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PHYSICAL ACTIVITY AS A PREDICTOR OF COLLEGE STUDENT HAPPINESS ACROSS GENDER DIFFERENCES

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Abstract

The academic demands often experienced by college students and a sedentary lifestyle that is not balanced with physical activity affect their psychological well-being, such as a decrease in happiness levels. This study aims to determine physical activity as one of the predictors of happiness among college students, moderated by gender. A non-experimental quantitative method was chosen as the research method, with a cross-sectional design. The total of research respondents was 230 college students selected through purposive sampling. The measurement tools used were the International Physical Activity Questionnaire (IPAQ) for physical activity variables and the Oxford Happiness Questionnaire to measure happiness, both of which have been proven to be valid and reliable. Data analysis techniques used Multiple Regression Analysis (MRA) through JASP 0.95.2 software. Physical activity was found to have a positive effect on college student happiness ($\beta = 0.208$; $p < 0.01$), and gender was able to moderate the relationship between physical activity and happiness (β interaction = 0.556; $p < 0.01$), with a stronger effect on female college students than male college students. The results of this study contribute theoretically to the understanding of physical activity factors that can affect subjective well-being among college students, while also providing practical implications for further promoting healthy lifestyles through physical activity in higher education institutions, with consideration given to gender.

Keywords: College Students, Gender, Happiness, Physical Activity

Abstrak. Tuntutan akademik yang sering dialami mahasiswa dan gaya hidup sedentari yang tidak diimbangi dengan aktivitas fisik memengaruh kesejahteraan psikologis mereka, seperti penurunan tingkat kebahagiaan. Penelitian ini bertujuan untuk mengetahui aktivitas fisik sebagai salah satu prediktor kebahagiaan pada mahasiswa yang dimoderasi oleh gender. Kuantitatif non-eksperimen dipilih sebagai metode dalam penelitian dengan *cross-sectional* sebagai desain penelitian. Total responden penelitian adalah 230 mahasiswa yang dipilih menggunakan *purposive sampling.* Adapun Alat ukur penelitian menggunakan *International Physical Activity Questionnaire* (IPAQ) untuk variabel aktivitas fisik dan *Oxford Happiness Questionnaire* untuk mengukur kebahagiaan yang sudah terbukti valid dan reliabel. Uji *Multiple Regression Analysis* (MRA) adalah uji analisis data utama yang digunakan melalui software JASP 0.95.2. Aktivitas fisik terbukti berpengaruh positif terhadap kebahagiaan mahasiswa ($\beta = 0{,}208$; $p < 0{,}01$) dan gender mampu memoderasi hubungan antara aktivitas fisik dengan kebahagiaan (β interaksi $= 0{,}556$; $p < 0{,}01$) yang lebih kuat pengaruhnya terhadap mahasiswa perempuan dari pada laki-laki. Hasil penelitian memberikan kontribusi secara teoritis mengenai faktor aktivitas fisik yang dapat memengaruhi kesejahteraan subjektif pada mahasiswa sekaligus memberikan implikasi praktis untuk semakin mempromosikan gaya hidup sehat melalui aktivitas fisik di institusi perguruan tinggi dengan memperhatikan gender.

Kata-kata Kunci : Aktivitas Fisik, Gender, Kebahagiaan, Mahasiswa

Background

Happiness has become one of the main indicators to measure a person's psychological well-being in the modern era. More studies show that physical activity can be a key predictor of increased happiness, especially among college students. College students are a productive age group that is vulnerable to academic stress and social changes that affect their psychological well-being (Jiang et al., 2021). Physical activity, whether in the form of regular exercise or daily activities, has been shown to have a positive relationship with happiness and psychological well-being. Research by Bermejo-Cantarero & Velazquez-Ruiz (2025) found that college students who are physically active have higher levels of self-esteem and happiness than those who are inactive.

