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THE IMPACT OF PHYSICAL ACTIVITY ON PSYCHO-EMOTIONAL WELLNESS

CORNEA GEORGETA GABRIELA

Spiru Haret University, gabriela.cornea@spiruharet.ro

Abstract

In today's society, there is a growing awareness of the historical neglect of mental health, particularly during the post-industrial era. Consequently, there is a concerted effort to identify practical solutions for addressing the prevalent ailments of our time, namely stress and depression. Promoting engagement in physical activities is heralded as a convenient, low-risk approach in contrast to traditional methods of treating and preventing mental health disorders, as well as the overall health issues arising from a sedentary lifestyle.

The World Health Organization underscores the importance of physical activity for adults, recommending a minimum of 150 to 300 minutes of moderate-intensity aerobic exercise or 75 to 150 minutes of vigorous aerobic activity. Another noteworthy catalyst driving the popularity of physical activities is the influence of social media. This digital platform not only perpetuates specific beauty standards but also encourages users to explore various avenues to enhance both their physical appearance and performance.

Once more, the most accessible pathway to attain these objectives is through consistent engagement in physical exercises, which aid in weight management and enhance muscle tone and overall physique. Nevertheless, a quandary emerges: while physical activity is a powerful tool against stress and depression, the pursuit of unrealistic beauty standards may hinder its anticipated psycho-emotional benefits. An additional facet to contemplate when examining the impact of physical activities on psycho-emotional well-being is the evolving notion of "normalcy" in the wake of the COVID-19 pandemic..

Keywords: Sport Psychology, Emotional Wellness, Pandemic's Impact, Coping with Stress and Anxiety, and Self-Confidence.

INTRODUCTION

The field of exercise psychology is an interdisciplinary domain that delves into the psychological aspects, attitudes, behaviors, and emotions associated with physical workouts. It draws on several key subdisciplines, including psychophysiology, cognitive-behavioral psychology, and social psychology. In this context, research in the realm of sport and exercise psychology has primarily centered around three essential avenues: the psychophysiological perspective, the cognitive-behavioral approach, and the psycho-social dimension.

Research in the realm of psycho-emotional well-being has highlighted its significant associations with various mental health aspects. Studies have revealed links between its absence and conditions such as depression (Wood & Joseph, 2010), anxiety (Yüksel & Bahadır-Yılmaz, 2019), and reduced stress management capabilities (Keech, Cole, Hagger, & Hamilton, 2020).

Recent investigations have illuminated the profound impact of different facets of positive psycho-emotional states on an individual's overall health. For instance, optimism has been connected to a reduced risk of vascular diseases and a lower likelihood of mortality due to such conditions (Hernandez et al., 2015; Sims et al., 2019).

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Consistent physical activity has been shown to have a beneficial influence on psycho-emotional well-being.

Main benefits of physical activity

<i>Psychological part</i>	<i>Gained benefits</i>
Anxiety	Improved anxiety management capacity
	Reduced anxiety levels
Self-esteem	Improved self-esteem
	Improved social interactions
Cognitive functions	Focus
	Inhibitory control
	Cognitive flexibility
	Declarative, spatial, and work memory
	Improved data processing, problem-solving and decision-making capacity
Other benefits	Improved performance at the workplace
	Improved sex life

Engaging in physical activity typically induces a state of activation that fosters a sense of serenity and tranquility, which can effectively diminish feelings of anger and internal tension (Legrand, Bertucci, & Hudson, 2016). Furthermore, regular training sessions enhance one's capacity to cope with diverse stressors, with the underlying mechanism being the anti-inflammatory impact of physical exercise (Hamer, Endrighi, & Poole, 2012).

Both aerobic exercise and resistance training can yield favorable outcomes for clinically healthy adults, notably by enhancing their emotional well-being and self-perception. This improvement often includes increased contentment with their bodies, stemming from achievements in weight loss and muscle toning.

Aerobic exercise demonstrates not only short-term enhancements in cognitive abilities following a single training session but also longer-lasting benefits with regular physical training spanning several months. Numerous studies (Archer, Josefsson, & Lindwall, 2014; Vedovelli et al., 2017) have indicated that individuals who engage in consistent aerobic exercise exhibit improved performance on tests measuring various cognitive facets, including attentional capacity, inhibitory control, cognitive flexibility, working memory, declarative memory, spatial memory, and information processing speed.

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The transient effects of physical exercise on cognitive functions manifest as improvements in most executive brain functions lasting for up to two hours after the conclusion of the training session (Cantelon & Giles, 2021).

Enhancing mental well-being and subjective health through regular exercise can have a positive impact on workplace performance. This has led companies to initiate specialized programs aimed at promoting physical activity among their employees (Coulson, McKenna, & Field, 2008; Gil-Beltrán, Meneghel, Llorens, & Salanova, 2020).

For children and teenagers, engaging in physical exercise plays a vital role in fostering social integration, enhancing social skills, and boosting self-esteem (Archer et al., 2014). Moreover, by improving cognitive abilities and fostering a competitive spirit, physical exercise contributes to enhancing academic performance in school (Tompsonski, Lambourne, & Okumura, 2011; Donnelly et al., 2016).

