BASIC MOTOR COMPETENCIES IN THE 1ST AND 2ND GRADE ELEMENTARY SCHOOL CHILDREN IN SLOVAKIA

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ABSTRACT

A number of youth movement activities, e.g. running, walking, jumping, climbing trees, throwing and catching a ball, has been on a decline in the current European cultural space. The results of this research contribute to broadening the knowledge about the level of basic motor competencies and qualifications of the 1st and 2nd grade elementary children in the Slovak Republic. The primary data on the basic motor competencies and qualifications of the examined group (n=307, age = 7.58 ± 0.69 years) were collected by means of the MOBAK 1–2 test battery (Herrmann et al., 2018b). The significance of differences between boys (n=156, age 7.62 ± 0.69) and girls (n=151, age 7.55 ± 0.70) was evaluated by Student's t-test in two independent groups. The boys in the first grade (n = 97) achieved a significantly better performance in basic motor competency object movements ($\bar{x}$ = 5.17 ± 1.79 points) than their female peers (n=88, $\bar{x}$ = 3.52 ± 1.78). The girls in the second grade did not achieve a statistically better performance in the movement qualifications in throwing, balancing and rolling than the first-graders of the same gender. Knowledge of the level of basic motor competencies and qualifications of the Slovak elementary school children allows the national and European educational and cultural authorities to design and improve the content of physical and sport education classes.

Keywords: basic motor competencies; first-graders; second-graders; elementary school; boys and girls; MOBAK 1-2 test battery

Introduction

Basic motor competencies are defined as functional performance dispositions, which guarantee that children are qualified to participate in sports and exercise (Herrmann et al., 2019).

Unfortunately, the current European culture foster the lifestyle with limited daily physical activities in almost all of its citizens regardless of their age and gender. For example, the parents drive their children to school by car every day and then continue to work. In both cases, they only carry out minimum motor activity. It is unthinkable for many Europeans to walk to school or walk to work...

A similar situation can be observed in children and adolescents. The several-hours-long unorganized physical outdoor activities after coming home from school are a thing of the past. The interest in physical activities organized by schools, sports clubs and non-profit organizations is on a decline. Many young people do not perform any physical activity at all.

Such a behavior has far-reaching society-wide health and economic impacts.

Herrmann and his colleagues (Herrmann et al., 2017a; Herrmann et al., 2018b) set the objective to map the level of basic movement skills and abilities in children of both sexes from kindergarten to the sixth grade of elementary school. They developed the MOBAK-KG test battery for kindergartens (Herrmann et al., 2019), MOBAK 1-2 for the pupils of the first and second grade elementary school (Herrmann and Seelig, 2014, 2017a; Herrmann et al., 2018a), MOBAK 3-4 for the third and fourth grade elementary school (Herrmann & Seelig, 2015; 2017b) and MOBAK 5-6 for the fifth and sixth grade elementary school (Herrmann & Seelig, 2016; Herrmann & Seelig, 2017c).

All four test batteries contain motor tasks targeted at demonstrating the level of children's skills in two areas:

1. object-movement tasks with ball and/or small ball control activities;
2. self-movement tasks with body control activities.

The first group of tasks includes the following tests:

1. throwing a ball at a stationary target;
2. different methods of catching a moving ball or small ball;
3. dribbling the ball by hand/hands;
4. dribbling the ball by foot/feet.

The second group of tests includes:

1. maintaining dynamic balance;
2. various rolling;
3. various jumping;
4. various types of movements (walking, running, shuffle stepping sideways …).

It is clear that the motor tasks in the test items copy a number of spontaneous activities of children:

1. in the yard, for example, the child throws and catches the ball bouncing off the wall, dribbles and kicks the ball;
2. in the nature, for example, the child balances while walking on a tree that fell over the stream, jumps over various natural obstacles, playfully crosses rugged terrain etc.

