

The impact of physical activity on students' happiness in the context of positive and negative motivation

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

Abstract

Background and Study Aim This study investigated whether the physical activity and the type of motivation among students inactive in professional sport can enhance their life satisfaction.

Material and Methods An experimental study was conducted with the participation of 164 students (not athletes) aged 24,52±4. In the experimental groups participants engaged in physical activity which they performed at their leisure 3 times a week for at least 30 minutes for 6 weeks. Additionally, the students were motivated to be active in a positive way (focus on benefits), in a negative way (focus on avoiding losses) or were not motivated at all. The experiment was based on a mixed group plan - with the initial and final measurement of the Satisfaction With Life Scale (SWLS), Positive and Negative Affect Schedule (PANAS).

Results The results confirm that involvement in regular sport brings benefits in terms of improving psychological well-being. The type of motivation proved to determine the influence of the practiced sport on life satisfaction. Students who were negatively motivated achieved a positive change but in terms of the level of negative affect it was lower than in the other groups. On the other hand, positively motivated students achieved the greatest change in terms of positive and negative emotions. However, there was no increase in the level of subjective well-being in these subjects. The greatest psychological benefits of sports activity were achieved by the subjects who were focused only on being active without additional motivation. There were no changes in the analyzed variables in the control group.

Conclusions This data may contribute to promoting undertaking leisure activities that will actually increase life satisfaction of young adults.

Keywords: subjective well-being, positive, negative, affect, motivation, physical activity

Introduction

Physical activity is a fundamental component of a healthy lifestyle. Systematic physical exercise helps to maintain a good physical and mental condition; it can favorably affect people's emotional state and improve their assessment of life satisfaction [1]. In recent years, many studies have shown that people taking specific intentional actions, such as physical exercise can improve their mood, increase satisfaction, reduce depression or anxiety and improve their level of mental well-being [2, 3].

Psychological well-being, colloquially referred to as happiness, has long been the subject of interest of scientists and ordinary people. Many current definitions of happiness emphasize its subjective qualities, describing it as life satisfaction. One of the most popular definitions of happiness was formulated by an outstanding representative of positive psychology, E. Diener. In his opinion, psychological well-being is "the degree to which a person likes his own life" [4, pp. 63]. The proposition of [3] who understand happiness as a subjective assessment of the level of perceived happiness or, in

other words, an assessment of the long-term balance of positive and negative emotions, is maintained in a similar trend. In a slightly different way, the above-mentioned author puts it in her popular publication on the methods of building a happy life: happiness is experiencing joy, satisfaction and well-being combined with the awareness that living is good, valuable and makes sense [5, 6].

Therefore, it can be assumed that happiness is a positive attitude to life, one that determines the active struggle with adversities and presents the opportunity to pursue one's own aspirations and values as well as to develop one's virtues. Happiness is manifested in the perceived subjective satisfaction with life, which is a balance of positive and negative affect [7].

Physical activity, as a fundamental component of a healthy lifestyle, is a very important determinant of happiness. The main and direct effect of exercise is to induce positive affect, mainly through the release of endorphins, while the long-term effect is increased mental well-being. This is due to the beneficial side effects of activity, such as decreasing depression and anxiety, and better functioning of the entire human body. Research has proven that

intense exercise improves mood [8].

Some studies have shown an advantage of physical exercise over other leisure activities. Hills and Argyle [9] analyzed the level of psychological well-being in four groups of respondents, classified according to different ways of spending free time (sports activities, listening to music, religious practices, watching TV). The respondents undertaking physical activity achieved the highest results on the Oxford Happiness Scale.

A very important area of the relationship between physical activity and mental well-being is the quality of motivation. Undoubtedly, people who take up physical activity driven by internal motivation derive much more benefit from it than those who act with external benefits in mind. This relationship has been documented in numerous studies and described on the basis of the classical theory of self-determination by Ryan and Deci [10, 11].

