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The Influence of Physical Activity on Student Satisfaction

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Abstract

Regular physical activity can raise personal energy levels and improve mood, which is important for achieving overall health, physical but also mental health. For overall health, it is essential to establish a link between individual aspects of mental health and physical activity. The paper includes the basic theses about the importance of physical activities (sport, exercises, walking, etc.) for students' health, i.e. the influence of exercising on the physical and mental health of each individual. The main research goal was to examine the connection between physical activity and the subjective feeling of satisfaction. As part of the empirical research, an anonymous survey was conducted among 226 students from Croatia belonging to different study groups. The research indicated the correlations between the examined variables and showed that engaging in physical activities in different ways is extremely important for human health. Participants engaged in activities of high and moderate intensity show the highest positive correlation with satisfaction.

Keywords
Health, physical activity, satisfaction, students.

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Introduction

WHO defines physical activity "as any bodily movement produced by skeletal muscles that requires energy expenditure" (WHO, 2020). Physical activity, health, and life quality are interconnected. Lack of physical activity leads to disorders and diseases of today, including overweight and nervous tension, which are increasingly present in young people. Yet, the leisure time of children and young people is increasingly used for activities that require almost no muscular effort. Research (Hayes, 2002) was conducted on a sample of children aged 11 to 15 to better understand the lifestyle of young people of that age from their perspective. The main leisure activity for these young people is watching television, followed by listening to music, writing homework, and working on the computer. Sports activities are less represented, mainly football and cycling for boys and walking and swimming for girls. Research in Denmark (Mehlbye & Jensen, 2003) showed that one of the main physical activities is playing sports. The obstacles that prevent high school and college students from engaging in physical activity primarily stem from psychological, emotional, cognitive, environmental, and sociocultural factors. These results indicate that any future efforts to change behavior or to target hindrances to physical activity need to prioritize these dimensions. Moreover, there is a need for further research on the least examined dimensions, namely the characteristics of physical activity and behavioral features, in the time to come (Ferreira et al, 2022).

Regular physical activity can raise personal energy levels, improve mood, which is important for achieving overall physical and mental health. Physical activity also significantly contributes to an individual's personal satisfaction through a subjective and objective feeling of happiness. Subjective feeling implies individual self-reflection, including respecting individual preferences for certain aspects of well-being, and objective feeling implies "fixed" and proven benefits of a person regardless of their subjective significance for a person's life (Bloodworth et al, 2012). There are significant differences among students in resilience depending on their participation in sports (Bai et al, 2022). Students' performance in physical education and health studies improved with increasing professional sports experience and improving athletic ability (Wang et al., 2020). Physical activity has been shown to increase an individual's self-efficacy (Wang et al, 2022, Yao et al, 2023), and resilience has been shown to improve life

satisfaction (Liao et al, 2022). By increasing students' resilience, physical activity contributes to subjective well-being (Hao & Yu, 2022). There is a significant relationship between self-efficacy and resilience (Qin et al, 2023). The role of self-efficacy is a protective factor in resilience (Huanyu, Jun, Bo, et al, 2023). Thus, physical activity affects life satisfaction, increasing self-efficacy and resilience of students (You et al, 2021). Individuals who exercised more showed better results regarding their physical health, mental health and academic performance (Shantakumar et al., 2022), while aerobic exercise and yoga reduced depression in individuals (Alderman et al., 2016). Through active participation in physical exercise, individuals' competence and self-efficacy significantly improved (Xu et al., 2021). Life satisfaction is influenced by individual factors (Li & Lu, 2022). Physical activity reduces the risk of heart, blood vessel and life-threatening diseases and reduces several psychological and social complications (Curran et al., 2020; Li et al., 2022). Studies have shown that physical activity has potential benefits for students' academic performance (Hou et al., 2020; Ren et al., 2021). Research has shown that regular physical activity improves the psychological needs of students (Li et al, 2022), the overall physical and mental development of students (Wu, Jiang, 2022), their communication skills (Lindenschot, 2022) and emotional regulation (Tang et al. al, 2022). There is a positive correlation between physical activity and academic performance in university students in Indonesia (Hariyanto et al, 2023). Physical activity has a positive effect on body image and improves life satisfaction (You and Lee, 2022). Students who regularly engage in physical activity have more energy and feel better. Physical activity also achieves other health and social goals. It encourages the development of social skills and socializing with each other, it helps creating a positive self-image and increases self-esteem. It also improves physical and mental ability.

