ORIGINAL SCIENTIFIC PAPER

Differences in Physical Activity and Academic Performance between Urban and Rural Schoolchildren in Slovenia

Vedrana Sember[1,2], Shawnda A. Morrison[3], Gregor Jurak[1], Marjeta Kovac[1], Gregor Starc[1]

Affiliations: [1]University of Ljubljana, Faculty of Sports, Ljubljana, Slovenia, [2]University of Primorska, Faculty of Mathematics, Natural Sciences and Information Technologies, Koper, Slovenia, [3]University of Primorska, Faculty of Health Sciences, Izola, Slovenia

Correspondence: G. Starc, University of Ljubljana, Faculty of Sports, Gortanova 22, Ljubljana, Slovenia. E-mail: Gregor.Starc@fsp.uni-lj.si

ABSTRACT In Slovenia, the existing studies of relations between physical activity (PA), academic performance (AP) and urbanization grade have used subjective self-reporting tools for assessing physical activity, which usually led to an underestimation of true PA. We have attempted to overcome this and have investigated the link between PA in rural and urban Slovenian schoolchildren by an objective assessment of PA, using a multi-sensor SenseWear PRO armband. The analysis showed that urban children in Slovenia are more physically active than rural children are and achieve better AP (mathematics grade). Additionally, children who are active between 60 and 120 minutes of MVPA/day have higher AP than their peers who are active less than 60 or more than 120 minutes, whereas the latter groups did not differ in academic performance.

KEY WORDS physical activity, mathematics, accelerometery

@MJSSMontenegro
PHYSICAL ACTIVITY AND ACADEMIC PERFORMANCE
http://mjssm.me/?sekcija=article&artid=154

Introduction

An increase of physical activity (PA) can have a positive impact on the academic performance of children (Shephard, 1997), since the performance of complex movements stimulates the frontal cortex of the brain, an area which is responsible for learning and problem solving (Jensen, 2005). A number of studies have already documented a positive relationship between PA and academic performance (AP) (Singh, Uitjtdewilligen, Twisk, Van Mechelen & Chinapaw, 2012), but researchers also acknowledge that the increase in PA can have many other beneficial effects, such as higher self-esteem, body image (Libbey, 2004), improved concentration (Caterino & Polak, 1999) and better behaviour in the classroom (Evans, Evans, Schmid & Pennypacker, 1985; Allison, Faith & Franklin, 1985). The consequent increase of AP of children contributes to better classroom climate, better attitudes of teachers towards students, and improved self-esteem of children (Nelson & Gordon-Larsen, 2006), which are psychological factors often associated with high levels of PA.

It has been well documented that there are differences in PA behaviours associated with living in urban and rural environments (Loucaides, Chedzoy & Bennett, 2004; Joens-Matre, Welk, Calabro, Russel, Nicklay & Hensley, 2008). While evidence often shows lower PA levels in urban children compared to their rural counterparts (Joens-Matre et al., 2008; Dolman, Norton & Tucker, 2002), this pattern has not been confirmed in Slovenia, where the opposite patterns have been observed (Planinšec, 2006; Planinšec, Pišot & Fošnarič, 2006).

Slovenian urbanization is characterized by a large number of small settlements; it has only two cities with more than 50,000 inhabitants (Ljubljana and Maribor), with 90% of all settlements having fewer than 500 inhabitants (Mesta in urbana območja, 2017). Several studies have compared urban and rural schoolchildren's PA in Slovenia. Planinšec (2006) investigated possible links between school achievement and the volume

Accepted after revision: December 21 2017 | First published online: March 01 2018

Conflict of interest: None declared.

of average daily PA in younger schoolchildren (1st–5th grades), and whether differences in PA occurred regardless of gender, or school grade. The study showed that the most physically active children had above average school performance, whereas the least active children had below average school performance (as measured by grade point average (GPA) or mathematics grade). Children who exceeded the average academic achievement were physically active for 91 min/day; the average ones were active for 85 min/day and children whose academic achievement was below average were active for 84 min/day (Planinšec, 2006). Similarly, Planinšec, Pišot and Fošnarič (2006) found that children from suburban areas of Slovenia were slightly more active (87 min/day) than children from urban areas (85 min/day), while the least active children came from the rural areas (82 min/day). This study also showed that the level of PA in Slovenian children is well above the WHO recommendations of 60 minutes of moderate to vigorous PA per day (World Health Organization, 2010). Finally, Zurc more recently (2011) assessed the PA of Slovenian schoolchildren using self-reporting and established that (from the sample of 1,660 schoolchildren), 746 are active more than one hour per day; boys tended to be significantly more active and more involved in organized PA than girls were.