Slightly less attention was paid to the importance of positive and negative motivation for psychological well-being. Positive motivation is associated with the pursuit of something desirable, attractive (approach goals), while negative motivation focuses on avoiding the aversive factor (avoidance goals). Taking up activity may be based on positive and / or negative motivation and it is not always an aware process [12]. Scientific research in the field of psychology [13, 14] emphasizes the superiority of positive motivation over negative. Negative motivation is less effective, energetically and emotionally expensive, and yet people quite habitually motivate others or themselves, arousing intense negative motivation [15]. Research by Elliot and Sheldon [16] found that focusing on avoidance goals is positively correlated with symptoms of somatic diseases, mainly due to the relationship between avoidance strategies and neuroticism. In other studies conducted with the participation of students, it was shown that the implementation of negatively motivated goals decreased the subjective well-being of the respondents. Moreover, avoidance-oriented goals were observed to be associated with neuroticism and low self-assessment of skills [17]. Research by Emmons [12] proved that people whose actions are dominated by the motivation aimed at avoiding something (e.g. rejection, loneliness, losing a job) experience less positive affect and are less satisfied with life than people focused on striving for something (e.g. getting a good job, starting a family). In addition, negative motivation is also associated with more frequent anxiety, dissatisfaction and worse health.

At the same time, it is believed that negative motivation releases more energy, mobilizes for more intense involvement and triggers stronger aspirations. However, in the long run, it may lead to the strengthening of a negative attitude towards

being active. Acting under the influence of anxiety reduces the satisfaction with activity, which can lead to demotivation [18]. According to Andreas and Andreas [13], there are four styles of inducing motivation to act, and one of them consists precisely in evoking in one's mind the consequences that will arise in the case of the abandonment of activity. This type of catastrophic thinking, while in fact unpleasant, forces you to do a specific task. The validity of the use of negative motivation cannot be questioned. In certain specific situations, anticipating undesirable effects (or inaction) may prove to be a very effective management strategy (when, for example, undesirable effects may be dangerous). On the other hand, in everyday activities, behavior based on motivation focused on avoidance will be associated with large mental overload, fear and unpleasant emotions. Focusing on negative predictions does not allow you to fully enjoy your activity [19].

Lyubomirsky [20] takes a slightly more radical position on the issue of negative motivation. In her opinion, goals formulated based on the avoidance of losses bring much less benefit, as they sensitize to threats and failures, thus acting like a self-fulfilling prophecy. As a result, they make people feel more nervous, stressed, and less effective. Lyubomirsky emphasizes that the condition of a happy life is the ability to achieve positive goals. Such optimistic resolutions automatically increase the chance of success. Similarly, Maltz [14] believes that positive motivation activates the mechanism of success, while negative motivation produces the mechanism of failure.

In summary, negative motivation is less effective, energetically and emotionally more draining than positive motivation. In addition, the action aimed at avoiding loss adversely affects mental well-being, however, its complete elimination is not only impossible but also inadvisable.

Purpose. Physical activity is an important and effective method of increasing psychological well-being. Therefore, the question arises whether engaging sports inactive students in regular exercises can bring the effect of improving their psychological well-being in a short time? In addition, an activity that is carried out with positive consequences in mind brings more benefits to happiness than activity motivated by the desire to avoid loss. Nevertheless, those taking action based on negative motivation may also experience an improvement in mental well-being by undertaking regular physical exercise. This is because of the benefits of the activity itself.

Hypothesis. The main hypothesis is that participants who perform the physical activities would improve in psychological well-being (e.g., greater life satisfaction, more positive affects, and less negative affect) across the intervention period,

relative to control group. It is also predicted that participants who performed activities with positive motivation would report increased measures of positive affect, and decreased indicators of negative affect more than other groups. The negatively motivated group would achieve the least benefits.

Material and Methods

Participants

The total number of 164 students aged 24,52±4 took part in the experimental research (117 female, 47 male). Participants were students of first and second cycle of a large non-public university in the south of Poland. The sample of students represented the following fields: administration, management, pedagogy, economy and logistics. Due to the specifics of the experimental procedure students of physical education were not involved in the study. The students who participated in the experiment did not engage in professional sports and a regular physical activity, but were obliged to complete a physical education course. The presented study is part of a larger project in which over 600 students participated. Prior to commencing the study, formal consent was requested from participants. They were informed about test procedures and voluntarily participated in data collection. However, the subjects were not informed about the various experimental conditions. The study was conducted with ethic rules based on Helsinki Declaration.

