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Original empirical article

ASSOCIATIONS BETWEEN THE SELF-ESTIMATED AND ACTUAL PHYSICAL FITNESS SCORES OF FINNISH GRADE 6 STUDENTS

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Abstract. *The purpose of this study was to examine if Grade 6 students were able to estimate and appraise their own physical fitness. The participants (N = 48, 20 girls and 28 boys) completed a three item self-report questionnaire to estimate their physical fitness levels (i.e., high, average, low) in relation to objectively assessed endurance, strength, and flexibility fitness levels. Significant correlations were found between self-estimation of endurance and 1500m/2000m running time (r = -.69); self-estimation of strength and composite strength scores (standing long jump, sit-ups and shoulder hang/pull-ups) (r = -.71); and self-estimation of flexibility and sit and reach scores (r = -.50). ANOVA results revealed significant differences between the high, average, and low self-estimated fitness groups in actual endurance, strength, and flexibility fitness scores. In all cases, the high self-estimation group demonstrated higher scores on the corresponding objective measures. The results clearly indicated that Grade 6 have acquired sufficient skills to competently undertake self-assessments of their fitness.*

Key words: *children, physical fitness, self-assessment, elementary school*

INTRODUCTION

Fitness characteristics are regularly evaluated in the context of physical education as a key component of the curriculum (Pangrazi, 2007). This has typically been achieved using objective measures to assess fitness characteristics such as endurance, strength, and

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flexibility, and the comparison of student performance with existing normative results (Cale and Harris, 2007). Previous literature has promoted the use of fitness testing to support various teaching and learning goals (e.g., Keating and Silverman, 2004; Keating, 2008), however, objective assessment is time consuming and may be negatively perceived by some students (Cale and Harris, 2007; Ross, Jones, & Deerness, 2007). For this reason, physical education programs may be served just as effectively through the use of alternative methods such as self-estimation of fitness.

Physical fitness is an important part of human functionality related to health and well-being. Fitness is characterized by a person's capability to function in and adapt to physical exercise and can be demonstrated through the operation of body systems associated with energy supply and energy transmission, circulation and respiration, and the performance of muscles and other soft tissues (Åstrand et al., 2003). Health-related fitness refers to those components of fitness that relate to health and the benefits of a physically active lifestyle (Bouchard et al., 2007). In a typical definition of health-related physical fitness, many components are measured, such as cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition. Self-estimation of one's own physical fitness is a multi-dimensional phenomenon. Self-estimated physical competence is part of the general self-perception and it is usually divided into physical competence, body image, self-estimated physical strength and physical fitness. (Fox & Corbin, 1989).Within the school setting, the attributes of fitness evaluated are often representative of a health-related focus and normally assessed using objective measures (McKenzie, 2007).

Several major international investigations have reported secular changes in the fitness levels of children (e.g., Olds and Tomkinson, 2007; Volbekienė and Griciūtė, 2007; Wennlöf, Yngve, & Sjöström, 2006). Olds and Tomkinson (2007) completed a major review of studies regarding changes children's aerobic fitness levels since the 1970s and proposed that performance on tests of aerobic fitness has been declining globally at a rate of about 5% each decade since 1970". In samples of Swedish children, Wennlöf et al. (2006) reported decreases in the aerobic fitness of 9 year-olds but not 15 year olds following comparisons of VO2 max data collected in 1952 and 1998. Volbekienė and Griciūtė (2007) compared the health-related fitness attributes of 12 to 16 year-old Lithuanian children from 1992 to 2002. They reported marked differences in the aerobic fitness and flexibility of the two samples; however, they also found a slight increase in the children's abdominal strength. In considering this set of secular studies, it appears that in general findings highlight a pattern of decrease in children's aerobic fitness, but the evidence is equivocal in regards to other attributes of fitness such as strength and flexibility.