1. Problem and aim

Benefits of physical activity are covered in several studies, but they did not give answer to the question of what level of physical activity can establish a positive relationship with subjective well-being for students. The goal of empirical research is to establish a connection between students' physical activity in their free time and the subjective benefits that physical activity brings to them.

2. Methodology

2.1 Research goals

Starting from the observed and indicated problem, the research goal is to examine the relationship between students' physical activity (like playing sport, exercises, walking) and their subjective well-being, and see what activities students engage in, during their free time.

2.2 Procedure and participants

Empirical research was conducted in October 2022 via Google forms, which were filled out voluntarily by students attending one of the following faculties: The Faculty of Humanities and Social Sciences, the Faculty of Electrical Engineering, and the Faculty of Kinesiology. The sample consisted of 226 students (86 males and 140 females).

This research is focused on the problems accompanying educational work and, above all, on the connection of physical activity (sport, exercises, walking) and its benefit for the individual and their psychophysical abilities. The research is empirical and, considering the type of research and the research problem, it was most efficient and economical to use several research methods. The following methods were used in the research: the analytical-descriptive method, the method of theoretical analysis, and the method of studying documentation. Within those methods the theoretical considerations and empirical contributions of previous research were demonstrated. The method of theoretical analysis was used to obtain new knowledge, important data and understanding, to find relationships and solutions; thus, through logical thinking accompanied with selected examples and illustrations we come to new solutions, views and scientific experiences. The method of studying pedagogical documentation was used to collect data relevant to examining the connection between students' physical activity and personal satisfaction. Within the framework of the Sarwey method, the following research techniques were used: surveying, scaling, analysis of pedagogical documentation, and data arrangement and statistical processing. A three-part questionnaire was used for the purposes of the research. The first part of the questionnaire contained sociodemographic characteristics: gender, faculty, place of study, and grade point average in the previous year. In the second part of the questionnaire with 19 items, respondents assessed on a 0 to 5 rating scale the extent to which certain statements apply to them, where 0 meant: never, and 5 meant: always.

The third part of the questionnaire was The International Physical Activity Questionnaire – Short Form (IPAQ – SF) (Craig et al., 2003). Respondents evaluated their activity in the previous 7 days. Four types of physical activity intensity were measured: weak, moderate, vigorous/intense and sitting. The minimum duration of the activity was up to 1 hour.

Descriptive statistics (frequencies and percentages) were used in the analysis of the results, and the arithmetic mean and standard deviation were analysed for each question. Using factor analysis and Spearman's correlation coefficient, it was analysed how the observed questions are grouped and which factors can be extracted from the observed questionnaire (using Varimax with Kaiser normalization, while factor extraction was performed based on the matrix rotation results). The reliability of the questionnaire by factors was tested using the Cronbach's Alpha method. Since the significance value of the Shapiro-Wilk and Kolmogorov-Smirnov tests is not higher than 0.05 for most of the observed variables, the variables were tested with the help of non-parametric statistical tests (Sperman's correlation coefficient, Mann-Whitney U test and Kruskal-Wallis H test). Kaiser-Meyer-Olkin measure of sampling adequacy is 0.903, which assumes a very high value of the test, and it can also be seen that Bartlett's test is statistically significant ($p<0.05$).

3. Results

The obtained results of empirical research will be presented and discussed in the context of educational practice and compared with available scientific papers in the field of research. The results are presented in the table and further explained in the text.

