European Proceedings of
International Conference on Education & Educational Sciences
EpICEEPSY

www.europeanproceedings.com

e-ISSN: 2672-8141

DOI: 10.15405/epiceepsy.20111.33

11th ICEEPSY 2020

The International Conference on Education and Educational Psychology

INFLUENCE QUALITY OF THE MOTORIC ON THE LEVEL CHILDREN´S SELF-ESTEEM AND HAPPINESS

Ludmila Miklánková (a)*, Alena Navrátilová (a)
*Corresponding author

(a) Department of Primary and Pre-primary Education, Pedagogical Faculty, Palacky University in Olomouc, Czech Republic, e-mail: Ludmila.miklankova@upol.cz

Abstract

The aim of the research is to describe and analyse the relationship between the level of motor skills of children in younger school age and self-confidence in the area of physical self-esteem and happiness. Within the research were solved further research questions: Does a higher level of motor skills predict a higher level of self-esteem? Does the level of motor skills affect the happiness of younger school children? Research into the context of motor skills, physical self-esteem and happiness is focused on older age groups; it is not so common in younger school aged children. However, new knowledge may have an impact on the formation of the child's self-concept and on its success during school and adulthood. The research group consisted of 97 children aged 9.39 years. The level of motor skills was determined by the TGMD-2 test. Self-esteem and happiness were 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 correlation coefficient, gender differences by Mann-Whitney test. There is a strong relationship between physical self-esteem and happiness (r = 0.73). Poor dependence was found between motor skills and happiness (r = 0.22). No gender differences were found. Strong correlation was confirmed between physical self-esteem and feeling of happiness (r = 0.70) in boys. There is a relationship between motor skills and happiness (r = 0.46) and physical self-esteem and happiness (r = 0.74) in girls. The results show the need to support physical self-esteem in pre-puberty children, which affects a sense of happiness. The monitored context must be further investigated for the given age category. These findings may have an impact on the promotion of school success and, in the future, in the working process for adults.

Keywords: Physical education, self-concept, children.

https://doi.org/10.15405/epiceepsy.20111.33
Corresponding Author: Ludmila Miklánková
Selection and peer-review under responsibility of the Organizing Committee of the conference
2672-8141

1. Introduction

Research into the development of children's motor skills and its influence on human development in various aspects of his personality (biological, psychological and social) is still the subject of research. In recent years, the attention of researchers aims on the relationship between human physical activity and physical health (Craig et al., 2020; Martinez-Gomez et al., 2011; Söğüt et al., 2019). With a comprehensive concept of health (according to the WHO definition), research has expanded on the relationship between physical activity and mental and social health and further on the effects of physical activity in the process of socialization and the impact on mental and social health (e.g. Bagøien et al., 2010; Chatzisarantis & Hagger, 2009; Murray et al., 2018; Whittingham et al., 2010). In recent years, the relationship between the level of motor skills and physical activity of children has been proven, as well as the connection between physical exercises and executive functions. Physical exercise positively affects both the structure and function of the brain and subsequently the cognitive abilities of the child (Haapala et al., 2014; Van Dusen et al., 2011). This increases the importance of aimed development of motor skills and school physical education. Nowadays, we can observe a boom in research concerning the influence of motor skills levels on the development of executive functions in children (e.g. Donnelly et al., 2016; Ericsson & Karlsson, 2014; Piek et al., 2008; Stevens et al., 2008). An interesting area is the connection between the level of physical fitness and self-concept of children, which is being examined more and more often, both in the intact population and in children with disabilities (e.g Hartman et al., 2011; Jenni et al., 2013; Kim et al., 2016; Loprinzi et al., 2012, McPhillips & Jordan-Black, 2007). Researches on the relationship between motor skills, physical self-esteem and happiness are more focused on older age groups (e.g. Hestbaek et al., 2017; Tremblay et al., 2000) probably due to the used methodology. Some researches suggest a relationship between the level of motor skills (respectively amount of acquired motor skills), social skills and self-confidence of the child (Arbesman et al., 2013; Dehghan et al., 2017; Tabatabaee et al., 2016). At a younger school age, the process of socialization continues, the child joins the group of classmates and tries to choose his/hers social role in it. Developed motor skills allow children to participate in games with classmates, experience a feeling of success, positive emotions, and thus achieve a feeling of happiness (Bell et al., 2010; Edwards et al., 2005; Holder & Coleman, 2009; Sharif, 2014; Singer, 2015). The feeling of happiness and well-being is a basic attribute in a child's development, which influences a number of other important aspects, such as adaptability, creativity or cognitive development (Husted, 2017; Roope & Anand, 2016). New findings from the development of motor skills point to the possible influence of the level of motor skills in the formation of the child's self-concept and the effects on the success of the child during compulsory school attendance and also in adulthood.