Self-estimated physical fitness and health was examined using a single item measure for a sample of 11-year-old children (Vuori et al., 2004) in Finland. The researchers found in 1986 that 57% of the girls and 62% of the boys estimated their physical fitness at good or very good. In 2002, the results indicated that 80% of the girls and 77% of the boys estimated that they have good or very good physical fitness. Only a small number other studies have used more detailed self-estimation of fitness measures and compared the results with actual measures of fitness. Lamb and Hayworth (1998) found strong significant correlations between self-perceived and objective measures of endurance, strength, and flexibility for large sample of English adolescents. In a similar study involving Estonian children and adolescents, Jürimäe and Saar (2003) reported that actual endurance and self-estimated endurance were significantly correlated for the sample of 10 to 17 year-olds. Flexibility scores were significantly correlated for all but the 10 to 11-year-old par-

ticipants. Handgrip dynamometry was used as the objective strength measure but scores for this test did not correlate significantly with self-estimated strength scores for any age group. These findings highlight that the use of self-estimation as an indicator of children's fitness is a valuable adjunct to objective assessment that warrants further investigation.

According to the National Core Curriculum of Finland (2004) one goal of basic education is to develop the student's capacity to undertake self-assessment of their abilities. The purpose of developing self-assessment proficiencies is to support improvements in study skills and the growth of the student's self-knowledge. Physical education teachers should also search for opportunities to promote students' capabilities for self-assessment associated with physical and motor skills. To date, only limited research information is available as to how PE teachers could support the student's development of self-assessment skills and how realistic self-assessment is for elementary school-aged children in physical education. The purpose of this study, therefore, was to evaluate the effectiveness of a physical education program that provided Grade 6 children with skills and knowledge associated with the self-estimation of their fitness levels. As an additional component to the regular objective assessment of the children's physical fitness, this sample also completed a short measure of self-estimated fitness.

METHOD

Participants

The participants of this study were 48 Grade 6 students from one school located in central Finland. The age of subjects varied between 11-12-years and the sample included 20 girls and 28 boys. The students have participated in two mixed gender physical education classes per week at both grade one and two. From grades three to six students had 3 PE lessons per week in which a female PE teacher taught the girls group and a male PE teacher taught the boys groups. PE group sizes varied between 16 and 24 students.

Instruments

The methods used were divided into four sections:
1. Content of teaching,
2. Subjective measurement of fitness,
3. Objective measurement of fitness,
4. Validity and reliability of the fitness tests.

Content of teaching. In Finland the physical fitness of students is measured longitudinally to observe their fitness development over time. Teaching content includes specific fitness information and activities, which students can practice, thus, developing and managing their own physical fitness. The students in this sample were involved in the practice of self-evaluation as a key element of the PE curriculum since Grade 1. During the first years of schooling, self-evaluation focused on students' experiences of different physical activities and activity during PE lessons. Self-evaluation also involved the self-assessment of their social behavior. As an important element of the Grade 6 PE program teachers purchased 30 heart rate monitors (Polar, model E40) for student use during classes. Students wore the heart rate monitors during approximately ten different PE classes. Stu-

dents were taught to measure and record heart rates and to make conclusions regarding the intensity of the physical activity. Teachers discussed the different heart functions and how they are related to heart rate. Information concerning how students could maintain and develop their fitness levels using heart rate information was also provided. During one lesson students visited the Finnish Olympic Research Center to observe a fitness testing session involving young elite-level athletes. During that visit teachers and students discussed the differences between the procedures associated with elite-level fitness testing and school based fitness assessments.

Subjective measurement of physical fitness. During the final phase of the Grade 6 PE program students completed the self-estimation of physical fitness questionnaire. The measure includes three different items that are: 1) "I'm able to do tasks demanding endurance", 2) " I'm able to do tasks demanding strength" and 3) "I'm able to do tasks demanding flexibility". Students answered using one of three different response alternatives that are a) "very well" b) "average" or c) "poorly". The self-estimation of physical fitness items were modified versions of items used as part of the Health Behaviour in School-aged children study (Vuori et al., 2004) for the self-assessment of physical activity.