Procedure

At baseline, all participants completed demographics and several well-being measures (described below). Using a single-blind design, participants were randomly assigned to participate in one of four possible conditions. In the first, second and third group participants were engaged in physical activity for 6 weeks, which they performed at their leisure, 3 times a week for at least 30 minutes. These were such activities as: jogging, Nordic walking, bicycle, swimming pool, roller skates, team games, gym, aerobics.

Each time before starting physical activity, participants logged on the study website (e-learning system) to describe what benefits or rewards they would achieve by practicing in physical activity (positive motivation - PM) or what losses they would suffer if they quit regular sports activities (negative motivation - NM). In the third group, in the control condition, they described the current weather (unmotivated group - UM). All groups participating in physical activity reported the frequency and duration of exercise on the study website and documented it with a photo. The fourth group did not undertake any physical activity or reported on the study website (control condition - CC). After 6 weeks, participants completed post-manipulation measures of all of the constructs assessed at

baseline. Students were instructed not to discuss their assignments with others, and they were not aware of any assigned condition. Importantly, randomization was at the student level. Therefore, each group and field of study included a mix of students participating in each condition.

The research was conducted during the school year (the study was conducted before the onset of the COVID-19 pandemic).

Measures

The participants reported their current satisfaction with their life in general using the Satisfaction With Life Scale (SWLS) [21]. The SWLS consists of five questions (e.g., "In most ways my life is close to my ideal", "I am satisfied with my life") rated on 7-point Likert-type scales (1 = strongly disagree, 7 = strongly agree). The scale possesses satisfactory psychometric indicators. Internal coherence, tested by means of Cronbach's alpha coefficient for the entire Polish version of the scale, was $\alpha=0,83$.

Participants reported positive and negative emotions using Positive and Negative Affect Schedule (PANAS) in Polish translation and adaptation by Brzozowski [22]. The PANAS is a self-report questionnaire that consists of two 10-item scales to measure both positive and negative affect. Each item is rated on a 5-point scale of 1 (not at all) to 5 (very much). Internal consistency was tested for the entire Polish version of the scale (range from $\alpha=0,82$ to $\alpha=0,84$) and its particular dimensions i.e. positive affect (range from $\alpha=0,82$ to $\alpha=0,89$) and negative affect (range from $\alpha=0,89$ to $\alpha=0,91$), using Cronbach's alpha coefficient and concluding that it is satisfactory.

Statistical Analysis

The following statistical analysis were performed: the analysis of the reliability of the SWLS and PANAS scales using Cronbach's α coefficient, and the analysis of differences among several measurements (before and after experimental manipulation), by using the Repeated Measures ANOVA. For the detailed comparative analysis of results among separate groups the post-hoc Bonfferoni testing for multiple groups comparisons was used. All statistical analyses were conducted using the STATISTICA 13.1 software.

Results

The experiment based on a mixed group plan - with the initial and final measurement of the dependent variable and with the participation of the control group. In the first stage, the pretest (T1) was carried out in all groups, then the independent variable (sports activity) was introduced to the experimental groups and the control group (CC) was left unchanged. In the third and final stage, a posttest (T2) was performed in all groups.

According to the Levene's test, it was found that all variables' values in the research groups are of normal distribution. Table 1 shows the results of all parameters acquired during the experiment.

No statistically significant differences were found between all the analyzed groups in the pretest results, which is consistent with the research assumption.

Results for the Subjective Well-Being Scales

Anova analysis with repeated measurement was performed. The simple main effect on the within-subject factor (sport activity) achieved a statistically significant result $F(1,160)=25,35$; $p<0,001$; $\eta^2=0,14$

The interaction of the inter-subject factor (type of motivation) and the intra-subject factor (sport activity) also achieved a significant result $F(1,160)=5,56$ $p=0,001$; $\eta^2=0,10$.

Multiple pairwise comparisons showed that the significant differences between the first and second measure was found in group NM ($p<0,001$) and also in group UM ($p<0,001$). This means that in the group of respondents who were negatively motivated and those who were not motivated at all to perform a sport, there was a positive change in the subjective well-being scale. There was no change in the group of positively motivated subjects (PM) and the control group (CC). Pairwise multiple comparisons were also performed for the posttest results. It turned out that there were no statistically significant differences between the groups. The means for the analyzed groups are presented in Table 1.

