TESTS OF SPACE-TIME ORIENTATION BY BASKETBALL SPECIFIC MEANS IN CHILDREN AGED 8-9

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Abstract
The research basis was the testing of the space-time orientation ability in 8-9 years old children by basketball game means. The evaluation of this ability was made by efficient testing adapted to age features, appropriate to the competition category baby-basketball.
Rightly made, these tests evaluating the space-time orientation ability of 8-9 years old children contribute to the enrichment of representations and skills about the game, the playground, the opponent and also encourage their initiative in the future evolution as players.
Research methods. The methods and techniques of scientific research in the present article are as follows: bibliographic documentation, pedagogical observation, testing method, mathematical statistics, graphics and tables.
Results and conclusions: capitalizing the results previously processed shows that the right selection of means, properly dosed and using our tests, the space-time orientation in 8-9 years old children can be improved by the help of specific basketball game exercises. This research also confirms our starting hypothesis.
Key words*: coordinative ability, space-time orientation ability, basketball, tests.*

INTRODUCTION

Basketball is an accessible game that has gained popularity so that more and more children wish to play it. Thus, the varied content of the game should be carefully guided and oriented towards developing and increasing group relations, educating certain psychomotor skills and their various forms, acquiring elements and technical procedures necessary to practise it properly, as well as gaining skills and habits of moral conduct.
Authors such as Mondoni (2005), Zwierko, Lesiakowski, Florkiewicz (2005), Cătănescu (2008) evince the decisive role of the coordinative capacities development through properly selected operational structures, to the purpose of increasing the skill level in basketball, starting from an early age. The literature has approached this notion of the space-time orientation (Dragnea, Bota, 1999; Glasauer, Nieber, 2000, Finichiu, 2009, etc.).
The space-time orientation presupposes changing the body position and movement in space and time as compared to a certain field of action: fixed points of reference (the basket) or mobile points of reference (members of the same or the opposing team).

HYPOTHESIS

Starting from the premise that the requirements of the game today are complex and ask for the scientific preparation of the training lessons starting from an early age, testing the space-time orientation ability in children aged 8-9, belonging to the category baby-basketball, may provide objective information on their level of development through means specific to basketball.

Aim of the paper: testing the space-time orientation ability in children aged 8-9 through means specific to basketball.

METHODS OF RESEARCH

Used in the present study: the study method in specialised literature, pedagogical observation, the test method, the statistical-mathematical method (http://www.usablestats.com/calcs/2samplet), the graph and table method.
Subjects: the sample consisted of 20 children, male, aged between 8 and 9, suitable for the competitional category baby-basketball.

RESEARCH STRUCTURE AND ORGANISATION

The research took place at the Phoenix Sports Club in Galaţi between March 2012 and March 2013. The study program observed the following tasks and research stages:

Stage I:
- Studying and implementing the specialised documentation, the trainers' practical and methodological experience.

Stage II:
- Initial test (12 March 2012) and final test (18 March 2013) of the level of development of the children's space-time orientation ability, and the research work proper focusing on the selection of means and their inclusion in operational models.

Stage III:
- Processing and using the data obtained from the tests.
- Selecting the effective means having contributed to the development of the space-time orientation ability.

- Highlighting the conclusions and practical-methodological recommendations.

To check the starting hypothesis, ***a set of 5 tests were proposed (5)*** in order to assess the ability of space-time orientation in the children selected for research. It is worth mentioning that the tests are based on the means specific to the game of basketball. During the research, one sample was measured at the beginning and at the end. After the initial test, the means of space-time orientation development were selected and included into operational models, being used in various stages of the training lessons for an interval of one year. The tests applied were identical in both assessments. In order to make an accurate assessment, the marking system was numerical, expressed by numbers from 1 to 10. Minimum levels of performance were given for all tests (Table 1).