To summarize, the previous findings on PA in Slovenian schoolchildren showed that children from rural areas are less active than urban schoolchildren, while those with higher PA levels demonstrate (slightly) better AP. However, all the above-mentioned data were based on subjective assessments and self-report. Subjective assessment of PA is known to underestimate levels of true PA, leading to inconsistent estimations of energy expenditures and blunt conclusions based on habitual PA. To overcome these issues, this study investigated the link between PA in rural and urban Slovenian schoolchildren by measuring PA objectively using a multi-sensor device (SenseWear Armband PRO, Bodymedia, Inc., Pittsburgh, PA).

Methods

Participants

The sample was defined by an initial round of research conducted by Šturm in 1970 (1972) and was carried out in 10 research sites (Figure 1). The primary sampling unit was "school" and the secondary "class". The analysis focused on pupils from grades 1 to 8 of elementary schools. Due to changes in the educational system, and the introduction of nine-year elementary school in the 1990s, the research rounds from 1993 onwards included pupils from grades 1 to 9 (Jurak, Kovač & Starc, 2013; Starc et al., 2014). Measurements included only those pupils who had not been permanently or temporarily excused from physical education classes due to health reasons. Parents gave their written informed consent for their children to be included in the study.

Physical activity measurements

Physical activity was measured using a SenseWear Armband accelerometer (Bodymedia, Pittsburgh, Pennsylvania), which measures body acceleration in three axes (i.e. triaxial activity monitors), with the epoch length of 60 seconds. The SenseWear Armband was placed on the upper-left arm at the level of the triceps following established guidelines (Van Remoortel et al. 2012). The data sample consisted of those children who wore the device for at least three days during the weekdays and two days during weekends, for more than 90% of the time (i.e. 21 hours and 20 minutes). Levels for the moderate PA detection algorithm were set at 4.0 METs, and activity levels were defined for five levels: inactivity, sedentary, low, moderate and vigorous. Based on the purified value of PA, four groups were constructed (Table 1). PA is expressed as active energy expenditure (AEE) in kilojoules (kJ) and minutes of PA/day (duration) for the remainder of this paper.

Academic performance assessment

We used the mathematics grade as the indicator of AP. Previous studies showed that in Slovenia there is a high correlation between mathematics grade and GPA, but that the mathematics grade has slightly better reliability (Flere, Klanjšek, Musil et al. 2009). In Slovenia, maths grades are given using the following scale: 1 (inadequate), 2 (sufficient), 3 (good), 4 (very good), and 5 (excellent). Based on the assessment in mathematics, children were divided into three groups: low AP (< 3), normal AP (> 3 < 4) and high AP (> 4).

Place of residence

School regions were selected and divided based on their economic and socio-demographic characteristics within the Republic of Slovenia (Figure 1). In this study, the two schools from Ljubljana, the only Slovenian city with more than 300,000 inhabitants, were categorized as urban, and all others as rural schools. Ljubljana was also the only research site with two schools included in the data analysis.

Data collection

Data were collected during the research project Analysis of Development Trends of Children and Youth in Slovenia (ACDSi); methodology are reported elsewhere (Jurak, Kovač & Starc, 2013). Data were collected in three parts during two days at one research site: anthropometry (measurement of physical characteristics in a separated area), fitness (majority of fitness tests were carried out in the school gym, except for running (60 m and 600 m) which was carried out outside), and psychology

FIGURE 1 Map of the ACDSi research sites

DOI 10.26773/mjssm.180309

(children answering questionnaires via internet in computer labs and under the supervision of one or two members of the research team). Data were collected in the autumn of 2013.