For elderly individuals, consistent engagement in physical activities plays a crucial role in enhancing their quality of life. It helps to preserve cognitive abilities as they age, prevents and manages specific neurological or cardiovascular conditions, and sustains a high degree of independence in terms of mobility and daily activities (Tulloch, Bombell, Dean, & Tiedemann, 2018; Ryan, Murphy, Boland, Galvin, & Smith, 2018).

GOAL

The objective of this research is to examine the impact of engaging in physical activities in a general sense, with a particular focus on physical exercises, on the psycho-emotional well-being and self-image of individuals who participate in these activities.

OBJECTIVES

This research is guided by the following objectives:

The research aims to achieve the following objectives:

1. Conduct a comprehensive analysis of existing studies and models that assess the relationship between levels of physical activity and psycho-emotional well-being, with a specific focus on self-image.
2. Conduct quantitative correlational research to assess the degree of correlation between engagement in physical activities and psycho-emotional well-being, as well as its connection to self-image.
3. Conduct quantitative correlational research to examine the relationship between individuals' motivations for participating in physical exercise and their psycho-emotional well-being, particularly in relation to self-image.
4. Conduct quantitative correlational research to explore the connection between Body Mass Index (BMI) and psycho-emotional well-being and self-image.

These objectives aim to provide valuable insights into the complex interplay between physical activity, psycho-emotional well-being, and self-image, contributing to a better understanding of their relationships and potential implications.

HYPOTHESIS

1. Psycho-emotional well-being is positively correlated with regular physical activity.
2. Self-body image is positively related to regular physical activity, indicating that individuals who engage in consistent exercise have a more positive body image compared to sedentary individuals.
3. There is a significant statistical difference in terms of psycho-emotional well-being between individuals who exercise for constructive reasons (health, state of mind, physical condition) and those who exercise primarily for appearance.
4. There is a significant statistical difference in terms of self-body image between individuals who exercise for constructive reasons (health, state of mind, physical condition) and those who exercise primarily for appearance.
5. Psycho-emotional well-being is correlated with Body Mass Index (BMI), suggesting that individuals with healthier BMI scores may experience better psycho-emotional well-being.
6. Self-body image is correlated with Body Mass Index (BMI), indicating that BMI may influence how individuals perceive their own bodies.

RESEARCH PARTICIPANTS

A set of N = 171 persons have participated in this research, randomly selected, 63 men and 107 women, and one person did not declare its gender. The sample included both physically very active persons (N=57), sufficiently active persons (N=91) and sedentary persons (N=23). All participants agreed voluntarily to be part of this research and their recruitment was made using social media and dedicated questionnaire distribution platforms.

METHODS

For this research I developed a questionnaire that involved the selection of 4 inventories of questions relevant to the aspects studied, whose relevance is confirmed by their use in various previous researches.

To evaluate the level of physical activity, the short version of IPAQ (International Physical Activity Questionnaire) was used, consisting of 7 questions used to evaluate the level of physical activity during the last 7 days. The result of this test can be either nominal or continuous. In the first case, the respondents will be classified in one of the following categories:

- Sedentary persons (1st category): subjects who fail to fulfil the conditions to be included in the 2nd and 3rd categories
- Moderately active persons (2nd category): subjects who fulfil at least one of the following criteria:
 - 3 or more intense physical activity days of at least 20 minutes per day;
 - 5 or more moderate physical activity days or at least 30 minutes of walking per day;

- 5 or more days including any combination of walking, moderate or intense physical activity with an energy consumption per week of at least 600 MET (Metabolic Equivalent of Task)-minutes/week. MET represents the amount of energy consumed when resting.
 - Highly active (3rd category): subjects who fulfil at least one of the following criteria:
 - 3 or more intense physical activity days with an energy consumption of at least 1500 MET-minutes/week;
- 7 days of activity including any combination of walking, moderate or intense physical activity with an energy consumption per week of at least 3000 MET- minutes/week.

As the benefits of a workout program only start to show after a period of constant training, in order to achieve comparable IPAQ test results, a control question was inserted (“Do you work out on a regular basis?”). Depending on the answer to this question, the TOTAL_MET-minutes/week score was multiplied by an index as follows:

- The subjects who responded “Yes, during the past month”: index 0.
- The subjects who responded “Yes, during the past 6 months” : index 0.9
- The subjects who responded “Yes, during the past year”: index 1
- The subjects who responded “Yes, for more than one year”, index 1.1

To evaluate the reasons behind each subject’s training the REI questionnaire was used (Reasons for Exercise Inventory), as developed by (Cash et al., 1994). This inventory consists of 21 items requiring the subjects to mention the extent to which they agree with a set of affirmations concerning the reasons for which they work out, assessed on a 7 points Likert scale (1 – Not important at all, 7 – Extremely important). These reasons have been divided into 2 categories, positive ones (to improve physical condition, health, mindset, to socialize and for entertainment) and negative ones (to manage weight and improve physical look). Separate scores have been calculated for each category of reasons.

