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# RESULTS FROM SPECIALIZED TEST FOR AGILITY CONTROL OF 11-12 YEAR-OLD PUPILS

*(Original scientific paper)*

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**Abstract**

*Agility represents motor quality connected with the ability of the organism to coordinate separate movement and action in time, space and effort, adequate to the motor task (Zhelyaskov & Dashevam (*Желязков & Дашева), *2011). Many tests for agility control exist in practice, but in most cases the information provided by the criteria, reliability, objectiveness, validity and* standardization *is not established with different groups of people. For this task in February and March 2013 we conducted an experimental study with 5th grade students aged between 11-12 years old. They were 99, divided in 4 groups according to their sport-motor activity and gender. In short time interval completed the test "slalom movement" twice. The analysis of mathematical methods data processed, allowed the criteria for informativeness of the chosen complex and specialized tests of agility control to be determined. It was concluded that in both groups of non-active training and active training in group sports, of boys the results were compatible with the requirements effective application of the test. In both endurance sports groups and challenge sports groups that were not found. Application of the described adequate and necessary methodological approach improved the process of quality control of agility in 11-12 year-old students.*

**Keywords:** *pedagogical experiment, reliability, validity, standardization, objectiveness, "slalom movement" test, questionnaire, analysis of variance, Pearson's correlation, agility test, pupils*

## INTRODUCTION

Agility is a complex motor quality which has direct relation to mastering of technical elements and new movement with increased coordination complexity (Rachev (Рачев), 1998). The exercises for it development should be in compliance with the indicated, toward the space feeling, time and a degree of neuromuscular effort to be developed (Petkova & Kvartnikova (Петрова & Квартирникова). 1985).Quality control requires measurement of completion time of specific test and subsequent quantitative evaluation. The only testing that is expedient is the one where the applied motor exercises and conditions, in which they are conducted, are attested and quantitatively evaluated for reliability, validity, standardization and objectiveness, as well as the presence of results evaluation system (Bachev (Бачев), 2011). Moreover, the time loss should be kept to a minimum. The test to be used has to be detail planned and carefully selected (Bube, Fec, Shubler & Trogsh 1972). In connection with this we focused our attention towards a complex test for quality control of agility – the *"slalom movement" test.*

*The goal* of this study is to improve the process of agility control with 11-12 year-old 5th graders pupil through experimental establishment of the criteria for informativeness of a complex and specialized in this sense test.

*Subgoals of the study:*

1. Selection of an agility control test and experimental research with its application with 11-12 year-old students.
2. Determination of basic criteria for informativeness - validity, standardization, objectiveness for the chosen test.
3. Determination of the statistical reliability of the chosen test with non-active training students and active training students.

## METHODS

*The objects* of our study are control of the motor quality agility and the criteria for informativeness of the *"slalom movement" test*.

*The subjects* are students from the 5th grade of 81 "Victor Hugo", Sofia aged 11-12 years old. The number of tested students is 99, from which 58 boys and 41 girls.

The methods used in the research process were:

- literary research;

- questionnaire to inquire the attitude of students to towards sports. That was used to divide in different groups;
- pedagogical experiment;
- examination with the "slalom movement" test (fig.1.).

The test begins in standing starting position. When the start signal is given the students makes a step forward roll of a mattress. After that 5 meter distance is run to the first cone. Five consecutive cones, placed 1 meter apart, are jumped over (overlapped). A 2 m. run follows and two stands (pillars) are by passed – the first from the right and the other - from the left. The distance between them is 2 m. and there is a bar attached on 1 m. height, under which the student must go. After another 2 m. run is the finish.

The distance of the whole test is 18 m. The test is devised for students aged from 10 to 19 years.

To establish reliability of the "slalom movement" test results we use repetitive testing methods. Time measurement for test completion is done with a stop watch and is recorded in a protocol

- Mathematical methods that we applied were calculated using the program Microsoft office Excel 2003. They were *analysis of variance*, graphical representation, average level indicators, distraction indicators, calculation of standard linear *Pearson's correlation*.

