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## Interaction of physical activity, joy of physical activity and quality of life of high school students with different level of sport performance

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### Abstract

**Purpose:** The paper presents the results of the relationship analysis between physical activity, joy of physical activity and areas of quality of life in high school students with different levels of sport performance. We expected a higher number of positive interactions between the observed indicators in students with voluntary and organized physical activity in the week.

**Methods:** The survey was attended by 16-19 years old ( $n = 895$ ) high-school students. The quality of life was examined through a modified SQUALA questionnaire, enjoyment of physical activities by the PACES questionnaire and the level of physical activity in hours per week (PA). The data are presented by the descriptive characteristics of the ( $n$ ,  $M$ ,  $SD$ ) and statistical significance of the differences, respectively the relationships were evaluated by nonparametric methods ( $W$ ,  $U$ ,  $r_s$ ) at a level of significance ( $p < 0.10$ ;  $p < 0.05$  a  $p < 0.01$ ).

**Results:** The results demonstrated differentiated interactions between the physical activity, joy of physical activity subjective assessment and the quality of life in high school students. Correlations between PA and PACES and SQUALA are sporadically in groups with different level of sport performance mainly with negative interactions prevailing. PA in the week correlates positively with PACES ( $r_s = 0.089$ ,  $p = 0.148$ ) and material well-being ( $r_s = 0.111$ ,  $p = 0.070$ ) in active athletes and top athletes with psychosocial well-being ( $r_s = 0.291$ ,  $p = 0.058$ )

High frequency of positive interactions between the PACES and SQUALA subjective assessment at occasional athletes (physical, spiritual well-being, appearance and ownership), active athletes (psychosocial and spiritual well-being, education), registered athletes (education) and top athletes (physical well-being) were observed. Only for passive athletes, the interactions between the observed variables were not recorded.

**Conclusions:** The results reaffirm the importance of volunteer and organized physical activity in the life of high-school students which have potential to raise the level of enjoyment from the activity. The low levels of PA interactions with the areas of life among the high-school students point to the necessity for further observation of this construct.

**Keywords:** physical activity, quality of life, interaction, adolescence, high school

### Introduction

In middle adolescence period, young people go through many internal and external transformations. The emphasis is on physical appearance and with increasing sexual maturity the tendency to self-sufficiency is showing up. Experimentation occurs at the area of relationships, experiences and roles. Adolescents are setting their norms, searching for themselves, clarifying their opinions by which they form their own world view, personal identity and then they expect the acceptance in the community <sup>[1, 2]</sup>. Family and family environment are the important factors during filling emotional and social needs of immature person. These factors are related to the subjective perception of well-being <sup>[3]</sup> and affects relationships with peers, partners or close people <sup>[4]</sup>.

Life satisfaction is largely connected with sociometric status and health condition and it indicates personal well-being of adolescents <sup>[5]</sup> and it is influenced by more factors as an engaging in religious activities, interpersonal relationships, important life events, ethnicity, social support, orphanage, self-esteem and personal variable, very important is also the age of the individual <sup>[6]</sup>. We define quality of life with respect to satisfaction of the person according

to how he reaches his goals that satisfy his life needs [7]. These are determined by hierarchy of values to which is effort of man focused on. Success in fulfillment personal goals foreshadows achieving integrated personality and feelings of happiness.

When these efforts are fragmented, and the personal ambitions are not fulfilled, they feel discomfort, which is reflected on the evaluation of quality of life [8]. Hierarchy of adolescent's goals aged from 15 to 24 years forms the priority of good job (37%), graduation of school (36%), establish a family (25%), money (12%), own flat (10%), satisfaction with life (6%), run a business (5%) and health (4%).

It turns out, that the physical ability and participating at the physical activities affects personal well-being and quality of the whole life. It shows in social, psychological and physical fields of life and invoke the wide range of consequences [9, 10]. Participation on the regular exercises can help reduce depressive symptoms and reduce anxiety. It has a positive effect on the psychological field and it also affects higher self-esteem and perception of oneself. Researches shows positive impact of the physical activities to the subjective well-being [11-16]. Researches has also confirmed that joy of the movement is a consistent predictor of the level of physical activity. Joy from the physical activity growing with increasing sports level which means that the lowest average values were achieved by the passive ones and the highest values were achieved by the active and professional athletes [17-19].