Data processing

All statistics were conducted using IBM SPSS 22.0. Normal distribution was checked visually, and with the Kolmogorov-Smirnov test. After examination of the data (and eliminating unfitted measurements from samples due to missing results), descriptive statistics were made. For all physical fitness, PA and AP parameters (e.g. motor abilities and physical dimensions of the body) correlation coefficients were analysed using the nonparametric Spearman's rho test. To determine differences between stratifications of PA (low PA, normal PA, high PA, and very high PA) and indicators of physical fitness, a nonparametric Kruskal-Wallis test was performed. To determine the differences between groups of PA and academic performance, a nonparametric Kruskal-Wallis test was performed, which is used when operating with ordinal data. When the significance level was higher than 0.05, we determined that no difference exists, but when the significance level was <0.05, a Mann-Whitney U test was performed to determine the between-PA group differences, and differences in AP. For all post hoc comparisons, a Bonferroni correction was performed, and effect size was calculated.

Results

The sample of schools included the capital city (Ljubljana, the only urban city and the administrative centre of Slovenia); industrial centres (Jesenice, Ravne na Koroškem, Trbovlje) and places with a strong rural hinterland and various industrial plants (Tolmin, Žalec, Izola, Ormož, Trebnje, Metlika). In the present study, n=356 schoolchildren participated, and after cleaning the data, a total of n=166 (nboys=87, ngirls=79) elementary school children, aged 11 (grade 6) from 11 Slovenian elementary schools in 10 different economic and socio-demographic areas of the Republic of Slovenia were included for final analysis. A sample of children from the present study was also measured in September and October 2013. Altogether, four different PA groups were identified (low PA group, normal PA group, high PA group, very high PA group) (Table 1).

TABLE 1 PA groups

Group	Levels of PA	Values for levels of PA (min)	N
1	Low PA	Up to 60 min/day	24
2	Normal PA	From 61 to 120 min/day	46
3	High PA	From 121 to 180 min/day	57
4	Very high PA	From 180/day and more	39

Slovenian grade 6 children are, on average, physically active 141.83 + 7.37 min/day and expend 2386.42 + 166.89 kJ of energy daily. The average AP for all children participating in this study was 4.11 + 0.89. Descriptive statistics for objectively-measured PA is shown in Table 2. Spearman's rho coefficient (r=-0.24)

TABLE 2 PA descriptive statistics

	N	min	max	SD	SW	p	S/K
AEE	166	343	24708	2150.25	0.17	0.00	70.32/0.38
Duration	166	21	915	94.97	0.13	0.00	3.57/25.82

Note: AEE – active energy expenditure (kJ); Duration – duration of PA (min); N – sample size; min – minimum value; max – maximum value; SD - standard deviation; p – significance level; SW – Shapiro-Wilk test; S/K – skewness/kurtosis.

showed statistically significant (p<0.05) correlations between AP and objectively-measured PA in grade 6 schoolchildren. The correlation coefficient showed small, negative correlations between these variables. The independent-sample Kruskal-Wallis test showed statistically significant differences between the distributions

TABLE 3 Mann-Whitney U test for objectively measured PA groups and AP

Low and normal PA groups	Low and high PA groups	Low and very high PA groups	Normal and high PA groups	Normal and very high PA group	High and very high PA group
MR1=11.25	MR1=17.31	MR1=16.69	MR2=23.28	MR2=22.19	MR3=25.73
MR2=13.13	MR3=17.56	MR4=112.87	MR3=20.40	MR4=14.47	MR4=19.26
N=24	N=34	N=27	N=42	N=35	N=45
Z=-0.656	Z=-0.064	Z=-1.18	Z=-0.78	Z=-2.3	Z=-1.69
p= 0.51	p= 0.95	p= 0.24	p= 0.44	p= 0.02	p= 0.09
				ES= 0.39	

Note: MR1 represents Mean Rank for low PA group, MR2 represents Mean Rank for normal PA group, MR3 represents Mean Rank for high PA group, and MR4 represents Mean rank for very high PA group.

of objectively measured PA and AP (0.04, p<0.05). The normal PA group (MR2 = 22.19) performed better in AP compared to the high PA group (MR4 = 14.47).

Mann-Whitney U values (Table 3) were found to be statistically significant (Z=-2.3, p<0.05), and the differences between groups were moderately large (ES=0.39). Statistically significant differences in AP were found between the normal (60 – 120 min/day) and high (180 and more min/day) PA groups. The normal PA group performed significantly better in AP than the high PA group did.

Average daily PA in urban (M=162.07 + 157.7 min/day) and rural areas of Slovenia (137.7 + 75.6 min/day, p<0.05) show skewness coefficients that indicate that the results are skewed to the left, thus in the direction of less active children. Normal distributions of urban and rural PA duration significantly deviate from the theoretical distributions. Nonparametric Mann-Whitney test (U=1727) did not show a statistically significant difference between rural and urban children's PA duration (Table 4).