Currently, the trend of sedentary lifestyles is increasing among students due to the development of digital technology and increasing academic burdens, such as sitting for long periods of time during lectures and frequently accessing digital media, which has the potential to reduce their emotional well-being (Daramola & Aribasoye, 2023). Additionally, time constraints and laziness also contribute to a decrease in students' physical activity (Carballo-Fazanes et al., 2020). Global research shows that the majority of university students have not reached the recommended weekly physical activity, with 84% not exercising outside of class hours and 56% having high levels of sedentary behavior (Wojtyla-Buciora et al., 2017; Moya Bautista et al., 2024). Similarly, data on physical activity levels in Indonesia shows that participants tend to be low (±36%), including those of productive age and university students (Maksum & Indahwati, 2021). This is supported by a recent WHO (2024) which found that nearly one-third of the adult population worldwide doesn’t meet the recommendation of at least 150 minutes of physical activity per week.

Regular engagement in physical activity is not correlated with depression, anxiety, psychosomatic stress and positively correlated with well-being and quality of life (Herbert et al., 2020; Kai & Sun, 2021; Sasongko et al., 2025). Research by Bajramovic et al. (2022) found that during the COVID-19 pandemic, students who maintained physical activity showed higher well-being compared to those who were inactive. In addition, the relationship between physical activity and happiness can be explained through Self-Determination Theory, which states that engagement in activities that fulfill basic psychological needs such as competence, autonomy, and social connectedness can increase an individual's subjective well-being (Ghaneapur et al., 2019; Gray et al., 2018). Research by Pengpid & Peltzer (2019) further reinforces that physical activity has a positive relationship with life satisfaction and improved mental health in individuals.

Based on international surveys, when viewed by gender, the level of physical inactivity is greater among women at 34% than among men at 29% (PAHO, 2024). Furthermore, the types and levels of physical activity in men and women generally differ due to physiological differences, which can potentially lead to different levels of happiness. This phenomenon stems from social and psychological factors that differentiate the experience of happiness based on gender. In general, male college students choose more strenuous physical activities and higher intensity, which leads to higher levels of happiness than female college students (Goncalves & Martinez, 2018; Jiang et al., 2021). The study by Yoon & Jung (2025) also shows that among physical education students, female college students tend to have lower levels of happiness than male college students.

Previous research gaps prompted this study to fill the existing gaps. Although several international studies have revealed gender correlations in the relationship between physical activity and happiness (Murphy et al., 2018), many studies in Indonesia generally only examine the direct relationship between the two using adult populations without involving gender as a moderator (Patria, 2022; Maksum & Indahwati, 2021; Ramadan et al., 2023). Besides that, research subjects involving college students in Indonesia are still limited and only focus on physical health, such as nutrition, without involving psychological well-being such as happiness as the main outcome (Yuniarti et al., 2024; Ekawati et al., 2025). This gap prompted research to be conducted to provide evidence on the differential role of gender in the relationship between physical activity and happiness among college students. The research questions asked are 1) does physical activity affect happiness in students, and 2) does gender moderate the effect of physical activity on happiness. Therefore, this study is expected to contribute new insights to sports psychology and have practical implications for the development of gender-based campus policies that encourage balanced participation in

physical activities between men and women without restrictions, thereby increasing mental health awareness, especially happiness.

Method

This study used a non-experimental quantitative research design with a cross-sectional approach to analyze the relationship between physical activity and happiness through gender as a moderator. A non-experimental quantitative approach was chosen because it is suitable for testing the influence between variables without manipulating the independent variable. The study was conducted at a State University in Surabaya and lasted approximately two months. The population in this study consisted of active students at a university in Surabaya, with a total of 230 participants. College students were chosen as participants because they are in early adulthood (aged 18–25 years) and are in a transitional phase, where the balance between physical activity and happiness greatly affects their academic performance and quality of life. Purposive sampling is the sampling technique used in this study because respondents are selected based on criteria that have been determined in accordance with the research objectives. The following are the research criteria: 1) active college students aged 18-25 years, 2) have engaged in physical activity at least once in the last 2 weeks, 3) are willing to participate voluntarily without coercion. The distribution of research participants is shown in table 1.