As the major benefits of physical ability for the overall life satisfaction and personal well-being we can consider the beneficial effect on metabolism and ability to achieve the optimal body weight. These abilities results prevention of many diseases and disorders while is important to mention independence and autonomy of the individual [20]. Adolescent's dissatisfaction with their bodies reflects in their low self-confidence, self-esteem and the occurrence of anxiety and depressive states were noticed [21]. Young people who are dissatisfied with their bodies feel handicapped and they have fewer friends which shows up in their social status [22].

Regular physical activities for 3-5 times a week are recommended [23-27] and they draw attention to the positive interactions between the regular physical activity and the life areas mainly in groups of high school students and the university students. The amount and polarity of physical activity interactions with individual areas of life are closely related with specificity of adolescent groups. The essentials factors which play the important role here, are the level of physical activity, type and area dimension of the school, study programme, gender, social groups and many [28-30]. Therefore, it is necessary to apply the presented research methods to diverse target groups of adolescents and to contribute to the issue of relationship analyzes between the level of physical activity and individual areas of quality of life. The important factor which should have affected the causality in a relationship to the results is the level of sport performance.

In our research we focused on high-school students in middle adolescence period. The main aim was to point to the interactions between the individual areas of life, joy from physical activity and different physical activity during the week. We have also dealt with the questions: what is the level of the physical activity during the week and what is the quality of life of the students in middle adolescence period? What are the differences in the individual areas of quality of life from the perspective of importance and satisfaction?

## Methods

The questionnaire survey focused on finding the frequency of physical activity in a week, level of sport performance, joy from the physical activity and the quality of life. Questionnaire survey was attended by 895 high-school students (girls and boys) from Slovak Republic with average age 17,22 years. There was no age difference between the groups of high-school students with different sport performance levels ( $p=n. s.$ )

Physical activity in the week was determined from the total realized hours of the week and hours without physical education. Respondents reported their sport performance levels by their subjective evaluation.

We designate the groups of students with different sport performance levels from A to E.

- A. Passive athletes - do not seek physical activity, attend mandatory sports activities at school or at work
- B. Occasional athletes - seek physical activity, not regular in a week, physical activity is not organized
- C. Active athletes - regular activity in a week, no membership in sport organization, member
- D. Registered athletes - they are members of sport organization, national level,
- E. Top athletes - international level, performance and top sport.

For the evaluation of the joy of physical activity we used questionnaire PACES – Physical Activity Enjoyment Scale which consist of 16 statements to which are respondents express themselves by the 5 points, Likert scale. Total score is obtained by the counting of individual answers. High values represent the joy from the physical activity and the low values from summary score represents less joy from the physical activity [31].

The questionnaire of quality of life contained several parts from the SQUALA questionnaire [32, 33, 8]. The questionnaire parts were evaluated from the point of view:

- 1<sup>st</sup>: sphere of physical well-being - health, sleep, solution of everyday activities, do not have problems
- 2<sup>nd</sup>: sphere of psychosocial well-being - family, personal relationships, intimate relationships, hobbies, safety
- 3<sup>rd</sup>: sphere of spiritual well-being - justice, freedom, beauty and art, truth
- 4<sup>th</sup>: sphere of material well-being - money, good food
- 5<sup>th</sup>: education - to be educated, to go to school
- 6<sup>th</sup>: leisure time - possibility to spend your free time, have enough things for play and fun
- 7<sup>th</sup>: appearance and ownership of the things - look good, to dress nicely, have things that I like
- 8<sup>th</sup>: orientation to the future - to have children and job in the future that will enjoy

The questionnaire defines spheres from the objective aspect: "*how it is important to you...*" and from the second subjective viewpoint: "*how are you satisfied with...*".

Both items are assessed on a 5-point scale depending on the importance of each item for their life (1 totally unimportant; 2 little important; 3 medium important; 4 very important; 5 the most important) and (1. Very dissatisfied, 2. Dissatisfied, 3. Medium satisfied, 4. Satisfied, 5. Very satisfied).

