STUDY REGARDING THE EVALUATION OF AGILITY IN SIXTH GRADERS

Cătălina Ababei, "Vasile Alecsandri" University of Bacău
e-mail:ababeicatalina@ub.ro

Abstract

Although agility is not a new word, it is used more frequently in athletic activities: professional sports, physical education lesson, or leisure time activities. That is because agility implies actually a combination of strength, speed, coordination, and balance. This author chose to evaluate agility in sixth graders because at this age the plasticity degree of the cerebral cortex is very high, allowing the children to learn new motor skills very fast. The test chosen for this study was the Figure 8 Hop Test, which was validated and published in the book "Functional testing in Human Performance" (the chapter "Speed, Agility and Quickness Testing") (2009), by M.P. Reiman, RC. Manske. This research started from the hypothesis stating that *the Figure 8 Hop Test could highlight the development level of speed, power and balance, which could lead to a possible assessment of the effectiveness of the means and methods used in this purpose during the physical education lesson. In the end, the study has confirmed partially the working hypothesis.*

Key words: figure eight hop test, pupils, agility

1. Introduction

The development of basic motor skills during the physical education lesson through classic methods seems to lose ground, as the attractiveness of the track and field themed lessons seems to suffer (C. Ababei 2012). In this context, in 2016, the study conducted on two primary grades has confirmed that by introducing in the physical education lessons the concept "IAAF KIDS' ATHLETICS" the social interaction was positively influenced as well as the pupils' performances during the assessment challenges (C. Ababei, 2017). Continuing the studies in this sense, it can be said that the psychomotor development level in middle school pupils can be also improved. This age level was chosen because, according to Bringman (1973), here one can improve the best the motor control skills, the motor combinations (Meinel, 1976), and the temporal, reaction, and rhythm differentiation skill (Hirtz, 1978). The end of the maturing of the motor cortical area facilitates the cooperation between the involuntary and the voluntary movements, dependent on the motor cerebral cortex.

At this age also, suppleness exercises are also recommended; later this can be maintained and be less improved (Zatiorski, 1973).

The author of this paper believes that the *Figure 8 Hop Test* can give the pupils the ability to control their power, speed and balance, in other words one can assess the children's agility in a more dynamic and attractive way.

In regards to the definition of agility, there are no divergent opinions. The Romanian Language Dictionary defines **AGILITY** *n. as swiftness, quickness, suppleness, physical nimbleness.*

Agility/Suppleness is defined by experts in the field as an ability of the articular system that conditions the effectiveness of various motor actions, usually being associated with a good motor performance. In the professional literature, the term has several synonyms: suppleness, flexibility, joint mobility, muscle/ligament extensibility (Dragnea, Bota, 1999). Harre and Frey see mobility as being "a person's ability to perform motions with a large range, through that person's own strength, or under the influence of exterior forces."

2. Purpose, hypothesis, and research methods

This paper's objective was to test sixth grade pupils to highlight the control they have on their power, speed, and dynamic balance and to observe whether the results recorded by the subjects are within the average reference values. This research started from the hypothesis stating *that the Figure 8 Hop Test could highlight the development level of speed, power and balance, which could lead to a possible assessment of the effectiveness of the means and methods used in this purpose during the physical education lesson.*

3. Research subjects

The research was conducted on December 11 - 17, 2017, on the sixth grade from the "Alecu Russo" School of Bacau. The grade was composed of 11 pupils, 8 girls and 3 boys. Table 1 presents the subjects of this study.

Table 1 The sixth graders

No.	Last and First name	Weight (Kg)	Height (cm)
1	B.D*	48	159
2	B.G*	47	161
3	D.R.	78	169
4	I.C*	32	148
5	M.A.	46	160
6	P.A.	64	150
7	P.L*	64	150
8	S.A*	49	146
9	V.B*	45	156
10	I.B*	40	151
11	A.A*	73	161

Female

Table 2 presents the average height and weight in children, according to their age, data collected from the professional literature.

Table 2 Data regarding the average development of height and weight in children, according to their age

Development table: weight and height				
Age	Average weight (kilograms)		Average height (centimeters)	
	Females	Males	Females	Males
12 yrs.	41.5	40.0	153	150

Source: Emil and Herta Capraru, Bucharest, 2007

4. Development of the research

This study used the documentation method, the testing method, and the statistical mathematical method for analyzing the data. The *Figure 8 Hop Test* is a validated test, belonging to authors M.P. Reiman, RC. Manske, who have described it in their book "Functional testing in Human Performance" (the chapter "Speed, Agility and Quickness Testing"), 2009.