To study the mental and emotional well-being of the subjects the PGWBI (Psychological General Well Being Index) inventory was used, developed by Harold Dupuy in 1971 and revised in (Dupuy, 1984). The reason for choosing this questionnaire is that it was validated by its use in many researches (Carotenuto et al., 2013; Guerrini Usubini et al., 2021; Lundgren-Nilsson, Jonsdottir, Ahlborg, & Tennant, 2013). It consists of 22 items evaluated on a 6 points Likert scale covering the following aspects: depression, anxiety, self-control, positive thinking, general health, and vitality. Each affirmation is scored from 0 to 5, the total score ranging from 0 (lack of psycho-emotional well-being) to 110 (perfect psycho-emotional balance).

The last part of the questionnaire aims to evaluate the satisfaction level with the body image, and for this the BISS questionnaire was used (Body Image States Scale) (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002), which as all the other questionnaires used was validated and used in many previous researches (Arigo, Hevel, Bittel, & Maher, 2022; Bardi, Arnaud, Bagès, Langlois, & Rousseau, 2021; Saunders, Nutter, & Russell-Mayhew, 2022). This is a 6 items questionnaire evaluated on a 9 points Likert scale measuring the degree of the subject’s satisfaction with his/her own body (1 – Extremely unsatisfied, 9 – Extremely satisfied). The evaluated aspects are weight, body shape, general physical appearance, and attractiveness.

The Qualtrics platform has been used to collect data, due to its various features: possibility to develop complex logical sequence questionnaires, possibility to connect and calculate scores for certain groups of questions (thus a score has been generated for each standardized questionnaire that was applied), possibility to export results in SPSS format for subsequent analysis and possibility to analyze the data (both descriptive and inferential statistics). Social media, email and SurveyCircle and SurveySwap platforms have been used to distribute the questionnaires.

RESULTS

In terms of demographic data, the study subjects were aged between 18 and 61 years old, with an average age of 28 years and standard deviation was $\sigma=8.58$. The distribution by gender was: 67 men (39.2%), 103 women (60.2%), and one person chose not to declare its gender (0.6%) Based on the recommendations for the interpretation of the IPAQ test results, the subjects were classified into 3 categories according to the result of the IPAQ questionnaire: sedentary, sufficiently active, and very active, the distribution by category being as shown in Table 2.1.

Table 2.1 *Distribution of subjects by physical activity level*

Activity level	Frequency	Percentage
Sedentary	23	13.5
Sufficiently active	91	53.2
Highly active	57	33.3
Total	171	100.0

The scores obtained in the psycho-emotional well-being evaluation questionnaire, which will be referred to from now on as *PEW variable*, and respectively the scores obtained in the assessment of self body image satisfaction degree, which will be referred to from now as the *BI variable*, have been analyzed to determine whether they have a normal distribution and can thus be used later in inferential statistical tests. Given that the number of samples is over 50, the recommendation is to use the Kolmogorov-Smirnov test (Mishra et al., 2019).

In Table 2.2 the result of Kolmogorov-Smirnov tests is presented for the PEW variable. It can be observed that the result of the p-test is higher than the chosen significance threshold of 0.05, which means that we can confirm the null hypothesis of the test, namely that the distribution of the PEW variable is normal.

Table 2.2 *Normality check for the PEW variable*

	Kolmogorov-Smirnov		
	Statistic	df	p
PEW (Psycho-emotional well-being)	.063	171	.094

The same was found for the *BI* variable, which in turn has a normal distribution, as illustrated by the result of the test presented in Table 2.3.

Table 2.3 *Normality check for the BI variable.*

	Kolmogorov-Smirnov		
	Statistic	df	p
Body image (BI)	.067	171	.061

Inferential statistical analysis

In this study the main statistical analysis performed were:

- The Spearman correlation coefficient - physical activity (PA) - psycho-emotional well-being (PEW), where PEW – dependent variable, PA – independent variable
- The Spearman correlation coefficient - physical activity (PA) – body image (BI), where BI – dependent variable, PA – independent variable
- ANOVA Psycho-emotional well-being (sedentary, sufficiently active, highly active).
- ANOVA Self body image (sedentary, sufficiently active, highly active).
- Test t: psycho-emotional well-being (positive reasons, negative reasons).
- Test t: body image (positive reasons, negative reasons).
- The Spearman correlation coefficient: body mass index (BMI) – psycho-emotional well-being (PEW)
- The Spearman correlation coefficient: body mass index (BMI) – body image (BI).

A. Relation between physical activity and psycho-emotional well-being

To analyze the relation between the psycho-emotional well-being and the physical activity of subjects, two approaches have been used. Firstly, the relation between the physical activity shaped as continuous numeric variable was analyzed, measuring the MET level – minutes/week, calculated based on the formula in the IPAQ test interpretation guidelines and the PEW variable.

