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FREEDOM FROM ANXIETY IN RELATIONSHIP WITH THE LEVEL OF MOTOR SKILLS IN CHILDREN

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Abstract

Problematics of feeling anxious during compulsory school attendance is considered as a part of executive functions. Connection between cognitive and motor development is lately widely researched worldwide. Based on the aim of the study was stated following question: Is there a relationship between the level of motor skills and freedom from anxiety in younger school children? The aim of the paper is to analyse the relationship between freedom from anxiety and the level of gross motor skills in children at primary school, as the issue of specific relationships between cognitive and motor development of children is currently a problem solved especially abroad. The research group consisted of 108 children aged 9,65 years. The level of gross motor skills was determined by the TGMD-2 test. Freedom from anxiety was assessed by the Piers-Harris Children's Self-Concept Scale. The data were collected within the project IGA_PdF_2020_020. The relationship between the monitored variables was assessed by correlation coefficient, gender differences by Mann-Whitney test. Among the monitored variables, only a very weak negative dependency was found (r_s = -0.10). Stronger relationship was found in girls (r_s = -0.14) while boys dependency was only -0.04, but the difference was not significant (p=0,38). Significant difference between genders was found in the level of gross motor skills (p=0,00), where girls performed better than boys. In the Czech Republic is co-educated physical education at the first level of elementary schools. Demonstration of the relationship between motor skills and freedom from anxiety in the larger and more representative set could support the importance of the physical education process of younger school age children.

Keywords: Anxiety, motor skills, children.

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1. Introduction

Regular physical activity (PA) is beneficial to the maintenance of good physical and psychological health (Cortis et al., 2017). Fundamental movement skills (FMS) are stated to be necessary to children's psychological and physical development, with studies beginning to show a causal relationship between FMS and PA (Barnett et al., 2011; Barnett et al., 2016; Robinson et al., 2015; Utesch et al., 2019). FMS consists of object control skills that require efficient throwing, striking, and catching movements and locomotor skills that require fluid coordination movements of the body as the individual moves in one direction or another (Logan et al., 2018; Ulrich, 2017). FMS are connected with motor development, which refers to continuous changes in motor behavior over the life course and plays a crucial role in children's overall development (Gallahue et al., 2012; Haywood & Getchell, 2014).

Based on the evidence it seems pertinent to understand if FMS are not only the building blocks to movement and PA but are the sources of information for psychological determinants that support children in developing and maintaining a physically active life (Peersa et al., 2020). Individuals who possess motor competencies are qualified to access various fields of exercise and to use their learning experiences to build up a physically active lifestyle (Robinson et al., 2015).

Some studies have demonstrated positive associations of motor competence at baseline with cognition (Chaddock et al., 2012; Niederer et al., 2011). The concept of motor competence is currently receiving special attention in educational and health sciences (Herrmann et al., 2019). Motor competence does not develop ‘‘naturally’’ or automatically over time, but, rather, it needs to be taught (Morgan et al., 2013). The importance of physical education (PE) in the development of motor competence has been discussed and highlighted (Ennis, 2011), making motor competence a key feature of quality PE (Dyson, 2014; European Commission, 2016). The importance is even more confirmed by the fact, that body actions play a critical role in children’s cognition (Needham & Libertus, 2011). Geertsen et al. (2016) found positive relations between physical activity levels and specific cognitive functions such as working memory and selective attention.

Literature mentioned above implies that cognitive and executive functions are linked with fundamental motor skills. Mastering of gross motor skills can place child in a school group in the front position (being part of children’s games, participate in various activities, etc.; Tsuda et al., 2019). That’s why we believe, that motor skills influence also freedom form anxiety levels, which are connected to child’s self-concept. Perceived self-concept is a part of thinking and therefore cognitive and executive functions should play important role. Based on presented researches is the main aim of this paper to examine relationship between the level of motor skills and freedom from anxiety in younger school aged children.

2. Problem Statement

Attention of researchers nowadays is focused on fundamental motor skills in connection with many different aspects and perspectives (Adolph & Franchak, 2017; Cadoret et al., 2018; Davies et al., 2016; Frick & Möhring, 2016; Kim et al., 2017). Confirmation of the relationship between motor proficiency and freedom from anxiety levels in children can lead not only to better position of Physical Education in primary schools, but to more gentle approach towards children. Deeper understanding of this perspective and

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important issue can lead to increased quality of education, which is can influence future welfare of the society.

3. Research Questions

The main research question is, if there is a relationship between the level of motor skills and freedom from anxiety in younger school aged children.

3.1. Are there significant differences in feelings connected with freedom from anxiety between genders?

3.2. Will there be found significant differences in the level of gross motor skills in terms of gender?

3.3. Are girls significantly better in locomotor skills?

3.4. Do boys have significantly higher level of object control skills?

4. Purpose of the Study

The purpose of the study is to assess the relationship between the level of gross motor skills and freedom from anxiety in younger school aged children within the project IGA_PdF_2020_020 and therefore contribute to problematics of connection between motor skills and self-concept of a child.

