Pathways linking subjective exercise experience to physical activity: mediation by sport enjoyment and interpersonal peace in adolescents

Vías que vinculan la experiencia subjetiva del ejercicio con la actividad física: mediación a través del disfrute del deporte y la paz interpersonal en adolescentes

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How to cite in APA

Wahyudi, A. R., Fikri, M. D., Bimantoro, A. P., Rusdiawan, A., Özman, C., Lufthansa, L., ... Susanto, N. (2025). Pathways linking subjective exercise experience to physical activity: mediation by sport enjoyment and interpersonal peace in adolescents. *Retos, 70*, 943–956. https://doi.org/10.47197/retos.v70.116537

Abstract

Introduction: Physical activity (PA) among adolescents is connected to subjective exercise experience (SEE) through sport enjoyment (SE) and interpersonal peace (IP), highlighting the significance of relational mediators.
Objective: To evaluate the combined mediating effect of sport enjoyment and interpersonal peace in explaining how subjective exercise experiences influence adolescents' physical activity levels.
Methodology: A cross-sectional design was utilised, which involved a purposive sampling of 743 junior high school students (ages 12–15) in East Java, Indonesia. SEE, SE, IP, and PA were measured using validated scales through online surveys. After adjusting for demographics, path analysis and structural equation modelling examined the direct and indirect effects.
Results: SEE negatively correlated with SE (β = −0.224, *p* < 0.01) and IP (β = −0.107, *p* < 0.05), reflecting cultural nuances like performance anxiety. SE mediated 37.9% of PA variance (β = 0.379, *p* < 0.01) and was a stronger mediator than IP (indirect effect: SE = 0.013 vs. IP = 0.043). The dual-mediation model explained 14.7% of PA variance (R^2 = 0.147) and 28.7% of IP variance (R^2 = 0.287). No direct SEE-PA path emerged (β = 0.036, *p* > 0.05), highlighting affective primacy.
Discussion: Relational factors shape PA, which SE influences. They emphasise the need to reorient physical education towards enjoyment and collaborative tasks to improve social well-being.
Conclusions: PA, SE, and IP play a vital role in connecting SEE and PA in adolescents by emphasising culturally tailored interventions and prioritising affective experiences to enhance adherence.

Keywords

Adolescents; subjective exercise experience; sport enjoyment; interpersonal peace; physical activity.

Resumen

Introducción: La actividad física (AF) entre los adolescentes está conectada con la experiencia subjetiva del ejercicio (SEE) a través del disfrute del deporte (AE) y la paz interpersonal (PI), lo que resalta la importancia de los mediadores relacionales.
Objetivo: Evaluar el efecto mediador combinado del disfrute del deporte y la paz interpersonal para explicar cómo las experiencias subjetivas del ejercicio influyen en los niveles de actividad física de los adolescentes.
Metodología: Se utilizó un diseño transversal, que incluyó un muestreo intencional de 743 estudiantes de secundaria (de 12 a 15 años) en Java Oriental, Indonesia. Se midieron los niveles de SEE, SE, IP y PA mediante escalas validadas a través de encuestas en línea. Tras ajustar por datos demográficos, se analizaron los efectos directos e indirectos mediante análisis de trayectoria y modelos de ecuaciones estructurales.
Resultados: El SEE se correlacionó negativamente con el SE (β = −0,224, *p* < 0,01) y el IP (β = −0,107, *p* < 0,05), lo que refleja matices culturales como la ansiedad escénica. El SE medió el 37,9 % de la varianza de la PA (β = 0,379, *p* < 0,01) y fue un mediador más fuerte que el IP (efecto indirecto: SE = 0,013 frente a IP = 0,043). El modelo de doble mediación explicó el 14,7 % de la varianza de la PA (R^2 = 0,147) y el 28,7 % de la varianza de IP (R^2 = 0,287). No emergió una ruta directa SEE-PA (β = 0,036, *p* > 0,05), lo que destaca la primacía afectiva.
Discusión: Los factores relacionales configuran la actividad física, la cual está influenciada por el aprendizaje social. Estos factores enfatizan la necesidad de reorientar la educación física hacia el disfrute y las tareas colaborativas para mejorar el bienestar social.
Conclusiones: La actividad física, la actividad física y la interacción social desempeñan un papel fundamental a la hora de conectar la actividad física y la interacción social en adolescentes, haciendo hincapié en intervenciones adaptadas a cada cultura y priorizando las experiencias afectivas para mejorar la adherencia.