Table 2.4 *Monotonic correlation between PEW and PA*

Spearman rho	Physical activity (PA)	Correlation coefficient	1.000	.175*
		p (bilateral)	.	.022
		N	171	171
	Psycho-emotional well-being (PEW)	Correlation coefficient	.175*	1.000
		p (bilateral)	.022	.
		N	171	171
The correlation is significant with the significance threshold of 0.05*				

The second aspect of analyzing the relation between the psycho-emotional well-being and the physical activity was represented by the ANOVA analysis on the relation between the emotional well-being of 3 groups: sedentary, sufficiently active, and highly active. Prior to any endeavor, the homogeneity of the variance of the 3 groups was tested using the Levene test, concluding that this prerequisite to perform the ANOVA test is fulfilled. (Table 2.5).

Table 2.5 *Checking the homogeneity of variances for ANOVA PEW analysis*

		Levene statistics	df1	df2	p>0.05
Psycho-emotional well-being (PEW)	Based on mean	.219	2	168	.803
	Based on the median	.261	2	168	.771
	Based on the mean and an adjusted variances	.261	2	165.216	.771

The results of the ANOVA analysis are presented in Table 2.6, finding a major difference in terms of statistics between the groups ($p = 0.018 < \alpha = 0.05$).

Table 2.6 *ANOVA analysis of the differences between the groups of sedentary, sufficiently active, and highly active groups in terms of PEW*

ANOVA					
Psycho-emotional well-being					
	Sum of squares	Df	Mean squares	F	p<0.05
Between groups	3129.011	2	1564.505	4.097	.018
Within the group	64160.966	168	381.911		
Total	67289.977	170			

To follow-up, comparisons have been performed between each pair of groups, resulting in a difference significant in terms of statistics between the highly active group of subjects and the sedentary group of subjects in terms of psycho-emotional well-being ($p = 0.038 < \alpha = 0.05$). Thus, the highly active subjects have a much higher PEW level than the sedentary subjects (Table 2.7).

Table 2.7 *Post-ANOVA analysis of the differences between the sedentary, sufficiently active, and highly active pairs of groups in terms of PEW*

(I) Activity level	(J) Activity level	Difference of means(I-J)	Standard deviation	P
1 Highly active	2 Sedentary	11.95423*	4.82752	.038
	3 Sufficiently active	7.73684	3.30106	.053
2 Sedentary	1 Highly active	-11.95423*	4.82752	.038

	3 Sufficiently active	-4.21739	4.56088	.625
3 Sufficiently active	1 Highly active	-7.73684	3.30106	.053
	2 Sedentary	4.21739	4.56088	.625

Based on the ANOVA analysis and on the study on the correlation it results that Hypothesis 1 of this research is confirmed.

Also, an analysis was performed on the existence of statistically significant differences between the body image of the 3 categories of subjects classified depending on the physical activity level: sedentary, sufficiently active, and highly active. The Levene test was applied beforehand to determine if the 3 groups observe the variance homogeneity criteria, which was confirmed by the result $p=0.547 > \alpha=0.05$. The descriptive statistical parameters of BI for the 3 groups of subjects are presented in Figure 1

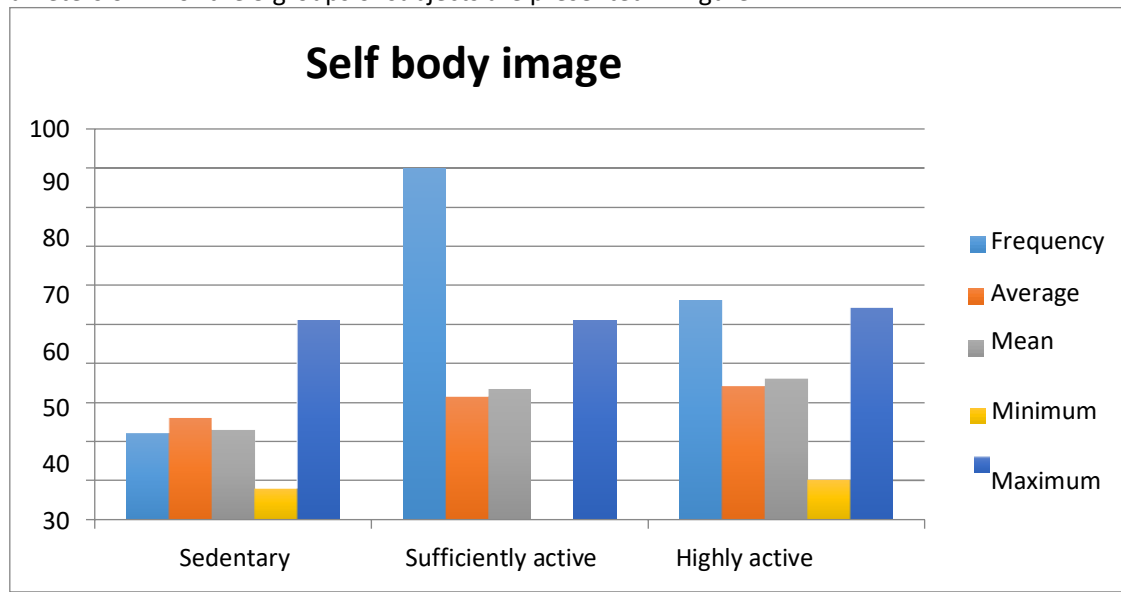


Figure 1. Descriptive statistical analysis of BI for studied groups.