Results for the Positives Affect Scales

The simple main effect on within-subject factor

(sports activity) achieved a result $F(1,160)=36,72$; $p<0,001$; $\eta^2=0,19$. Interactive affect was $F(1,160)=4,60$ $p=0,004$; $\eta^2=0,08$, which means that the type of motivation and undertaken sports activity influenced the change in the level of positive affect in different ways. As a result of the Bonferroni test, a statistically significant difference was found between first and second measure of positive affect in group PA ($p<0,001$), NA ($p<0,001$) and UM ($p<0,001$). There were no changes in the control group, which confirms the research hypothesis. Details are provided in Table 1.

Statistically significant differences were found in the level of positive affect in the posttest (after experimental manipulation) $F(3,160)=3,56$ $p=0,016$; $\eta^2=0,07$. In the control group, the level of positive affect was lower compared to all three experimental groups: PA ($p<0,001$), NA ($p<0,001$), AM ($p<0,001$). The results are illustrated in Figure 1.

Results for the Negative Affect Scales

The obtained results indicate significant differences between the measurements of the dependent variable. The in-subject tests for the main effect (sports activity) reached the level of $F(1,160)=112,30$; $p<0,001$; $\eta^2=0,41$. There was also an interaction between the type of motivation (inter-subject) and sport activity (within-subject) factors $F(1,160)=16,05$ $p<0,001$; $\eta^2=0,23$. Pairwise comparisons with the Bonferroni correction were performed, which showed a significant decrease in negative affect in the experimental group: PA ($p<0,001$), NA ($p<0,001$) and UM ($p<0,001$). There was no change in the control group.

Table 1. Results of one-way within-subjects ANOVA for the particular well-being dimension (pretest and posttest)

Dimensions of well-being	one Group	Pretest (T1)		Posttest (T2)		Difference in Means				
		M	sd	M	sd	T2-T1	SE	F**	p	η^2
Subjective well-being	PM	21,44	5,61	22,10	4,67	0,67	0,51	1,70	0,19	0,01
	NM	21,07	5,65	23,30	5,27	2,22*	0,50	19,43	<0,001	0,11
	UN	20,53	4,55	22,75	4,25	2,22*	0,50	19,43	<0,001	0,14
	CC	21,84	5,48	21,76	5,78	-0,09	0,48	0,03	0,85	<0,001
Positive affect	PM	51,64	7,67	55,92	7,67	4,28*	1,23	12,09	<0,001	0,07
	NM	51,15	7,13	55,75	7,91	4,60*	1,22	14,31	<0,001	0,08
	UN	51,38	7,75	57,08	7,89	5,70*	1,22	21,97	<0,001	0,12
	CC	51,81	8,14	51,89	7,99	0,08	1,15	<0,001	1,00	<0,001
Negative affect	PM	28,97	8,71	20,41	5,15	-8,56*	1,29	44,11	<0,001	0,22
	NM	29,05	8,72	24,38	8,89	-4,67*	1,27	13,48	<0,001	0,08
	UN	32,13	7,27	19,63	4,85	-12,50*	1,27	96,39	<0,001	0,38
	CC	29,44	8,05	28,49	8,92	-0,96	1,20	0,63	0,42	0,01

N=164; PM - positive motivation, n=39; NM - negative motivation, n=40; UM - unmotivated group, n=40; CC - control condition n=45; * The difference of means is significant at the level $p<0.01$; ** Wilks' Lambda test

