	4.68	2.71	.345	-.199
		5-6	5.59	4.86		
Originality	Ball	3-4	1.45	1.98	.206	-.267
		5-6	2.08	2.41		
	Little ball	3-4	0.63	0.69	.339	-.202
		5-6	1.22	3.20		
	Jump drop	3-4	1.76	1.59	.987	.003
		5-6	1.73	7.12		
	Gym ring	3-4	2.24	2.42	.891	.029
		5-6	2.10	5.22		
Flexibility	Ball	3-4	0.66	0.81	.383	-.184
		5-6	0.95	1.68		
	Little ball	3-4	0.23	0.33	.616	-.106
		5-6	0.55	3.32		
	Jump drop	3-4	1.34	1.21	.896	.028
		5-6	1.15	7.36		
	Gym ring	3-4	1.25	1.05	.968	-.008
		5-6	1.29	5.36		

***$p < .01$

There was no statistically significant difference in motor creativity by gender (Table 4).

Table 4. Difference in TCAM scores by GENDER						
TCAM	task	gender	Mean	Std. Dev.	p	Cohen’s d
Fluency	Ball	girls	5.38	2.38	.620	-.077
		boys	5.57	2.56		
	Little ball	girls	2.84	1.49	.451	-.117
		boys	3.16	3.54		
	Jump drop	girls	3.71	2.57	.265	-.173
		boys	4.80	8.51		
	Gym ring	girls	4.91	2.55	.137	-.232
		boys	5.97	5.89		
Originality	Ball	girls	1.80	2.25	.349	-.145
		boys	2.15	2.45		
	Little ball	girls	0.97	1.33	.504	-.168
		boys	1.27	3.93		
	Jump drop	girls	1.18	1.62	.279	-.251
		boys	2.28	9.03		
	Gym ring	girls	1.50	1,80	.107	-.104
		boys	2.72	6.57		
Flexibility	Ball	girls	0.86	1.24	.750	-.049
		boys	0.94	1.85		
	Little ball	girls	0.23	0.41	.267	-.172
		boys	0.76	4.25		
	Jump drop	girls	0.58	0.99	.256	-.176
		boys	1.77	9.41		
	Gym ring	girls	0.73	0.90	.149	-.224
		boys	1.83	6.82		

A more detailed presentation of differences in motor creativity by boys (Table 5) according to age shows that there is a statistically significant difference only in fluency when using the ball ($p < .01$), Effect Size is large ($d > 0.5$).

Table 5. Difference in TCAM scores by AGE - boys						
TCAM	task	age years	Mean	Std. Dev.	p	Cohen’s d

Fluency	Ball	3-4	3.65	2,30	0.001***	-0.965
		5-6	5.98	2,44		
	Little ball	3-4	2.83	1,04	0.689	-0.114
		5-6	3.23	3,88		
	Jump drop	3-4	4.61	2,12	0.922	-0.028
		5-6	4,84	9,34		
	Gym ring	3-4	5.29	2,89	0.629	-0.138
		5-6	6.11	6,36		
Originality	Ball	3-4	1.91	2,47	0.680	-0.118
		5-6	2.20	2,47		
	Little ball	3-4	0.71	0,69	0.541	-0.175
		5-6	1.40	4,31		
	Jump drop	3-4	1.97	1,55	0.884	-0.042
		5-6	2.34	9,94		
	Gym ring	3-4	2.57	2,58	0.923	-0.028
		5-6	2.75	7,15		
Flexibility	Ball	3-4	0.70	0,92	0.582	-0.157
		5-6	0.99	1,99		
	Little ball	3-4	0.25	0,38	0.615	-0.144
		5-6	0.87	4,68		
	Jump drop	3-4	1.49	1,13	0.899	-0.036
		5-6	1.83	10,37		
	Gym ring	3-4	1.41	0,98	0.794	-0.074
		5-6	1.92	7,51		

***p < .01

Table 6. Difference in TCAM scores by AGE - girls						
TCAM	t task	age years	Mean	Std. Dev.	p	Cohen’s d
Fluency	Ball	3-4	3.52	1.31	0.003***	-0.964
		5-6	5.69	2.38		
	Little ball	3-4	0.88	0.95	0.126	-0.483
		5-6	1.96	2.37		
	Jump drop	3-4	0.61	0.69	0.447	-0.239