Table 1. Participants Distribution

Gender	Amount (N = 230)	%
Man	111	48,3
Woman	119	51,7
Total	230	100

The research participants consisted of 230 active college students, with 111 male students (48.3%) and 119 female students (51.7%). Data collection was conducted using a Google form that was distributed online to participants who met the research criteria. This study used two instruments, namely the International Physical Activity Questionnaire (IPAQ) to measure physical activity, which produced a total physical activity score in Metabolic Equivalent of Task (Total MET). Then, the happiness variable used an adaptation of the Oxford Happiness Questionnaire instrument consisting of 8 items from Barattucci et al. (2024) and has been tested for validity and reliability with an estimate value (α : 0.702) that is indicated to be good.

Before data analysis was performed, physical activity variables using Total MET from IPAQ were mean-centered or standardized by calculating the average of the total types of Walking MET, Moderate MET, and High MET for each sample. This mean-centering process

is carried out to reduce potential multicollinearity between variables and to facilitate the interpretation of regression coefficients in moderation analysis. Then, the gender variable is entered into the model as a dummy variable using the coding 0 = male and 1 = female. Next, the interaction term was formed by multiplying the centered TOTAL MET by the gender dummy variable and proceeding to MRA analysis.

Data analysis was performed using JASP software version 0.95.2. The steps in data analysis are 1) testing the validity and reliability of the instrument to ensure the consistency and accuracy of the measuring tool; 2) conducting a normality test using the Kolmogorov-Smirnov test; 3) conducting a principal analysis using Multiple Regression Analysis (MRA) to see the effect of physical activity on happiness with gender interaction as a moderating variable. The use of MRA analysis can directly determine whether there is a relationship between variables with the addition of a moderator variable (Cao et al., 2025). Multicollinearity testing was also conducted as a regression model assumption test based on the Variance Inflation Factor (VIF) and tolerance values to ensure the stability of the regression coefficient values.

Result and Discussion

Result

Based on the results of statistical analysis, an overview of the level of physical activity and happiness of students and a significant relationship between the two variables moderated by gender was obtained.

Table 2. Phsyical Activity Category

Category	Total	%	Male	%	Female	%
Low	20	8,7%	9	8,1%	11	9,2%
Moderate	91	39,6%	41	36,9%	50	42%
High	119	51,7%	61	55%	58	48,7%
Total	230	100%	111	100%	119	100%

The categorization results in table 2, show that the majority of college students are in the high physical activity category (51.7%), with 119 male students (51.7%) and 58 female students (48.7%). Followed by the moderate category (39.6%), with 91 male college students (39.6%) and 50 female college students (42%), and low physical activity level (8.7%), with 20 male college students (8.7%) and only 11 female collage students (9.2%). There is a relatively consistent pattern in the IPAQ physical activity category among both male and female college students, although high physical activity is greater among male college students than female college students.

Table 3. Happiness Category

Category	Total	%	Male	%	Female	%
Low	7	3%	5	4,5%	2	1,7%
Moderate	129	56,1%	65	58,6%	64	53,8%
High	94	40,9%	41	36,9%	53	44,5%
Total	230	100%	111	100%	119	100%

The results of the happiness categorization in table 3 show that most students fall into the moderate happiness category (56.1%), with 65 male students (58.6%) and 64 female students (53.8%), followed by the high happiness category (40.9%), with 41 male students (36.9%) and 53 female students (44.5%). After that, only a small portion of students were in the low category (3%), with 7 male students (3%) and only 2 female students (1.7%). The distribution of happiness categories shows that, in general, students have a fairly good level of happiness, with female college students tending to have a slightly higher proportion of high happiness than male college students.