**RESULTS AND DISSCUSION**

Determining of the criteria *informativeness* – validity, objectivness, standard and reliability of the "slalom movement' test are presented consequently.

*Validity* of the test was proven through logical analysis of its contending. It consists of several elements, which are connected - forward roll, running, jumping and passing through. All this elements are a function of the coordination abilities of the students and require fast respond of suddenly changing situation. Within 18 m. (the length of the test) the situation changing constantly. This showed that contend of the test included all elements comprising the quality agility. The test is valid for it measurement and control.

The test is *objective* because there is more than one researcher when register the time achievements.

It is *standard* because the requirements and conditions for it execution are equal for all subjects.

*Statistical reliability* we determined on the bases of achievement from the second testing, which are metrically scaled. In this case through calculation of the standard linear correlation of *Pearson's correlation* coefficient we can also determine the character of reliability. It is satisfactory if the value of the coefficient "r" is above or equal to 0.8 and the number of test subjects is large (preferably then 20).

For greater precision we divided the test subject not only by physical activity but also by gender.

The group of non active *training* students consists of 43 subjects. The number of the boys in the group was 21 and the value of the calculated *Pearson's correlation* coefficient was 0.8. It shows that the test has high statistical reliability. The Table 1. provide the results of the variation analysis. Fig.2 shows a graph with results distribution.

Table 1. clearly shows that the second attempt was better than the first in these indicators - mean, median, range, maximum and minimum. The cause can be due to learning of the execution technique. On the graph 2. we can see that there is a normal distribution of the results from the two attempts of the students – 42 in total. On these bases we can also create one evaluation scale. The abscissa represents the time in (s) and the ordinate – the number of students falling under the given results, represented by (n).

The best results are in the 6.01 -8.00 seconds interval. The most common results are in the 8.01 -10.00 seconds interval. The 10.01 – 12.00 seconds interval consist of the below average results. The weakest results with the non active training boys are in the 12.00-14.00 seconds interval. Table 2 represents the corresponding grade on the students in accordance with their age and physical abilities.

All non active training girls age between 11-12 years old what we researched were 22 total. The *Pearson's correlation* coefficient was at value of 0.27. This value is too low and is not satisfying for reliability. For this reason we think that is not appropriate to represent other results of non active training girls.

The group of active training consist of students

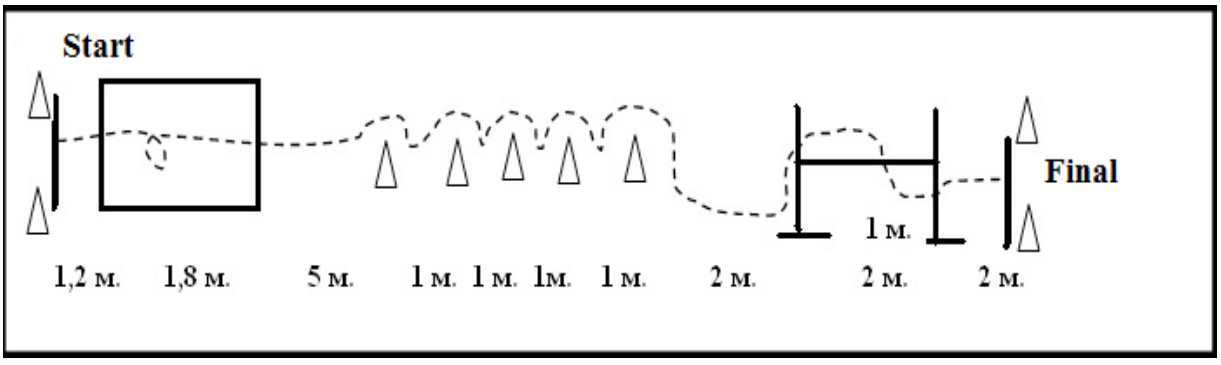
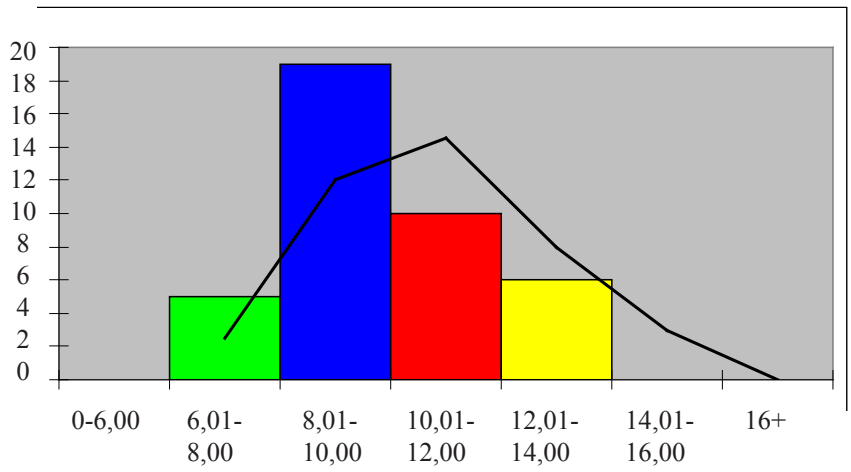