Objective measurement of physical fitness. At the completion of the Grade 6 PE program we objectively measured the students' physical fitness levels. Firstly, the aerobic endurance levels of students were measured using the long distance running test (Safrit, 1990). The running distance was set at 1500m girls and 2000m for boys using the school's own 300m athletic facility. Students completed the run only once and their finishing time was recorded. The next five fitness assessments were administered indoors over two PE lessons. The size of school's gym was approximately 17m x 10m. The sit ups (completed in 30s), standing broad jump (cm) and sit and reach (cm) assessments were the same for boys and girls. Upper body strength was measured by time (s) of shoulder hang for girls and the number of completed pull-ups for boys. The students were familiar with all test items because the assessments form part of the school fitness evaluation program that all Finnish students complete once or twice a year from Grade 3. All measurements were completed during normal PE lessons. The PE teacher for each group assessed the students' task performance in the following test items: 1500m/2000m run, shoulder hang, and pull-ups. Students assessed their peers for sit ups, sit and reach and standing broad jump. For statistical analysis a combined category of strength was created. The strength score was calculated by averaging the normative performance results for standing broad jump, shoulder hang /pull-ups and sit ups.

Validity and reliability of the fitness tests. Earlier research has shown the tests selected have good validity, satisfactory reliability, and conform to international standards for the assessment of physical fitness (e.g., Larson, 1974; Safrit, 1990). Previous researchers have reported the inter-rater reliability of the tests varied between .57 and .98 (Simons et al., 1982). Nupponen (1981) generated and reported normative data for each of the tests. It should be noted, however, that a single test does not necessarily measure only a single fitness characteristic. Tests can assess many different fitness properties and correspondingly, one characteristic could be evaluated by several tests.

Procedure

Descriptive data was analyzed for the girls and boys for both the objective and subjective fitness test items. All analyses for the objective fitness scores were based on the

participants' normative percentage score, derived from data presented by Nupponen (1981), rather than the raw score. This was done so that analyses involving girls and boys scores in fitness characteristics in which the tests varied (e.g., 2000m run for boys and 1500m run for girls representing endurance) could be conducted for the whole sample based on the normative percentage for that fitness characteristic. Gender differences were evaluated using the independent samples t-test. The correlations between self-estimation and objective test items were determined using Spearman's rank correlation test. One way ANOVA was used to evaluate differences in objective fitness test scores between students grouped according to their self-estimated fitness category. Hochberg's GT2 method *post hoc* test for unequal sample sizes was then used to evaluate pair-wise group differences (Wilcox, 1987).

RESULTS

Scores for participants' self-estimation of fitness level are presented in Table 1. The main trend found for both boys and girls was that the majority of participants evaluated their endurance, strength, and flexibility fitness levels as either very good or average. Only 5 to 15% of participants evaluated their fitness as poor within the three fitness characteristics. Higher percentages of boys self estimated their endurance and flexibility as very good. A higher percentage of girls self estimated their strength as very good. The patterns of percentage distributions of the self-estimation score groups for each of the fitness characteristics were very similar for the overall sample. The internal consistency of the 3-item measure was low (r = .51) with the flexibility item leading to the greatest change in Cronbach's alpha if removed.

Table 1. Grade 6 (girls and boys) self-estimations of their fitness level

Self-estimation of Fitness Item	Girls (n = 20)		Boys (n = 28)		All (n = 48)	
	n	%	n	%	n	%
I'm able to do endurance tasks						
- very well	8	40	16	57	24	50
- average	9	45	8	29	17	35
- poor	3	15	4	14	7	15
My strength level is						
- very good	11	55	13	46	24	50
- average	8	40	12	43	20	42
- poor	1	5	3	11	4	8
I'm able to do tasks demanding flexibility						
- very well	8	40	14	50	22	46
- average	9	45	10	36	19	40
- poor	3	15	4	14	7	14

The girls and boys actual and normative performance scores for each of the objectively assessed variables are shown in Table 2. There were no statistically significant differences between genders in the endurance and strength items. Girls were more flexible

than boys. Normative performance results for each of the self-estimated fitness categories for each of the fitness characteristics are also shown in Table 2.