Table 4. Descriptive Statistics

	Valid	Mean	Std. Deviation	Range	Minimum	Maximum
TOTAL HP	230	29.00	5.151	28.00	12.00	40.00
TOTAL MET	230	3,664.04	2,967.087	16,149.00	0.000	16,149

Descriptive statistics in table 4 show that the average level of happiness among college students is 29.00 with a standard deviation of 5.151. This means that, in general, college students have a moderate to high level of happiness with fairly moderate variations in scores among participants. The happiness score range obtained is 12-40, which also shows differences in happiness levels among college students but not to an extreme degree. Meanwhile, students' physical activity, measured using the total MET score from the IPAQ, has an average value of 3,664.04 MET-minutes/week, with a standard deviation of 2,967.09. The large standard deviation value shows that there is quite a high variation in the level of physical activity among college students, ranging from those with very low physical activity to those who are very physically active.

Table 5. Multicolinearity Test

Model	Variabel Prediktor	Tolerance	VIF
M_0	Physical Activity (Total MET)	1.000	1.000
M_1	Physical Activity (Total MET)	0.965	1.036
	Gender	0.965	1.036

Before conducting the moderation regression analysis, assumption tests were performed to ensure the validity of the model. The results of the linearity, normality, and homoscedasticity tests showed that the data met the assumptions of linear regression with a normal data distribution. In addition, multicollinearity tests in table 5 were also performed by looking at the

VIF (1.036) and tolerance (0.965) values, which showed that there were no collinearity problems because (VIF < 5) and the Tolerance value (> 0.10).

Table 6. Modal Summary

Model	R	R^2	Adjusted R^2	RMSE
M_0	0.000	0.000	0.000	5.151
M_1	0.208	0.043	0.039	5.050

Note. M_1 includes TOTAL MET

As can be seen in Table 5, the coefficient of determination (R^2 = 0.043) means that physical activity only explains 4.3% of the variation in student happiness. Although this contribution is relatively small, it still has an influence and is acceptable in psychological research, considering that happiness is a complex construct that is influenced by various other factors such as psychological, social, academic, and environmental conditions. This means that physical activity has been proven to be one of the factors that contribute to happiness, although it is not the only determining factor of happiness.

Table 6. Anova Test

Model		Sum of Squares	df	Mean Square	F	p
M_1	Regression	261.9	1	261.91	10.27	.002
	Residual	5,814.1	228	25.50		
	Total	6,076.0	229			

Note. M_1 includes TOTAL MET

The Anova test results show that physical activity as a predictor of happiness among students is statistically significant. This is indicated by an F value of 10.27 with p = 0.002, which means that the regression model as a whole is able to explain the variation in college students happiness comprehensively.

Table 7. Moderation Regression Analysis

Model		Unstandardized	Standard Error	Standardized	t	p
M_0	(Intercept)	29.000	0.340		85.383	< .001
M_1	(Intercept)	27.679	0.530		52.245	< .001
	TOTAL MET	3.604×10^{-4}	1.125×10^{-4}	0.208	3.205	.002
	TOTAL MET ✻ Jenis Kelamin	7.075×10^{-4}	2.546×10^{-4}	0.556	2.778	.006

The regression coefficient test results of MRA show that physical activity has a positive and significant effect on student happiness. This is indicated by the standardized regression coefficient value (β = 0.208) with a t value of 3.205 and p = 0.002. The value (p <

0.05) shows that the effect is statistically significant. The positive direction of the coefficient indicates that the higher the level of physical activity among students, the greater their level of happiness. In other words, students who are more physically active tend to have higher levels of happiness than students who are less active.

The results of MRA analysis show that the interaction between physical activity and gender has a significant effect on student happiness (β = 0.556; t = 2.778; p = 0.006). A significant value (p < 0.05) means that gender can moderate the relationship between physical activity and happiness. This means that the strength of the relationship between physical activity and happiness differs between male and female students. To interpret which is stronger between male and female students, a simple slope analysis was conducted.

Table 8. Regression Slopes and Intercept

		95% Confidence Interval			95% Confidence Interval	
Variables	Value	Lower	Upper	Standardized Slope (β)	Lower β	Upper β
(Intercept)	28.20	26.76	29.64	0.00	0.00	0.00
TOTAL MET	0.00	-0.00	0.00	0.11	-0.04	0.26

Note. Confidence intervals computed 95% Confidence Intervals. All estimates are conditional estimates.