*Fig.1. Test "slalom movement"*

*Table 1. Results from analysis of variance for "slalom movement" test of non active training boys*

| *Statistical parameters* | | *Attempt 1* | *Attempt 2* |
|---|---|---|---|
| Mean | ( X) | 10,18 | 9,43 |
| Standard Error | (m X) | 0,39 | 0,30 |
| Median | (Me) | 10,01 | 9,36 |
| Mode | (Mo) | n/a | n/a |
| Standard Deviation | (S) | 1,77 | 1,32 |
| Sample Variance | ($S^2$) | 3,12 | 1,75 |
| Kurtosis | (Ex) | (0,77) | (0,01) |
| Skewness | (As) | 0,33 | 0,48 |
| Range | (R) | 6,16 | 5,10 |
| Minimum | (Min) | 7,37 | 7,20 |
| Maximum | (Max) | 13,53 | 12,30 |
| Sum | (∑x) | 203,58 | 188,60 |
| Coint | (n) | 21 | 21 |




| *S* | *n* |
|---|---|
| 0-6,00 | 0 |
| 6,01-8,00 | 5 |
| 8,01-10,00 | 19 |
| 10,01-12,00 | 10 |
| 12,01-14,00 | 6 |
| 14,01-16,00 | 0 |
| 16+ | 0 |

*Fig. 2. Distribution of achievement of non active training boys*

*Table 2. Normative table for grading of the test achievement wit non active training boys*

| Grade | | Achievement |
|---|---|---|
| Excellent (5,50 – 6,00) | A | (under 8,00s.) |
| Very good (4,50 – 5,49) | B | (8,01s. - 10,00s.) |
| Good (3,50 – 4,49) | C | (10,01s. - 12,00s.) |
| Average ( 2,50 – 3,49) | D | (12,01s. - 14,00s.) |
| Poor ( under 2,50) | F | (over 14,01s.) |

practicing – basketball, volleyball, football and handball. Again the results of the boys are presented first. There are 23 boys and value of the *Pearson's correlation* (r) is equal to 0.84. This is highly statistically reliable. The number of this pupils is large, the date were satisfactory.

Table 3. shows *analysis of variance* of active training boys in group sport, aged 11-12 years old and fig.3 - the graph of grade distribution.

The results depicted in Table 3. again show us that the second attempt is better than the first one. The value is very close and is in the 4 seconds range in both attempts. In Fig. 3. we can make the following important analysis for both student attempts. The best results of tested subject in the research are in this group – 6.69 seconds. The average attempt which is also the most are in the 8.01 – 10.00 seconds interval. The weakest results are in the 10.01 – 12.0 seconds interval. There is no attempt over 12.00 second which is a good achievement. In conclusion we thing this test is appropriate for boy aged 11-12 training in group sports.