TABLE 4 Urban and rural children's PA descriptive statistics

PA	N	M	SD	SW	p	S/K	MW
Urban	166	162.1	157.7	0.52	0.00	4.25/20.8	MRu=88.7 MRr=82.45 U=1787.00 Z=-0.625 P=-0.625
Rural		137.7	75.6				

Note: PA – Physical activity (min/day); N – sample size; M – arithmetic mean; SD – standard deviation; SW – Shapiro-Wilk test; N- sample size; p – significance level; S/K - Skewness/Kurtosis; MW – Mann-Whitney test; MRu – median ranks urban; MRr – median ranks rural; U – U value; Z – Z value; P – Mann-Whitney P value; Mann-Whitney test is significant after performing Bonferroni correction at 0.025.

Spearman's rho coefficient showed that there is a negative correlation between PA and AP in boys (r=0.24). Urban grade 6 children achieved an average mathematics grade of 4.25+0.85 in comparison to 3.56 + 1.16 in rural grade 6 children. Skewness coefficients for urban areas show that results of AP are skewed to the right, meaning in the direction of children who perform better in mathematics. Skewness coefficients for rural areas show that results of AP are skewed to the left, therefore in the direction of worse mathematics grades. Normal distributions of urban and rural AP deviate from the theoretical distributions. The non-parametric Mann-Whitney test (U=358.5) was statistically significant (Z=-2.38, p<0.05), and the difference between rural and urban children in AP was considered a medium effect size (ES=0.29). Urban schoolchildren (MRu=42.26) performed better in mathematics in comparison to rural schoolchildren (MRr=30.97).

Discussion

Children exceeding the WHO (2010) recommendations for PA perform better in academics, but only within certain limits of PA durations. In the very low PA group with less than 60 minutes of MVPA per day, and in the PA groups exceeding 120 minutes or MVPA/day, did not show significant differences in AP in favour of the more active children. In this regard, WHO (2010) recommendations seem too modest to improve the cognitive and physical health of children, and it would be advisable to change the recommendations to 60 to 120 MVPA per day, whereby the threshold for moderate physical activity could be moved from 3 to 4 MET. Children from urban areas tend to perform significantly better in mathematics in comparison to children from the rural areas of Slovenia, which is in contrast with some other studies in which children from rural areas perform better in academics, such as reading and mathematics (Alspaugh, 1992; Alspaugh & Harting, 1995). For the current study, only the national capital region of Slovenia was treated as an urban city. Urban Audit defines medium-sized cities as having populations between 50,000 and 250,000 inhabitants, and large cities as having 250,000 or more inhabitants. Ljubljana and Maribor are thus classified as medium cities, but since Ljubljana meets the criteria of ≥ 250,000 inhabitants (Klement, 2006), it is the only urban city in Slovenia. Because of the diverse landscape and greater dispersion of smaller cities in Slovenia, the results obtained in the present study are relevant only for international comparisons, and not for assessing the real urban-rural situation in the country. Therefore, factors for potential differences in AP between rural and urban settlements in Slovenia may be a reflection of specific regional environments, availability of resources, differences in socioeconomic status of families, community influence, and parental expectations towards PA.

In comparison to other regions of Slovenia, Ljubljana is considerably more developed, and experiences the positive migration balance of highly educated people, than other regions of the country. The reason for higher AP in urban children may, therefore, also be due to the influence of the parental educational level. Sember (2017) has reported that a mother's (r=0.26, p<0.05) and father's education (r=0.22, p<0.05) are significantly correlated to children's academic performance. Since better-educated parents are likely to move to the capital region (Rebernik, 2003), there may also be a greater percentage of children who perform better in academics for this reason alone.

DOI 10.26773/mjssm.180309

In terms of assessing academic performance, the math grade is the best one for the Slovenian education setting, with the highest predictive value of overall AP (r=0.50) (Flere, Klanjšek, Musil et al. 2009), including higher levels of reliability (0,89 – 0,94) (Carlson, Fulton, Lee et al. 2008). AP grades were based on ratings by school teachers; therefore, any potential personal bias cannot be entirely excluded. Nevertheless, although the strongest relationships were found between aerobic fitness and achievement in mathematics (Fedewa & Ahn, 2011), grade point average and mathematics grade are the only two instruments of AP used in larger studies of this nature; thus, the results of this study can only be generalized to those instruments that measure AP using the mathematics grade.