For the data presentation we used basic descriptive statistics (frequency  $n$ , arithmetical mean  $M$ , standard deviation  $SD$ , mathematical difference of averages "d"). Differences between the importance and satisfaction in the quality of life of dependent groups were assessed by Wilcoxon test and the differences of independent groups were assessed by Mann-Whitney U-test. For finding the interaction between criteria

“frequency of physical activity in a week” and “areas of quality of life” we used the Spearman’s correlation coefficient ( $r_s$ ). For the assessment of the statistical significance of differences we used the level of significance  $p < 20$ ,  $p < 10$ ,  $p < 05$ ,  $p < 01$ . The data were processed in MS Excel and SPSS.

**Results**

**Physical activity** of high school students divided to groups according to level of sport performance is differentiated from the view of the total hours of physical activities ( $p < 01$ ) and the extracurricular physical activities in a week ( $p < 01$ ). The amount of the physical activity is closely related with the

rising sport level (table 1 and 2). The lowest amount of physical activities in a week we noticed in the group of students who had passive interest in physical activity ( $M = 3,07$ ;  $SD = 1,88$ ). The amount of physical activity in passive athletes consisted mostly of compulsory physical education hours at high schools, while the extracurricular physical activity reach on average  $M = 1,13$  hours ( $SD = 1,60$ ) per week. The highest amount of physical activity reached students who was registered at the sports clubs ( $M = 10,81$ ;  $SD = 3,86$ ) or they did sport on the top level ( $M = 13,28$ ;  $SD = 4,23$ ).

**Table 1:** The level of physical activity per week, joy of physical activities and the fields of quality of life in high-school students

Indicators	Sports performance										
	A Passive [n=56]		B Occasional [n=351]		C Active [n=267]		D Registered [n=178]		E Top [n=43]		
	M	SD	M	SD	M	SD	M	SD	M	SD	
Physical activities per week without physical education [h]	1,13	1,60	3,06	1,90	5,93	3,16	8,74	3,85	11,33	4,13	
Total physical activities per week [h]	3,07	1,88	4,99	1,98	7,91	3,20	10,81	3,86	13,28	4,23	
The joy of physical activities	46,79	5,03	47,90	3,89	48,37	3,76	49,18	3,42	48,77	4,05	
How important for you ...	Physical well-being	4,42	,49	4,35	,55	4,34	,57	4,31	,55	4,35	,50
	Psychosocial well-being	3,74	,54	3,77	,53	3,82	,50	3,83	,53	3,84	,54
	Spiritual well-being	4,21	,52	4,04	,62	4,10	,57	4,04	,65	4,02	,64
	Material well-being	4,02	,81	3,76	,84	3,77	,82	3,97	,75	4,06	,71
	Education	3,91	,81	3,85	,81	3,87	,82	3,85	,71	3,58	,95
	Leisure time	4,13	,82	3,96	,77	4,00	,77	4,10	,69	3,99	,86
	Appearance and Property affairs	3,64	,90	3,46	,87	3,49	,87	3,65	,81	3,48	,92
Focusing on the future	4,04	,88	4,22	,75	4,33	,68	4,33	,71	4,24	,90	
How are you satisfied ...	Physical well-being	3,61	,67	3,73	,62	3,83	,59	3,86	,52	4,00	,55
	Psychosocial well-being	3,70	,49	3,69	,55	3,75	,51	3,80	,49	3,90	,53
	Spiritual well-being	2,81	,81	2,90	,68	2,93	,64	2,96	,69	2,99	,86
	Material well-being	3,54	,93	3,55	,75	3,62	,77	3,74	,77	3,69	,91
	Education	3,71	,85	3,78	,78	3,83	,70	3,68	,74	3,62	,75
	Leisure time	3,63	,92	3,73	,82	3,87	,78	3,95	,74	3,88	,85
	Appearance and Property affairs	3,79	,66	3,85	,66	4,02	,62	4,02	,59	4,18	,58

Note: n- quantity, M – average value, SD-standard deviation

The results of the evaluation of the joy of physical activities in high-school students indicates between the defined sports levels statistically significant differences (table 1 and 2). The level of joy from the physical activities in group of passive athletes ( $M = 46, 79$ ;  $SD = 5, 03$ ) and occasional athletes ( $M$

$= 47, 90$ ;  $SD = 3, 89$ ) is lower in comparison with group of students who are active in physical activities and they are registered or top athletes ( $p < 05$  a  $p < 01$ ). The groups of active, registered and top athletes have the same level of the joy of physical activities ( $p = n.s.$ )

**Table 2:** Statistical comparison of the physical activity in a week, joy of physical activity and the fields of quality of life between the groups of students with different sport level performance.