Table 1. Basic levels for the tests proposed to assess the space-time orientation ability in children aged 8-9

No.	Test 1		Test 2		Test 3		Test 4		Test 5	
	Standard (seconds)	Mark	Standard (seconds)	Mark	Standard (no. throws)	Mark	Standard (seconds)	Mark	Standard (seconds)	Mark
1.	5,1	10	25 ''	10	10	10	25 ''	10	25 ''	10
2.	5,2	9	26''	9	9	9	26''	9	26''	9
3.	5,3	8	27''	8	8	8	27''	8	27''	8
4.	5,4	7	28''	7	7	7	28''	7	28''	7
5.	5,5	6	29''	6	6	6	29''	6	29''	6
6.	5,6	5	30''	5	5	5	30''	5	30''	5
7.	5,7	4	31''	4	4	4	31''	4	31''	4
8.	5,8	3	32''	3	3	3	32''	3	32''	3
9.	5,9	2	33''	2	2	2	33''	2	33''	2
10.	5,0	1	34''	1	1	1	34''	1	34''	1

The description of the tests used to assess the space-time orientation ability is the following:

Test 1
Materials used: flagpoles
Place: basketball court

Test description: racing with changes of direction near hurdles (Figure 1) on a 20-meter distance, standing starting position. Timing starts at the first move.

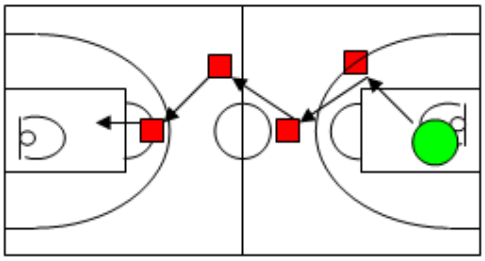

Figure 1. Route of technical event no.1

Test 2
Materials used: basketballs
Place: basketball court
Test description: The executor, his back turned against the movement direction, throws the ball up, catches it, executes a 90° turn and crosses the court dribbling (Figure. 2). Timing starts at the moment of the turn when dribbling starts. The able arm is used.

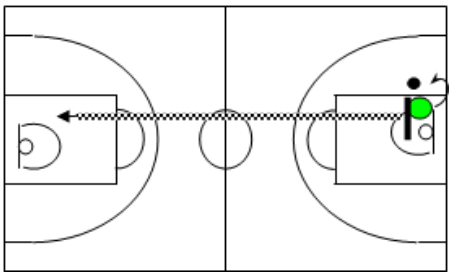

Figure 2. Route of test no.2

Test 3
Materials used: basketballs
Place: basketball court
Test description: in pairs, face to face, the children have to perform the following tasks: one passes the ball, the other is the executor. The procedure effected is passing the ball double-handedly from the chest level in various planes (sideways - right\ left, up\ down) at the passing player's command. Each child will throw a number of 10 passes (Figure. 3). The marking system is shown in Table 1.

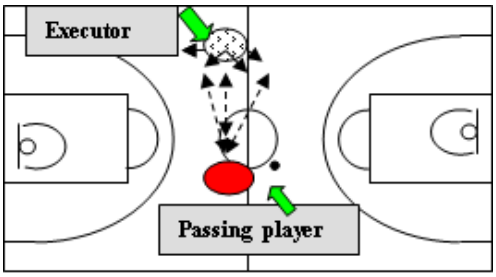

Figure 3. Route of test no.3

Test 4
Materials used: basketballs, hoop
Place: basketball court
Test description: a hoop placed at a distance of 4 meters at a height of 1.5 m, nailed down on the wall (Figure 4). The children squat facing against the throwing direction, the ball is held at chest level, the grip is symmetrical, then they take a 180° turn and go back to the squatting position at the signal of a whistle. In this position 10 throws are executed to a fixed target, in an interval previously agreed on (30''). The marking system for this test is shown in Table 1.

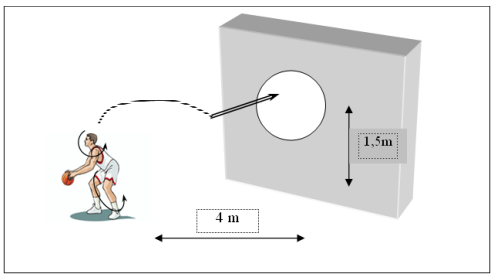

Figure 4. Route of test no.4

Test 5
Materials used: basketballs, flagpoles
Place: basketball court
Test description: Two-ball dribbling is simultaneously executed on a marked course (Figure 5). Next to each flagpole the numbers 1 to 8 have been marked. The executor starts moving at the sound of the whistle, then follows the direction indicated by the numbers on the marked course. The marking system is shown in Table 1.