Table 1: Assessment of students' condition

Question	*1 (never)*	*2*	*3*	*4*	*5 (always)*
I feel fulfilled	2.2%	5.3%	25.7%	48.2%	18.6%
I feel sad	17.3%	41.2%	30.1%	10.6%	0.9%
Big study responsibilities make me tired	1.8%	11.5%	36.3%	31.0%	19.5%
I can hardly meet the demands of individual professors	16.4%	32.7%	32.7%	13.7%	4.4%
My parents have too high expectations of me	31.0%	28.8%	23.9%	11.9%	4.4%
I have some free time	4.0%	20.8%	37.2%	27.4%	10.6%
I feel depressed, frustrated and downhearted	30.1%	39.8%	15.9%	11.5%	2.7%
I am irritable, bite my nails or have other tics	39.8%	23.0%	17.3%	11.9%	8.0%
I feel restless, anxious, and nervous	21.7%	29.6%	22.1%	15.5%	11.1%

I panic quickly	28.3%	27.9%	19.5%	17.7%	6.6%
I feel sluggish and bored	26.5%	33.6%	20.8%	13.3%	5.8%
I feel tired and exhausted	10.2%	26.5%	29.6%	24.3%	9.3%
I get angry quickly and react impulsively	43.4%	17.3%	17.3%	15.9%	6.2%
I think clearly	0.0%	8.4%	26.5%	45.1%	19.9%
My life is full	0.9%	8.0%	23.0%	41.2%	27.0%
I fall asleep easily	5.8%	11.1%	19.9%	37.2%	26.1%
I feel active and productive	1.3%	11.5%	33.2%	36.3%	17.7%
I am happy with my life	1.8%	5.8%	20.8%	39.4%	32.3%
I can handle challenges and stressful tasks	2.7%	8.4%	26.1%	37.2%	25.7%

Table 2: Evaluation of positive and negative feelings

	F1	***F2***	***F3***	***x̄***	***Sd***	***Cronbach's Alpha***
F1 - Negative feelings and thinking				2,520	0,807	,869
I feel sad	,531	-,339	,319	2,37	,92	
I have some free time	,449	,255	,323	3,20	1,02	
I feel depressed, frustrated and downhearted	,689	-,365	,316	2,17	1,07	
I am irritable, bite my nails or have other tics	,728	-,081	-,023	2,25	1,31	
I feel restless, anxious and nervous	,746	-,296	,308	2,65	1,28	
I panic quickly	,608	-,339	,317	2,46	1,25	
I feel sluggish and bored	,546	-,504	,175	2,38	1,18	
I feel tired and exhausted	,661	-,225	,365	2,96	1,14	
I get angry quickly and react impulsively	,401	-,189	,078	2,24	1,32	
F2 - Positive feelings and thinking				3,796	0,678	,824
I feel fulfilled	-,377	,686	,002	3,76	,89	
I think clearly	,072	,608	-,139	3,77	,87	
My life is full	-,309	,738	-,124	3,85	,94	
I fall asleep easily	-,331	,332	,225	3,67	1,15	
I feel active and productive	-,244	,658	-,133	3,58	,96	
I am happy with my life	-,497	,702	-,113	3,95	,96	
I can handle challenges and stressful tasks	-,192	,666	-,374	3,75	1,02	
F3 - Obligations, professors' demands and parental expectations				2,807	0,77	,535
Big study responsibilities make me tired	,266	-,006	,738	3,55	,99	
I can hardly meet the demands of individual professors	,105	-,241	,784	2,57	1,06	
My parents have too high expectations of me	,100	-,131	,387	2,30	1,16	

Table 1 shows the results on the Subjective Well-Being Scale. The results of the Kaiser-Meyer-Olkin measure of sampling adequacy are 0.956, which represents a very high reliability of the test. It should also be noted that Bartlett's test is statistically

significant ($p<0.05$). The lowest value of the arithmetic means of the respondents' answers is recorded for the questions: *I feel depressed, frustrated and downhearted* where the arithmetic mean of the respondents' answers is 2.17 while the standard deviation is 1.07, followed by *I get angry quickly and react impulsively* where the arithmetic mean of the respondents' answers is 2.24 while the standard deviation is 1.32, followed by *I am irritable, I bite my nails or have some other tics* where the arithmetic mean of the respondents' answers is 2.25 while the standard deviation is 1.31. Looking at the data for negative feelings and thinking, it can be seen that the arithmetic mean is 2.52 with a standard deviation of 0.81, for positive feelings and thinking it can be seen that the arithmetic mean is 3.76 with a standard deviation of 0.68, for obligations, professors' requirements and parental expectations, it can be seen that the arithmetic mean is 2.81 with a standard deviation of 0.77.