2. Problem Statement

Compulsory school attendance places high demands on the ability to adapt to the school environment, on the specifics of the school class and the daily routine requires not only certain physical and mental preconditions, but also a certain degree of social and communicative competences. The social success of a child largely depends on the level of his/hers motor skills. According to Matějček (2005), gross motor skills are a "gateway to the children's group", they enable cooperation with peers as part of the

https://doi.org/10.15405/epiceepsy.20111.33
Corresponding Author: Ludmila Miklánková
Selection and peer-review under responsibility of the Organizing Committee of the conference
2672-8141

fulfillment of school attendance and leisure games. Common positive experiences in the children's group allow children to experience feelings of happiness. Researches suggest the existence of a relationship between the level of motor skills, positive physical self-concept and the feeling of satisfaction and happiness in a child's life.

3. Research Questions

3.1. Does higher level of motor skills also predict a higher level of self-esteem in children?

3.2. Does the level of motor skills affect the feeling of happiness in children at a younger school age?

3.3. Will there be gender differences in the relationships between the level of motor skills, happiness and physical self-esteem?

4. Purpose of the Study

The aim of the research is to describe and analyse the relationship between the level of motor skills in primary school children and their self-concept, focusing on the area of physical self-esteem and the feeling of happiness.

5. Research Methods

The research group was created 97 by primary school children in average age 9,39 ± 0,51 years (boys 9,33± 0,44, girls 9,44±0,58) as part of compulsory school education. Height and weight was normal according to WHO child-growth standards (http://www.who.int/ childgrowth /standards/Technical_report.pdf) – average height of children was 141,68 cm±0,80, average weight was 35,25 ±0,49 kg. No child was handicapped. All procedures were in line with the ethical standards of the relevant Committee of Experiments on Humans (institutional and national) and the 1975 Helsinki's Declaration in the context of its revision in 2008. The research was approved by Ethical Committee of author's authorities (No. 4/2020). Children's parents were informed about aims, methods and process of research before the start of the research. The children could interrupt or leave their participation during the research anytime. The anonymity of obtained data was declared. The TGMD-2 test (Ulrich, 2000) was used to determine the level of motor skills in children. The test focuses on locomotion skills (running, gallop forward, skipping low obstacles, jumping, gallop sideways) and object control skills (ball launch, dribbling, ball throw, kicking the ball, catching the ball and rolling the ball). Motor skills are evaluated according to precisely given criteria (correct = 1 point, incorrect = 0 points). Every child has the right to see a demonstration of the required skill and to undergo one training attempt with the possibility of correction by the evaluator. Then the child demonstrates given motor skill in two consecutive experiments. The first and also the second attempt are assessed. The sum of the child's points was converted in accordance with the TGMD-2 Test Manual to a standard score. Locomotor skills are evaluated for both boys and girls according to the same conversion table. The assessment of object control skills is already gender-differentiated. Locomotor and object control skills are considered to be the basic components of gross motor skills (Matějček, 2005; Rintala & Loovis, 2013). The overall obtained standard score is compared to a gross

https://doi.org/10.15405/epiceepsy.20111.33
Corresponding Author: Ludmila Miklánková
Selection and peer-review under responsibility of the Organizing Committee of the conference
2672-8141

