Physical activity as a key to happiness in university students: moderated by emotion regulation

La actividad física como clave para la felicidad en estudiantes universitarios: moderada por la regulación emocional

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Received: 21-08-25
Accepted: 28-08-25

How to cite in APA

Jannah, M., Widohardhono, R., Purnomo, R. A. A., Santosa, R. P., Harita, A. N. W., Dewi, D. K., ... Maulidiyah, E. F. (2025). Physical activity as a key to happiness in university students: moderated by emotion regulation. *Retos, 71*, 805–817. https://doi.org/10.47197/retos.v71.117446

Abstract

Introduction: Happiness is recognized as a key aspect of the psychological well-being of university students, yet academic pressure and sedentary lifestyles often undermine it. Physical activity was considered beneficial, but its effect depended on an individual's capacity for emotion regulation.
Objective: This study aimed to examine the role of physical activity as a predictor of happiness among Indonesian university students and explore the moderating role of emotion regulation in this relationship.
Methodology: A quantitative approach was employed with 706 undergraduate students from a university in East Java, Indonesia, selected through purposive sampling. Data were collected through online questionnaires measuring happiness, emotion regulation, and physical activity and were analyzed using moderation regression.
Results: The findings indicated that both physical activity and emotion regulation significantly influenced students' happiness, although their contribution to the variability in happiness was relatively low (Adjusted $R^2 = 0.017$). Furthermore, emotion regulation significantly moderated the relationship between physical activity and happiness.
Discussion: These findings align with existing research, suggesting that physical activity is associated with higher happiness levels and that emotion regulation enhances well-being. However, the relatively low explanatory power suggests that other factors may also play an important role in predicting happiness among university students.
Conclusions: The ability to regulate emotions strengthened the positive effect of physical activity on happiness, highlighting the importance of developing both physical and emotional strategies to promote students' well-being.

Keywords

Lifestyle behavior; physical engagement; psychological well-being; university students.

Resumen

Introducción: La felicidad fue reconocida como un aspecto clave del bienestar psicológico para los estudiantes universitarios, aunque a menudo se veía debilitada por la presión académica y los estilos de vida sedentarios. Se consideraba que la actividad física era beneficiosa, pero su efecto dependía de la capacidad individual para regular las emociones.
Objetivo: El estudio tuvo como objetivo examinar el papel de la actividad física como predictor de la felicidad entre estudiantes universitarios indonesios y explorar el papel moderador de la regulación emocional en esta relación.
Metodología: Se empleó un enfoque cuantitativo con 706 estudiantes de pregrado de una universidad en Java Oriental, seleccionados mediante muestreo intencional. Los datos se recolectaron a través de cuestionarios en línea que medían felicidad, regulación emocional y actividad física, y se analizaron mediante regresión de moderación.
Resultados: Los hallazgos indicaron que tanto la actividad física como la regulación emocional influyeron significativamente en la felicidad de los estudiantes, aunque su contribución a la variabilidad de la felicidad fue relativamente baja (R^2 ajustado = 0.017). Además, se demostró que la regulación emocional moderaba de manera significativa la relación entre la actividad física y la felicidad.
Discusión: Estos resultados coincidieron con investigaciones previas que sugieren que la actividad física se asocia con mayores niveles de felicidad y que la regulación emocional mejora el bienestar. Sin embargo, el bajo poder explicativo relativo sugiere que otros factores también pueden desempeñar roles importantes en la predicción de la felicidad entre los estudiantes universitarios.
Conclusiones: Se concluyó que la capacidad para regular las emociones fortalecía el efecto positivo de la actividad física sobre la felicidad, destacando la importancia de desarrollar tanto estrategias físicas como emocionales para promover el bienestar estudiantil.

Palabras clave

Bienestar psicológico; comportamiento de estilo de vida; estudiantes universitarios; participación física.

Introduction

Happiness is an important factor in assessing an individual's psychological well-being. This is no exception for university students; they not only need happiness to reflect a positive emotional state but also play a role in increasing learning motivation, the quality of social relationships, comfort in life, and even academic success (Froiland et al., 2019; Y. Jiang et al., 2022). Nevertheless, students face various challenges in their education to achieve happiness. Moreover, they are at a critical age, namely, the young adult age group. A dynamic stage of development, coupled with the challenge of facing a new phase of life, becomes an obstacle to attaining happiness (Ajithkumar & L, 2024). At this critical age, they experience additional pressures in their developmental stages, such as academic demands, transitioning social roles, identity exploration, economic pressures, and future career prospects (Nikunen & Korvajärvi, 2022; Walsh et al., 2024). Students need to understand what can enhance their happiness so that they can live their lives decently and comfortably.