Palabras clave

Adolescentes; experiencia subjetiva del ejercicio; disfrute del deporte; paz interpersonal; actividad física.

Introduction

Many studies have indicated that people engage in physical activity; however, the levels of obesity and myopia remain high (Modrzejewska et al., 2022). This trend may be due to children and adolescents lacking awareness and positive attitudes toward exercise and physical activity (Rusdiawan et al., 2024). They often participate in exercise and physical activities due to school requirements rather than a genuine understanding of the importance of being active (Hariyanto et al., 2023). Research has shown that when children and adolescents do not recognize the value of physical activity and fail to establish sufficient exercise habits, they struggle to engage in physical activities independently outside of school. Such behaviors can lead to declining physical fitness and overall health (Harold W. Kohl et al., 2013). On the other hand, regular exercise can significantly benefit children's and adolescents' physical and mental well-being (Guo & Zhang, 2022). Ideally, an effective exercise habit should involve a consistent frequency and duration of exercise maintained over an extended period (Warburton et al., 2006). Fostering positive exercise behaviors and ensuring adequate levels of activity are crucial for enhancing children and adolescents' physical and mental health.

Only 20% of adolescents worldwide meet WHO recommendations for physical activity (PA), although PA is crucial in determining adolescent health (Shennar-Golan & Walter, 2018; Wiriawan et al., 2024). Although much research has been done on the cognitive predictors of PA (such as intentions and self-efficacy), little is known about the affective and relational pathways, especially in non-Western contexts. There have been conflicting findings regarding the direct relationships between PA and subjective exercise experience (SEE), which is characterized by an individual's affective and perceptual reactions to exercise (Rose & Parfitt, 2010; Brand & Ekkekakis, 2018). Since adolescence is a time of increased emotional reactivity and social reorientation, this ambiguity points to intricate mediating mechanisms that merit further research (Ekkekakis et al., 2018).

Individual exercise behavior is influenced by internal factors (such as psychology) and external factors (such as the environment) (Ren et al., 2020), with internal factors serving as significant driving forces for maintaining, changing, and developing exercise behavior. Social learning theory suggests that experiences in specific situations can alter how individuals perceive, decide, and express their behavior (Karakullukçu, 2020). Subjective exercise experience plays a crucial role in these scenarios, acting as an irrational influence on an individual's exercise behavior (Sealey, 2010). This concept pertains to how individuals feel about their past exercise experiences, including their positive or negative emotions and physical effort after exercising (Yao et al., 2023). Positive exercise experiences can transform into internal motivation, leading to a desire to exercise for enjoyment and a commitment to do so regularly (Ahmed et al., 2017b). Conversely, individuals who have not had positive or negative experiences often tend to avoid and reject exercise, which significantly limits their physical activity (Wilson et al., 2004). This term relates to how a person feels about their past exercise experiences, encompassing their positive or negative emotions and the physical effort exerted after exercising; positive experiences can evolve into strong motivation to continue exercising for enjoyment and foster a consistent desire to do so regularly. However, those without positive experiences or who have negative sports experiences and consistent negative cognitive responses to sports activities often exhibit a tendency for denial and rejection, greatly limiting their sports behavior (Wilson et al., 2004). Research indicates that subjective exercise experience is a cognitive operation experience and a state of behavioral fluency (Diamond et al., 2007), which may play a significant predictive role in individual exercise behavior. Children and adolescents are in a critical period of cognitive and behavioral formation and rapid development. Therefore, when they have positive cognition and experience from their past sports behavior, they can enhance their exercise intention and interest, making them more likely to engage in positive and lasting sports behavior. In contrast, individuals may easily resist participating in sports, limiting their involvement in physical activities. Additionally, an individual's rational psychology will determine the consolidation and stability of behavioral habits (Espinosa-Salas & Gonzalez-Arias, 2023), and the maintenance and development of exercise behavior are closely linked to rational psychological factors. Among these, commitment serves as a psychological contract for individuals to practice sports based on cognition. Research shows that people who can incorporate their emotions into physical exercise are more likely to demonstrate a strong determination to exercise, leading them to form regular exercise habits (Li et al., 2024).