(I) activity category_1	(J) activity category_1	Mean difference (I-J)	Standard error	p
1 Highly active	2 Sedentary	8.08619*	2.68622	.008
	3 Sufficiently active	1.93426	1.83684	.545
2 Sedentary	1 Highly active	-8.08619*	2.68622	.008
	3 Sufficiently active	-6.15194*	2.53785	.043
3 Sufficiently active	1 Highly active	-1.93426	1.83684	.545
	2 Sedentary	6.15194*	2.53785	.043

Table 2.8 Post-ANOVA analysis of the differences between the sedentary, sufficiently active, and highly active pairs of groups in terms of BI

Based on these analysis we can state that Hypothesis 2 is confirmed, thus there is a positive monotonic correlation between the physical activity level and the self-body image satisfaction level, as the persons in the highly active or sufficiently active groups are more satisfied with their own bodies than the sedentary persons.

B. Relation between the reasons for working out and the psycho-emotional well-being

Thereafter the differences between the two categories in terms of psycho-emotional well-being was studied, by applying the t bilateral test for independent samples. The t test results presented in Table 2.9 show that in terms of psycho-emotional well-being there are no statistically significant differences ($p=0.183 > \alpha = 0.05$) between the subjects who work out for constructive reasons and those who work out to improve their self-image. Therefore, the Hypothesis 3 of this study is not confirmed.

Table 2.9 Results of t test on the differences between the groups of subjects with Negative Reasons and Positive Reasons in terms of PEW

		Levene test on variance equality		t	df	p
		F	p			
Psycho-emotional well-being (PEW)	Variences assumed to be equal	2.115	.148	-1.339	147	.183
	Variences are not assumed to be equal			-1.342	145.899	.182

C. Relation between the reasons of subjects for working out and their body image. Using the above-mentioned categories, a bilateral t-test was performed for independent samples in order to conclude if there are major statistic differences in the environments of both groups in terms of self-body image. The test result show that there is such a significant difference in terms of statistics ($p=0.007 < \alpha = 0.01$) on behalf of the group of persons who work out rather for positive reasons, as shown in Table 2.10. This confirms the Hypothesis 4of this study.

Table 2.10 Results of t-test on the difference between the categories of Negative Reasons and Positive Reasons in terms of Body Image

Self body image (BI)		Levene Test		T test						
		F	p	t	df	p	Differenc e of environments	Differe nce of standard errors	99% Confidence Interval of the Difference	
									Lower	Upper
	Presumed equal variances	1.516	.220	-2.713	147	.007	-4.75126	1.75159	-9.32236	-.18016
	Unpresumed equal variances			-2.708	144.693	.008	-4.75126	1.75464	-9.33129	-.17123

D. Relation between psycho-emotional well-being/body image and the body mass index

As following the descriptive analysis, it was found that the body mass index does not have a normal distribution (according to Figure 2.5), the Spearman index was used in studying the correlation between the psycho-emotional wellbeing and the BMI, thus finding a negative monotonic correlation significant in terms of statistics between the two variables ($p=0.008 < \alpha = 0.01$). The negative correlation is feeble as shown by the Spearman index $\rho=-0.204$, according to Table 2.11, thus confirming the Hypothesis 5 of this study.

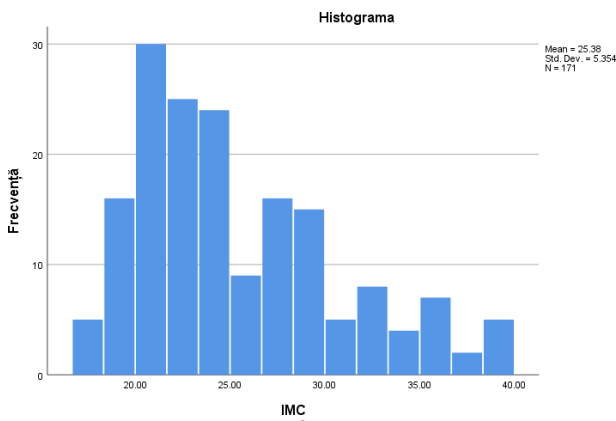


Figure 2. Histogram of the body mass index variable

Table 2.11- Correlation between psycho-emotional well-being and body mass index

		BPE	
Spearman rho	BMI	Correlation index	-.204**
		p (bilateral)	.008
		N	171

The Spearman correlation index between the body image and the body mass index was also calculated. The results presented in Table 2.12 show a negative monotonic correlation between the two variables, this being highly significant in terms of statistics ($p = 0.000 < \alpha = 0.001$). The negative monotonic correlation is strong, as illustrated by the value of the Spearman coefficient $\rho = -0.529$. This analysis hereby confirms the Hypothesis 6 of this study.