motor development quotient (further GMDQ) conversion key that expresses the level of child's motor development (Čepička, 2010; Ulrich, 2000). The level of self-esteem and feeling of happiness were assessed using data obtained from a questionnaire Piers-Harris Children's Self-Concept Scale (Piers & Herzberg, 2002, Czech translation and standardization Obereignerů et al., 2015). The questionnaire has 60 items and is intended for group administration for children and adolescents aged 9 - 18 years, for people who can read with comprehension of the text. The questions in the questionnaire are dichotomous. The subscale for the evaluation of the so-called physical appearance and attributes has 11 items that achieve scores: above average (≥56T, 73 percentile or more), average (40T-55T, 16-69 percentile) and low score (≤39T, less than 14 percentile). The purpose of the questionnaire was described to the children in an age appropriate form. The subscale for evaluating happiness consists of 10 items that reflect the feeling of happiness and satisfaction with life. The method of scoring is the same as for the evaluation of physical self-esteem. The relationship between the monitored variables was determined by the Spearman correlation coefficient, differences in the monitored variables in terms of gender by Mann-Whitney test. The data were processed in the program Statistica 13.4. (TibcoSoftware). The project is funded by the grant agency of the author's workplace - Faculty of Education, Palacký University in Olomouc under number IGA_PdF_2020_020.

6. Findings

In the level of gross motor skills, children from the monitored group reached the average level of GMDQ (96.35 ± 13.10 points; boys 94.18 ± 12.78 points; girls 98.66 ± 13.04 points), which corresponds to the 25–75th percentile of the population. The standard score for locomotor skills was 9.55 ± 2.52 (boys 9.52 ± 2.48, girls 9.81 ± 2.55) and for object control skills 9.12 ± 2.58 (boys 8.54 ± 2.49; girls 9.74 ± 2.52). In terms of gender, no statistically significant difference was found in the level of gross motor skills (U = 940.50 p = 0.09). There were 2 children in the category very poor (girls 0, boys 0). In the category poor were 6 children (girls 3, boys 4), 16 children in the category below average (girls 8, boys 11), 59 children in the category average (girls 29 , boys 31), 7 persons in the category above average (girls 3, boys 4) and 6 persons in the category superior (girls 3, boys 0) (Table 1). There was only one person in the very superior category - a girl.

Table 01. The level of GMDQ (n = 97, n_{girls} = 47, n_{boys}=50)

GMDQ [points]	Percentile score	All [%]	Girls [%]	Boys [%]
<70	<1st	0	0	0
70-79	2-8th	7,22	3	8
80-89	10-24th	19,59	8	22
90-110	25-75th	61,86	29	62
111-120	76-9th	7,22	3	8
121-130	92-98th	3,09	3	0
>130	99th	1,03	1	0

In the Piers-Harris assessment of physical self-esteem, the validation scores of boys (6.9 ± 2.52 points) and girls (6.47 ± 2.53) were almost similar and did not show a statistically significant difference (U

https://doi.org/10.15405/epiceepsy.20111.33
Corresponding Author: Ludmila Miklánková
Selection and peer-review under responsibility of the Organizing Committee of the conference
2672-8141

= 1046.50 p = 0.35). In overall, the group achieved the average standard T-score 49.47 ± 8.28 (T-score - girls = 48.72 ± 8.55; T-score-boys = 50.18 ± 8.50) and the highest frequency of children was in the categories T-average (all 54.64% , girls 55.31%, boys 54.0%) and T-above average (all 34.02%, girls 31.92%, boys 36%) (Figure 1). Nevertheless, 11.34% of children were in the T-low score category (girls 12.77%, boys 10.0%).

In the subscale focused on happiness, the research group achieved T-score 50.71 ± 8.57, while in boys with a validation score of 8.12 ± 2.48 the result was more positive (T = 51.42 ± 8.54) than in girls (T = 49.96 ± 8.60), who achieved a validation score of 5.80 ± 2.18. When evaluating T-scores, a total of 56.70% of children were classified as average (girls 51.06%, boys 60.0%). Almost a third of children from the research group (29.89%) belonged according to results in the category above average (girls 29.79%, boys 30%). From the monitored group of children, only 14.43% achieved in the subscale of happiness low score, with boys (10%) showing a more positive results than girls (19.15%). No significant difference in validation scores was found between the results of girls and boys in the value of happiness (U = 1057.00 p = 0.40).