The creators of the MOBAK test batteries Herrmann & Seelig (2014, 2015, 2016) repeatedly reported that the sets of test tasks were also designed to identify talented children in sports games (ball or small ball control with upper and lower limbs) and select talented children for individual sports, such as athletics or gymnastics (body movement control). [1]

In addition to the methodological approaches, a number of researchers (Tuminaitė, 2016; Mačura et al., 2017; Vrbas, 2017; Herrmann et al., 2018b; Gerlach et al., 2018; Masaryková & Labudová,

1 The importance of examining the basic motor competencies and qualifications of children is also evidenced by the award of a two-year (2018–2019) Erasmus + grant titled *Basic Motor Competencies – EU* (BMC-EU, 2018) by the European Union.

2018; Quitério et al., 2018; Scheuer et al., 2019) have begun publishing the first results of children at the level of basic motor competencies and qualifications.

The main aim of our paper is to improve the understanding of the level of basic motor competencies and qualifications of the first-graders and second-graders in both sexes in the Slovak Republic with a vision of their potential comparison with the peers from other countries from the European Union and worldwide. We identified and compared the level of performance in boys and girls – first-graders and second-graders – at the level of basic motor competencies: object-movement and self-movement.

Method

The primary data on the basic motor competencies and qualifications of the examined groups (Tab. 1) were obtained by means of the MOBAK 1-2 test battery (Herrmann et al., 2018b).

The significance of differences was calculated and evaluated by Student's t-test in two independent groups (Vincent & Weir, 2012). The statistical analyses were done in Excel with the significance levels of $p \leq .05$ and $p \leq .01$. The testing was performed in the second half of the 2018/2019 school year in the period from January to May 2019.

Table 1 *Descriptive parameters of compared groups*

Grade	Gender	n	Decimal age ($\bar{x}$) [years]	Range [years]
1st	♂	97	7.21±0.41	6.31–8.26
1st	♀	88	7.04±0.40	6.33–8.31
1st	♂ + ♀	185	7.13±0.41	6.31–8.31
2nd	♂	59	8.30±0.43	7.22–9.34
2nd	♀	63	8.25±0.29	7.60–8.94
2nd	♂ + ♀	122	8.28±0.37	7.22–9.34
1st + 2nd	♂	156	7.62±0.69	6.33–8.94
1st + 2nd	♀	151	7.55±0.70	6.31–9.34
1st + 2nd	♂ + ♀	307	7.58±0.69	6.31–9.34

Results

Effects of age: As expected, the second-graders (♂ + ♀) had statistically better results both in the object movement and self-movement activities compared to the first-graders (Fig. 1, Tab. 2).

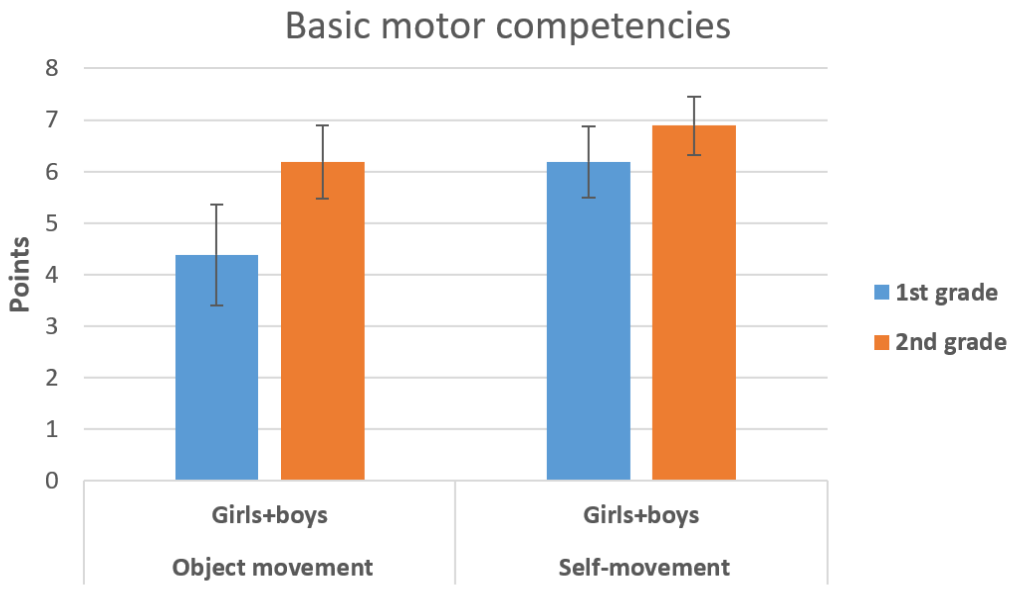

Figure 1 *Comparison of basic motor competencies between first-graders and second-graders in Slovakia*