Table 2. Actual and normative objective fitness test scores and gender difference t values

Objective Fitness Variables	Overall		Girls		Boys		t	
	M	SD	M	SD	M	SD	value	sig
Endurance %	49.67	30.90	45.60	30.67	52.57	31.29	-0.767	. 447
1500m /2000m (s)			472.20	70.07	568.21	98.28		
Strength Total %	62.37	22.83						
Standing Broad Jump %	59.58	26.06	63.90	29.22	56.50	23.62	0.969	.338
Standing Broad Jump (cm)	181.69	21.91	174.75	25.25	186.40	18.06	-1.905	.063
Arm strength %	47.98	32.81	49.75	36.18	46.71	30.81	0.313	.756
Arm Hang(s)/Pull-ups(reps)			16.19	16.71	3.29	3.52		
Sit Ups %	79.54	28.84	75.60	29.63	82.36	28.47	-0.797	.429
Sit Ups (reps)	23.81	6.63	21.75	6.74	25.29	6.25	-1.120	.270
Flexibility%	76.25	22.61	85.50	16.93	69.64	24.07	2.529	.015
Sit and Reach (cm)	61.25	5.99	65.55	5.17	58.07	4.38	5.359	.000

Correlations between self-estimated fitness items and normative scores for the objective measures are shown in Table 3. Self-estimated endurance correlated strongly with the normative 1500m/2000m performance and moderately with strength (total). Self-estimated strength correlated strongly with the normative strength and moderately with endurance performance. In addition, self-estimated flexibility correlated moderately with the normative sit and reach performance but it was not associated with normative endurance and strength scores. Results also showed that self-estimated strength correlated with moderately with self-estimated endurance and self-estimated flexibility was found to correlate weakly with self-estimated endurance.

Table 3. Correlations of self-estimated fitness and normative scores for the objective test items

Objective Fitness Item (N = 48)	Self-estimation of Fitness Category		
	Endurance	Strength	Flexibility
Endurance			
1500m/2000m	**-.69*****	-.49***	.21
Strength (total)	-.47**	**-.71*****	-.08
Standing long jump	-.39**	-.66***	-.15
Hanging/pull-ups	-.33*	-.47**	-.12
Sit ups	-.44**	-.64***	.08
Flexibility			
Sit and Reach	-.08	-.05	**-.50*****

* p < .05, ** p < .01, *** p < .001

The ANOVA results revealed significant differences between the self-estimated fitness groups in objective endurance, strength (total) and flexibility fitness scores (Table 4).

Table 4. Descriptives and F-values for Self-estimation level group differences in normative objective measure scores

Normative Fitness Variable	Very Good			Average			Poor			ANOVA	
	M	SD	n	M	SD	n	M	SD	n	F (2,45)	sig
Endurance %	71.58	19.50	24	30.23	21.13	17	21.71	30.47	7	24.55	< .001
Strength Total %	76.96	14.38	24	51.60	19.37	20	28.67	14.74	4	21.49	< .001
Flexibility%	86.59	15.59	22	72.74	16.86	19	53.29	35.42	7	7.96	< .001

Post-hoc analyses indicated significant differences existed in objective endurance scores between the above average and both the average and below average self-estimation of endurance fitness groups ($p<.001$), whereas, no significant difference was found between the average and below average groups. Significant post-hoc differences in objective strength scores were found between the above average and both the average and below average self-estimation of strength fitness groups ($p< .001$). In addition, there was also a significant difference between average and below average self-estimation of strength fitness groups in objective strength scores ($p=.046$). A significant difference was found only between the above average and below average self-estimation of flexibility groups ($p<.001$) in objective flexibility scores.

DISCUSSION

The purpose of this study was to evaluate the relationship between the self-estimations and objective assessments of physical fitness for a sample of Grade 6 Finnish children. Results the correlations clearly indicated that the students' estimations of their own fitness levels were closely related to corresponding objectively measured fitness scores. This suggests that utilizing children's own evaluations of fitness constitutes a viable alternative to more complex objective testing, and also allows for the on-going mastery of the skills required in the accurate self-estimation of fitness across the lifespan.

