

RELATION OF SOME MOTORIC ABILITIES WITH READINESS-TO-SCHOOL TEST WITH GIRLS AGED FIVE

UDC: 796.332.014.25(497.8)

(Original scientific paper)

Mirko Jakimovski¹, Daniela Sukova Stojmanovska², Georgi Georgiev²

¹Doctoral students, Faculty for physical education, sport and health

²Faculty for physical education, sport and health

Abstract

The purpose of this research is related to the relationship between motor skills and the test for school readiness in girls. The sample of respondents in this research is 70 girls aged 60 to 66 months (5 to 5.5 years) from two kindergartens from Stip. 15 motor tests were applied - three for assessment of: coordination, flexibility, balance, precision and explosive power. To assess girls' readiness for school, a special test consisting of 5 subtests for determining the pre-knowledge of girls was applied. The obtained results from the regression analysis show that a statistically significant prediction among the five most important motor tests (predictor system of variables) and school readiness tests is only determined in the numerical test for school readiness.

Key words: preschool age, kindergarten, children's pre-knowledge, regression analysis.

Introduction

The early phase of childhood, namely the period from the very birth to the age of six (6), is the shortest and most specific period during which the foundations of a normal psychological and physical development of children are laid. The pre-school period is quite significant in the child's development and persons dedicated to the education of pre-school children need to be well acquainted with the capacity of child's organism, especially in the fifth year of their lives. This mostly refers to the trainers and teachers of preschool institution, as well to some teachers in Physical and Health Education who work in groups.

Breckenridge and Vicent (1960) in "Children's development: Physical and Psychological development through the adolescence" are explaining they explain that human abilities are closely related to the history of family, type of living, as well as the daily activities in which the child is engaged in the preschool institution, where they spend a certain amount of time every day. More often than not it is expressed through the game, the freedom of expression and creativity of every child. In his research "Integral development: theory and experimental results", Ismail (1976) points at the changes in the anthropologic dimensions and mutual relations, and later, in his another research ("Connection between cognitive, conative and motoric characteristics", Ismail, 1979), he brings forth that the individual abilities and characteristics are responsible for the child's development.

During the child's time spent in the kindergarten, different types of programs and tests are conducted with the aim to assess the children's maturity in the psycho-physical, social and emotional parameters.

The present research has as a primarily goal to establish objectively the internal structure and possible connections between different motoric abilities with the children of preschool age and their readiness for school.

Former researches

Establishing the structure of morphologic and motoric space with different aged respondents of both sexes and of different status, both athletes and non-athletes, has been the subject of many former researches. A smaller number is the amount of the papers defining the correlation between the mentioned two spaces with the cognitive, conative and pedagogic-psychological and social characteristics, as well as an isolated assessment of the motor space structure alone. A very small number of authors have studied the motor ability structure with children aged 5. That age has been studied mostly in relation to the morphologic and motor space, as well as to the differences between boys and girls. In the Republic of Macedonia studies of

the type were conducted with schoolchildren from 11 to 14 (Klincharov, 2003; Mitevski, 2005; Georgiev, 2006 and others), within which, by longitudinal research, the structure of motoric space was determined. That kind of researches can serve as directions for examining the same problem with children at the age of 5. The only available studies of the type referring to respondents of preschool age in the Republic of Macedonia are conducted by the authors Dukovski (1984), Popeska (2009 and 2011) and Jakimovski (2013).

The former researches, which have mainly been focused on estimating the achieved results during the children's development and which were supposed to provide smooth engaging into the educational process at school, followed a few directions. A part of the research explorers considered it important to pay attention to establishing the psychological maturity of children before going to school (Montessori, 1967; Tolcic, 1986). Others thought how to engage everybody to that estimation and to assess the body development (Gesell, 1941; Gardner, 1999).

Subject, Goal and Hypothesis of the Research

In order to plan, force and valorize the effects of programs conducted in kindergartens, the establishment of the initial and final levels of motoric abilities is of a great significance. Assessing the motoric status means to define the quantitative and qualitative level of motoric abilities. The basic goal of the present research is to establish the relation between some motoric abilities and the readiness-to-school test in relation with girls of preschool age. Determination of the presented relations is equally important from the position of both kinesiology as a science and practical implementation in assessing the acquired level of children readiness for going to school.

Subject and Goals of the Research

The subject of the research refers to studying motoric abilities and the readiness-to-school test with girls aged 5 from two kindergartens in the town of Shtip.

The primary goal of the research is to establish the relation between the achieved psychological results of motoric abilities with children – girls mainly – to enter the school.