Physical activity is a widely studied determinant of happiness in the literature. Quality physical activity can psychologically improve mood, reduce symptoms of depression and anxiety, and increase energy consumption (de Oliveira et al., 2019; Kencana et al., 2025; Mahindru et al., 2023; Sieniawska et al., 2024; Singh et al., 2023). Individuals tend to be mentally healthier when they are regularly physically active. Physical activity triggers the release of neurotransmitters, such as endorphins and serotonin, which play a role in maintaining good emotional regulation and creating positive feelings (Chen & Nakagawa, 2023; Sieniawska et al., 2024). Additionally, physical activity can increase feelings of achievement, self-control, and self-confidence, which contribute to happiness (Nikolaev et al., 2024; Potoczny et al., 2024, 2025). Thus, physical activity is not only a health necessity but also an important foundation for supporting the comprehensive development of individuals.

Given the importance of a healthy lifestyle involving consistent physical activity, this is necessary for university students. However, a sedentary lifestyle is prevalent among Indonesian students. According to a survey by the Ministry of Youth and Sports of the Republic of Indonesia, only 5.04% of individuals aged 16-30 fall into the “good” category for physical fitness, while 83.53% fall into the “poor” category (Mutohir et al., 2023). This certainly does not align with the standards that a country must meet to achieve both physical and mental health. The WHO recommends that young people engage in at least 150 min of moderate-intensity physical activity weekly (World Health Organization, 2020). Low levels of physical activity have become a serious challenge, especially considering the high rates of mild-to-moderate mental health disorders among university students, including stress, anxiety, and academic burnout (Ghrouz et al., 2019; Sasongko et al., 2025; Wu et al., 2015).

Although physical activity is known to positively affect happiness, not all individuals experience the same psychological benefits. These differences can be influenced by an individual’s ability to manage their emotions (Bernstein & McNally, 2018). According to the concept of emotion regulation, individuals have a certain level of control that allows them to better understand, manage, and adjust their emotional reactions to become more adaptive in various situations (Gross, 2015). Individuals with good emotion regulation skills tend to interpret physically exhausting or challenging experiences more positively, thereby strengthening the impact of physical activity on their happiness (Martinez et al., 2024; Mu et al., 2024). Thus, emotion regulation is needed as a supporting factor to achieve happiness from physical activity.

Specifically, several previous studies have discussed regulation and physical activity in different contexts. Other studies have shown that affect regulation is related to physical activity and psychological well-being, with affect regulation serving as a perceived sense of control during physical activity that determines the psychological outcomes obtained (Sudeck et al., 2018). In the context of university students, emotion regulation has also been shown to be associated with life satisfaction and subjective well-being, in which emotion regulation varies for each individual depending on the dimensions of emotion regulation (Poria et al., 2021; Extremera et al., 2020).

In addition to emotion regulation, gender factors also have the potential to influence the relationship between physical activity and happiness. Among males and females, there are often differences in patterns of physical activity, emotion regulation strategies, and perceptions of happiness (Delhom et al., 2021; W. Jiang et al., 2021; Wandik et al., 2024). Men tend to be more engaged in high-intensity physical

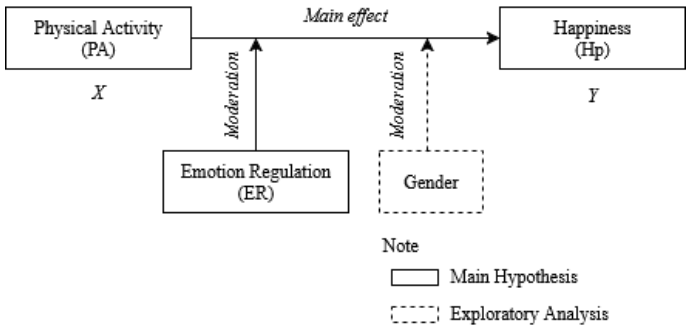
activities, whereas women more often participate in physical activities as part of social and recreational events (W. Jiang et al., 2021). This difference may affect the variations in the psychological benefits each gender receives, including their level of happiness (Wandik et al., 2024). Therefore, although this study primarily focused on the role of emotion regulation as a moderator, additional analyses were conducted to examine whether gender moderates the relationship between physical activity and happiness. This is expected to provide a deeper understanding of the dynamics of happiness among undergraduate students in the future.