Indicators	A > B	A > C	A > D	A > E	B > C	B > D	B > E	C > D	C > E	D > E
Physical activities per week without physical education [h]	**	**	**	**	**	**	**	**	**	**
Total physical activities per week [h]	**	**	**	**	**	**	**	**	**	**
The joy of physical activities	n.s.	*	**	*	**	**	**	n.s.	n.s.	n.s.
How important for you ...	Physical well-being	n.s.								
	Psychosocial well-being	n.s.								
	Spiritual well-being	n.s.								
	Material well-being	*	*	n.s.	n.s.	n.s.	**	**	**	*
	Education	n.s.	*							
	Leisure time	n.s.	n.s.	n.s.	n.s.	n.s.	*	*	n.s.	n.s.
	Appearance and Property affairs	n.s.	n.s.	n.s.	n.s.	n.s.	**	**	*	n.s.
Focusing on the future	n.s.	*	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	
How are you satisfied ...	Physical well-being	n.s.	*	*	**	*	*	n.s.	n.s.	
	Psychosocial well-being	n.s.	n.s.	n.s.	n.s.	n.s.	**	**	n.s.	
	Spiritual well-being	n.s.								
	Material well-being	n.s.	n.s.	n.s.	n.s.	n.s.	**	**	*	
	Education	n.s.	*							
	Leisure time	n.s.	n.s.	**	n.s.	*	**	**	n.s.	
	Appearance and Property affairs	n.s.	**	**	**	**	**	**	n.s.	

Note: PA - physical activity, TV - physical education, Mann-Whitney U test,  $p < 05^*$ ,  $p < 01^{**}$ , n.s. – not statistically significant

By comparison of the quality of life between the groups of students with different sport performance (table 1 and 2, pictures 1 to 5) and from the view of the subjective evaluation

of importance and satisfaction with the fields of quality of life (table 3), it pointed to some common but also to some differentiated characters of the groups.

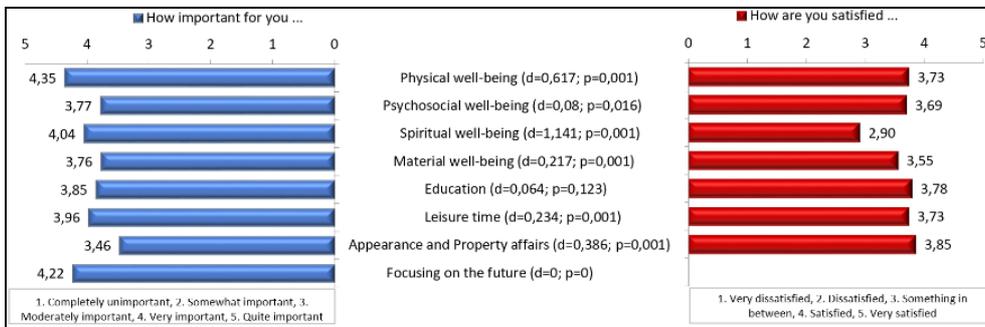
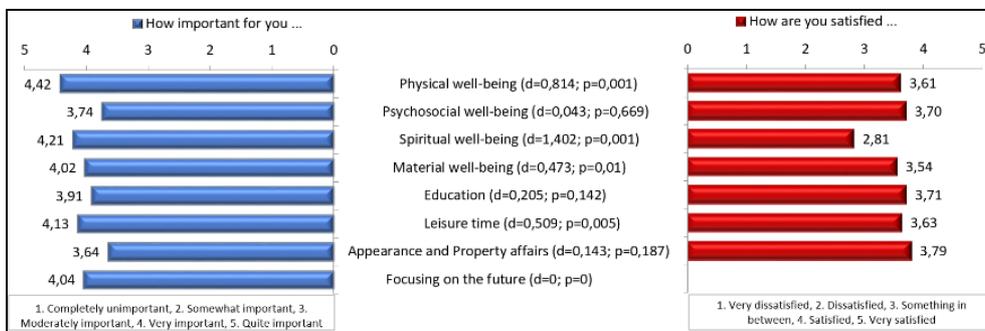
To the physical well-being (>4, 30 very important), psychosocial well-being (>3, 73 medium important) and to the spiritual well-being (>4, 0 very important) the groups of high-school students reported the same level of importance. Respondents attach the greatest importance (>4, 0 very important) to the physical well-being, spirituality and to the orientation to their future. Less important for them are the fields of psychosocial well-being, education, appearance and property affairs. All groups of students report the same level