Table 2 *Basic motor competencies of the compared grade groups regardless of gender (♂ + ♀)*

Grade	Object movement ($\bar{x}$) [points]		Self-movement ($\bar{x}$) [points]	
1st	4.38±1.96		6.19±1.38	
2nd	6.19±1.42	-9.361**	6.89±1.13	-4.679**

** p ≤.01

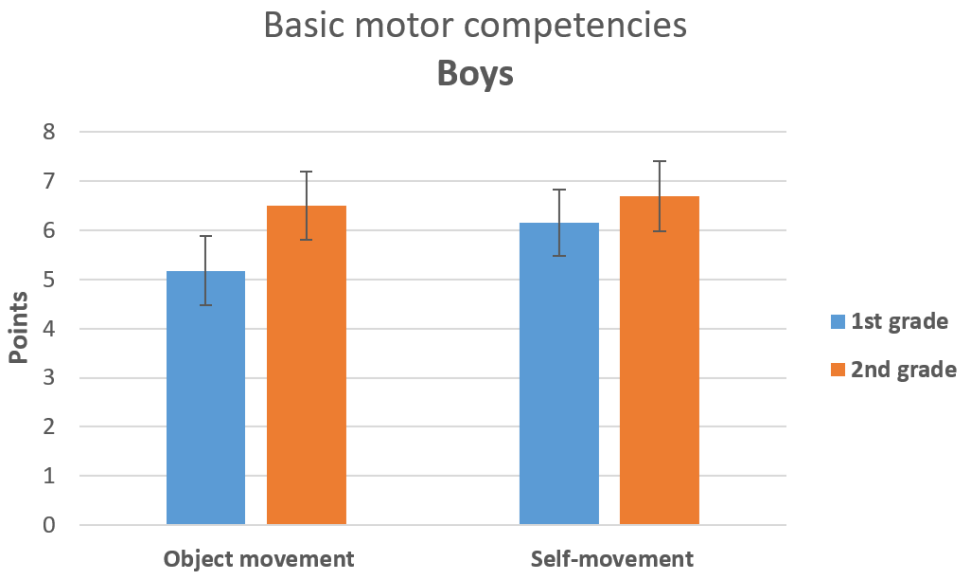

Figure 2 *Comparison of basic motor competencies between first-grade and second-grade boys in Slovakia*

The skill levels in second-grade boys in self-movement activities were indeed higher, but not by a significant margin compared to the first-graders (Fig. 2, Tab. 3). In the ball and small ball control activities (object movement activities) we found statistically higher levels in the second-graders than in the first-graders.

Table 3 *Basic motor competencies of the compared first-grade and second-grade boys*

Grade	Object movement ($\bar{x}$) [points]		Self-movement ($\bar{x}$) [points]	
1st	5.17±1.79		6.14±1.38	
2nd	6.49±1.43	-4.830**	6.68±1.32	-2.385