The *Figure 8 Hop Test* is described in Figure 1.
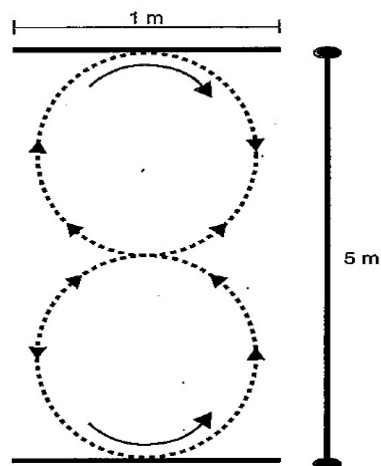
Figure 1 Figure 8 Hop Test
(Based on MP Reiman, RC. Manske, Human Kinetics, 2009)

The test assessed the subjects' ability to control their power, speed, and dynamic balance that are developed in their leg over a multi-directional track, with a focus on the performance speed, in both the

dominant and the non-dominant leg. The test was applied using the following materials: cones to mark the track, a timer, an adherent surface, a measuring tape.

Procedurally, the test was conducted as follows:
1. The pupil stood on one leg behind the start line, his hands on his hips.
2. When the command "start" is given, the subject started hopping on one leg in an eight shaped direction.
3. It is recommended that the first performance is done with the non-dominant leg.
4. There were two performances for each leg, the best result being recorded.

The average reference values are presented in table 3.

Table 3 The reference values for the *Figure 8 Hop Test*

Figure 8 Hop Test	Normal value Male	Normal value Female
Non-dominant leg (sec)	11.39±1.38	12.64±0.88
Dominant leg (sec)	11.36±1.30	12.47±0.89

Based on Itoh et al.1998, Oritz et al.2005, p<0.5

5. Results of the research

The results recorded for both the dominant and the non-dominant leg are presented as a table. (Table 4)

Table 4 The results recorded for the dominant and the non-dominant leg

| No.	Last and First name	*Figure 8 Hop Test* Non-dominant leg (sec)	*Figure 8 Hop Test* Dominant leg (sec)	Weight (Kg)	Height (cm)
1	B.D*	8.55	7.59	48	159
2	B.G*	10.45	7.49	47	161
3	D.R.	10.66	10.55	78	169
4	I.C*	7.89	7.57	32	148
5	M.A.	9.00	9.12	46	160
6	P.A.	10.42	10.29	64	150
7	P.L*	7.06	7.03	64	150
8	S.A*	7.02	7.81	49	146
9	V.B*	8.56	8.63	45	156
10	I.B*	7.55	6.78	40	151
11	A.A*	10.26	10.52	73	161

*Female

The results were statistically analyzed using the SPSS software to see whether they have a positive or a negative correlation degree in relation to the subjects' height and weight. The Pearson correlations are presented in table 5.

Table 5 The Pearson correlations of the test results in relation to the subjects' height and weight

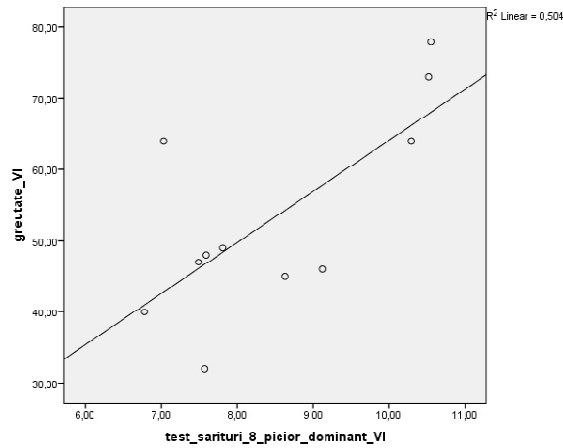| Correlations for the 6th grade		Weight	Height
figure_8_hop_test_non-dominant_leg_6_	Pearson Correlation	.539	.726[*]
	Sig. (2-tailed)	.087	.011
	N	11	11
figure_8_hop_test_dominant_leg_6	Pearson Correlation	.710[*]	.520
	Sig. (2-tailed)	.014	.101
	N	11	11

For the sixth graders, as a result of the Pearson correlations between the *Figure 8 Hop Test*, the non-dominant and the dominant leg and weight, the following correlation indices were recorded:

The index 0.539, p‹0.01, indicates a good, positive correlation between the Figure 8 Hop Test the non-dominant leg and weight, meaning that the pupils with a weight within the average reference values have recorded better results at this test. The result is presented in chart 1.
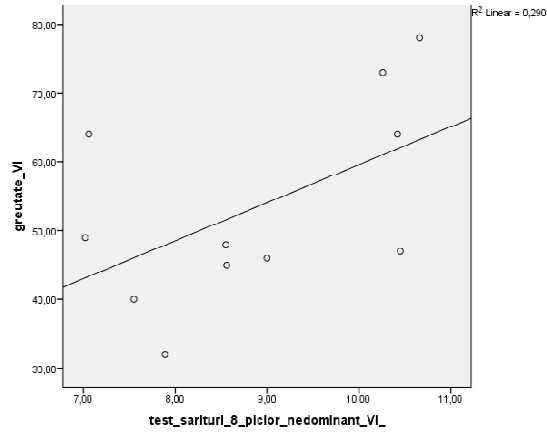
Chart 1 Correlation between the Figure 8 Hop Test non-dominant leg and weight
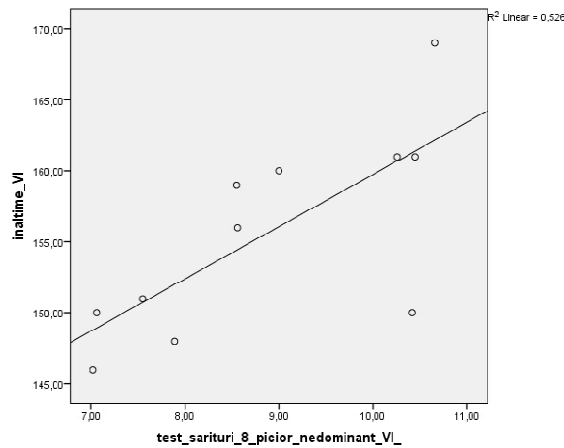
The index 0.710, p‹0.01, indicates a very good, positive correlation between the Figure 8 Hop Test the dominant leg and weight, meaning that the pupils with a weight within the average reference values have recorded better results at this test. The result is presented in chart 2.