The following goals are defined according to the research subject:

1. To establish the most valid motoric tests for assessing motoric abilities with girls, which are simultaneously treated as a predictor system of variables.
2. To establish the relations between motoric abilities and the readiness-to-school test with the tested girls of preschool age.

The Hypotheses of Research.

Basing on the knowledge of the former studies, the defined subject and final goals of the present research, we can mark the following hypotheses:

X-1. There is a statistically significant connection between the motoric abilities as predictor system of variables and the test for readiness to school with girls of preschool age.

Methods of Research

The Sample of Respondents

The sample of respondents is defined as girl-respondents at preschool age from two kindergartens in Shtip (Vera Tchiriviri-Trena and Astibo). The total number of respondents is 70 girls. All the children engaged in the test study have to meet certain criteria referring to their age from 60 to 66 months (5 to 5,5 years of age) at the time of research and to be in a complete psycho-physical health condition.

What we bared in mind while designing the way of research condition was the number of children of preschool age, the readiness of the kindergartens and parents to allow the competition of measurements, the suitable conditions of premises available in gardens for carrying the appointed measures and the readiness of the staff for collaboration and unimpeded progress of measurements.

Sample of Variables

The sample of variables is selected according to the research subject and is composed of 15 motoric for assessing motoric abilities and 5 tests for readiness to school in terms of psych-physical characteristics.

Sample of Variables of Motoric Abilities

Motoric abilities as part of total psycho-physical abilities present the level of basic latent human movement dimensions. Regardless of the fact whether they are inherited or acquired through trainings, they provide the quality of a successful performance with simple or complex movements (Kurelic and col., 1975). Application of some particular tests provides the notion of the level of motoric abilities existing in the latent space. For the demands of the present research and aiming to establish the structure of motoric space with children aged 5, there are applied 15 motoric variables, covering the motor space established in former researches with respondents of other periods.

Motoric variables are hypothetically meant for assessing: coordination, flexibility, balance, precision and explosive power.

Table 1. Presentation of the selected motoric tests

Applied Tests	Code
COORDINATION 1. Rolling a ball 2. Slalom with two balls 3. Poligon	MKTT MKST MKPN
EXPLOSIVE POWER 1. Standing long jump 2. Distant throw of medical ball 3. Ten-meter high start	MSSD MSFM MS10
FLEXIBILITY 1. Deep bench 2. Spreading from back laying 3. Slope deck to the floor	MFPK MFRL MFPR
BALANCE 1. Walking on an inverted bench 2. Standing on a bench in width 3. Standing on a bench in length	MROSK MRSKS MRSKD
PRECISION 1. Throwing a hoop on the stalk 2. Strolling in a horizontal goal with a ball 3. Strolling a short stick	MPFO MPGT MPKS

Sample of Variables of Readiness-To-School Test

The readiness-to-school test is a checked psychologically measuring instrument constructed by Vlahovic-Stetic, Vizek-Vidovic, Arambasic and Miharija (1995) and consists of 5 subtests: test of perception; test of connecting dots; test of recognition; test of redrawing; and numerical test.

Methods of Processing the Data

The data obtained from the applied motoric tests and the readiness-to-school test about the sample of respondents - 5 years old girls, are processed with the following mathematical-statistical methods:

The basic descriptive statistical parameters are calculated:

Arithmetic mean – Mean, Standard deviation – Std. Dev., Minimum and maximum result, Test of asymmetry and distribution of results – Skewness, Test of result homogeneity – Kurtosis, Pearson's coefficient of correlation (r).

Validity of motoric tests is determined by Hotellings factor analysis and the most valid tests are used in the predictor system of variables in calculating the regressive analysis.

In checking the relation of the readiness-to-school test as a correlation variable and motoric abilities as a predictor system of variables, the linear regressive analysis is applied.

Results

According to the results obtained in Table 2, which refer to the motoric tests (from number 1 to 5) and the readiness-to-school test (from number 16 to number 20), there can be noticed that, with reference to the coefficient of symmetry, they are mainly in the frame of a normal and moderate asymmetry (skewness).

Also, according to the values of kurtosis, the results tend to platicurtic.

Neither of the applied tests was established to demonstrate a significant result digression from the normal distribution. In relation to the condition a conclusion can be drawn that the tests applied to girls differ with a satisfactory sensitivity and discriminativity.