5. Research Methods

The research group consisted of 108 children (62 girls and 46 boys) from Czech elementary schools at the age 9,65 ± 0,90 years (average height 143,43 ± 8,58 cm and weight 35,24 ± 7,89 kg). The research was approved by the Ethics Committee of the Pedagogical Faculty of Palacký University in Olomouc (No. 4/2020) and implemented as part of the project IGA_PdF_2020_020. The child was placed in the research after signing written agreement of his / her parents / legal representatives and after the approval of the management of elementary schools. The participation in the project was voluntary and free of charge. The anonymity of the data was declared and guaranteed to all participants. Children may have asked questions during the testing, could at any time temporarily interrupt or leave the research based on their decision or decision made by their parents/ legal representatives. Children's responses were observed and, in case of a negative reaction, testing was interrupted or ended. For the assessment of gross motor skills was used TGMD-2 test battery. The test monitors the level of locomotor and object control skills. The result is a standard score that is converted from rough score based on the child's age and gender. The standard score is converted to Gross Motor Quotient (GMQ), which is an indicator of the final level of gross motor skills. Based on GMQ, the level of motor skills is assessed in the following categories: very superior (>130 points), superior (121–130 points), above average (111–120 points), average (90–110 points), below average (80–89 points), poor (70–79 points) and very poor (<70 points). Data about freedom from anxiety were collected by the standardised questionnaire Piers-Harris Children's Self-Concept Scale 2 (Piers & Herzberg, 2002). In the mentioned category – freedom from anxiety – are probands divided based on their T-score into the

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following categories: above average range (≥56 T), average range (40–55 T) and low range (≤39 T). The correlation between the level of motor skills and the level of verbal competences was declared with correlation coefficient. Gender differences in gross motor and verbal competences were evaluated by t-test. The level of significant importance was declared on $p < 0.05$. Data were processed by software STATISTICA, version 13.4.0 (Tibco Software, Inc.).

6. Findings

The main research question was, if there is a relationship between the level of motor skills and freedom from anxiety in younger school aged children. Among the monitored variables, only a very weak negative dependency was found (rs = -0.10). It is obvious, that not many children (13.89 %) scored Above average category (Figure 01), which means that children refuse to experience feelings of sadness, nervousness, worries or unpleasant moods. Children in this category also express basic satisfaction with their appearance, social behaviour and other personality features. The most children naturally belonged to Average category (54.63 %). Children who score average category usually experience positive emotional states, but also confirm certain problems connected with moods. If the scores are lower (about 40T-44T) child admits more unpleasant emotional experiences than typical child from standardized group according to valid methodology (Piers & Herzberg, 2002). Surprisingly large was also Below average group, where ended 31.48 % of children. These children admit significant troubles with dysphoric moods and can also feel anxiety from certain school activities (for example: writing tests, being questioned in front of schoolmates, etc.). Children from this category also state generalize anxiety, which affects many aspects of their lives. Low scores can be connected with dissatisfaction with child's appearance, feeling of social isolation and child's wish to be overall different. Further examination of the research results indicate that stronger relationship was found in girls (rs = -0.14) while boys dependency was only -0.04, but the difference was not significant (p=0,38).

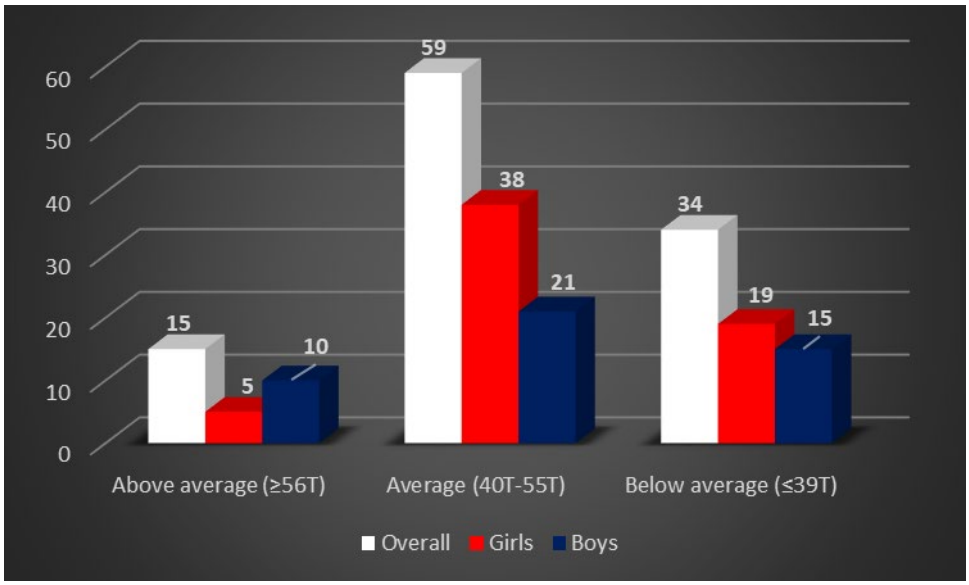

Figure 01. Results – freedom from anxiety according to categories and gender (n=108)