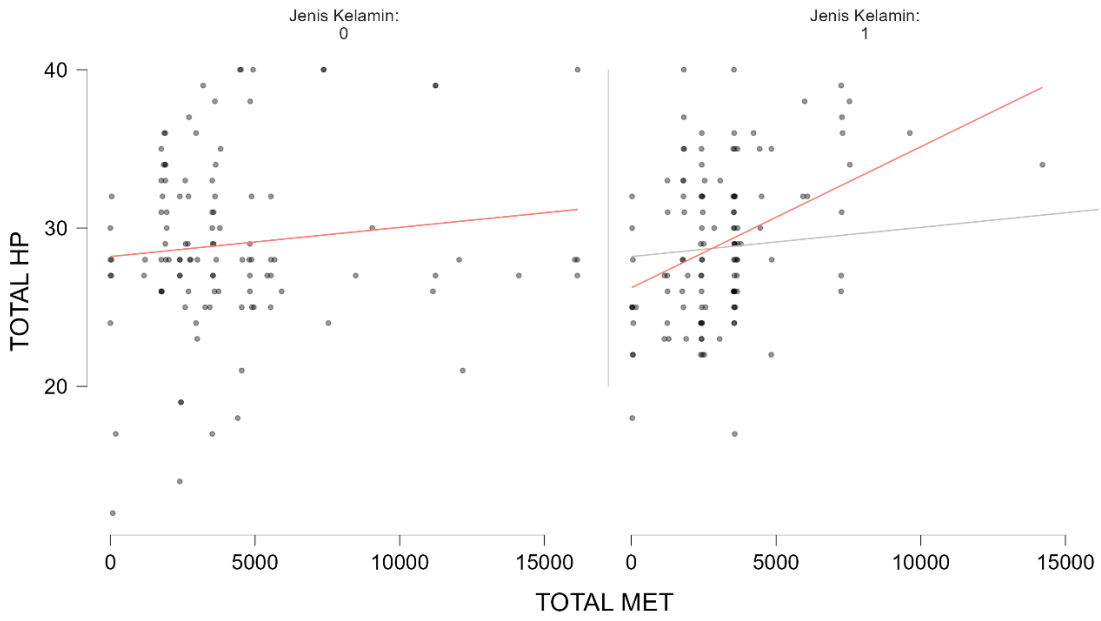

Figure 1. Interaction Plot Male vs Female

Furthermore, the results show that the effect of physical activity on happiness differs between male and female college students. The gender variable in the data analysis was coded as 0 = male and 1 = female. The results of the simple slope analysis in table 8 show that the effect of physical activity on happiness among male college students (reference group) was not significant. This is indicated by the standard coefficient value (β = 0.11) with a 95% confidence interval that crosses zero (−0.04 to 0.26) with evidence of a relatively small and flat regression slope graph in Figure 1. Conversely, among female college students, the

relationship between physical activity and happiness is stronger, as reflected in the steeper slope of the line in Figure 1. This means that the relationship between physical activity and happiness is stronger among female students than among male college students.

Discussion

Physical activity plays a significant role in college student happiness. College students who engage in regular physical activity tend to experience higher levels of happiness compared to college students who are inactive. This study is consistent with various previous studies that have found a positive correlation between physical activity and happiness. Research conducted by Li et al. (2025) shows that physical activity contributes directly to happiness, with positive attitudes toward exercise and sleep quality acting as mediators in this relationship. Engaging in enjoyable physical activities can improve college students' mental well-being, especially when they feel satisfied and enjoy the physical activity without feeling forced (Karakullukcu et al., 2025). This is in line with the Subjective Well-Being (SWB) theory, which states that physical activity can has a positive relationship with happiness in strengthening positive emotions, reducing stress levels, and increasing self-confidence, as well as influencing the quality of social relationships (Nairun et al., 2025; Pan et al., 2025; Song et al., 2025).