The current results show some differences in PA duration between urban and rural children. Urban children are slightly more active than rural children in Slovenia, which is consistent to the results of Planinšec (1997), Matejek and Planinšec (2008), and Planinšec, Pišot and Fošnarič (2006), who found that children from rural areas were the least active in Slovenia. All studies mentioned above were assessing PA using self-report methods, and the uncertainty of these results (Warnecke, Johnson, Chavez et al. 1997) has now been confirmed using objective measures of PA. All comparative studies of rural and urban children's PA in the Slovenian environment were conducted only in one geographical setting, meaning that the results could not be generalized to the entire Slovenian population. The results of the presented study introduce additional high-quality evidence of relations between urbanization grade, PA, and AP due to objectively assessed PA, and geographic dispersity of research sites, but to confirm the findings and make them more generalizable, future research should include larger numbers of children, and mathematics grades should also be combined with grades of other subjects and GPA.

Ethical Considerations

Approval of the National Medical Ethics Committee for the ACDSi study was obtained in June 2013 (ID 138/05/13).

REFERENCES

Allison, D. B., Faith, M. S., & Franklin, R. D. (1995). Antecedent exercise in the treatment of disruptive behavior: a meta‐analytic review. *Clinical Psychology: Science and Practice*, *2*(3), 279-303.

Alspaugh, J.W. (1992). Socioeconomic Measures and Achievement: Urban vs. Rural. *Rural Educator*, *13*(3), 2-7.

Alspaugh, J. W., & Harting, R. D. (1995). Transition effects of school grade-level organization on student achievement. *Journal of Research and Development in Education*, *28*, 145-145.

Carlson, S. A., Fulton, J. E., Lee, S. M., Maynard, L. M., Brown, D. R., Kohl III, H. W., & Dietz, W. H. (2008). Physical education and academic achievement in elementary school: data from the early childhood longitudinal study. *American journal of public health*, *98*(4), 721-727.

Caterino, M. C., & Polak, E. D. (1999). Effects of two types of activity on the performance of second-, third-, and fourth-grade students on a test of concentration. *Perceptual and motor skills*, *89*(1), 245-248.

Dollman, J., Norton, K., & Tucker, G. (2002). Anthropometry, fitness and physical activity of urban and rural South Australian children. *Pediatric Exercise Science*, *14*(3), 297-312.

Evans, W. H., Evans, S. S., Schmid, R. E., & Pennypacker, H. S. (1985). The effects of exercise on selected classroom behaviors of behaviorally disordered adolescents. *Behavioral Disorders*, 42-51.

Fedewa, A. L., & Ahn, S. (2011). The effects of PA and physical fitness on children's achievement and cognitive outcomes: a meta-analysis. *Research quarterly for exercise and sport*, *82*(3), 521-535.

Flere, S., Klanjšek, R., Musil, B., Tavčar Krajnc, M., & Kirbiš, A. (2009). Kdo je uspešen v slovenski šoli [Who is successfull in Slovenian school?]. *Ljubljana: Pedagoški inštitut [Institute for pedagogy]*.

Jensen, E. (2005). *Teaching with the brain in mind*. Alexandria: Association for Supervision and Curriculum Development.

Joens Matre, R. R., Welk, G. J., Calabro, M. A., Russell, D. W., Nicklay, E., & Hensley, L. D. (2008). Rural–urban differences in physical activity, physical fitness, and overweight prevalence of children. The Journal of rural health, 24(1), 49-54.

Jurak, G., Kovač, M., & Starc, G. (2013). The ACDSi 2013–The Analysis of Children's Development in Slovenia 2013: Study protocol. *Anthropological Notebooks*, *19*(3), 123-43.

Klement, B. (2006). Vloga srednjih in malih mest za uresničevanje policentričnega razvoja Slovenije. Ljubljana: Univerza v Ljubljani: Fakulteta za gradbeništvo in geodezijo, *Diplomsko delo.*

Libbey, M. (2004). Learning from 2003: Spamming Trends and Key Insights. MIT Spam Conference.