In Table 2, in the factor analysis, three factors were extracted, which after Varimax rotation with Kaiser normalization explain 58.275% of the total variance. Factors: F1 - Positive well-being, F2 - Depression/anxiety and F3 - Good mood show a very high Cronbach's alpha value indicating the reliability of the questionnaire. The analysis also established a high consistency of research items within the observed factor and the possibility of forming a total score for the mentioned variables.

Table 3: The value of the intensity of physical activity

Question	*Answer*	*%*
In your opinion, how much physical activity per week would be enough?	up to 1 hour	1.8%
	between 1 and 2 hours	13.3%
	between 2 and 3 hours	11.9%
	between 3 and 4 hours	15.9%
	between 4 and 5 hours	15.5%
	between 5 and 6 hours	16.4%
	more than 6 hours	25.2%
Your physical activity is	weak	25.2%
	moderate	49.1%
	high	25.7%
How much do you move on average per day?	up to 30 min	3.1%
	between 30 min and 1 hour	16.8%
	between 1 and 2 hours	20.4%
	between 2 and 3 hours	24.3%
	between 3 and 4 hours	14.6%
	more than 4 hours	20.4%
	I do not move	0.4%
How many times a week do you engage in	I have no moderate physical	21.7%

moderate physical activities (bicycle, tennis, etc.)	activities	
	once a week	26.1%
	two times a week	18.6%
	three times a week	10.6%
	four times a week	6.6%
	five times a week	6.6%
	six times a week	1.8%
	every day	8.0%
How many times a week do you engage in vigorous physical activities (aerobics, weightlifting, etc.)?	I do not engage in vigorous physical activities	33.6%
	once a week	11.5%
	two times a week	12.4%
	three times a week	19.5%
	four times a week	10.6%
	five times a week	2.7%
	six times a week	3.5%
	every day	6.2%

Table 4: Correlation between total physical activity and observed factors

Factors	*Your physical activity is*	*N*	*Arithmetic mean ranks*	*Kruskal-Wallis H*	*df*	*p*
Negative feelings and thinking	weak	57	124,52	2,347	2	0,309
	moderate	111	111,32			
	high	58	106,85			
Positive feelings and thinking	weak	57	86,66	21,886	2	0,000
	moderate	111	111,68			
	high	58	143,36			
Obligations, professors' demands and parental expectations	weak	57	120,25	4,560	2	0,102
	moderate	111	118,19			
	high	58	97,89			

According to this research, most students agree that they should engage in physical activity for more than 6 hours, which also affects a more positive way of thinking about life. It can be seen that students engage in more vigorous physical activities up to three times a week, while moderate physical activities are done once a week. If we look at the significance value for positive feelings and thinking, we can see that p is less than 5%, $p<0.05$, so it can be said, with a reliability level of 95%, that there is a statistically significant difference for the level of physical activity, where the ranks are higher for respondents whose physical activity is high. We can see that no statistically significant difference was observed regarding the question of how much students sit on average per day (test value is $p>0.05$). The value of Cronbach's Alpha for the factor "Negative feelings and thinking" is 0.869, which represents a high reliability

value for the observed scale. High reliability was also obtained for the factor "Positive feelings and thinking" and is 0.824. Slightly lower reliability was obtained for the third factor "Obligations, professors' demands and parental expectations" and is 0.535. When looking at the questions, the highest value of the arithmetic means of the respondents' answers is recorded for the item *I am happy with my life*, where the arithmetic mean of the respondents' answers is 3.95, while the standard deviation is 0.96, followed by *My life is fulfilled*, where the arithmetic mean of the respondents' answers is 3.85, while the standard deviation is 0.94.