For this sample, 85 to 90% of the children estimated their fitness as very good or average. This result was higher than expected. Previous findings, however, have indicated that the endurance levels of Scandinavian children are declining (Huotari, 2004; Wennlöf et al., 2006). Furthermore, the students represented in the average category for endurance demonstrated normative endurance scores in the low range. This suggests that many students in this category were overestimating their endurance fitness levels. In relation to the strength category, the students' self-estimation closely matched the corresponding scores of normative strength. Self-estimation scores for flexibility demonstrated a pattern that suggests that the students underestimated their fitness. Normative flexibility mean values for the average and poor categories were higher than is typically observed for students objectively classified as average or poor in flexibility suggesting that the students were underestimating their capacitates.

A possible reason underlying the over-estimation of endurance scores by students in the average category may be that the normative scores we have used were formulated in 1981. Research examining changes in children's fitness over the last 20 years indicated that aerobic fitness is the main area of decline (Wennlöf et al., 2006). As children tend to

estimate their fitness on the basis of peer comparison, the normative data may not accurately reflect the current status of the endurance fitness levels of children in Finland. Research regarding strength and flexibility indicates a higher level of stability over time in the actual fitness levels of children than changes in aerobic fitness (Tomkinson, 2007). The present finding regarding strength indicates that the actual scores are representative of global trends highlighting minimal change in children's strength levels (Volbekienė and Griciūtė, 2007; Tomkinson, 2007).This suggests, therefore, that the normative data provide an accurate indication of actual strength fitness. Furthermore, the strong association between actual and self-estimated strength, and the significant differences between each of the self-estimated categories, provides support for the efficacy of children's self-estimations of their strength. Additionally, the children's actual flexibility scores were representative of normal and above normal fitness across the categories of self-estimation. Secular reports of changes in children's flexibility are limited; however, Volbekienė and Griciūtė (2007) found a small decline in the flexibility of 12-year-olds between 1992 and 2002. One possibility for the children's apparent under-estimation of their flexibility is that the sample school places a large focus on this area of fitness within the school physical education program. The children in this sample, on the basis of their peer comparisons, may not have an understanding that their flexibility is possibly better than children of other school settings. Interestingly, children (especially boys) are less likely to observe characteristics such as flexibility in demonstrations of fitness during leisure or community sport based physical activity (e.g., aerobic, anaerobic) and as a consequence the performance of the sit and reach test in the school setting may constitute their only reference point in regards to flexibility. Overall, the relationships between actual and self-estimated fitness observed in the current data were very good and similar to those reported by Lamb and Hayworth (1998), and much higher than those found by Jürimäe and Saar (2003), particularly in relation to strength and flexibility.

A number of interesting gender differences were observed in the both the self-estimated and actual data. Firstly, a higher percentage of the girls self-estimated their strength as average or very good than the boys, whereas no significant differences between genders for any of the normative strength test scores were found. This result is in contrast with Jürimäe and Saar (2003) who reported that boys scored significantly higher in self-estimations of strength in 10- to 11 year-old and 14- to 15 year-old children. In regards to flexibility, more boys estimated their flexibility as very good, whereas girls had significantly higher normative flexibility scores. This result was similar to the gender pattern found by Jürimäe and Saar (2003). In the current sample, societal influences in the manner in which boys and girls perceive strength and flexibility as characteristics of fitness may represent a possible explanation for the results. Girls may give a lower priority of strength as a fitness attribute whereas boys, consider strength to be an important representation of their overall fitness. The reverse pattern was observed for flexibility. Boys are often in social situations that involve the demonstration of their levels of strength to each other within the physical activities in which they participate (e.g., outdoor activities, ice hockey) (Connell, 2008). Girls participate more in sports and activities that have a greater reliance on flexibility (e.g., gymnastics aerobics, dance) (Nupponen et al., 2002). This may serve to provide boys with the information to make a more accurate assessment of their strength and girls of their flexibility. It is worth noting that the girls in this sample did have relatively high normative scores in the strength tests, and the boys had similarly high normative scores for flexibility. The girls and boys in this sample,

therefore may simply represent an above average group in regards to strength and flexibility fitness and for this reason their self-estimation patterns fits the cohort accurately.