Nevertheless, research on the moderating role of emotion regulation in the relationship between physical activity and happiness is limited, particularly in Indonesia. Most previous studies have focused on the direct relationship between physical activity and well-being or the influence of emotion regulation on well-being without exploring the interaction between the two. In addition, most research has been conducted in Western countries with different cultural contexts and educational systems. Collectivist cultures, such as Indonesia, can influence how individuals understand happiness and express emotions (Soemantri et al., 2021), making a contextual approach necessary to understand the psychological dynamics of Indonesian students regarding their physical activity.

Therefore, this study aimed to address this gap by examining the role of physical activity as a predictor of happiness among Indonesian university students and exploring whether emotion regulation moderates this relationship. The findings of this study are expected to provide empirical contributions to the development of interventions for improving student well-being, either through physical activity promotion or emotion regulation training.

This study examined three variables: variable X is Physical Activity (PA), variable Y is the Happiness (Hp), and the moderating variable is Emotion Regulation (ER). All variables were tested using a model that examined physical activity directly in relation to happiness. In subsequent tests, emotion regulation was added as a moderator variable. Hypothesis 1 (H1) stated that physical activity affects happiness, whereas Hypothesis 2 (H2) stated that emotion regulation moderates the relationship between physical activity and happiness. In addition, as an additional exploratory analysis, a moderation test was conducted on gender to obtain deeper insights related to this research. Gender was not included in the main hypothesis, but was tested separately to observe whether it also acts as a moderator variable in the relationship between physical activity and happiness. This model was applied to observe both direct and moderating effects, and the concept is illustrated in figure 1.

Figure 1. Research Model



Method

This research is quantitative and non-experimental because it uses data obtained from questionnaires with a correlational design. Furthermore, the data were analyzed using Simple Moderation Regression to evaluate the effect of physical activity on happiness and moderate this variable with emotion regulation. This design was chosen to identify and analyze the extent to which physical activity can predict happiness and how individuals' ability to regulate emotions can strengthen or weaken this effect.

Participants

A total of 706 respondents were recruited, and data were collected from a university in East Java with a diverse student population. Participants were selected using purposive sampling, which aligned the samples with the research objectives. The distribution of gender is presented in Table 1.

Table 1. Distribution of Gender

Gender	Total	Percen
Man	111	16%
Woman	595	84%
Total	706	100%

Procedure

Data were collected using an online questionnaire that was widely distributed among university students through social media and academic networks. The selected participant criteria were active undergraduate students at a university from various regions in Indonesia, as well as those who were willing to voluntarily participate in this study. The purposive sampling technique was then used, considering that the collected data matched the required respondent characteristics and were aligned with the research objectives of this study. All research procedures were conducted in accordance with ethical principles, including providing participants with information about the study aims, maintaining data confidentiality, and obtaining voluntary consent to participate in the study.

Instrument

Oxford Happiness Questionnaire

Several measurement tools were used in this study. For happiness, this study adapted the Oxford Happiness Questionnaire developed by Barattucci et al. (2023). This instrument consists of eight items adapted using a Likert scale with five response options ranging from strongly disagree to strongly agree. The reliability test results yielded a score of 0.748, indicating that the data were reliable for further analyses.

Emotion Regulation Questionnaire for Indonesian Sport Setting (IERQ4S)

The Emotion Regulation Questionnaire for Indonesian Sports Setting (IERQ4S) was used to test emotion regulation (Jannah et al., 2023). This instrument contains 10 items using a Likert scale with five response options, ranging from strongly disagree to strongly agree. The reliability test results showed a score of 0.732, indicating that the data were reliable for further analysis.