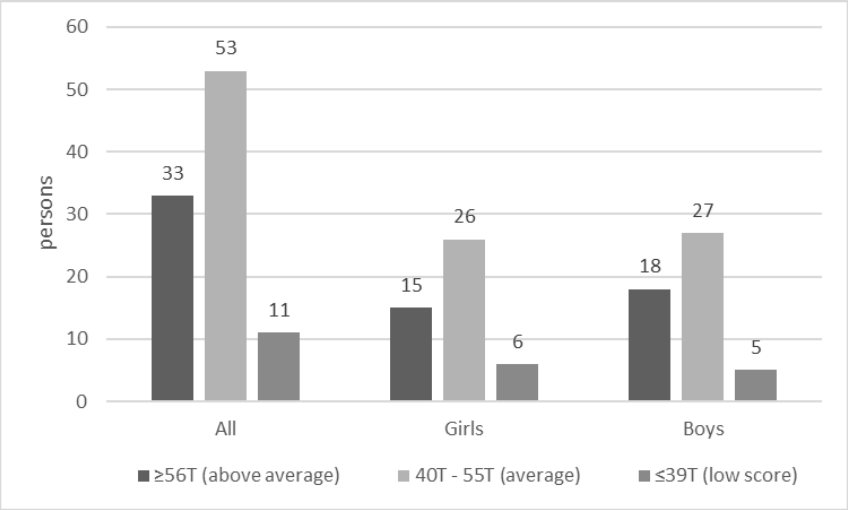

Figure 01. Categories of self-esteem sub-scale (n = 97, n_{girls} = 47, n_{boys}=50)

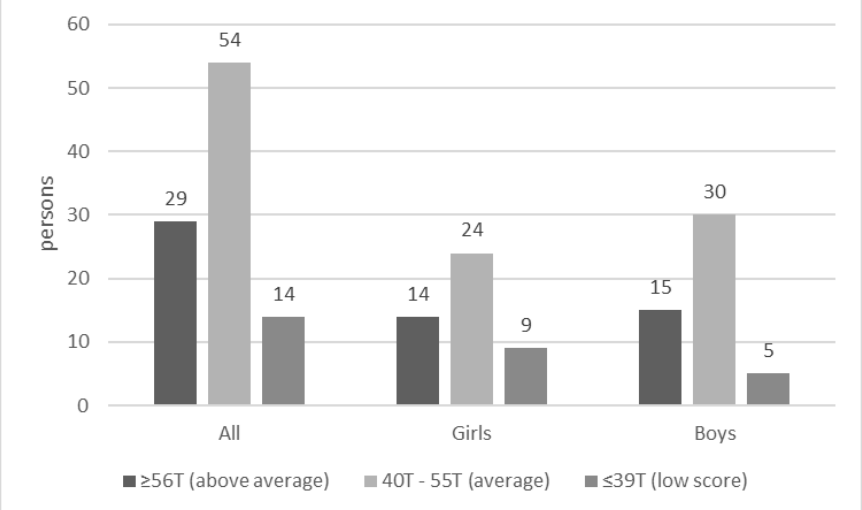

Figure 02. Categories of happiness sub-scale (n = 97, n_{girls} = 47, n_{boys}=50)

https://doi.org/10.15405/epiceepsy.20111.33
Corresponding Author: Ludmila Miklánková
Selection and peer-review under responsibility of the Organizing Committee of the conference
2672-8141

The correlation between happiness and physical self-esteem was confirmed in the monitored group ($r = 0.73$ $p \leq 0.05$). Weak dependence was found between the level of motor skills and the feeling of happiness ($r = 0.22$ $p \leq 0.05$). In boys, neither the connection between motor skills and the feeling of happiness nor the connection between motor skills and physical self-esteem was confirmed, but a high correlation of data was confirmed between physical self-esteem and the feeling of happiness ($r = 0.70$ $p \leq 0.05$). In girls, there is a high dependency between physical self-esteem and the level of motor skills ($r = 0.74$ $p \leq 0.05$) and a significant (medium) relationship between the level of motor skills and the feeling of happiness ($r = 0.46$ $p \leq 0.05$).