The major limitation of the present research is the small sample and the use of only a single school. As this study was designed as a pilot framework to evaluate the self-estimation measure, future research will be required that incorporates a substantially larger sample from a much broader number of school settings. Additionally, the normative data used was collected in 1976 (Nupponen, 1981) and may not serve as an accurate representation of the current fitness levels of Finnish school children. Future analysis of the self-estimation measure will require the use of more recent normative fitness information from either Finland or similar European samples. At this point in time the low level of internal consistency of the measure suggests that modifications to the item structure and the number of fitness categories evaluated are warranted. For example, rather than a 3-point scale a four or five point response scale may be more appropriate. The addition of a category of speed that has a closer link to several of the actual fitness measures such as the 50 m run could also serve to improve the assessment properties of the scale.

Overall, the findings have shown that children are capable of self-estimating their fitness levels in line with their actual levels of fitness. Although the reliability for the self-estimation scale was not assessed, convergent and divergent validity as demonstrated by the strong correlations between similar categories of self-estimated and actual fitness scores and weaker correlations between dissimilar categories provide basic evidence of the psychometric adequacy of the measure. The results indicate that further development and more in-depth evaluation of the measure would serve to refine the structure of a self-estimation of fitness instrument capable of providing a viable alternative to objective assessments of the fitness levels of school aged children.

REFERENCES

1. Åstrand, P.-O., Rodahl, K., Dahl, H., & Stromme, S. (2003). *Textbook of work physiology. Physiological Bases of Exercise*. 4th edition. New York: McGraw-Hill.
2. Bouchard, C., Blair, S. N., & Haskell, W. L. (2007). *Physical Activity and Health*. Champaign, IL: Human Kinetics.
3. Cale, L., & Harris, J. (2009). Fitness testing in physical education – a misdirect effort in promoting healthy lifestyles and physical activity. *Physical Education and Sport Pedagogy*, 14, 89-108.
4. Connell, R. (2008). Masculinity construction and sports in boy's education: a framework for thinking about the issue. *Sport, Education and Society*, 13, 131-145.
5. Fox, K. R., & Corbin, C. B. 1989. The Physical self-perception profile: Development and preliminary validation. *Journal of Sport and Exercise Psychology* 11, 408–430.
6. Huotari, P. (2004). *Are they fit? – Finnish school-aged children's physical fitness in 1976 and 2001*. Jyväskylä: Research Institute of Physical Culture and Health.
7. Jürimäe, T., & Saar, M. (2003). Self-perceived and actual indicators of motor abilities in children and adolescents. *Perceptual and Motor Skills*, 97, 862-866.
8. Keating, X.D., & Silverman, S. (2004). Teachers' use of fitness tests in physical education programs: Problems, and future directions. *Quest*, 55, 141-160.
9. Keating, X.D., Guan, J., Ferguson, R. H., Chen, L., & Bridges D. M. (2008). Physical education teacher attitudes toward fitness tests scale: cross-revalidation and modification. *Measurement Physical Education Exercise Science*, 12, 72-87.
10. Lamb, K.L., & Haworth, W.B. (1998). Self-Perceived Fitness Among Adolescents Schoolboys. *Physical Education & Sport Pedagogy*, 3, 167-177.
11. Larson, L.A. (ed.) (1974). *Fitness, health and work capacity. International standards for assessment*. New York, NY: Macmillan.