International Physical Activity Questionnaire (IPAQ)

This study used the International Physical Activity Questionnaire (IPAQ), which has been internationally tested for validity and reliability. This study also referred to the minimum physical activity guidelines of the World Health Organization (WHO), specifically the recommendation of at least 150–300 min of moderate-intensity physical activity per week (Craig et al., 2003; World Health Organization, 2020). This questionnaire was designed to assess an individual's level of physical activity based on the Metabolic Equivalent of Task (MET), which is the ratio of the metabolic rate during a specific activity to the metabolic rate at rest. For moderate-intensity activities, the duration of the activity is multiplied by a value of 4 MET, whereas for high-intensity activities, it is multiplied by 8 MET (Kencana et al., 2025).

Data analysis

Data analysis in this study began with a normality test to determine whether the subsequent statistical tests were parametric or nonparametric. The normality test involved the variables of Happiness and Emotion Regulation, while Physical Activity was not included because the distribution of exercise time tended to be statistically non-normal owing to the large number of respondents who did not engage in physical activity when measured in minutes per week. The result of the normality test using skewness for Happiness was Skewness (0.060) with SE (0.092), resulting in (Z = 0.060 / 0.092 = 0.65), which means that the distribution is normal because the z-skewness value falls between -1.96 and +1.96. For Emotion Regulation, the value was (Z = -0.130 / 0.092 = -1.41), which was still within the normal range.

Next, an Interval Categorization analysis was conducted to observe the data distribution for each variable. Subsequently, to test for effects and moderation, we used Moderation Regression Analysis (MRA) to determine the effect of PA on happiness. This analysis was chosen because it is more suitable for testing the role of a moderator than ANOVA. The linear regression model allowed for testing whether emotional self-regulation and gender served as moderator variables in the relationship between physical activity and happiness. The significance test of the model is indicated by the p-value of the regression output. It should be noted that the ANOVA table appearing in the linear regression results only serves to test whether the regression model as a whole is significant; therefore, in this study, ANOVA is not used as a separate analytical technique. The data were processed using Microsoft Excel 2021 and JASP version 0.19.3.0.

Results

Based on the results of the research conducted on 706 students, the descriptions of student activities are shown in Table 2.

Table 2. Categories of Physical Activity Levels of Students

Category	Total	Percentage	Man	Total	Women	Total
Low	89	13%	9	8%	80	13%
Medium	285	40%	41	37%	244	41%
High	332	47%	61	55%	271	46%
Total	706	100%	111	100%	595	100%

The majority of the 706 student respondents had a high level of physical activity (332 students, equivalent to 47% of total respondents). Meanwhile, 285 students (40 %) were in the moderate category, and only 89 students (13 %) were classified as having a low level of physical activity. When viewed by gender, the majority of male students had a high level of physical activity, totaling 61 (55 %), followed by 41 (37 %) in the moderate category and only 9 (8 %) in the low category. Similarly, among female students, the majority were in the high physical activity category, totaling 271 respondents (46 %), followed by 244 respondents (41 %) in the moderate category, and 80 female students (13 %) in the low category.

Based on the results of the research conducted on 706 students, the happiness category results in Table 3 are as follows.

Table 3. Categories of Happiness Levels of Students

Category	Total	Percentage	Man	Total	Women	Total
Low	15	2%	5	5%	10	2%
Medium	405	57%	70	63%	335	56%
High	286	41%	36	32%	250	42%
Total	706	100%	111	100%	595	100%

The majority of students fell into the moderate happiness category, totaling 405 (57 %). Meanwhile, 286 students (41%) were in the high-happiness category, and only 15 students (2%) were in the low-happiness category. When viewed by gender, most male students had a moderate level of happiness, with 70 respondents (63 %), followed by 36 in the high category (32 %), and only five male students (5%) in the low category. Similarly, among female students, the majority were in the moderate happiness category, totaling 335 (56%), followed by 250 female students (42%) in the high and only 10 female students (2%) in the low categories.

The levels of students' emotion regulation, based on the results of a study involving 706 students, are presented in Table 4.

Table 4. Categories of Emotion Regulation Levels of Students

Category	Total	Percentage	Man	Total	Women	Total
Low	12	2%	1	1%	11	2%
Medium	389	55%	50	45%	339	57%
High	305	43%	60	54%	245	41%
Total	706	100%	111	100%	595	100%

A total of 389 students (55%) were in the moderate emotion regulation category, followed by 305 students (43%) with high emotion regulation, and only 12 students (2%) with low emotion regulation. When viewed by gender, the majority of male students had high emotion regulation levels, totaling 60 respondents (54 %), followed by the moderate category with 50 respondents (45 %), and only one male student (1%) fell into the low category. Among female students, the majority were in the moderate emotion regulation category, totaling 339 (57 %), followed by 245 (42%) in the high category, and only 11 (2%) in the low category.