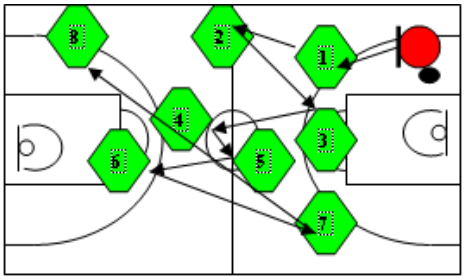

Figure 5. Route of test no.5

DATA PROCESSING AND INTERPRETATION
The analysis and interpretation of data from statistical point of view for the average and standard deviation at each variable of the sample was made using the tutorial Usable Statistic coordinated by Jeff Sauro (http://www.usablestats.com/calcs/2samplet).

RESULTS AND DISCUSSION
The descriptive analysis of the statistical parameters - average, standard deviation, for the research sample - was included in Tables 2-6.
Upon the statistical mathematical processing of the data registered in the initial and the final test of the

control events, a series of values were obtained, as follows:

a. Test no. 1

Table 2. Values of statistic indices in the initial and final assessment for test 1

	N	Mean	StDev	SE Mean
Sample 1 TI	20	7.1	1.4473	0.324
Sample 2 TF	20	8.35	1.387	0.31

Observed difference (Sample 1 - Sample 2): -1.25
Standard Deviation of Difference: 0.4482
Unequal Variances
DF: 37
95% Confidence Interval for the Difference(-2.1581, -0.3419)
T-Value -2.7889
Population 1 ≠ Population 2: P-Value = 0.0084
Population 1 < Population 2: P-Value = 0.9958
Population 1 > Population 2: P-Value = 0.0042

Equal Variances
Pooled Standard Deviation: 1.4175
Pooled DF: 38
95% Confidence Interval for the Difference (-2.1573, -0.3427)
T-Value -2.7886
Population 1 ≠ Population 2: P-Value = 0.0082
Population 1 < Population 2: P-Value = 0.9959
Population 1 > Population 2: P-Value = 0.0041

b. Test no. 2

Table 3. Values of statistic indices in the initial and final assessment for test 2

	N	Mean	StDev	SE Mean
Sample 1 TI	20	6.2	1.5424	0.345
Sample 2 TF	20	7.65	1.5985	0.357

Observed difference (Sample 1 - Sample 2): -1.45
Standard Deviation of Difference: 0.4967
Unequal Variances
DF: 37
95% Confidence Interval for the Difference (-2.4564, -0.4436)
T-Value -2.9193
Population 1 ≠ Population 2: P-Value = 0.006
Population 1 ≠ Population 2: P-Value = 0.0058
Population 1 < Population 2: P-Value = 0.9971
Population 1 > Population 2: P-Value = 0.0029

Population 1 < Population 2: P-Value = 0.997
Population 1 > Population 2: P-Value = 0.003
Equal Variances
Pooled Standard Deviation: 1.5707
Pooled DF: 38
95% Confidence Interval for the Difference (-2.4555, -0.4445)
T-Value -2.9193

c. Test no.3

Table 4. Values of statistic indices in the initial and final assessment for test 3

	N	Mean	StDev	SE Mean
Sample 1 TI	20	6.65	1.0894	0.244
Sample 2 TF	20	8.7	1.0809	0.242

Observed difference (Sample 1 - Sample 2): -2.05
Standard Deviation of Difference: 0.3432
Unequal Variances
DF: 37

95% Confidence Interval for the Difference (-2.7454, -1.3546)
T-Value -5.9732
Population 1 ≠ Population 2: P-Value = < .00001
Population 1 < Population 2: P-Value = >.99999

Population 1 > Population 2: P-Value = < .00001
Equal Variances
Pooled Standard Deviation: 1.0852
Pooled DF: 38
95% Confidence Interval for the Difference (-2.7448, -1.3552)
T-Value -5.9737
Population 1 ≠ Population 2: P-Value = < .00001
Population 1 < Population 2: P-Value = >.99999
Population 1 > Population 2: P-Value = < .00001

d. Test no.4

Table 5. Values of statistic indices in the initial and final assessment for test 4

	N	Mean	StDev	SE Mean
Sample 1 TI	20	5.9	1.2096	0.27
Sample 2 TF	20	7.5	1.2773	0.286

Observed difference (Sample 1 - Sample 2): -1.6
Standard Deviation of Difference: 0.3934
Unequal Variances
DF: 37
95% Confidence Interval for the Difference (-2.3971, -0.8029)
T-Value -4.0671
Population 1 ≠ Population 2: P-Value = 0.0002
Population 1 < Population 2: P-Value = 0.9999
Population 1 > Population 2: P-Value = 0.0001
Equal Variances
Pooled Standard Deviation: 1.2439
Pooled DF: 38
95% Confidence Interval for the Difference (-2.3964, -0.8036)
T-Value -4.0676
Population 1 ≠ Population 2: P-Value = 0.0002
Population 1 < Population 2: P-Value = 0.9999
Population 1 > Population 2: P-Value = 0.0001

e. Test no.5

Table 6. Values of statistic indices in the initial and final assessment for test 5