of dissatisfaction with spiritual well-being (<2,99 dissatisfied). Fields of quality of life are for the respondents very important, even though they are not very satisfied with these fields. The evaluation of the satisfaction did not reach in most cases rating index 4,0 (satisfied). The average evaluation of the satisfaction is between 3,0 – 4,0. The higher satisfaction than 4,0 we can find in areas of appearance and property affairs and in physical well-being of active, registered and top athletes groups of students.

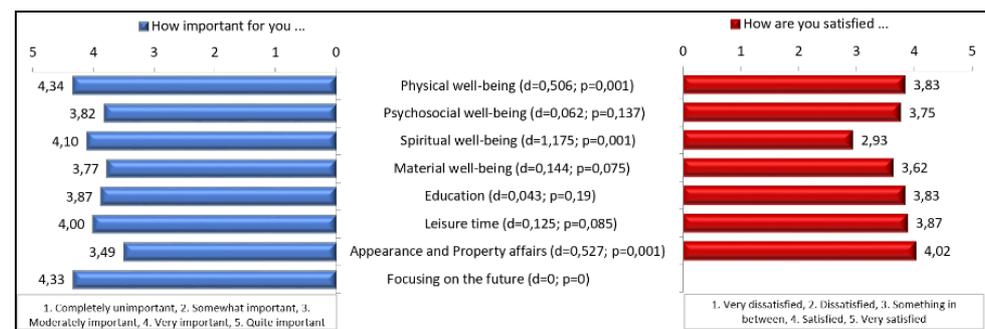
**Table 3:** Statistical comparison of the fields of quality of life from the importance and satisfaction point of view according to the different level of sport performance of the high-school students.

Indicators	Sports performance									
	Passive		Occasional		Active		Registered		Top	
	z	p	z	p	z	p	z	p	z	p
Physical well-being	5,87**	,000	12,33**	,000	10,41**	,000	8,19**	,000	3,52**	,000
Psychosocial well-being	0,43	,668	2,42*	,016	1,49	,136	,52	,603	,90	,370
Spiritual well-being	6,20**	,000	14,88**	,000	13,32**	,000	10,34**	,000	5,27**	,000
Material well-being	2,58**	,010	3,63**	,000	1,78	,075	2,73**	,006	2,05*	,041
Education	1,47	,141	1,54	,123	1,31	,190	3,12**	,002	,07	,947
Leisure time	2,86**	,004	3,85**	,000	1,72	,085	1,90	,057	,25	,806
Appearance and Property affairs	1,32	,187	6,87**	,000	7,80**	,000	5,31**	,000	4,43**	,000

Note: Wilcoxon z test,  $p < 0,05$ \*,  $p < 0,01$ \*\*



**Fig 2:** Occasional athletes: comparison of quality of life in terms of importance and satisfaction (d - diameter of averages; p - value for the Wilcoxon z test)



**Fig 3:** Active athletes: comparison of quality of life in terms of importance and satisfaction (d - difference of averages; p - value for the Wilcoxon z test)