Table 2.12
Correlation between the body image and the body mass index

		Self body image	
Spearman rho	Body mass index	Correlation coefficient	-.529**
		p (bilateral)	.000
		N	171
**. The correlation is significant with threshold $\alpha = 0.01$ (bilateral).			

CONCLUSIONS

The main objective of this study was to determine to what extent physical activity contributes to achieving psycho-emotional well-being and improving the perception of one's own body. In this regard, a statistically significant positive correlation was found between the level of physical activity assessed by means of the IPAQ questionnaire and the psycho-emotional well-being assessed by means of the PGWBI questionnaire. The identified level of correlation is low, but the context in which this study took place should be considered, namely the fact that the society is still under the influence of the psychological impact of the pandemic, to which it was recently added the stress caused by the military conflict in Ukraine and the possibility of triggering a major economic crisis. Thus, in the absence of restrictions, we can say that the level of physical activity of most people has returned to normal. Instead, the psycho-emotional well-being was and continues to be affected by the collective traumas suffered in the last period, which influences the relationship between the level of physical activity and the psycho-emotional well-being. The results obtained on the PGWBI questionnaire were relatively low (for men the average score was 66.5 and for women 65.99 out of a maximum score of 110), which demonstrates that most of the population is deeply marked by the crises they have faced in the past period. This study did not consider the control variables such as the psychological impact of the pandemic, of the war or of the economic crisis, which

most likely explains the low correlation identified. The ANOVA analysis revealed statistically significant differences between the group of highly active people and that of sedentary people, which confirms that a high level of physical activity contributes to the acquisition of psycho-emotional balance. We can thus conclude that the Hypothesis 1 of this study is statistically valid.

In terms of the body image, it was also found to be positively correlated with the level of physical activity, the correlation coefficient indicating a weak level of association. The average score obtained by women was 32.74, and by men 30.69 out of a maximum of 54 points. These relatively low scores can be attributed to the fact that today's society has set unrealistic standards of beauty, and those who feel the pressure of these standards tend to undervalue themselves and are not satisfied with their appearance. Many people turn to workout programs trying to reach these beauty standards, and as this reason is not a constructive one, it does not always have the desired effects. Thus, some people, even if they are very active, continue to be dissatisfied with their appearance. Comparing the level of satisfaction with self-image for the very active, sufficiently active, and sedentary groups, a statistically significant difference was found between the very active and sedentary groups, and between the sufficiently active and sedentary groups, respectively. We can thus state that physical activities contribute to improving self body image for very active and sufficiently active people compared to sedentary ones. We thus conclude that the Hypothesis 2 of this study is confirmed.

Another objective of this study was to determine if there are significant differences in terms of psycho-emotional wellbeing and the body image among the persons who work out for constructive reasons such as improving their health or fight stress and those who work out mainly for their physical appearance. It was found that in terms of psycho-emotional wellbeing there are no major differences between the two groups, meaning that the Hypothesis 3 of this study cannot be validated. This surprising result can also be attributed to the past two years that negatively influenced the psycho-emotional state of most people. It is a signal of a world in deep suffering that has not yet been able to find the motivation and effective methods to overcome this state, confirmed by this study which did not identify major differences between women and men or between the various age groups in terms of psycho-emotional well-being and self body image. Therapeutic measures to overcome this crisis must be as diverse as possible, and a program of physical activities should be backed by other intervention techniques to help the population overcome this moment.

In terms of self body-image a major statistic difference was found between the groups who work out for positive/negative reasons, thus the Hypothesis 4 of this study was validated. This result can be explained by the fact that positive reasons for practicing physical activities are relatively stable concepts that do not change much over time. Instead, society's beauty standards are in constant evolution, and trying to aim for such a target that is constantly changing can cause frustrations with a negative impact both on the way we perceive our own body and on our mental state. People who aim for clear and stable goals for which there is clear evidence that they can be achieved through consistent physical activity will be more motivated and engaged than those who pursue ambiguous and deeply subjective goals such as ideal physical appearance. The former are more likely to achieve their goals and be satisfied with their results (including those related to their physical appearance) than those who are motivated primarily by improving their physical appearance.

One of the limitations of this study is that it is based on self-reported physical activity levels, and in general people, especially in modern society where they are intellectually overworked, are not very accurate when asked to say how much time they spent during the past week doing a certain activity, especially in the case of those for whom that activity is not part of their usual routine. As a result, measuring the level of activity through a continuous score is relatively imprecise. Instead, fitting into a certain category according to the level of activity (very active, sufficiently active, sedentary) provides more real results. To counter this deficiency, the relation between the body mass index and psycho-emotional well-being, respectively body image, was studied. The errors of judgment in this case are more reduced, as people tend to be somewhat more honest and precise when it comes to height and weight. The results of this part of the study showed a statistically significant negative correlation between BMI and psycho-emotional well-being, respectively between BMI and body image, which allowed the validation of Hypotheses 5 and 6.