Table 2. Basic Statistics of the Applied Variables

	N	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
1. MKTT	70	6.38	15.35	10.8590	2.81678	.038	-1.560
2. MKST	70	32.64	87.16	57.8101	15.82296	.009	-1.191
3. MKPN	70	22.08	55.06	40.8080	9.35054	-.513	-.954
4. MSSD	70	33	135	85.33	27.563	-.139	-1.042
5. MSFM	70	114	451	260.24	90.673	.265	-.955
6. MS10	70	2.15	4.56	3.4566	.64381	-.192	-1.072
7. MFPK	70	21	52	35.54	9.103	-.008	-1.072
8. MFRL	70	61	135	95.06	22.303	.301	-1.206
9. MFPR	70	25	51	38.71	8.099	-.109	-1.359
10. MROSK	70	5.97	34.67	19.8224	8.00273	-.328	-1.130
11. MRSKS	70	.71	20.22	9.4844	5.93686	-.003	-1.274
12. MRSKD	70	1.25	54.18	28.3103	17.62753	-.332	-1.512
13. MPFO	70	0	7	2.77	1.787	.026	-.667
14. MPGT	70	0	20	10.46	5.571	-.024	-.968
15. MPKS	70	34	174	98.06	46.495	.098	-1.464
16. TPER	70	2	15	10.29	3.473	-.480	-.638
17. TPOT	70	0	10	6.07	2.804	-.668	-.450
18. TPRP	70	4	13	9.71	2.390	-.654	-.537
19. TPRC	70	0	9	5.86	2.763	-.798	-.559
20. TNUM	70	0	10	5.89	2.922	-.358	-.932

The results presented in tables from 3 to 7 refer to the factorization of the applied motoric tests aiming to establish the most valid of them with relation to a particular motoric ability (dimension): coordination, explosive power, flexibility, balance and precision.

The general state is that all established Pearson's coefficients of correlation between the motoric tests applied with girls are statistically significant on the level of 0.05 and vary from the lowest -.335 to the highest .832.

Also, the common thing is the fact that for the three of motoric tests applied to each latent dimension, there is selected one Hotelling's main component of each through the factor analysis. It suggests of a unified subject of measurement for the three tests in relation to the latent dimension. The values of projections of Hotelling's main component are from 1.917 963.911%) to 2.559 (85.288%).

In the predictor system of motoric variables we include the tests of the highest validity according to the projection of the first and the only main component, and respectively with the highest values of communalities. The tests are:

1. Rolling the ball (MKTT) for coordination,
2. Standing long jump (MSSD) for explosive power,
3. Slope deck to the floor (MFPR) for flexibility,
4. Standing on a bench in width (MRSKS) for balance, and
5. Strolling a short stick (MPKS) for precision.

Table 3. Factor analysis of motoric tests about coordination

Variables	r			H1	Com	Total	% of Var	Cum %
	MKTT	MKST	MKPN					
MKTT	1.000			.927	.859	2.380	79.342	79.342
MKST	.832	1.000		.919	.845	.452	15.063	94.406
MKPN	.626	.605	1.000	.823	.677	.168	5.594	100.000

Table 4. Factor analysis of motoric tests about explosive power

Variables	r			H1	Com	Total	% of Var	Cum %
	MSSD	MSFM	MS10					
MSSD	1.000			.863	.744	1.917	63.911	63.911
MSFM	.514	1.000		.764	.584	.665	22.155	86.066
MS10	-.519	-.335	1.000	-.768	.589	.418	13.934	100.000

Table 5. Factor analysis of motoric tests about flexibility

Variables	r			H1	Com	Total	% of Var	Cum %
	MFPK	MFRL	MFPR					
MFPK	1.000			.930	.865	2.559	85.288	85.288
MFRL	.759	1.000		.909	.826	.257	8.566	93.855
MFPR	.816	.763	1.000	.932	.868	.184	6.145	100.000

Table 6. Factor analysis of motoric tests about balance

Variables	r			H1	Com	Total	% of Var	Cum %
	MROSK	MRSKS	MRSKD					
MROSK	1.000			.888	.789	2.359	78.641	78.641
MRSKS	.709	1.000		.898	.806	.352	11.749	90.390
MRSKD	.654	.676	1.000	.874	.764	.288	9.610	100.000

Table 7. Factor analysis of motoric tests about precision

Variables	r			H1	Com	Total	% of Var	Cum %
	MPFO	MPGT	MPKS					
MPFO	1.000			.908	.824	2.526	84.196	84.196
MPGT	.724	1.000		.912	.832	.276	9.214	93.411
MPKS	.777	.787	1.000	.933	.870	.198	6.589	100.000

According to the results obtained in Tables from number 8 to 12, where as a criterion variable the tests of psychological readiness for school are applied – test of perception (TPER), test of connecting dots (TPOT), test of recognition (TPRP), test of redrawing (TPRC) and numerical test (TNUM) – and the predictor system is represented by the five early mentioned motoric tests, there can be noticed that the applied system of predictor motoric tests do not influence statistically significantly the following test about psychological readiness to school: test of perception (TPER), test of connecting dots (TPOT), test of recognition (TPRP), and test of redrawing (TPRC).