** p ≤.01

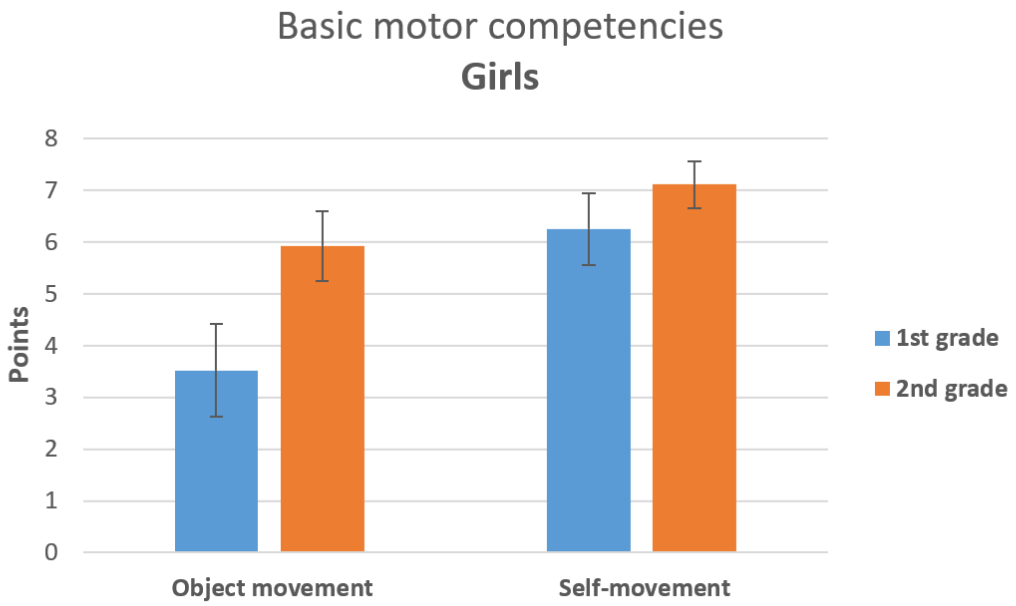

Figure 3 *Comparison of basic motor competencies between first-grade and second-grade girls in Slovakia*

The second-grade girls achieved significantly better results in both basic motor competencies than the younger first-graders (Fig. 3, Tab. 4).

Table 4 *Basic motor competencies of the compared groups of first-grade and second-grade girls*

Grade	Object movement ($\bar{x}$) [points]		Self-movement ($\bar{x}$) [points]	
1st	3.52±1.78		6.24±1,40	
2nd	5.90±1.35	-9.356**	7.10±0.89	-4.588**

** p ≤.01

Effects of gender: Unlike the boys, the older second-grade girls achieved significantly better performance compared to the performance of first-grade girls in movement tasks not only in object movement, but also in self-movement (Fig. 3, Tab. 4).

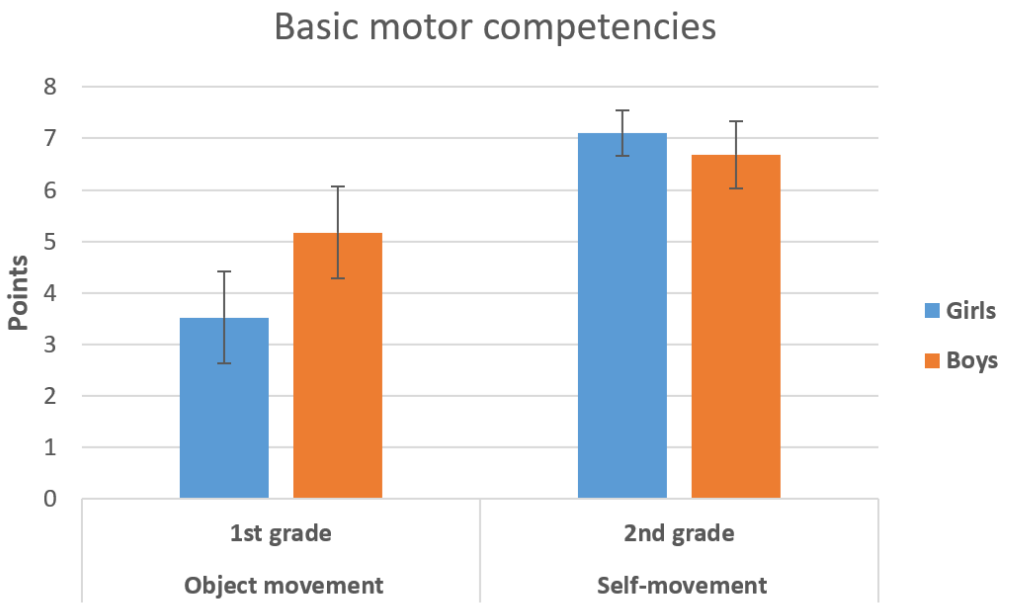

Figure 4 *Comparison of basic motor competencies between the girls and boys in Slovakia*

First-graders: Gender comparison. The first-grade boys had a significantly better performance in object movement than the first-grader girls. In contrast, we found better performance levels of the first-grade girls in self-movement compared to the first-grade boys, but they were not statistically significant (Fig. 4, Tab. 5).