Self-esteem is created and gradually grows over the course of life, depending on the child's positive experience and success in life activities and interactions. Children who are encouraged and positively evaluated are even more confident in new activities and interactions. Low levels of self-esteem can result in antisocial to aggressive behavior in older age groups and are generally related to a person's quality of life (Donnellan et al., 2005; Rendon-Macias et al., 2014; Schonert-Reichl et al., 2012). Baumeister et al. (2003) state that high self-esteem is closely related to the feeling of happiness. The higher level of motor skills is highly appreciated by the groups of children. Children who possess a wide range of motor skills are popular in the team and among classmates and are often desired partners for children's games. This evokes pleasant feelings in them and the child is actively looking for a group of peers. According to Piek et al. (2006), there is a relationship between self-esteem and a child's motor development. And the same authors point out that the issue needs to be further explored due to the possibility of interventions by educators. Topçu et al. (2016) or Galvez et al. (2014) also confirm that obese children have a lower level of self-confidence and are less satisfied with their physical appearance. Many researchers (e.g. Ekornås et al., 2010; Fotiadou et al., 2015;) confirm the relationship between self-esteem and motor skills in children with disabilities.

7. Conclusion

The results show the need to support physical self-esteem in primary school children, which is reflected in their sense of happiness. Improved control of primary motor skills is closely related to the feeling of happiness, in our research group especially in girls. This finding seems to be associated with an earlier onset of puberty in girls. The observed context needs to be further investigated for a given age category. Satisfied children are involved in creating the classroom climate. School class is an artificially created social group in which the child acquires the first experience and skills with a "work" group. In the group created this way, children spend many years as a part of compulsory school attendance. On the level of self-concept and happiness, the child's relationship to school as an institution and to education in general may depend. A positive relationship can thus be reflected in school success and in the future for adults in success in the work process. It would be appropriate to focus further research on the relationships between the level of motor skills, the child's self-confidence and happiness. We should pay special attention to the creation of new research methods designed to examine the issue in younger age categories (preschool age, younger school age), where the possibility of aimed interventions would arise if positive correlations are confirmed. The results of research should also be presented to the professional public - kindergarten and primary school teachers.

References

Arbesman, M., Bazyk, S., & Nochajski, S. M. (2013). Systematic review of occupational therapy and mental health promotion, prevention, and intervention for children and youth. *Am J Occup Ther., 67*(6), e120-e130. https://doi.org/10.5014/ajot.2013.008359

Bagøien, T. E., Halvari, H., & Nesheim, H. (2010). Self-Determined Motivation in Physical Education and its Links to Motivation for Leisure-Time Physical Activity, Physical Activity, and Well-Being in General. *Perceptual and Motor Skills, 111*(2), 407–432.

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does High Self-Esteem Cause Better Performance, Interpersonal Success, Happiness, or Healthier Lifestyles? *Psychological Science in the Public Interest, 4*(1), 1–44. https://doi.org/10.1111/1529-1006.01431

Bell, H. C., Pellis, S. M., & Kolb, B. (2010). Juvenile peer play experience and the development of the orbitofrontal and medial prefrontal cortices. *Behavioural Brain Research, 207*(1), 7-13.

Čepička, L. (2010). Normative data for the Test of Gross Motor Development-2 in 7-yr.-old children in the Czech Republic. *Perceptual and Motor Skills, 110*(3), 1048-1052.

Chatzisarantis, N. L. D., & Hagger, M. S. (2009). Effects of an intervention based on self-determination theory on self-reported leisure-time physical activity participation. *Psychology and Health, 24*, 29–48.

Craig, W., Pickett, W., & King, M. (2020). *The health and wellbeing of Canadian adolescents: Findings from the 2018 health behaviour in school-aged children study*. Public Health Agency of Canada.

Dehghan, L., Mirzakhani, N., Rezaee, M., & Tabatabaee, M. (2017). The Relationship Between Fine Motor Skills and Social Development and Maturation. *Iranian Rehabilitation Journal, 15*(4), 407-414.

Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low Self-Esteem Is Related to Aggression, Antisocial Behavior, and Delinquency. *Psychological Science, 16*(4), 328–335. https://doi.org/10.1111/j.0956-7976.2005.01535.x

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine and Science in Sports and Exercise, 48*(6), 1223-1224. https://doi.org/10.1249/MSS.0000000000000966

Edwards, S. D., Ngcobo, H. S. B, Edwards, D. J., & Palavar, K. (2005). Exploring the relationship between physical activity, psychological well-being and physical self-perception in different exercise groups. *South African Journal for Research in Sport, Physical, 27*(1), 59-79.