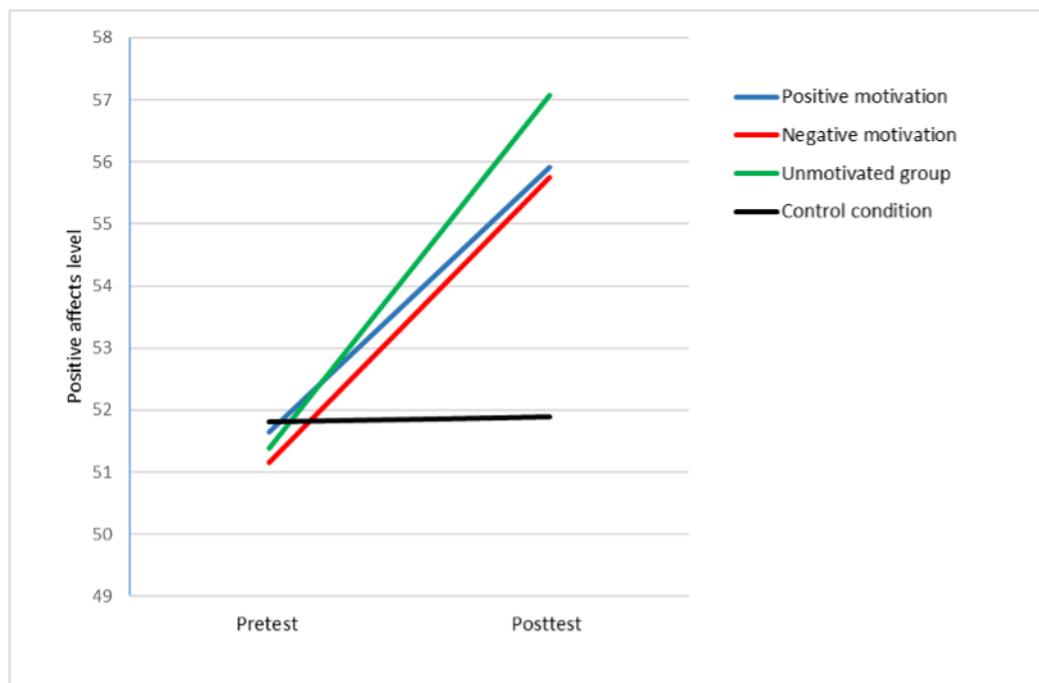


Figure 1. The positive affect mean scores in pretest and posttest of the four groups of students: positively motivated (PM)*, negatively motivated (NM)*, unmotivated group (UM)*, control conditions (CC). Significant differences between control groups and experimental groups in posttest ($p < 0.001$). * Intra-group differences significant at the level of $p < 0.001$

Statistically significant intergroup differences were shown in the second measurement $F(3,160) = 13,30$; $p < 0,001$; $\eta^2 = 0,20$. The estimated results of negative affect in the control group are significantly higher than in the experimental groups: PA ($p < 0,001$), NA ($p = 0,01$) and UM ($p < 0,001$), which is consistent with the assumed hypothesis. In addition, it was shown that students from the NA group also achieved higher scores on the negative affect scale than students from the PA group ($p = 0,017$) and UM group ($p = 0,004$). The results are illustrated in Figure 2.

Discussion

The experiment showed that undertaking simple and regular physical activities by physically inactive students resulted in improved psychological well-being. In the case of students, an increase in indicators of general psychological well-being, an increase in positive affect and a decrease in negative affect were observed. In the control group, there were no changes in the analyzed psychological parameters. The obtained results are in line with the model of psychological well-being proposed by Lyubomirsky [5] a leading representative of the view that every person can be happy regardless of the potential level of happiness recorded in the genes. Lyubomirsky leaves as much as 40% of the responsibility for psychological well-being to the activities undertaken by a person. Therefore, people have great possibilities in exceeding this biological

limit, and one of the methods of conscious influence on well-being is physical activity. Similar results have been obtained in numerous non-experimental studies conducted around the world. A meta-analysis of studies conducted by Netz and his team [23] found a statistically significant effect confirming the link between sports activities and well-being. The researchers concluded that the relationship was so strong that a causal correlation could be inferred from it. Downward and Rasciute [24] analyzed in their study how any chosen sport activity (the participants chose from 67 different exercises) affect psychological well-being and subjective health assessment. The researchers confirmed their hypotheses and additionally found that sport has a positive effect on satisfaction with social relationships. Also Cha's study [25] confirmed that people with high life satisfaction spend more time performing sports activities than those with low indicators. Additionally, studies conducted on large samples confirm the relation of non-professional sport activity with well-being. Stubbe et al. [26] analyzed 8,000 twins aged 18 to 65 years. Respondents who were active in sport had significantly higher levels of life satisfaction than those who were not active in sport. In another study by Hassmén et al. [27] conducted a study with three thousand Finns in which they proved that people who practice sport two or three times a week have fewer depressive symptoms, less anxiety and anger, can cope better with stress and are more socially integrated.