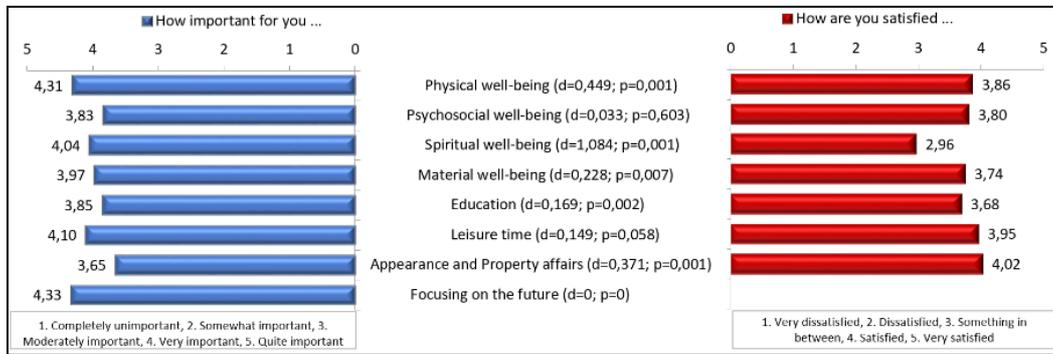


Fig 4: Registered athletes: comparison of quality of life in terms of importance and satisfaction (d - difference of averages; p - value for the Wilcoxon z test)

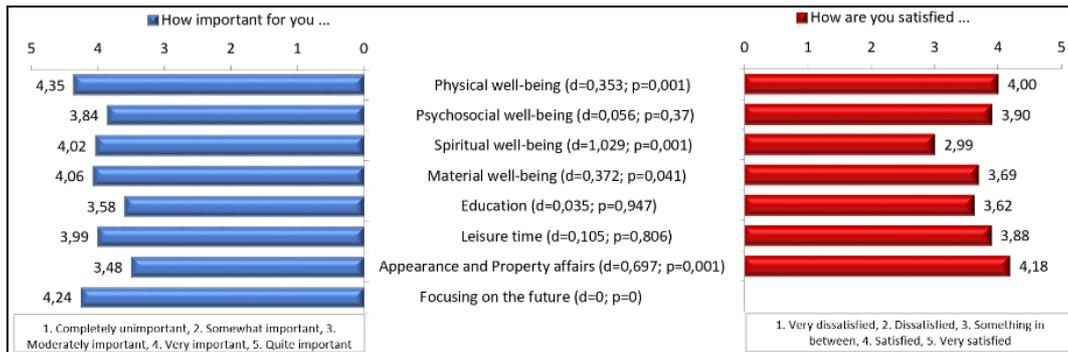


Fig 5: Top athletes: comparison of quality of life in terms of importance and satisfaction (d - difference of averages; p - value for the Wilcoxon z test)

Results of the correlation analysis showed differential interactions between the total physical activity (PA), subjective assessment of joy from the physical activities (PACES) and quality of life of high-school students (SQUALA). The correlations between PA, PACES and SQUALA we find in groups with different level of sport

performance sporadically with negative interactions prevailing (table 4). Total physical activity in a week correlates positively with the “the joy of physical activities” ( $r_s = ,089, p = ,148$ ) and with material well-being ( $r_s = ,111, p = ,070$ ) in active athletes and top athletes with psychosocial well-being ( $r_s = ,291, p = ,058$ ).

Table 4: Correlation of total physical activity in a week and the joy of physical activity/quality of life fields

Indicators	Sports performance					
		Passive	Occasional	Active	Registered	Top
The joy of physical activities	$r_s$	-,169	-,016	0,089*	,055	-,030
	p	,214	,766	,148	,463	,847
Physical well-being	$r_s$	-,042	-,007	,020	-,044	,199
	p	,761	,892	,749	,556	,201
Psychosocial well-being	$r_s$	,086	-,002	-,029	-0,11*	0,291**
	p	,529	,968	,632	,144	,058
Spiritual well-being	$r_s$	-,074	-,027	,023	-,043	,068
	p	,590	,620	,706	,566	,664
Material well-being	$r_s$	-,003	,035	0,111**	-0,097*	,012
	p	,985	,516	,070	,197	,941
Education	$r_s$	,005	,047	-0,080*	-0,152***	-,168
	p	,971	,382	,193	,043	,283
Leisure time	$r_s$	,013	-,018	,015	-,015	,190
	p	,927	,739	,813	,844	,222
Appearance and Property affairs	$r_s$	-,072	,030	-,061	,088	,056
	p	,600	,578	,321	,241	,722