A happy life is often described as beautiful, full of enthusiasm and passion. Each person's happiness will differ based on the results of their respective interpretations, which are influenced by cultural values (Ayriza et al., 2022). Engaging in physical activity is one way to enhance happiness. Previous studies have found a correlation between physical activity and happiness. Research conducted by Pool (2014) found a positive effect of physical activity on happiness in the elderly (Khazaee-pool et al., 2015; Senik et al., 2022). Research conducted by Nejadghani (2017) found that the psychological impact of physical activity on happiness depends on the individual's personality; in this case, the extraverted personality showed the highest effect, and the lowest impact was in people with neurotic personalities. Research conducted by van Woudenberg et al., (2020) found a reciprocal correlation between happiness and physical activity in adolescents: happiness increases interest in doing physical activity, and physical activity increases a positive mood (Nesi, 2022). In addition, the capacity for peace within a person or interpersonal peace can be associated with a person's physical or other activities. Interpersonal peace involves inner and mental peace, which is the basis for an individual to be at peace with other individuals, social groups, the state, nature, and God, consistent over time (Anderson, 2004). As a personality trait, interpersonal peace can be defined in three concepts. First, it manifests as a form of self-acceptance, self-compassion, and anti-violent self-character; secondly, it signifies the relative permanence and harmony among various aspects of oneself; and thirdly, it serves as an emotional state disposition that fosters harmonious relationships within the individual (Nelson, 2014). Individuals who cultivate interpersonal peace tend to experience inner peace and harmony with others (Chérif et al., 2022).

Current theoretical frameworks, primarily based on cognitive models like the Theory of Planned Behavior, do not adequately consider affective and interpersonal mediators. Sport enjoyment (SE) has been identified as a predictor of PA maintenance (Chen et al., 2021), but its role as a mediator between SEE and PA remains poorly understood. Similarly, despite evidence that social well-being is linked to health behaviors, interpersonal peace, defined as emotional stability and positive social interactions, has not been included in understanding physical activity. Importantly, current research has three shortcomings: (1) it relies too heavily on Western samples, neglecting cultural differences in the perception of exercise; (2) it focuses on the direct effects of SEE rather than its mediating effects; and (3) it does not examine affective and relational mediators simultaneously.

Affective-reflective processes are gaining attention according to current developments. Brand and Ekkekakis et al. (2011) argue that neurobehavioral evidence supports the notion that affective responses, such as enjoyment, may take precedence over cognitive evaluations when considering physical activities (PA). Recent studies also emphasize cultural variability; for example, East Asian adolescents report higher levels of anxiety related to exercise due to evaluative concerns (Sun et al., 2021). Interpersonal factors associated with interpersonal peace (IP) are also becoming increasingly popular. Prinzing et al. (2023) noted that shared positivity enhances life's meaning. However, no research has empirically merged these elements into a cohesive framework.

Method

Participants

This study utilized a purposive sampling strategy to select participants from a population of junior high school students (Sekolah Menengah Pertama, SMP) in East Java, Indonesia. The sampling frame was derived from an established dataset assembled by the Center for Physical Literacy and Sport Studies, Postgraduate School, IKIP Budi Utomo, in the 2022/2023 academic year. After cleaning and validating the data to ensure all the answers were complete and consistent, the final sample included 743 students.