To determine the influence of physical activity and emotion regulation on happiness, a multiple linear regression analysis with moderation was used. The results of this analysis are presented in Table 5.

Table 5. Direct Effect Test

Predictor Variable	Coefficient(B)	Standard Error	Beta (β)	t	p	Description
Physical Activity	0.088	0.037	0.088	2.358	0.019	Significant ($p < 0.05$)
Emotion Regulation	0.112	0.037	0.112	3.010	0.003	Significant ($p < 0.05$)

Regression analysis results indicated that both physical activity and emotion regulation significantly affected the happiness of the participants. Physical activity had a coefficient of 0.088 and a *p-value* of 0.019 ($p < 0.05$), while emotion regulation had a coefficient of 0.112 and a *p-value* of 0.003 ($p < 0.05$). This means that the higher the level of physical activity and capacity for emotion regulation, the higher is the level of happiness. These findings reinforce the importance of both variables as predictors of happiness. A model summary was then conducted, as shown in Table 6.

Table 6. Model Summary

Model	R	R^2	Adjusted R^2	RMSE
M_0	0.000	0.000	0.000	1.000
M_1	0.141	0.020	0.017	0.991

Based on Table 6, the Adjusted R^2 value in Model 1 was 0.017, indicating that the combination of physical activity and emotion regulation explained only 1.7% of the variability in happiness among participants. Although both variables were statistically significant in influencing happiness, their contributions to the overall variance in happiness were low. This suggests that factors other than those in this model play a larger role in determining an individual's happiness level. Therefore, it is important to consider other variables, such as social, economic, and psychological factors, in future research to gain a more comprehensive understanding of the determinants of happiness.

Next, to examine whether physical activity and emotion regulation simultaneously affect happiness, an *ANOVA* was conducted. Table 7 presents the results of this study.

Table 7. ANOVA test

Source	Sum of Squares	Df	Mean Square	F	p	Description
Regression	14.004	2	7.002	7.124	< .001	Significant model — there is a simultaneous effect
Residual	690.996	703	0.983			
Total	705.000	705				

As shown in Table 7, the *F value* obtained was 7.124 ($p < 0.001$), indicating that the regression model was significant. This means that physical activity and emotion regulation significantly affect happiness. This *ANOVA* test supports the conclusion that both predictors can explain part of the variance in happiness levels, although the proportion is relatively small, as indicated by the Adjusted R^2 value.

A moderated regression test was conducted to determine whether emotion regulation moderated the relationship between physical activity and emotional happiness. Table 8 presents the analysis results.

Table 8. Moderation Regression Analysis

Predictor Variable	Coefficient (B)	Standard Error	Beta (β)	t	p	Description
Physical Activity	0.393	0.082	0.393	4.781	< .001	Significant
Regulation Emotion	0.102	0.037	0.102	2.755	0.006	Significant
Physical Activity ✻ Regulation Emotion (Interaction)	0.171	0.041	0.341	4.151	< .001	Significant – Moderation Effect

Based on Table 8, the interaction between physical activity and emotion regulation had a coefficient value of 0.171 ($p < 0.001$), indicating that emotion regulation significantly moderated the relationship between physical activity and happiness. In other words, the greater an individual's ability to regulate their emotions, the stronger the influence of physical activity on their happiness level. Thus, emotion regulation acts as a moderator that strengthens the positive relationship between physical activity and improved happiness. Figures 2 and 3 illustrate the increase resulting from the moderating effect of emotion regulation.