	N	Mean	StDev	SE Mean
Sample 1 TI	20	6.6	1.6351	0.366
Sample 2 TF	20	7.95	1.572	0.352

Observed difference (Sample 1 - Sample 2): -1.35
Standard Deviation of Difference: 0.5072
Unequal Variances
DF: 37
95% Confidence Interval for the Difference (-2.3777, -0.3223)
T-Value -2.6617
Population 1 ≠ Population 2: P-Value = 0.0114
Population 1 < Population 2: P-Value = 0.9943
Population 1 > Population 2: P-Value = 0.0057
Equal Variances
Pooled Standard Deviation: 1.6039
Pooled DF: 38
95% Confidence Interval for the Difference (-2.3768, -0.3232)
T-Value -2.6617
Population 1 ≠ Population 2: P-Value = 0.0114
Population 1 < Population 2: P-Value = 0.9943
Population 1 > Population 2: P-Value = 0.0057

In the initial test the data highlight the low development level of the space-time orientation in the children included in the research (baby-basketball category) and the need to use game-specific means in the training lessons in order to maximize performance.

Data processing in the final test reveal better scores, therefore increased performance. The progress is also evinced through the value of the "t" test. It registered values higher than those in Fisher's table (**t**-tab.=***2.086*** at the significant threshold P-0.05) at a significant threshold $p<0.05$, for all the tests administered to the children. The data shown in Figure 6 highlight the increase of the average mark in all the tests administered to the children.

Test 1 (racing with direction changes) registered a marking average of 7.1 as compared to 8.35 in the final test, i.e. a 1.25 difference. The comparative results in test 2 (throw-catch-turn-dribble) shows a difference of averages of 6.2 in the initial test and 7.65 in the final test, thus registering a difference of 1.45. The values of the averages in the initial test (6.65) and the final test (8.7) in test 3 exhibits the notable performance increase in the children under study, i.e. by 2.05, the highest difference in the tests under evaluation.

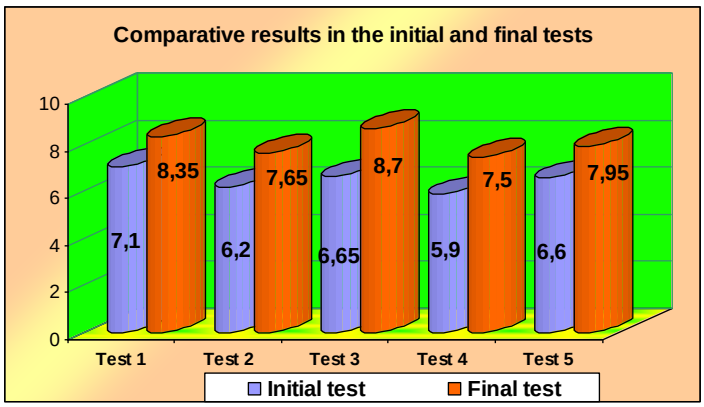

Figure 6. Comparative results in the initial and final tests

The comparative results of (5.9) and (7.5) in test 4 (fixed target throw) indicate a high value of the averages in favour of the final test. The difference between the two tests is 1.6. In test 5 (two-ball dribbling), the average in the initial test was 6.6 as compared to the final test where the average recorded was 7.95, i.e. an increase of 1.35.

The collection of the average in the specific tests proposed for the two assessment periods shows the improvement of the space-time orientation ability in the sample under study. The averages in the final test (8.03) increase as compared to those in the initial test (6.49), the difference thus being of 1.54.

Conclusions:

1. The data obtained in the tests prove that the space-time orientation may also develop in the baby-basketball category by the basketball-specific means, thus confirming the research hypothesis.

2. The analysis and interpretation of the assessment results upon the administration of the tests proposed in the present paper yield a notable improvement of the children's space-time orientation ability.

3. These tests proved their efficiency and may constitute a selection criterion in finding gifted children and including them in the elite groups of basketball training.

4. The practical use of the results previously processed proves that the proper selection of means, dosage and test type may improve the space-time orientation ability in children aged 8-9.

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