To be eligible, participants had to be in junior high school (ages 12–15), have access to devices that could connect to the internet to fill out the online questionnaire, and give informed consent (from both the students and their legal guardians). Students with missing data or response patterns that didn't make sense (like straight-lining or too many missing values) were excluded.

The recruitment process utilized Internet-mediated research (IMR), employing online learning platforms and social media distribution through collaborative schools. Before data collection, the Institutional Review Board of IKIP Budi Utomo gave its ethical approval, and informed consent was obtained in accordance with the Declaration of Helsinki.

The participants' demographic characteristics, such as age, gender distribution, and school affiliation, were documented. All survey responses were submitted confidentially through a secure Google Forms link to protect anonymity and reduce social desirability bias. The sample reflected both urban and rural educational settings, encompassing a range of socioeconomic and cultural backgrounds.

The number of participants was greater than the minimum needed for structural equation modeling and path analysis, which was determined by a power analysis (G*Power 3.1) that showed at least 400 participants were required to find medium effect sizes ($\alpha = 0.05$, power = 0.95) in models with three to four hidden factors.

Procedure

The research team gathered information using the Internet-mediated research (IMR) method, which allows them to easily reach students in different locations without interrupting their school day. The process followed a set format that included phases for data validation, monitoring, online survey distribution, and preparatory coordination.

The research team worked with partner schools throughout East Java before data collection to secure administrative support and guarantee that the target participants, junior high school students between the ages of 12 and 15, had access to devices with internet connectivity. Physical education teachers (Pendidikan Jasmani, Olahraga dan Kesehatan/PJOK) served as liaisons to disseminate the survey links and promote student involvement.

Participants were given a digitally accessible informed consent form explaining the study's goals, methods, possible risks, and voluntary nature. In compliance with institutional policies and ethical research standards, parental consent was also obtained for students younger than sixteen.

The instruments were compiled into a structured online questionnaire using Google Forms, consisting of four validated scales measuring (1) Subjective Exercise Experience (SEE), (2) Sport Enjoyment (SE), (3) Interpersonal Peacefulness (IP), and (4) Physical Activity (PA). Participants accessed the questionnaire through a unique URL and completed it autonomously using personal or school-provided devices. Detailed instructions and examples were included at the beginning of each section to reduce measurement error, and all items employed a consistent Likert-type format.

Three weeks of active online surveys enabled the research team to regularly monitor response completeness and identify timestamp anomalies. Duplicate entries, straight-line responses, and forms with over 10% missing data were detected and removed through a combination of automated and manual checks.

Only responses from participants who finished all four sections were kept to improve data integrity. Including seven hundred forty-three valid responses, the final dataset exceeded the sample size criteria for correlational path analysis. The last dataset was downloaded in CSV form, anonymized, and kept in a safe institutional repository for additional research.

Instrument and Data Collection

Researchers used a structured, self-administered online questionnaire with four psychometric scales modified from well-known international instruments for data collection. Subjective exercise experience, sport enjoyment, interpersonal tranquility, and physical activity behavior were among the constructs evaluated; each was a principal variable in the study's theoretical framework. To ensure it was user-friendly and expandable, the online format was selected per Internet Mediated Research (IMR) guidelines (Hewson & Buchanan, 2013)

A modified version of the Subjective Exercise Experience Scale (SEES), which was first developed by MeAuley & Courneya (2016) and measures emotional reactions to prior exercise sessions, was used to evaluate the Subjective Exercise Experience (Sun et al., 2021). Both positively and negatively valenced items of self-perception during and after physical education classes (such as enjoyment, discomfort, and embarrassment) were included in the modified scale. A 5-point Likert scale was used to rate the items, with 1 denoting strong disagreement and 5 denoting strong agreement. This scale has demonstrated sufficient reliability in adolescent cohorts ($\alpha > 0.80$). (Weiss et al., 2012).