Second-graders: Gender comparison. The second-grade boys were better in object movement activities ($p \leq 1\%$) compared to the second-grade girls. The situation reversed in the self-movement activities (Fig. 4, Tab. 5).

Gender comparison independent on age. By comparing all the girls and boys from the first and second grade, we found that girls are better at self-movement, but this difference is statistically insignificant when compared to the boys. In object movement, the boys were significantly better than girls (Fig. 4, Tab. 5).

Table 5 *Basic motor competencies of the compared groups of girls and boys in Slovakia*

Grade	Gender	Object movement ($\bar{x}$) [points]		Self-movement ($\bar{x}$) [points]	
1st	♂	5.16±1.79		6.14±1.38	
1st	♀	3.52±1.78	-6.259**	6.24±1,40	1.830
2nd	♂	6.49±1.43		6.68±1.32	
2nd	♀	5.90±1.35	-2.328**	7.10±0.89	-2.033**
1st + 2nd	♂	5.67±1.78		6.35±1.38	
1st + 2nd	♀	4.52±1.99	-5.338**	6.60±1.28	1.645

** p ≤.01

It is obvious that the Slovak first-grade and second-grade boys together are significantly more dexterous in the object movement activities than their female peers. Girls achieved better results in the self-movement activities, which were statistically significant only in the second-graders.

Discussion

When analyzing the testing period during the school year, we found that Herrmann et al. (2018b, p. 45) carried out their testing mostly in the months of October and November. Our testing was carried out in the months of January to May. The Slovak children were older in the testing period ($\bar{x}$ = 7.58 ± 0.69 years) compared to the German and Swiss children ($\bar{x}$ = 6.85 ± 0.42 years), which could be one of the reasons for the better results in basic motor competencies. One of the reasons for this older age of Slovak children during the testing period is the fact that Slovak parents may send their children to the first grade one year later based on the recommendation of the child's physician.

Table 6 *Comparison of basic motor competencies with Herrmann et al. (2018b)*

Grade**	Gender	*Object movement ($\bar{x}$) [points]	**Object movement ($\bar{x}$) [points]	Diff. ($\bar{x}$) [points]	*Self-movement ($\bar{x}$) [points]	**Self-movement ($\bar{x}$) [points]	Diff. ($\bar{x}$) [points]
1st	♂	4.49±1.97	5.17±1.79	0.67	4.83±1.82	6.14±1.38	1.31
1st	♀	3.00±1.78	3.52±1.78	0.52	5.02±1.87	6.24±1,40	1.22
1st	♂+♀	3.73±2.01	4.38±1.96	0.65	4.93±1.85	6.19±1.38	1.26
2nd	♂	5.26±1.95	6.49±1.43	1.23	4.89±2.03	6.68±1.32	1.79
2nd	♀	3.78±1.76	5.90±1.35	2.12	4.99±2.02	7.10±0.89	2.11
2nd	♂+♀	4.63±2.00	6.19±1.42	1.56	4.93±2.02	6.89±1.13	1.96
1st + 2nd	♂	4.77±1.99	5.67±1.78	0.09	4.85±1.90	6.35±1.38	1.50
1st + 2nd	♀	3.23±1.81	4.52±1.99	1.29	5.01±1.92	6.60±1.28	1.59
1st + 2nd	♂+♀	4.03±2.06	5.10±1.97	1.07	4.93±1.91	6.47±1.33	1.54

* Herrmann, Ch. et al. (2018b), ** this research

Tuminaitè (2016) did not find any link between gender and motor skills (n=129, 68 boys – 52.7%, 61 girls – 47.3%). She proposes a broader study to better examine the gender dimensions.