It is noticeable that the applied system of predictor motoric tests has statistically significant impact only on the numerical test (TNUM).

It is proved by the high values of coefficients of the multiple correlation and determination. F-test (2.445) is statistically significant. Two more tests as well have an individual influence on the criterion variable – Numerical test (TNUM), they are the tests of Strolling a short stick (MPKS).

Table 8. Regressive analysis of criterion variable TPER

	r	Part-r	St. BETA	t	Sig.
MKTT	-.041	-.097	-.155	-.782	.437
MSSD	-.047	-.036	-.064	-.289	.773
MFPR	-.107	-.142	-.224	-1.148	.255
MRSKS	-.105	-.110	-.124	-.884	.380
MPKS	.073	.174	.227	1.413	.162
R	R Square	df1	df2	F	Sig.
.251	.063	5	64	.860	.513

Table 9. Regressive analysis of criterion variable TPOT

	r	Part-r	St. BETA	t	Sig.
MKTT	-.108	-.216	-.351	-1.774	.081
MSSD	-.024	-.181	-.325	-1.472	.146
MFPR	.011	.076	.120	.613	.542
MRSKS	-.082	-.134	-.152	-1.086	.282
MPKS	.027	-.007	-.008	-.052	.958
R	R Square	df1	df2	F	Sig.
.244	.059	5	64	.807	.549

Table 10. Regressive analysis of criterion variable TPRP

	r	Part-r	St. BETA	t	Sig.
MKTT	-.282	-.281	-.441	-2.341	.022
MSSD	.116	-.105	-.178	-.847	.400
MFPR	.051	-.087	-.130	-.699	.487
MRSKS	-.027	-.141	-.152	-1.142	.258
MPKS	.204	.197	.247	1.612	.112
R	R Square	df1	df2	F	Sig.
.389	.151	5	64	2.280	.057

Table 11. Regressive analysis of criterion variable TPRC

	r	Part-r	St. BETA	t	Sig.
MKTT	-.219	-.305	-.486	-2.562	.013
MSSD	.050	-.177	-.304	-1.436	.156
MFPR	.012	.027	.041	.216	.830
MRSKS	-.145	-.235	-.260	-1.935	.057
MPKS	.074	.063	.078	.503	.617
R	R Square	df1	df2	F	Sig.
.368	.135	5	64	2.006	.090

Table 12. Regressive analysis of criterion variable TNUM

	r	Part-r	St. BETA	t	Sig.
MKTT	-.255	-.271	-.422	-2.255	.028
MSSD	.070	-.155	-.262	-1.252	.215
MFPR	.086	-.079	-.118	-.636	.527
MRSKS	.078	-.046	-.049	-.370	.713
MPKS	.280	.242	.304	1.998	.050
R	R Square	df1	df2	F	Sig.
.400	.160	5	64	2.445	.043

Conclusion

The basic goal of the present research was above all to establish the relation between some motoric abilities and the test of readiness to school for girls at the age of five before going to school.

According to the obtained results, there can be concluded that the applied system of five predictor motoric tests has statistically significant influence only on Numerical test (TNUM).

Literature

- Bala, G. (2003). Quantitative differences in motor abilities of pre – school boys and girls. *Kinesiologia Slovenica*, 9(2), 5-16.
- Bala, G. (2007). Morfoloske karakteristike pretskolske dece. *U K. Mikalački I Bala (Ur.), Antropoloske karakteristike i sposobnosti predškolske dece* (33-66) Novi Sad : Fakultet fizičke culture.
- Breckendridge, M. E., & Vincente, L. M. (1960). *Child Development: Physical and Psychologic Growth Through Adolescence*. Philadelphia: W. B. Saunders Co.
- Дуковски, С. (1984). *Структура и развој на морфолошките и биомоторичките димензии на децата од предшколска возраст од Скопје*. Докторска дисертација, Београд: Факултет за физичка култура.