The results also show that gender plays a significant moderating role in the relationship between physical activity and happiness. The effect of physical activity on happiness is stronger among female college students than male college students. These results are reinforced by previous studies showing that women generally experience greater increases in happiness and quality of life through participation in physical activity. The factors can be seen from social support and the need for emotional validation, which are more prevalent in women and can affect their emotional regulation, especially when physical activity is done in groups (Gilan et al., 2024; Zhang et al., 2022; Jiang et al., 2021). However, other studies show that the role of gender as a moderating variable can be weaker in certain cultures, especially when social norms and roles limit women's opportunities to participate in sports (Tian et al., 2022).

The differences in research results can be explained by differences in cultural backgrounds, social conditions, and the characteristics of physical activities performed. In more egalitarian societies, women are more free to choose physical activities that suit their emotional needs, such as yoga, Zumba, or group-based activities. These types of activities are more appealing to women because they not only involve physical aspects but also fulfill their social interaction needs, thereby directly contributing to increased positive emotions and happiness (Woelfel et al., 2024; Nieri & Hughes, 2023; Ahmed et al., 2025). Conversely, in

societies that still uphold patriarchy, women's participation in physical activity is often limited by certain social norms and pressure from the environment, which can ultimately reduce the psychological benefits that should be obtained from such activities (Lin et al., 2020; Laar et al., 2025; Peng et al., 2023). In addition to social and cultural factors, differences in research results are also influenced by individual characteristics, such as age and the intensity of physical activity. For example, Jiang et al. (2021) found that moderate-intensity physical activity was significantly associated with happiness in women, while high-intensity activity was more closely related to life satisfaction in men.

Theoretically, this study reinforces the model of the relationship between physical activity and happiness within the framework of subjective well-being theory by including gender as a moderating variable. These results add to understanding of biological characteristics and social dynamics, such as gender, which also play an important role in determining how strongly physical activity contributes to individual happiness. Then, from a practical standpoint, these results provide clear direction for universities and policymakers in the field of education. Higher education institutions are advised to develop inclusive campus sports programs that are able to accommodate the needs of all students, especially female students. The availability of adequate sports facilities and infrastructure, coupled with the strengthening of social support networks and the development of community-based physical activities, can be an effective strategy in improving students' psychological well-being. In addition, incorporating physical activity into mental health promotion programs has the potential to be a useful non-pharmacological intervention, not only to reduce academic stress, but also to improve students' quality of life in the long term.

This study is not without limitations that need to be considered. First, this study places physical activity as the main predictor of student happiness, while happiness is a multidimensional construct that is influenced by various psychological and social factors. Variables such as social support, financial conditions, academic pressure, and sleep quality also have the potential to make a significant contribution, even exceeding the influence of physical activity alone on student happiness levels (Cattelino et al., 2023; Pan et al., 2025). Second, the use of a quantitative approach with a cross-sectional design also limits the ability to draw causal conclusions between physical activity and happiness. Therefore, further research is recommended to apply longitudinal or experimental designs to learn more about the long-term effects of physical activity on happiness. In addition, it is necessary to add other mediating and moderating variables, such as motivation, social support, or self-efficacy, which are expected to further support a more comprehensive understanding of the mechanisms underlying the relationship between physical activity and happiness among students.

Conclusion

The results of the study indicate that physical activity does contribute positively and significantly to student happiness. In other words, the first hypothesis can be accepted, namely that involvement in physical activity is accompanied by an increase in student happiness levels. The main analysis results also conclude that gender significantly acts as a moderating variable, with the effect of physical activity on happiness being stronger among female students than male students. Among female students, the effect is stronger due to different psychological and social needs between male and female students. In practical terms, these results help provide an understanding of the importance of designing and strengthening physical activity programs in higher education settings as part of a strategy to improve student well-being and mental health, while taking into account differences in needs and characteristics based on gender. However, this study still has limitations, particularly in relation to other variables that could potentially influence happiness beyond physical activity and its cross-sectional design, meaning that causal relationships cannot yet be explained in depth. Therefore, further research is recommended to use longitudinal or experimental designs accompanied by other psychosocial variables to gain a more comprehensive understanding of the relationship between physical activity and happiness among college students.

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