Table 5: Correlation between the observed factors and the feeling of satisfaction

		Negative feelings and thinking	*Positive feelings and thinking*	*Obligations, professors' demands and parental expectations*
Negative feelings and thinking	r	1,000	-,602**	,498**
	p	.	,000	,000
Positive feelings and thinking	r	-,602**	1,000	-,356**
	p	,000	.	,000
Obligations, professors' demands and parental expectations	r	,498**	-,356**	1,000
	p	,000	,000	.

From Table 5, it can be seen that there was a positive and negative correlation between the observed variables, where the highest correlations were recorded between *negative feelings and thinking* and *positive feelings and thinking* (r=-0.602; p<0.01), *negative feelings and thinking* and *obligations, professors' demands and parental expectations* (r=0.498; p<0.01).

Table 1: Gender and number of students

Gender	*N*	*arithmetic mean ranks*	*sum of ranks*	*Mann-Whitney U*	*Wilcoxon W*	*Z*	*Asymp. Sig. (2-tailed)*
Male	86	95,58	8220,00	4479,000	8220,000	-3,233	0,001
Female	140	124,51	17431,00				
Male	86	131,65	11321,50	4459,500	14329,500	-3,277	0,001
Female	140	102,35	14329,50				
Male	86	107,87	9276,50	5535,500	9276,500	-1,024	0,306
Female	140	116,96	16374,50				

If we look at the significance value for *negative feelings and thinking* and *positive feelings and thinking*, we can see that p is less than 5% p<0.05, so it can be said, with a reliability level of 95%, that there is a statistically significant difference with regard to respondents' gender. At the same time, it can be seen in the table that the ranks for negative feelings and thinking are higher (the scale value is higher) in female respondents, while positive feelings and thinking are higher in male respondents.

Table 7: Correlation between the observed factors with regard to the faculty

	Faculty	*N*	*mean ranks*	*Kruskal-Wallis H*	*df*	*Asymp. Sig.*
Negative feelings and thinking	Electrical Engineering	72	89,31	24,719	5	0,001
	Humanities and Social Sciences	102	135,59			
	Kinesiology	52	106,11			
Positive feelings and thinking	Electrical Engineering	72	131,28	22,270	5	0,001
	Humanities and Social Sciences	102	92,47			
	Kinesiology	52	133,23			
Obligations, professors' demands and parental expectations	Electrical Engineering	72	110,18	12,106	5	0,306
	Humanities and Social Sciences	102	126,82			
	Kinesiology	52	90,66			

If we look at the significance value for *negative feelings and thinking*, *positive feelings and thinking* and *obligations, professors' demands and parental expectations*, we can see that p is less than 5%, p<0.05, so it can be said, with a reliability level of 95%, that there is a statistically significant difference for the selected faculties. The table shows that for negative feelings and thinking, the ranks are higher (the scale value is higher) among respondents attending the Faculty of Humanities and Social Sciences, while positive feelings and thinking are higher among respondents attending the Faculty of Electrical Engineering and the Faculty of Kinesiology.

4. Discussion

The results can be compared with the results of previous research in this area. Research by Downward & Dawson (2015) shows the highest positive correlation between low-intensity activity and subjective well-being. The concordance between research results is seen in activities of moderate intensity, which, along with activities of low intensity, record a positive correlation with the overall result of subjective well-being. Wicker & Frick (2015) give opposite results to our research regarding the correlation of subjective well-being and high-intensity activity. The data obtained in their sample, show a negative correlation between high-intensity activity and subjective well-being, which opens up the possibility of further research. The data in this paper, although examined by a different method, are consistent with the results of Loprinzi (2015) and Loprinzi & Davis (2016), who measured the level of activity intensity with accelerometers and confirmed that participants engaged in activities of high and moderate intensity show the highest positive correlation with self-reflection on life quality with an emphasis on health.