12. McKenzie, T.L. (2007). The preparation of Physical Educators: A Public Health Perspective. *Quest*, 59, 346-357.
13. Nupponen, H. (1981). *The physical –motor fitness of school children: reports of physical culture and health*. Jyväskylä: Research Institute of Physical Culture and Health.
14. Nupponen, H., & Huotari, P. (2002). Are they fit? – We are care about the increasing polarisation of physical fitness among adolescents. *Liikunta ja tiede*, 3, 4-9.
15. *National Core Curriculum for Basic Education 1994*. Government of Teaching. Helsinki: National Press, 109-110. [http//www.oph.fi/english]
16. Pangrazi, R. (2007). *Dynamic Physical Education for Elementary School Children, 15th Edition*. San Francisco: Benjamin Cummings.
17. Ross, B., Jones, R., & Deernees, S. (2007). The Role of Fitness Testing in Physical Education. *Physical Educator – Journal of Physical Education New Zealand*, 40, 22-24.
18. Safrit, M.J. (1990). The validity and reliability of fitness tests for children: A review. *Pediatric Exercise Science*, 2, 9-28.
19. Simons, J., Beunen, G., Renson, R., & van Gerven, D. (1982). Construction of a motor ability test battery for boys and girls aged 12 to 19 years, using factor analysis. *In J. Simons & R. Renson (eds) Evaluation of Motor Fitness*. Leuven: Institute of Physical Education of the K. U, 151-167.
20. Tomkinson, G.R. (2007). Global changes in anaerobic fitness test performance of children and adolescents (1958-2003). *Scandinavian Journal of Medicine and Science in Sports*, 17, 497-507.
21. Olds, T., Tomkinson, G., Léger, L., & Cazorla, G. (2006). Worldwide variation in the performance of children and adolescents: An analysis of 109 studies of the 20-m shuttle run test in 37 countries. *Journal of Sport Sciences*, 24, 1025-1038.
22. Volbekienė, V., & Griciūtė,. (2007). Health-related physical fitness among schoolchildren in Lithuania: A comparison from 1992 to 2002. *Scandinavian Journal of Public Health*, 35, 235-242.
23. Vuori, M., Kannas, L., & Tynjälä, J. (2004). Young people's health in context. Health Behaviour in School-aged Children (HBSC) study 20 years. *In L. Kannas (Eds.) School-aged health and health behaviour in change*. Health Promotion Research Center. University of Jyväskylä.
24. Wennlöf, A.H., Yngve, A., & Sjöström, M. (2006). Changes in Aerobic Fitness in Swedish Children and Adolescents. *Journal of Physical Activity and Health*, 36, 79-89.
25. Wilcox, R.R. (1987). New Designs in Analysis of Variance. *Annual Review of Psychology*, 38, 29-60.

POVEZANOST IZMEĐU SAMOPROCENJIVIH I STVARNIH FIZIČKIH FITNES REZULTATA FINSKIH UČENIKA ŠESTOG RAZREDA

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Svrha ove studije je bila da se utvrdi da li su učenici šestog razreda bili sposobni da procene i ocene svoj fizički fitnes. Ispitanici (N = 48: 20 devojčica i 28 dečaka) su popunili upitnik sa tri mogućnosti da procene svoj nivo fizičkog fitnesa (visok, prosečan, nizak) u vezi sa objektivno procenjenom izdržljivošću, snagom i nivoima fitnes fleksibilnosti. Značajne korelacije su utvrđene između samo-procene izdržljivosti i vremena trčanja na 1500m, odnosno 2000m (r = -.69); samo-procene snage i kombinovanih rezultata snage (standing long jump, sit-ups and shoulder hang/pull-ups) (r = -.71); i samo-procene fleksibilnosti i rezultata sit and reach (r = -.50). ANOVA rezultati su otkrili značajne razlike između fitnes grupa koje su se ocenjivale visoko, prosečno i nisko u stvarnim fitnes rezultatima izdržljivosti, snage i fleksibilnosti. U svim slučajevima samo-procenjujuća grupa koja je sebe visoko ocenila, pokazala je više rezultate na odgovarajućim objektivnim merenjima. Rezultati jasno pokazuju da šesti razred ima dovoljno veština da izvrši kompletnu samoprocenu svoga fitnesa.

Ključne reči: *deca, fizički fitnes, samoprocena, osnovna škola*