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Significant difference between genders was found in the level of gross motor skills (p=0.01), where girls performed better than boys. More than a half of children (58.33 %) had average level of motor skills (Table 01). According to divided gender groups in average female category were 66.13 % of girls and in from the male category there were 47.83 % of boys. What is alarming are results of boys in categories higher than average, where was not found any boy, while there was at least 6.48 % girls. But, this low percentage cannot soften the fact, that the results are really bad or substandard in higher categories than average is. The bad results of boys are in opposition to Eather et al. (2018) who found, that girls perform worse in motor skills, especially in object control skills.

Table 01. Children divided into categories according to GMQ standard score (n=108)

GMQ Standard score	Descriptive rating	Number of pupils	Girls	Boys
>130	Very Superior	0	0	0
121-130	Superior	1	1	0
111-120	Above Average	6	6	0
90-110	Average	63	41	22
80-89	Below Average	24	12	12
70-79	Poor	14	2	12
<70	Very Poor	0	0	0

Mean values of GMQ for girls is 96,71 ± 9,92 points while boys achieved only 90,41 ± 10,44 points. Mean values for the whole research group are 94,03 ± 10,61 points, which corresponds to 35 Percentile Rank.

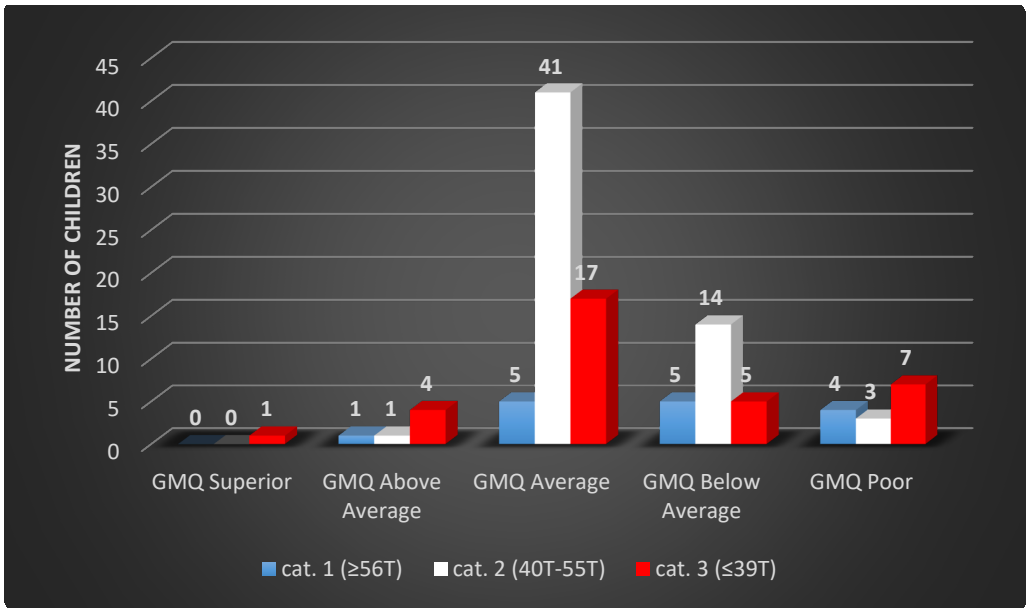

Figure 02. Results – freedom from anxiety (cat. 1 - 3) compared to Gross motor quotient categories (n=108)

The last thing we took in consideration was diversification of children according to their level of gross motor skills in connection with achieved level of freedom from anxiety (Figure 02). For us it was striking the negative dependency we found, which is visible on the Figure 02.

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7. Conclusion

The research results confirmed the substandard motor skills levels in Czech children. Especially in boys, who scored only average or lower levels of gross motor skills. This can be caused by many factors. We did not trail free time preferences, family background or other hobbies connected with sport clubs, etc. The findings are even more striking because of the system of physical education in the Czech Republic, where the lessons are co-educated. This fact should result in at least similar results in both genders. But also, growth and maturation may play role in this issue, because girls star usually be ahead of boys at this age. Another surprising finding is the negative correlation between gross motor skills and the freedom from anxiety levels (rs = -0.10). Although the dependency is very weak, striking is the negativity, because motor skills usually allow children to participate in many school activities, so children are often popular. One could say that they have no reason to experience feelings connected with anxiety like it is demonstrated in Figure 02. But the numbers of children are rather low, so research on higher number of children can result in different findings. On the other hand, these results can serve like a message to teachers, that even popular and skilled children are likely to experience troubles with dysphoric moods and feel anxious from certain school activities, etc. These negative experiences do not have to be connected to school only, but can be related to home environment or leisure activities, etc. Therefore, further examination of this problematics should continue and should aim on different aspects of children's life.

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