If for the relation between BMI and psycho-emotional wellbeing the negative correlation found was weak, for the relation between BMI and body image the identified negative correlation is strong. Also, the correlation between the BMI and the psycho-emotional wellbeing was stronger than the correlation between the physical activity and psycho-emotional wellbeing, and the correlation between the BMI and the body image was much stronger than the correlation between the physical activity and the body image. Therefore, we can say that the body mass index influences psycho-emotional well-being to a slightly greater extent than the level of physical activity. Regarding the body image, the influence of BMI is significantly higher than that of the level of physical activity.

The fact that the body mass index is a better predictor of psycho-emotional well-being than the level of physical activity can be explained by the fact that BMI is a physiological parameter with a significant impact on both the general state of health and the mental state. A high BMI is an aggravating factor for many medical conditions. At the same time, achieving psycho-emotional well-being is difficult in the case of a high BMI that has a negative impact on many aspects defining this state of balance: self-image, autonomy, self-confidence, ability to integrate into a society that insists on physical appearance. Depression is often a consequence of a high BMI, especially in people who gain weight rapidly after being at a normal weight for a long time. The body of overweight people has a reduced capacity to neutralize oxidizing factors and limited possibilities to fight against cellular oxidative stress. This aspect reduces the ability to fight psychological stress.

To understand the importance of these correlations, we must consider that the study subjects were adults, the only variable in calculating the BMI in this case being the weight, which except for health problems (such as hormonal ones) and surgical interventions such as stomach ablation can vary under the influence of two factors:

- Caloric intake that is controllable through diet
- Calory consumption that is controllable by the level of physical activity.

It therefore results that the caloric intake and implicitly the diet, most likely have a contribution to the higher level of the BMI-psycho-emotional well-being correlation compared to the level of the physical activity-psycho-emotional well-being correlation. The contribution is even greater in the case of the BMI-body image correlation, thus revealing that in modern society weight has acquired a high influence in the ideal model of beauty.

A future research direction emerges from these results, namely a comparative study of the impact of the 3 different intervention strategies on the psycho-emotional well-being and self-image:

- Strategy based exclusively on a workout program
- Strategy based exclusively on a meal plan
- Strategy based on a program combining workouts and a proper diet.

In this case, in order to ensure the most accurate recording of the level of physical activity, either activity monitoring devices such as fitness bracelets or just phone apps that record the number of steps can be used. Dedicated food consumption tracking apps can also be used to correctly monitor caloric intake.

Based on the results of this study, we can conclude that a physical activity program can be a feasible component of an intervention plan aimed at improving the quality of life, self-image, and overall psycho-emotional well-being. Such a program should also be supplemented with an appropriate nutritional plan to enable the subject to reach or maintain a normal body mass index.

References

- Ahmed, H. M., Blaha, M. J., Nasir, K., Rivera, J. J., & Blumenthal, R. S. (2012). Effects of physical activity on cardiovascular disease. *The American Journal of Cardiology*, *109*(2), 288–295.
- Archer, T., Josefsson, T., & Lindwall, M. (2014). Effects of physical exercise on depressive symptoms and biomarkers in depression. *CNS & Neurological Disorders Drug Targets*, *13*(10), 1640–1653.
- Arigo, D., Hevel, D., Bittel, K., & Maher, J. P. (2022). Within-person examination of the exercise intention-behavior gap among women in midlife with elevated cardiovascular disease risk. *Psychology of Sport and Exercise*, *60*.doi:10.1016/j.psychsport.2022.102138
- Bailey, D. M., Young, I. S., McEneny, J., Lawrenson, L., Kim, J., Barden, J., & Richardson, R.S. (2004). Regulation of free radical outflow from an isolated muscle bed in exercising humans. *American Journal of Physiology. Heart and Circulatory Physiology*, *287*(4), H1689-99.
- Bardi, L., Arnaud, C., Bagès, C., Langlois, F., & Rousseau, A. (2021). Translation and Validation of a State-Measure of Body Image Satisfaction: The Body Image State Scale. *Frontiers in Psychology*, *12*, 724710.
- Barone Gibbs, B., Hivert, M.-F., Jerome, G. J., Kraus, W. E., Rosenkranz, S. K., Schorr, E. N., American Heart Association Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular and Stroke Nursing; and Council on Clinical Cardiology. (2021). Physical Activity as a Critical Component of First-Line Treatment for Elevated Blood Pressure or Cholesterol: Who, What, and How?: A Scientific Statement From the American Heart Association. *Hypertension*, *78*(2), e26–e37.
- Bischoff, L. L., Otto, A.-K., Hold, C., & Wollesen, B. (2019). The effect of physical activity interventions on occupational stress for health personnel: A systematic review. *International Journal of Nursing Studies*, *97*, 94–104.
- Bou-Sospedra, C., Adelantado-Renau, M., Beltran-Valls, M. R., & Moliner-Urdiales, D. (2021). Independent and combined influence of physical fitness components on self-esteem in adolescents: DADOS study. *Annals of Human Biology*, *48*(7–8), 550–556.