Ekornås, B., Lundervold, A.J., Tjus, T., & Heimann, M. (2010). Anxiety disorders in 8-11-year-old children: motor skill performance and self-perception of competence. *Scand J Psychol, 51*(3), 271-277. https://doi.org/10.1111/j.1467-9450.2009.00763.x

Ericsson, I., & Karlsson, M. K. (2014). Motor skills and school performance in children with daily physical education in school - a 9-year intervention study. *Scand JMed Sci Sports, 24*(2), 273–8. https://doi.org/10.1111/j.1600-0838.2012.01458.xPMID:22487170.12

Fotiadou, E., Christodoulou, P. Tsimaras, V., Mousouli, M., & Soulis, S.-G. (2015). Motor Development and Self-Esteem of Children and Adolescents with Visual Impairment. *Journal of Education in Practice, 5*, 97-106.

Galvez, C. A., Rodriguez, G. P. L., Rosa, G. A., Garcia-Canto, E., & Perez-Soto, J. J. (2014). Relationship between body weight status and self-concept in schoolchildren. *Nutr Hosp 2014, 31*, 730–736.

Haapala, E. A., Poikkeus, A.-M., Tompuri, T. T., Kukkonen-Harjula, K., Leppanen, P. H., Lindi, V., & Lakka, T. A. (2014). Associations of motor and cardiovascular performance with academic skills in children. *Med Sci Sports Exerc., 46*(5), 1016–24. https://doi.org/10.1249/MSS.0000000000000186PMID:24126966

Hartman, E., Houwen, S., & Visscher, C. (2011). Motor skill performance and sports participation in deaf elementary schoolchildren. *Adapted Physical Activity Quarterly, 28*, 132-145.

Hestbaek L., Andersen, S.T., Skovgaard, T., Olesen, L. G. , Elmose, M., Bleses, D., Andersen, S. C., & Lauridsen, H. H. (2017). Influence of motor skills training on children's development evaluated in the Motor skills in PreSchool (MiPS) study-DK: study protocol for a randomized controlled trial, nested in a cohort study. *Trials, 18*(1), 400.

Holder, M. D., & Coleman, B. (2009). The contribution of social relationship to children's happiness. *J. Happiness Stud, 10*(3), 329-349. https://doi.org/10.1007/s10902-007-9083-0

Husted, H. S. (2017). The Relationship Between Psychological Well-Being and Successfully Transitioning to University (Undergraduate Honors Thesis). https://ir.lib.uwo.ca/psychK_uht/54

Jenni, O. G., Chaouch, A., Caflisch, J., & Rousson, V. (2013). Correlations Between Motor and Intellectual Functions in Normally Developing Children Between 7 and 18 Years. *Developmental Neuropsychology, 38*(2), 98-113. https://doi.org/10.1080/87565641.2012.733785.

Kim, H., Carlson, A. G., Curby, T. W., & Winsler, A. (2016). Relations among motor, social, and cognitive skills in pre-kindergarten children with developmental disabilities. *Research in Developmental Disabilities, 53-54*, 43–60. https://doi.org/10.1016/j.ridd.2016.01.016

Loprinzi, P. D., Cardinal, B. J., Loprinzi, K. L., & Lee, H. (2012). Benefits and environmental determinants of physical activity in children and adolescents. *Obesity Facts, 5*(4), 597–610.

Martinez-Gomez, D., Ortega, F. B., Ruiz, J. R., Vicente-Rodriguez, G., Veiga, O. L., & Widhalm, K. (2011). Excessive sedentary time and low cardiorespiratory fitness in European adolescents: the HELENA study. *Arch. Dis. Child., 96*, 240-246. https://doi.org/10.1136/adc.2010.187161

Matějček, Z. (2005). Prvních 6 let ve vývoji a výchově dítěte [The first 6 years in the development and upbringing of a child]. Grada Publishing.

McPhillips, M., & Jordan-Black, J. A. (2007). The effect of social disadvantage on motor development in young children: A comparative study. *Journal of Child Psychology and Psychiatry, 48*, 1214–1222.

Murray, L., Jennings, S., Mortimer, A., Prout, A., Melhuish, E., Hughes, C., Duncan, J., Holmes, J., Dishington, C., & Cooper, P. J. (2018). The impact of early-years provision in Children's Centres (EPICC) on child cognitive and socio-emotional development: study protocol for a randomised controlled trial. *Trials, 19*(1), 450. https://doi.org/10.1186/s13063-018-2700-x

Obereignerů, R., Orel, M., Reiterová, E., Mentel, A., Malčík, M., Petrůjová, T., & Friedlová, M. (2015). *Dotazník sebepojetí dětí adolescentů PHCSCS-2* [PHCSCS-2 Adolescent Children Self-Concept Questionnaire]. Hogrefe Test Centrum.