According to research (Panza et al., 2017), there are three self-reflective aspects of an individual: thinking about life, feelings, and happiness. Research from 2015 (Wick et al., 2015; Downward and Dawson, 2015) showed a great contribution of physical activity to a subjective feeling of satisfaction. Another research (Loprinzi, 2015; Loprinzi and Davis, 2016), on samples of adolescents, showed that the contribution of physical activity to life quality is most pronounced in adolescents who are moderately or intensely physically active. Based on the research sample of Wicker and Ficker (2015), it was shown that moderate intensity is a key factor for the subjective feeling of satisfaction, while vigorous activity is negatively related to the subjective feeling of satisfaction. Research by Downward and Dawson (2015) showed the highest level of personal subjective well-being on the relevant scale, and respondents with a moderate level of physical activity showed the lowest level of personal well-being.

According to a study conducted by Romero-Blanco et al. (2020), there was a notable rise in the levels of physical activity among university students during the lockdown period. Castañeda-Babarro et al. (2020) reported a significant decrease in self-reported vigorous physical activity as well as walking time by 16.8% and 58.2%, respectively, while sedentary behaviour increased in Spain during the confinement. The student group, which includes children and university students, exhibited the largest

reduction in moderate, vigorous, and walking activities. The review by Arora & Grey (2020) revealed that social isolation is linked to higher rates of physical inactivity and sedentarism in adults. Additionally, Dunton, Do & Wang (2020) found that the COVID-19 pandemic also negatively impacted the physical activity levels of children residing in the United States. Research (Castañeda-Babarro et al., 2020) shows that achieving the recommended levels of moderate-to-vigorous physical activity can help in developing a stronger habit of being physically active, which does not seem to be largely affected by the restrictions imposed due to COVID-19.

Furthermore, research by Andrijašević et al. (2005) concluded that female students spend most of their time watching television programs (69.1%), spending time with friends in cafes is equally present in male and female students, while a higher percentage (49%) of female students read books and magazines. Every second male student (53.6%) is engaged in sports and recreational activities, while only every fourth female student is physically active. Buntić (2006) investigated students' free time structure at several Zagreb faculties and found that 58% of them engage in some kind of physical activity in their free time, but that large differences occur depending on gender subsamples. The data show that more than 50% of female students do not engage in any physical activity in their free time. Bouillet (2008) obtained results from a sample of 313 students from Zagreb and found that regarding the desired content in their free time, students prefer socializing with friends and their girlfriend or boyfriend (53.7%). This relates to relaxing forms of socializing, which are not aimed at entertainment in the strict sense of the word, but include evening outings, casual entertainment and having a good time. This is followed by going to the nature (31.3%), resting and relaxing (28.6%), where it is evident that for almost a third of respondents ideal free time includes sleeping, lying down, passive rest, exchanging massages, etc. Sports content is only in the fifth place of interest when it comes to students from Zagreb (24.5%) and is very close in the percentage of answers (24.1%) with entertainment as a form of spending free time. In this case, entertainment primarily refers to going out and partying. Engaging in sports activities is most often related to entertaining and recreational socializing with friends, while continuous sport training is much less practiced. Raboteg-Šarić et al. (2002) investigated to what extent educational methods are related to adolescents' way of spending free time. The research results showed, among other things, that young men engage in more sports activities in their free time than girls.

5. Conclusion

Students' physical activity that is at a satisfactory level has a positive impact on their subjective well-being. Most students from this research feel positive, and the smallest number of them feels depressed or anxious. The results showed a correlation between total physical activity and positive well-being and depression/anxiety, whereby individuals who engage in moderate and high-intensity physical activities have the highest ranks of positive well-being, while those who engage in low-intensity physical activities have the highest level of depression/anxiety. Consequently, it can be concluded that there is a strong connection between students' physical activity and their subjective feeling of well-being. During student life, it is sometimes difficult to find time to engage in physical activity and exercise, but it should be considered that this will bring students a greater sense of well-being, which indirectly certainly contributes to students' increased mental health, and directly contributes to increased physical health.

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