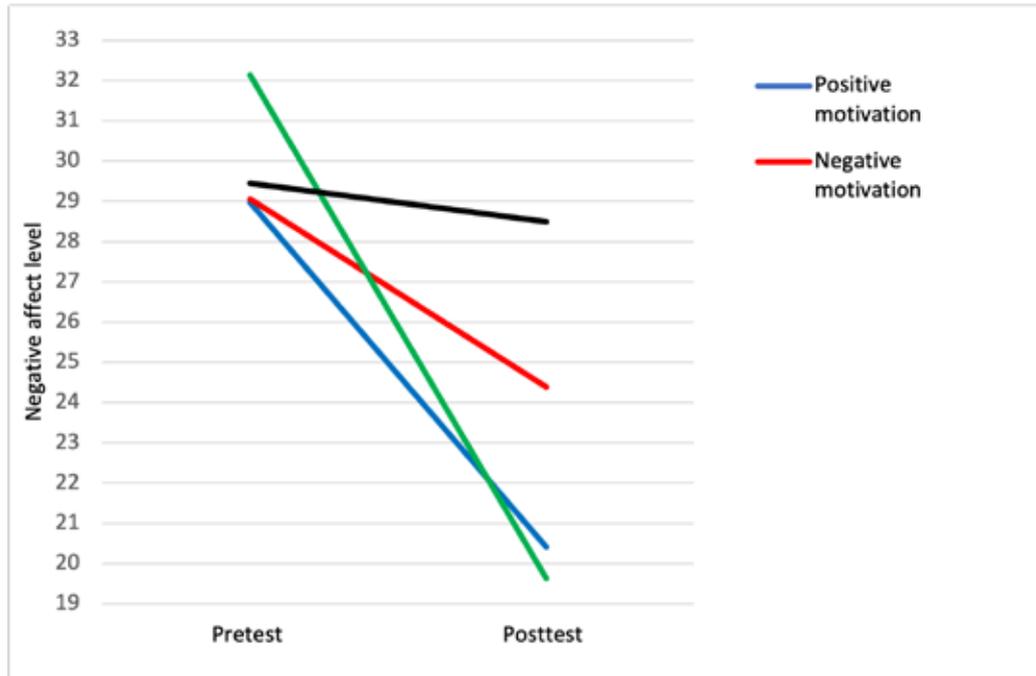


Figure 2. The negative affect mean scores in pretest and posttest of the four groups of students: positively motivated (PM)*, negatively motivated (NM)*, unmotivated group (UM)*, control conditions (CC). Significant differences between CC groups and experimental groups in posttest ($p < 0.001$). Significant differences between NM and PM ($p = 0,017$) and UM ($p = 0,004$) in posttest. * Intra-group differences significant at the level of $p < 0.001$

However, it is worth emphasizing that the author's research not only confirms the conclusions of previous studies, but above all extends their context. Most of the reports on the relationship between sport activity and psychological well-being are based on the analysis of people who decided to practice sport themselves. It is therefore possible that it is consistent with their needs and nature. Moreover, psychological well-being is not only a consequence of certain activities, but also a resource that motivates them [4]. This means that happy people more often decide to practice sport than unhappy people. At the same time, sport may increase their level of happiness. Correlative studies do not resolve the direction of the dependence of variables. However, it is possible thanks to experimental manipulation. Therefore, based on the experimental research conducted by the author, it can be concluded that it was physical exercise that improved the parameters of psychological functioning. It is worth mentioning that the presented study is part of a larger project in which more than 700 people participated. Only those subjects who did not practice regular physical activity were selected from all respondents, while the proposed activities were new to them.