Greek boys (n=73) performed significantly better than girls (n=73) at throwing, bouncing and dribbling, while the girls outperformed the boys at rolling and side stepping. This makes us conclude that the boys were more successful in object movement activities than the girls. In self-movement activities, the success rate of the boys and girls was approximately identical. The second-graders scored significantly higher than the first-graders at catching, bouncing, dribbling and jumping in Greece (Gerlach et al., 2018; p. 83). Interestingly, the one year older children (boys and girls combined) did not achieve a significantly better performance in the self-movement activities such as balancing, rolling, side stepping and object movement activities such as throwing.

The independent sample t-tests revealed significant gender differences (n=204, age 6.7 ± 0.3). The Portuguese boys achieved a higher object movement score (5.7 ± 1.8) than the girls (4.0 ± 1.7). However, the girls were significantly more proficient in the self-movement skills (♂ = 5.3 ± 1.8, ♀ = 4.3 ± 1.7) than the boys (Gerlach et al., 2018; p. 88).

The boys (n=122, $\bar{x}_{age}$ = 6.3 years, s_d = 0.4) exhibited better object movement motor competencies than the girls (n=127, $\bar{x}_{age}$ = 6.2 years, s_d = 0.5; boys: $\bar{x}$ = 5.8, s_d = 1.7 points; girls $\bar{x}$ = 4.0,

s_d = 1.7 points; p ≤.001), while the girls were more proficient in the self-movement skills (girls: $\overline{x}$ = 5.1, s_d = 1.8 points; boys: $\overline{x}$ = 4.3, s_d = 1.7 points; p ≤.01) (Quitério et al., 2018). Finally, this study noted no significant links between age and motor competence. These age-related findings are probably explained by the fact that the analyzed population had a very small age range.

Herrmann et al. (2017a) found that age had a positive influence on object movement competency, but not on self-movement one.

The boys exhibited higher object movement motor competencies than the girls (boys: $\overline{x}$ = 5.8, s_d = 1.7; girls $\overline{x}$ = 4.0, s_d = 1.7; p ≤.001), while the girls were more proficient in self-movement skills (girls: $\overline{x}$ = 5.1, s_d = 1.8; boys: $\overline{x}$ = 4.3, s_d = 1.7; p ≤.01) (Quitério et al., 2018).

The validity of the comparisons is sometimes questionable because some authors do not provide accurate information on the children's age (Tuminaitè, 2016; Gerlach et al., 2018) or the school year period in which the testing was conducted (Tuminaitè, 2016; Gerlach et al., 2018; Quitério et al., 2018). Similarly, some authors divide the children into the groups by first- or second-graders, while others divide them according to age with no clear indication of their school grade. Herrmann et al. (2018b) stratifies the compared groups by age and not by the school grade although the test batteries were designed for specific elementary school grades, initially. These facts may be sometimes confusing when interpreting the results.

It is commonly known that some physical performance in sports is determined genetically, and its improvement is only possible through long-term, targeted and intensive training (Horička et al., 2018; Šimonek & Horička, 2020). Therefore, the results do not always confirm the prevailing experience that older children achieve better results than younger children.

Another area for future research is to observe the relation between body height and weight and the performance levels achieved in the motion tasks. Gerlach et al. (2018) found mixed results for BMI in MOBAK-1. Children (n = 923) with a high BMI achieved higher results in locomotion (p. 84). Future research holds the answers even to this question.

Conclusion

The following trends are slowly becoming obvious:

Gender: boys show a higher performance than girls in object movement activities (competency). The situation is inverse in the self-movement activities.

Age: second-graders do not achieve better performance than first-graders in all physical activities in the MOBAK 1-2 test battery. We believe that the performance in some of the tests in this test battery in first-grade and second-grade populations is determined by the factors independent of age.

When justifying the trends in basic motor competencies, a more detailed gender and age comparison of the basic motor qualities will be vital in the future.

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