The number of girls training in group sports is 13. The value of the Pearson coefficient is r = 0.84 – the

*Table 3. Results from variational analysis for "slalom movement" test on active training in groups sports boys*

| *Statistical parameters* | | *Attempt 1* | *Attempt 2* |
|---|---|---|---|
| Mean | ( X) | 8,57 | 8,39 |
| Standard Error | (m X) | 0,19 | 0,23 |
| Median | (Me) | 8,52 | 8,04 |
| Mode | (Mo) | 7,79 | n/a |
| Standard Deviation | (S) | 0,93 | 1,12 |
| Sample Variance | ($S^2$) | 0,87 | 1,25 |
| Kurtosis | (Ex) | 0,84 | -0,83 |
| Skewness | (As) | 0,78 | 0,60 |
| Range | (R) | 4,15 | 3,83 |
| Minimum | (Min) | 6,86 | 6,69 |
| Maximum | (Max) | 11,01 | 10,52 |
| Sum | (∑x) | 197,09 | 192,89 |
| Coint | (n) | 23 | 23 |

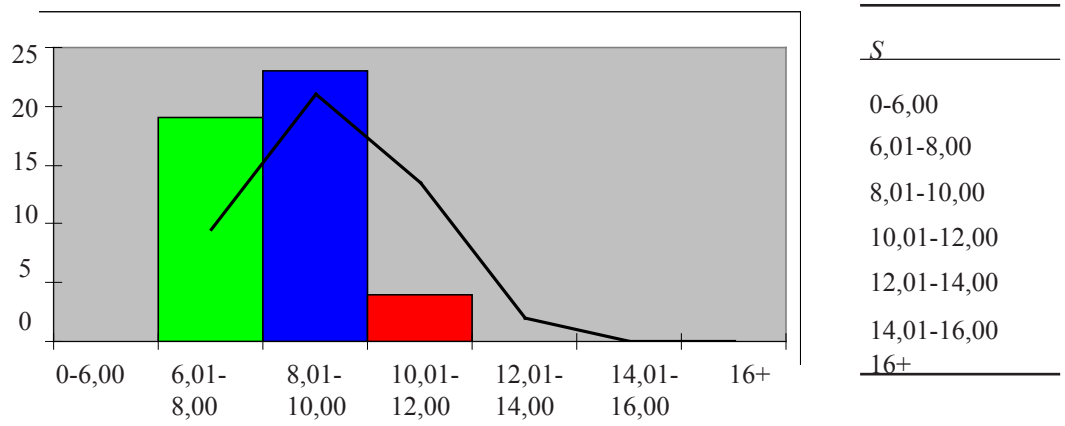



*Fig. 3. Distribution on achievement on active training groups sports*

same as with the boys but the number of researched subjects is lower. The results can be questioned and that is the reason we do not present the variation analysis and distribution graph connected with them.

The challenge sports groups include the students practicing – taekwondo, kung fu, boxing, aikido and karate. Statistical reliability in this group was not researched because the number of subjects is only 8.

The third group consists of students practicing in endurance sports – swimming, tennis and dance. The number of boys and girls is 14. The calculated value of Pearson coefficient is "r"=0.67. The established reliability for this group, as well as the low number of tested students is not satisfactory. For this reason we consider that the application of the test in the process of agility control with the last two groups is not expedient.

## CONCLUSIONS

The conclusions that we reached were as follows: 1. The "slalom movement" test is a complex test and is very suitable for non active training boys and students training in groups sports. 2. The statistical reliability of the test is not satisfactory for the non active training girls that were in the study. 3. We also consider the test application is not expedient for the endurance sport training students. 4. The "slalom movement" test should be applied in physical education in schools and sport for control and evaluation of agility, after researching its statistical reliability with a selected group of students.

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