Figure 2. Marginal effects of physical activity and happiness

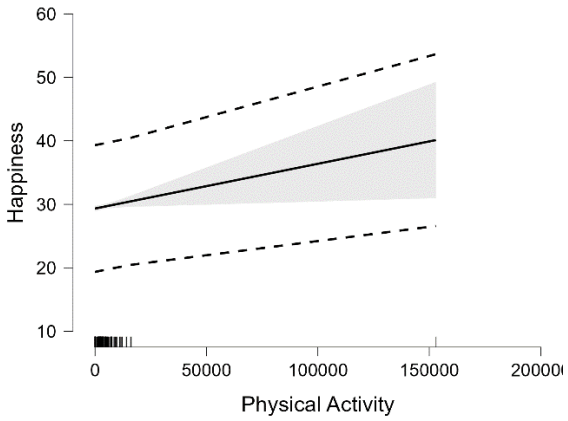
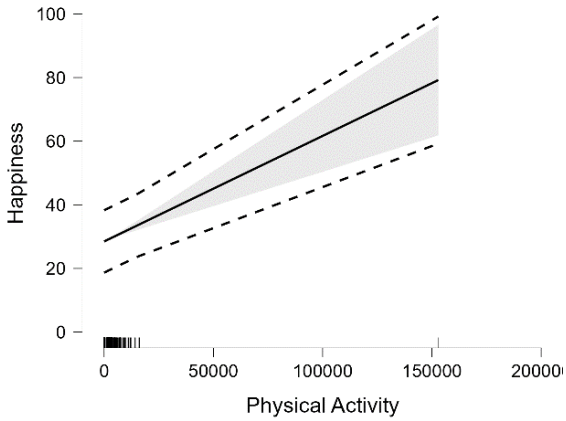


Figure 3. Marginal effects of physical activity and happiness with emotion regulation as a moderator



Based on the two images, it can be seen that physical activity is positively associated with happiness. Figure 2 illustrates that the higher the level of physical activity, the higher is the level of happiness. Although the data distribution mostly fell within the low-to-moderate levels of physical activity, the regression pattern consistently showed a positive effect. Furthermore, when emotion regulation was included as a moderating variable, the relationship between physical activity and happiness became

stronger (Figure 3). The results provide an overview of how emotion regulation strengthens the influence of physical activity on happiness among undergraduate students. These findings support the research hypothesis that physical activity contributes to happiness and that emotion regulation plays an important role in strengthening this relationship. Next, to deepen the analysis, a moderation analysis by gender was conducted (Table 9).

Table 9. Additional Moderation Test with Gender

Model	Variabel	Coefficient (B)	Standard Error	Beta *(β)*	*t*	*p*
M_0	(Intercept)	29.574	0.192	–	154.280	< .001
M_1	(Intercept)	29.378	0.209	–	140.511	< .001
	PA ✻ Gender	7.265×10^{-5}	3.146×10^{-5}	0.087	2.309	0.021

The results of the moderation test indicate that the interaction between Physical Activity and Gender has a significant effect on happiness, with a value (p = 0.021) that is less than (p = 0.05). This means that gender moderates the relationship between physical activity and happiness, although the effect is relatively small (β = 0.087). These findings suggest that the impact of physical activity on happiness differs between male and female students, with the contribution of physical activity to happiness varying between males and females.

Discussion

The results of the regression test showed that physical activity had a significant positive effect on happiness, with a coefficient value of 0.088 and a p-value of 0.019 (p < 0.05). This means that the higher the intensity of physical activity, the higher the level of happiness. These results also explain why physical activity contributes to mental health by increasing the production of endorphins, which are hormones known to boost positive feelings and relaxation, reduce stress, increase self-confidence and improve mood (Singh et al., 2023). Physical activity also helps reduce symptoms of depression and anxiety, which are often experienced by university students. High- and moderate-intensity physical activity is significantly associated with greater life satisfaction and happiness in young adults as they age(Fernández-García et al. 2025). Physical activity does not need to be performed for too long; just 10 min per week can increase happiness(Zhang & Chen, 2019). In addition to being beneficial for physical health and fitness, physical activity also has a positive emotional and social impact, especially among young adults, such as college students.

Similar to physical activity, emotion regulation significantly influenced happiness, with a coefficient of 0.112 and a p-value of 0.03 (p < 0.05). Individuals who can regulate their emotions tend to be more adaptive in facing academic or social pressures, allowing them to maintain positive feelings for longer and preventing negative effects on their mental well-being (Wang et al., 2022; Zekioğlu et al., 2024). Good emotional regulation helps individuals cope with pressure, reduce stress, and enhance happiness. Conversely, poor emotional regulation can increase the risk of psychological disorders, such as depression and anxiety. This is in line with Gross's explanation that individuals with good emotion regulation skills tend to be more resilient and have more stable emotional well-being(Gross, 2015). Emotional regulation is important because it helps maintain happiness and enhances coping with difficult situations.