Chart 2 Correlation between the Figure 8 Hop Test dominant leg and weight

For the sixth graders, as a result of the Pearson correlations between the *Figure 8 Hop Test*, the non-dominant and the dominant leg and height, the following correlation indices were recorded:

The index 0.726, p‹0.01, indicates a very good, positive correlation between the Figure 8 Hop Test the non-dominant leg and height, meaning that the pupils with a height higher than the average reference values have recorded better results at this test. The result is presented in chart 3.

Chart 3 Correlation between the Figure 8 Hop Test non-dominant leg and height

The index 0.520, p‹0.01, indicates a very good, positive correlation between the Figure 8 Hop Test the dominant leg and height, meaning that the pupils with a height higher than the average reference values have recorded better results at this test. The result is presented in chart 4.
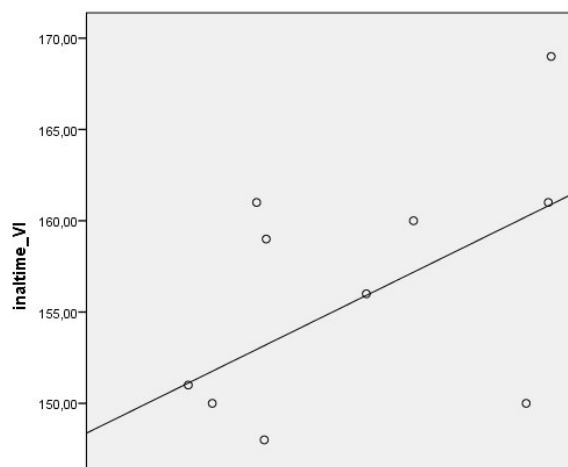
Chart 4 Correlation between the Figure 8 Hop Test dominant leg and height

6. Conclusions

This study has partially confirmed the starting hypothesis, in the sense that the Figure 8 Hop Test has emphasized the subjects' development level of speed, power, and balance, which allows one to say that over the course of the first semester, during the physical education lessons, the selected means have had a positive effect in developing these abilities. The results cannot be generalized because the number of subjects in this research was relatively small, and from this point of view one must be reserved until another research would apply this test to a larger number of subjects. The data recorded and statistically analyzed highlighted the fact that from a motor standpoint, the pupils with a body weight closer to the reference values in the professional literature, but with a height above average, manage to control better their power, speed and dynamic balance, in other words they are more agile. This conclusion is valid for both tests, meaning for both the dominant and the non-dominant leg.

References
1. Ababei, C. (2012) *Study Regarding The Attractiveness Of Track And Field Themed Lessons*, Journal Sport Si Societate, Volume **12,** Issue **2,** p. **164**
1. Ababei, C. (2017) *Study Regarding The Introduction Of The Concept "IAAF Kids' Athletics" In The Primary School In Physical Education Lessons*, **GYMNASIUM**, [S.l.], v. XVIII, n.1
2. Bringmann, W. (1973) *Sportbiologische Grundlagen fur den Unbusgleiter*, Beiheft 3
3. *Capraru, E., Capraru, H.,(2007) Mama şi copilul,* Bucuresti: Editura medicală
4. Dragnea, A., Bota, A. (1999) *Teoria activităţilor motrice.* Bucureşti:Editura Didactică şi Pedagogică
5. Hirtz, P., (1978) Theorie u. Praxis d. Kuperkultur 28, Beih 1, p.11-16
6. Harre, D. et al. (1973) *Teoria antrenamentului sportive*, Bucureşti: Stadion
7. Meinel, K., (1976) Bewegungslehre, Berlin
8. Oritz, A., et al.(2005) *Reability of seleted physical performance tests in young adult women,* J. Sstrength Cond Res,19:39-44
9. Reiman MP., Manske RC., (2009) *Functional testing in Human Performance, Speed, Agility and Quickness Testing*, Human Kinetics, p.160
10. Zatiorski, V.(1973) *Calităţile motrice ale sportivului.* Bucharest: Editura Didactică şi Pedagogică
11. *Dicţionarul Explicativ al Limbii Române. (2009).* Bucharest: Univers Enciclopedic Gold