The most important issue of the undertaken analyses was to decide which type of motivation would intensify the influence of sport activities on the level of happiness. The study predicted that participants who undertook physical exercise and

were negatively motivated (NM) would achieve less psychological benefit from sport than those who were positively motivated (PM) or not motivated at all (UM). The hypothesis was confirmed in terms of negative affect. The level of negative emotions experienced by the NM group decreased, however, in comparison to the other groups this change was statistically smaller. Respondents in the NM group made a note each time before taking up sport activities, in which they wrote what losses they would suffer when they did not take up physical exercise. They described negative scenarios such as illness, poor fitness, physical disability in old age or obesity. They imagined the punishment that they would experience if they stopped being active. These different mental strategies caused them to experience more negative affect during physical activity than students who focused on the benefits and students who were not additionally motivated. The results of the experiment are consistent with findings from research on the consequences of negative motivation [15, 16] and observations made in the field of psychotherapy and management.

No significant changes were observed for positive affect. Regardless of the type of motivation, all students who undertook sports activity felt more positive emotions. So it follows that even people who undertake sport activity to avoid negative consequences (e.g. out of fear of obesity or physical disability) can intensify positive emotions with this activity.

The study also showed a statistically significant increase in scores on subjective psychological well-being. It should be noted that this is the variable that is least sensitive to objective circumstances (such as experimental manipulation) [28, 29]. Students who played sport without additional motivation and those who did so to avoid losses (NM) improved their scores on the subjective well-being scale. However, the change did not occur for the PM group. As it is known from the experimental procedure, the participants in the PM group were given a task to describe the benefits they achieved by playing sport before starting sport. They also used different thinking strategies. They imagined that they would be athletic, healthy, physically attractive, fit and strong, which would also translate into their success in life. It can therefore be concluded that undertaking physical exercise with a reward in mind reduced the intrinsic motivation of the participants. As is known from numerous studies [30, 31], the prevalence of extrinsic motivation over intrinsic motivation results in a lower psychological well-being.

The study found that students who were not additionally motivated to participate in sporting activities achieved the most benefits. They made notes on the weather condition before starting physical exercise, which was a control condition. In their cases there was a beneficial improvement in all analysed parameters. The subjects derived benefit from the mere fact of participating in physical activity. This strategy proved to be the most beneficial and demonstrates the beneficial effects of sport on life satisfaction and emotions experienced.

The results of the study are relevant from both an academic and a social perspective. From a public health perspective, understanding what may improve life satisfaction has significant implications for the design, implementation, and promotion of activity programs for young people also in school and at universities. In order to improve life satisfaction, it is necessary to develop various programs that require physical activities, because this can relieve participants of anxiety [32, 33], help them regain their self-esteem [34], and help them maintain interpersonal relationships [35] with those who participate with them. The results of

the research presented here may also have practical relevance from a professional sport perspective. As it turns out both positive and negative motivation are effective but have negative consequences.

Conclusion

Undertaking regular sporting activity (2-3 times a week) by young people who are not involved in professional sport increases overall life satisfaction, reduces negative affect and intensifies positive emotions.

The psychological benefits of sporting activity vary depending on the type of motivation used. Focusing on the losses that will be incurred if sport is not practiced limits the impact of physical activity on reducing negative emotions.

Focusing on the rewards that can be achieved through sport limits the beneficial effects of physical activity on general psychological well-being (the level does not rise).

Regardless of the type of motivation used, physical activity intensifies positive emotions.

Limitations

Several important limitations should be noted when interpreting our findings.

The frequency of leisure-time physical activity was self-reported. Another limitation of this research is the selection of the research group. People from a similar social group and cultural area were examined. The sample was composed of relatively healthy individuals, free from severe functional and cognitive impairment, similar in origin, culture and social class.

Regardless of these limitations, the study shows a positive relationship between physical activity and life satisfaction. The main strength of the study was the analysis of different forms of motivation, which showed that physical activity, regardless of the type of motivation, brings benefits. These results should contribute to further research on this phenomenon and its better understanding, and in the long run, help to develop optimal preventive and therapeutic activity programs for young people.

Conflict of interest

There are no conflicts of interest.

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Cite this article as:

Błońska K. The impact of physical activity on students' happiness in the context of positive and negative motivation. *Physical Education of Students*, 2022;26(2):89–97. <https://doi.org/10.15561/20755279.2022.0205>

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Received: 21.02.2022

Accepted: 22.04.2022; **Published:** 30.04.2022