The main finding of this study was that emotion regulation significantly moderated the relationship between physical activity and improved happiness. In the context of university students, these results indicate that the benefits of physical activity on happiness are not universal but are influenced by an individual's ability to regulate their emotions. Students who are active or regularly engaged in physical activity but are unable to manage their emotions tend not to experience optimal increases in happiness. Conversely, individuals with high emotion regulation are better able to interpret physical activity as a positive activity, a means of relaxation, and a way to boost self-confidence, thereby increasing happiness. This study is supported by the dual-process model in health psychology, which states that healthy behaviors, such as exercise, affect an individual's positive psychological condition if they are supported by internal factors, such as emotion regulation. Physical activity accompanied by emotional regulation skills is important as it significantly increases student happiness and improves sleep quality(Li et al.,

2025). However, if students do not manage their emotional regulation well, this can lead to increased procrastination and low engagement in physical activity, ultimately resulting in decreased well-being (Herzog-Krzywoszanska et al., 2024).

The role of gender in moderating the relationship between physical activity and happiness is also crucial to discuss to examine the depth of this research. Based on the findings of this study, physical activity contributes to happiness in both males and females; however, the moderating effect of gender is relatively small (β = 0.087). Nonetheless, these moderation results are in line with several previous studies, which state that the level of physical activity influences happiness across genders (W. Jiang et al., 2021; Campos-Uscanga et al., 2022). In practice, the way physical activity is used to achieve happiness differs between women and men. For example, men tend to prefer high-intensity physical activities, whereas women tend to favor walking (W. Jiang et al., 2021). This description is consistent with the behavior of men who enjoy group-based strenuous exercise, whereas women are more inclined toward recreational activities and leisurely walks (Feraco et al., 2024; Lombardo et al., 2024). This indicates a difference in the types of physical activities that influence happiness, based on gender. This point adds a new dimension compared to previous research, as it reinforces that the contribution of physical activity to happiness remains important for both genders, albeit with an impact level that is not completely the same.

However, the research results showed a significant relationship with an R2 value of 0.017, which means that only 1.7% of the variability in happiness can be explained by physical activity and emotion regulation. This indicates that happiness is a multidimensional construct influenced by various factors, such as social relationships, family support, resilience, and other variables. This study had several limitations that should be considered. The low R^2 value indicates that happiness is influenced by factors other than physical activity and emotion regulation, which are not explained by this model. The cross-sectional approach also limits the analysis of causality between variables.

These findings imply that student well-being programs should not focus solely on physical activities but should also emphasize the development of emotion regulation skills. Educational institutions can design integrated interventions that combine physical activity with psychological training to provide comprehensive support for students' mental health. Future research should use a longitudinal design to capture psychological changes over a certain period and expand the sample to various regions and institutions. In addition, including other psychosocial variables, such as social support, academic stress, and work-life balance, is important to gain a more comprehensive understanding of the determinants of happiness.

Conclusions

Based on the results of this study, it can be concluded that physical activity and emotion regulation play important roles in influencing students' happiness levels both directly and indirectly. Physical activity and an individual's ability to regulate emotions have been proven to contribute positively to happiness. In addition, emotion regulation significantly strengthens the relationship between physical activity and happiness, meaning that the benefits of physical activity on happiness are felt more intensely if individuals can manage their emotions. The results of the additional moderation test by gender also showed that physical activity contributes to increased happiness. Therefore, these findings can provide depth to the tests conducted to analyze physical activity as the key to happiness.

Although the analysis showed a significant effect, the contribution of these two variables to happiness was relatively small (only 1.7%); This indicates that happiness is complex and influenced by various other aspects not covered in this study, such as social relationships, family support, balance between academic and personal life, and other psychological factors.

This study implies that efforts to improve student well-being should not only focus on physical aspects, such as exercise, but also on strengthening emotion regulation skills. Therefore, intervention programs on campus can be designed in an integrated manner, combining physical activity with psychological training to provide comprehensive support for students' mental health. Further research should use a longitudinal design and consider additional factors so that the picture of student happiness can be more comprehensive and in-depth.

Acknowledgements

We would like to express our gratitude to all the parties who kindly assisted in the smooth conduct of this study.

Financing

This research was funded by the Faculty of Psychology, State University of Surabaya, under the contract B/54745/UN38.II/LK.04.00/2025.

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