Piek, J. P., Baynam, G. B., & Barrett, N. C. (2006). The relationship between fine and gross motor ability, self-perceptions and self-worth in children and adolescents. *Hum Mov Sci., 25*(1), 65-75. https://doi.org/10.1016/j.humov.2005.10.011

Piek, J. P., Dawson, L., Smith, L. M., & Gasson, N. (2008). The role of early fine and gross motor development on later motor and cognitive ability. *Human Movement Science, 27*, 668-681.

Piers, E. V., & Herzberg, D. S. (2002). *Piers-Harris 2. Piers-Harris Children's Self-Concept Scale* (2nd ed.). Western Psychological Services (WPS).

Rendon-Macias, M. E., Rosas-Vargas, H., Villasis-Keever, M. A., & Perez-Garcia, C. (2014). Children's perception on obesity and quality of life: a Mexican survey. *BMC Pediatr, 14*, 131.

Rintala, P., & Loovis, E. M. (2013). Measuring Motor Skills in Finnish Children with Intellectual Disabilities. *Perceptual and Motor Skills, 116*(1), 294-303.

Roope, L., & Anand, P. (2016). The development and happiness of very young children. *Social Choice and Welfare, 47*(4), 825–851.

Schonert-Reichl, K. A., Smith, V., Zaidman-Zait, A., & Hertzman, C. (2012). Promoting children's prosocial behaviors in school: Impact of the "Roots of Empathy" program on the social and emotional competence of school-aged children. *School Mental Health, 4*, 1–21. https://doi.org/10.1007/s12310-011-9064-7

Sharif, S. (2014). *School playground: Its impact on children's learning and developmen*t. Asia-Pasific Regional Net-work for Early Childhood.

Singer, E. (2015). Play and playfulness in early childhood education and care. *Psychology in Russia: State of the Art, 8*(2), 27-35. https://doi.org/10.11621/pir.2015.0203

Söğüt, M., Clemente, F., Clark, C., Nikolaidis, P., Rosemann, T., & Knechtle, B. (2019). Variations in Central Adiposity, Cardiovascular Fitness, and Objectively Measured Physical Activity According to Weight Status in Children (9–11 Years). *Frontiers in Physiology, 1*0, 936.

Stevens, T. A., To, Y., Stevenson, S. J., & Lochbaum, M. R. (2008). The importance of physical activity and physical education in the prediction of academic achievement. *Journal of Sport Behavior, 31*(4), 368-388.

Tabatabaee, S., Shahbazi, M., Bagherzadeh, F. (2016). The relationship between motor development and social development of children in 6 to 10 years old in Mashhad (Persian)]. *Development & Motor Learning, 8*(2), 209-224.

Topçu, S., Orhon, F., Tayfun, M., Uçaktürk, S., & Demirel, F. (2016). Anxiety, depression and self-esteem levels in obese children: a case-control study. *Journal of Pediatric Endocrinology and Metabolism, 29*(3), 357-361. https://doi.org/10.1515/jpem-2015-0254

Tremblay, M. S., Inman, J. W., & Willms, J. D. (2000). The relationship between physical activity, selfesteem, and academic achievement in 12-Year-Old Children. *Pediatric Exercise Science, 12*, 312-323.

Ulrich, D. A. (2000). *The Test of Gross Motor Development* (2nd ed.) PRO-ED.

Van Dusen, D. P., Kelder, S. H., Kohl, H.W., Ranjit, N. & Perry, C. L. (2011). Associations of Physical Fitness and Academic Performance Among School children. *J Sch Health, 81*(12), 733–740. https://doi.org/10.1111/J.17461561.2011.00652.XPMID:WOS:000297242500002.11

Whittingham, K., Fahey, M., Rawicki, B., & Boyd, R. (2010). The relationship between motor abilities and early social development in a preschool cohort of children with cerebral palsy. *Research in Developmental Disabilities, 31*, 1346-1351.