Loucaides, C. A., Chedzoy, S. M., & Bennett, N. (2004). Differences in physical activity levels between urban and rural school children in Cyprus. Health education research, 19(2), 138-147.

Matejek, Č., Planinšec, J. 2008. Gibalna aktivnost in kakovost življenja mlajših otrok. In Štemberger, V., Pišot, R., Rupert, K. (eds.) (2008). *Otrok v gibanju,* Koper: Univerza na Primorskem, Pedagoška fakulteta. Ljubljana: Univerza v Ljubljani, Pedagoška fakulteta.

Nelson, M. C., & Gordon-Larsen, P. (2006). Physical activity and sedentary behavior patterns are associated with selected adolescent health risk behaviors. *Pediatrics*, *117*(4), 1281-1290.

Planinšec, J. 1997. Razlike v motorični učinkovitosti predšolskih otrok z vidika kraja bivanja. In Bezenšek, J. (ed.) (1977). V čas Konjic vtkane sanje, 59–63. Slovenske Konjice: Javni vzgojno-varstveni zavod Vrtec Slovenske Konjice.

Planinšec, J. (2006). Povezanost učnega uspeha in gibalne aktivnosti mlajših učencev [Connection between learning success and physical actvity of younger pupils]. *Šport: revija za teoretična in praktična vprašanja športa [Sport: Journal for theoretical and practical issues in sport],* 54 (3): 59–64.

Planinšec, J., Pišot, R., & Fošnarič, S. (2006). Gibalna aktivnost mlajsih solarjev v severovzhodni Sloveniji [Physical activity of younger pupils in notheast Slovenia]. *Didactica Slovenica*, *21*(3-4), 3-14.

Rebernik, D. (2003). Ljubljanska urbana regija–razvojni trendi, problemi in možnosti [Ljubljana region – trends, problems and options]. *Dela*, *19*, 165-176.

Sember, V. (2017). Impact of physical activity and physical fitnes on academic performance in in selected Slovenian schoolchildren. (Doctroal dossertation). University of Primorska: Faculty for mathematics, natural sciences and Information sciences. Retireved from https://www.famnit.upr.si/files/zakljucna_dela_repo/510

Shephard, R. J. (1997). Curricular physical activity and academic performance. *Pediatric exercise science*, *9*(2), 113-126.

Singh, A., Uijtdewilligen, L., Twisk, J. W., Van Mechelen, W., & Chinapaw, M. J. (2012). Physical activity and performance at school: a systematic review of the literature including a methodological quality assessment. *Archives of pediatrics & adolescent medicine*, *166*(1), 49-55.

Starc, G., Kovač, M., Strel, J., Pajek, M. B., Golja, P., Robič, T., ... & Duraković, M. M. (2015). The ACDSi 2014-a decennial study on adolescents' somatic, motor, psychosocial development and healthy lifestyle: Study protocol. *Anthropological Notebooks*, *21*(3), 107-123.

Statistical office of Republic of Slovenia. (2016). Prebivalci po spolu, občine, Slovenija, 1.januar 2016, obtained 12.06.2016 http://www.stat.si/StatWeb/prikazi-novico?id=5868&idp=17&headerbar=15.

Šturm, J. (1972). *Osnovni parametri in norme telesnih sposobnosti učencev in učenk osnovnih šol v SR Sloveniji*. Ljubljana: VŠTK, Inštitut za kineziologijo Visoke šole za telesno kulturo.

Van Remoortel, H., Raste, Y., Louvaris, Z., Giavedoni, S., Burtin, C., Langer, D., ..., & Troosters, T. (2012). Validity of six activity monitors in chronic obstructive pulmonary disease: a comparison with indirect calorimetry. *PloS one*, *7*(6), e39198.

Warnecke, R. B., Johnson, T. P., Chávez, N., Sudman, S., O'rourke, D. P., Lacey, L., & Horm, J. (1997). Improving question wording in surveys of culturally diverse populations. *Annals of epidemiology*, *7*(5), 334-342.

World Health Organisation. (2010). *Global recommendations on physical activity for health*. Switzerland: WHO.

Zurc, J. (2011). Gibalna aktivnost slovenskih otrok [Physical activity of Slovenian children]. *Šport: Revija Za Teoreticna in Prakticna Vprasanja Sporta [Sport: Journal for theoretical and practical issues in sport]*, *59*(1), 126-131.

DOI 10.26773/mjssm.180309