- Brasure, M., Desai, P., Davila, H., Nelson, V. A., Calvert, C., Jutkowitz, E., ... Kane, R. L. (2018). Physical Activity Interventions in Preventing Cognitive Decline and Alzheimer-Type Dementia: A Systematic Review. *Annals of Internal Medicine*, *168*(1), 30–38
- Cantelon, J. A., & Giles, G. E. (2021). A Review of Cognitive Changes During Acute Aerobic Exercise. *Frontiers in Psychology*, *12*, 653158.
- Carotenuto, A., Fasanaro, A. M., Molino, I., Sibilio, F., Saturnino, A., Traini, E., & Amenta, F. (2013). The Psychological General Well-Being Index (PGWBI) for assessing stress of seafarers on board merchant ships. *International Maritime Health*, *64*(4), 215–220.
- Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: the development and validation of the Body Image States Scale. *Eating Disorders*, *10*(2), 103–113.
- Cooney, G. M., Dwan, K., Greig, C. A., Lawlor, D. A., Rimer, J., Waugh, F. R., ... Mead, G. E. (2013). Exercise for depression. *Cochrane Database of Systematic Reviews*, (9), CD004366.
- Coulson, J. C., McKenna, J., & Field, M. (2008). Exercising at work and self-reported work performance. *International Journal of Workplace Health Management*, *1*(3), 176–197.
- Dale, L. P., Vanderloo, L., Moore, S., & Faulkner, G. (2019). Physical activity and depression, anxiety, and self-esteem in children and youth: An umbrella systematic review. *Mental Health and Physical Activity*, *16*, 66–79.
- Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., ... Szabo-Reed, A. N. (2016). Physical Activity, Fitness, Cognitive Function, and Academic Achievement in Children: A Systematic Review. *Medicine and Science in Sports and Exercise*, *48*(6), 1197–1222.
- Fernández-Bustos, J. G., Infantes-Paniagua, Á., Gonzalez-Martí, I., & Contreras-Jordán, O. R. (2019). Body Dissatisfaction in Adolescents: Differences by Sex, BMI and Type and Organisation of Physical Activity. *International Journal of Environmental Research and Public Health*, *16*(17). doi:10.3390/ijerph16173109
- Forrest, C. K., & Bruner, M. W. (2017). Evaluating social media as a platform for delivering a team-building exercise intervention: A pilot study. *International Journal of Sport and Exercise Psychology*, *15*(2), 190–206.
- Fox, K. R. (2001). The effects of exercise on self-perceptions and self-esteem. In *Physical activity and psychological well-being* (pp. 88–117). Routledge.
- Gerber, M., Schilling, R., Colledge, F., Ludyga, S., Pühse, U., & Brand, S. (2020). More than a simple pastime? The potential of physical activity to moderate the relationship between occupational stress and burnout symptoms. *International Journal of Stress Management*, *27*(1), 53.
- Gil-Beltrán, E., Meneghel, I., Llorens, S., & Salanova, M. (2020). Get Vigorous with Physical Exercise and Improve Your Well-Being at Work! *International Journal of Environmental Research and Public Health*, *17*(17). doi:10.3390/ijerph17176384
- Gong, H., Ni, C., Shen, X., Wu, T., & Jiang, C. (2015). Yoga for prenatal depression: a systematic review and meta-analysis. *BMC Psychiatry*, *15*, 14.
- Jugl, I., Bender, D., & Lösel, F. (2021). Do Sports Programs Prevent Crime and Reduce Reoffending? A Systematic Review and Meta-Analysis on the Effectiveness of Sports Programs. *Journal of Quantitative Criminology*. doi:10.1007/s10940-021-09536-3
- Keech, J. J., Cole, K. L., Hagger, M. S., & Hamilton, K. (2020). The association between stress mindset and physical and psychological wellbeing: testing a stress beliefs model in police officers. *Psychology & Health*, *35*(11), 1306–1325.
- Petrovics, P., Nagy, A., Sandor, B., Palfi, A., Szekeres, Z., Toth, K., & Szabados, E. (2021). Examination of Self-Esteem, Body Image, Eating Attitudes and Cardiorespiratory Performance in Adolescents. *International Journal of Environmental Research and Public Health*, *18*(24). doi:10.3390/ijerph182413172
- Phillips, M. D., Patrizi, R. M., Cheek, D. J., Wooten, J. S., Barbee, J. J., & Mitchell, J. B. (2012). Resistance training reduces subclinical inflammation in obese, postmenopausal women. *Medicine and Science in Sports and Exercise*, *44*(11), 2099–2110.
- Srsmith, D., Wider, L.-M., Wong, H. Y., Zipfel, S., Thiel, A., Giel, K. E., & Behrens, S. C. (2020). Influence of Physical Activity Interventions on Body Representation: A Systematic Review. *Frontiers in Psychiatry / Frontiers Research Foundation*, *11*, 99.