5-6	0.91	1.31				
Gym ring	3-4	2.50	0.97	0.392	-0.269	
	5-6	2.90	1.56			
Originality	Ball	3-4	0.53	0.71	0.058	-0.393
		5-6	1.04	1.40		
	Little ball	3-4	0.20	0.28	0.766	-0.093
		5-6	0.24	0.43		
	Jump drop	3-4	4.33	2.15	0.364	0.286
		5-6	3.60	2.63		
	Gym ring	3-4	1.49	1.66	0.470	0.227
		5-6	1.12	1.62		
Flexibility	Ball	3-4	1.16	1.33	0.113	0.701
		5-6	0.48	0.90		
	Little ball	3-4	3.92	2.35	0.146	-0.459
		5-6	5.08	2.56		
	Jump drop	3-4	1.83	2.24	0.501	0.211
		5-6	1.44	1.72		
	Gym ring	3-4	1.06	1.14	0.169	0.434
		5-6	0.67	0.85		

***p < .01

Also by girls (Table 6) there was a statistically significant difference in age only in fluency when using the ball ($p < .01$), Effect Size is large ($d > 0.5$).

Discussion

Some studies have focused on differences in motor creativity between boys and girls. The results of the research by Sturza Milić (2014) showed that certain motor skills are poorer, especially in girls, and that this consequently also affects motor creativity. In a sample of our study, differences in motor creativity between boys and girls (except fluency / ball) were not detected. The authors of the study Karaca et al. (2020) in their study did not detect a difference between boys and girls in motor creativity. In their study, Jekovec & Bucik (2015) used a pattern similar in gender and age to that used in our study. They state that creativity is not rigidly tied to age. In our study, we detected a statistically significant difference in motor creativity between 3-4 year and 5-6 year old children only by boys and by girls in fluency in ball use. Finding that children's motor creativity is poorly studied and that no-encouragement of motor abilities can lead to reduced motor creativity and generally poor child development (Sturza Milić, 2014), the presented research is another piece in the mosaic of motor research. creativity. The findings of our research can help kindergard teacher

to encourage children to creative ways of movement, which according to Torrents et al. (2021) can lead to the emergence of new forms of motor behavior and new solutions to motor tasks. The results of the research could, according to Zachopoulou et al. (2006) had consequences in the implications on three areas: to deepen our understanding of creativity as an integral part of the early childhood curriculum; to expand the use of movement during early years education; and to design in-service professional development of kindergard teacher with training programs in order to improve the implementation of creative contets.

Conclusions

Children are creative by nature, but creativity also depends on the environment and intrinsic motivation. In order for creativity to develop and grow in a healthy way, it is necessary to provide children with environments that can also help develop their creativity in the field of motor skills. Kindergard teacher play an important role in planning and implementing physical activities to promote children's motor creativity.

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Motorička kreativnost djece u dobi od pet do šest godina

Sažetak

Motorički darovito dijete je dijete koje dobro i pravilno svlada grubu motoriku i iskoristi je za sportska postignuća te ostvaruje natprosječne sportske rezultate. Najbolji način za otkrivanje motoričke kreativnosti je multidisciplinarni pristup. Istraživanje predstavlja način otkrivanja motoričke darovitosti pomoću TCAM testa. TCAM test je valjan i pouzdan instrument kojim je moguće mjeriti motorička kreativnost djece predškolske dobi. Četiri motorička zadatka s različitim sportskim rekvizitima (lopta, loptice, vijača, obruč) omogućuju evaluaciju tri aspekata motoričke kreativnosti: fluentnost, originalnost i fleksibilnost. Glavna svrha istraživanja bila je detaljnije istražiti motoričku kreativnost djece predškolske dobi. Neslučajni uzorak predstavlja 167 djece u dobi od tri do šest godina. 82 (49,1 %) djece je žensko i 85 (50,9 %) muško. Korištena je bila kauzalno-neeksperimentalna metoda istraživanja i kvantitativna tehnika prikupljanja podataka. Mjerni instrument je TCAM test kreativnog mišljenja gdje se kod četiri zadataka kretanja ocjenjuju fluentnost, originalnost i fleksibilnost četiri motoričkih zadataka: vođenje lopte od točke A do točke B, bacanje malih loptica u koš te različiti pokreti s vijačom i gimnastičkim obručem. Na osnovi t-testa za neovisne uzorke je utvrđeno da ne postoji statistički značajna razlika u motoričkoj kreativnosti djece prema spolu i dobi ($p>0,05$). Nalazi istraživanja mogu pomoći odgajateljima da potaknu djecu na kreativno kretanje.

Ključne riječi

motorička fluentnost; motorički razvoj; originalnost i fleksibilnost; TCAM

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