- Gardner, H., Kornhaber, M. L., & Wake, K. W. (1999). *Inteligencija - različita gledišta*. Jastrebarsko: Naklada Slap.
- Gesell, A., & Amatruda, C. (1941). *Development diagnosis: Normal and abnormal children development*. New York: Harper & Row.
- Георгиев, Г. (2006). *Развојот на некои димензии на антрополошкиот статус кај учениците од основните училишта, дефиниран со различни методолошко – статистички постапки*. Докторска дисертација, Скопје: Универзитет "Св. Кирил и Методиј", Факултет за физичка култура.
- Horvat, V. & Sindik, J. (2016). Associations between morphological characteristics, motor abilities and preparedness for school in preschool girls. *Croatian Journal of Education*, 18(4), 1173-1200.
- Humphrey, J. H. (1991). *An overview of childhood fitness*. Springfield, Illinois: Charles C. Thomas Publisher.
- Ismail, A. H. (1976). Integralni razvoj: teorija i eksperimentalni rezultati. *Kineziologija*, 6(1-2), 7-28.
- Ismail, A. H. (1979). Povezanost između kognitivnih, motoričkih i konativnih karakteristika. *Kineziologija*, (1-2).
- Јакимовски, М. (2013). *Релации помеѓу моторичките способности и тестот за подготвеност на училиште кај деца од 5-годишна возраст*. Магистерски труд, Скопје: Факултет за физичка култура.
- Jurimae, T., & Jurimae, J. (2001) *Growth, physical activity and motor development in prepubertal children*. New York: CRC Press.
- Клинчаров, И. (2003). Детерминација на разлики на некои морфолошки и моторички манифестации меѓу учесниците од женски и машки пол на возраст од 11-14 години. *Физичка култура*, 2, 22-24.
- Kelly, N. T., B. J. Kelly (1985). *Physical Education for Pre - School and Primary Grades*. Illinois: Charles C. Thomas Publisher, Springfield.
- Krombholz, Heinz. (2017) Development of motor talents and nontalents in preschool age. *Cogent Psychology*, 5: 1434059.
- Kurelic, N., Momirovic, K., Stojanovic, M., Sturm J., Radojevic, Dj. i Viskic – Stalec, N. (1975). *Struktura i razvoj morfoloskih i motorickih dimenzija omladine*. Beograd: Institut za naucna istrazivanja Fakulteta za fizicko vaspitanje.
- Malina, R. M., & Bouchard, C. (1991). *Growth, Maturation, and Physical Activity*. Champaign, Illinois: Human Kinetics.
- Marcon, R. A. (2002). Moving up the Grades: Relationship between Preschool Modeland Later School Success. *Early Childhood Research & Practice*, 4(1).
- Metikoš, D., Prot, F., Hofman, E., Pintar, Ž., Oreb, G. (1989). *Mjerenje bazičnih motoričkih dimenzija sportaša*. Zagreb: Komisija za udbenike i skripta Fakulteta za fizičku kulturu Sveučilišta u Zagrebu,.
- Митевски, О. (2005). *Развој на антропометриските и моторичките манифестации и латентните димензии кај млади од двата пола во Република Македонија*. Докторска дисертација, Скопје: Факултет за физичка култура.
- Montessori, M. (1967). *The Montessori method*. Cambridge: R. Bentley.
- Piaget, J. (1963). *Origins of intelligence in children*. New York: Norton.
- Planinšec, J. (2002). Relations between the motor and cognitive dimensions of preschool girls and boys. *Perceptual and motor skill*, 94(2), 415-423.
- Perić, D. (1991). *Komparativna analiza metodoloških sistema eksplikacije biomotoričkog statusa dece predškolskog uzrasta*. Doktorska disertacija, Beograd: Fakultet fizičke kulture Univerziteta u Beogradu.
- Попеска, Б. (2009). *Утврдување и компарирање на латентната структура на моторичкиот простор кај машки деца на 6 и 7 годишна возраст*. Магистерски труд, Скопје: Факултет за физичка култура.
- Попеска, Б. (2011). *Развој на морфолошките и моторичките димензии кај деца од машки пол во возрастниот период од 6 и 7 години*. Докторска дисертација, Скопје: Факултет за физичка култура.
- Tolčić, I. (1986). *POŠ - test za ispitivanje spremnosti djece za školu, Priručnik*. Ljubljana: Zavod SRS za produktivnost dela.
- Vlahović-Štetić, V., Vizek-Vidović, V., Arambašić, L. i Miharija, Ž. (1995). *Test spremnosti za školu*. Slap: Psihološki mjerni instrument.
- Zurc, J., Pišot, R., & Strojnik, V. (2005). Gender differences in motor performance in 6.5 – year – old children. *Kinesiologija Slovenica*, 11(1), 90-104.