Note: (Spearman correlation coefficient  $r_s$ ;  $p < 20^*$ ;  $p < 10^{**}$ ;  $p < 05^{***}$ ;  $p < 01^{****}$ )

**Table 5:** Correlation of the joy from the physical activity and the quality of life fields

Indicators		Sports performance				
		Passive	Occasional	Active	Registered	Top
Physical well-being	$r_s$	,097	0,071*	,027	-,063	0,217*
	$p$	,478	,181	,660	,400	,160
Psychosocial well-being	$r_s$	,050	,061	0,079*	-,052	,058
	$p$	,713	,252	,197	,488	,710
Spiritual well-being	$r_s$	-,078	0,079*	-0,09*	-,063	,137
	$p$	,570	,138	,139	,402	,380
Material well-being	$r_s$	-,097	,046	,007	-,072	,140
	$p$	,477	,385	,904	,338	,371
Education	$r_s$	,132	0,122***	-0,096*	0,151***	0,292**
	$p$	,334	,022	,114	,043	,057
Leisure time	$r_s$	,038	,008	,018	-,067	0,396****
	$p$	,780	,876	,767	,372	,008
Appearance and Property affairs	$r_s$	,027	0,088**	,052	-,027	,156
	$p$	,841	,097	,399	,725	,319

Note: (Spearman correlation coefficient  $r_s$ ;  $p < 20^*$ ;  $p < 10^{**}$ ;  $p < 05^{***}$ ;  $p < 01^{****}$ )

High frequency of positive interactions we can find between the subjective assessment PACES and SQUALA (table 5) in occasional athletes (Physical well-being  $r_s = ,071$ ;  $p < 20$ ; Spiritual well-being  $r_s = ,079$ ;  $p < 20$ ; Education  $r_s = ,122$ ;  $p < 05$ ; Appearance and Property affairs  $r_s = ,088$ ;  $p < ,10$ ), in active athletes (Psychosocial well-being  $r_s = ,079$ ;  $p < ,20$ ; Spiritual well-being  $r_s = -,090$ ;  $p < 20$ ; Education  $r_s = -,096$ ;  $p < 20$ ), in registered athletes (Education  $r_s = ,151$ ;  $p < 05$ ) and in top athletes (Physical well-being  $r_s = ,217$ ;  $p < 20$ ; Education  $r_s = ,292$ ;  $p < 10$ ; Free time čas  $r_s = ,396$ ;  $p < 01$ ). Interactions between the observed variables were not recorded only for passive athletes.

The most numerous interactions between the joy from the physical activity and the evaluation of the quality of life fields from importance and satisfaction point of view predominate in students which are occasionally or active athletes.

### Conclusion

The previous researches pointed to the physical activity, joy of the physical activity and the quality of life as to phenomena, among which in process of ontogenesis the interactions arise and disappear. High numbers of positive interactions between the mentioned phenomena was detected in students with voluntary and organized physical activity in a week in early and late adolescence period.

Low number of physical activity interactions with quality of life fields we register in the researches of students in middle adolescence period which has been confirmed in our research. Our results have proven the differentiated interactions between the physical activity, subjective assessment of joy of the physical activity and quality of life of the high-school students. Correlations between PA, PACES and SQUALA we can sporadically find in groups with different sport level performance, mainly with negative interactions.

Phenomenon of "joy from the physical activity" is significantly stepping forward. High frequency of positive reactions we can find between the subjective evaluation PACES and SQUALA in the occasional, active, registered and top athletes. Interactions was not found in the passive athletes. Congruence between the evaluation of the importance and satisfaction in the quality of life fields was not registered. Fields of quality of life are for the respondents very important, even though they are not very satisfied with these fields. It showed again that the middle adolescence period is very unstable period especially when it is concerned

with evaluation of satisfaction with quality of life. Low interactions PA with fields of quality of life among high-school students points to the necessity for the further monitoring of this construct. It shown again the importance of voluntary and organized physical activities in the life of high-school students which have potential to raise the level of enjoyment from the activity.

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