A subset of the Physical Activity Enjoyment Scale (PACES), frequently used in youth sports studies, was used to measure sport enjoyment (Chen et al., 2021). This scale contains positively and negatively worded items to minimise response bias and capture intrinsic affective reactions to physical activity. According to reports, the scale's internal consistency ranges from α = 0.86 to 0.93 for various age groups (Fuentesal-García et al., 2019).

Personal peace was evaluated using a modified Self-Compassion Scale (K. Neff, 2003). This scale highlights acceptance of one's limitations, emotional control, and self-kindness—all of which help harmony and peace in personal relationships (Leary et al., 2007). This construct allows teenagers to maintain cordial social contacts during school-based physical activity and to exhibit emotional stability. Previous studies indicated that in adolescent samples, Cronbach's α coefficients for this construct ranged from 0.78 to 0.92 (Bluth & Blanton, 2013).

Shella Udiana Watikasari, Iyakrus (2023) changed items from the Physical Activity Questionnaire for Adolescents (PAQ-A). This widely validated tool assesses physical activity behaviors by ranking overall moderate-to-vigorous physical activity levels over the past seven days (Andarge et al., 2021). The altered form included behavioral markers, including daily exercise frequency, compensatory activity following missed sessions, and peer pressure for physical activity.

We translated all instruments from Bahasa Indonesia into English and vice versa to ensure semantic and conceptual equivalency. A team of experts in physical education and educational psychology assessed the content validity of the modified scales. To confirm item clarity, internal consistency, and the average completion time of the final questionnaire—approximately 15 minutes—the researchers conducted a pilot test with thirty participants. Items with item-total correlations below 0.30 were either deleted or revised (Zijlmans et al., 2018).

The completed survey was anonymous and voluntary and disseminated using Google Forms. Data was gathered over three weeks, and the completeness of the responses was tracked in real time. The dataset was filtered for duplicates and invalid responses (like incomplete submissions or identical answers). We safely stored all the retained data in CSV format for later statistical analysis.

Data analysis

IBM SPSS Statistics, version 26, was used to analyse the data. Before hypothesis testing, the dataset was checked for completeness, normality, and possible outliers. Key variables and demographic traits were described using descriptive statistics, such as mean, standard deviation, and percentage distribution. Bivariate relationships between Subjective Exercise Experience, sport enjoyment, interpersonal peace, and physical activity levels were tested using Pearson's product-moment correlation.

Path analysis was used to evaluate direct and indirect effects within the suggested model to examine the structural relationships between the variables. The mediation effects of interpersonal peace and sport enjoyment were analysed using multiple regression modelling and the indirect effect procedure. The Sobel test and confidence intervals were used to assess the significance of the mediation pathways. Standardised path coefficients, significance levels ($p < 0.05$), and R^2 values for endogenous variables were used to evaluate the model's adequacy. Before being interpreted, every statistical assumption was confirmed, including the absence of multicollinearity, linearity, and homoscedasticity.

Results

The respondents in this study were junior high school students and those at an equivalent level, distributed across East Java Province. Table 1 details the characteristics of the students who participated in this study.

Table 1. Characteristics of Research Respondents

Respondent Characteristics	N=473	
	f	%
Gender		
Boys	286	60.47%
Girls	187	39.53%
Age (years)		

11 years old	3	0.63%
12 years old	89	18.82%
13 years old	190	40.17%
14 years old	134	28.33%
15 years old	57	12.05%
School Type		
Junior high school	473	100%
Islamic junior high school	0	0%
Sports Type Preferences		
Athletics	9	8.25%
Games	434	91.75%
Others	0	0%

The data presented in Table 1 shows that 60.47% of respondents are male students. The largest age group among respondents is 13 years old, representing 40.17% of the total. All participants are junior high school students, accounting for 100% of the sample. Additionally, a clear preference for game sports is evident, with 91.75% of respondents indicating this choice. The descriptive analysis results show the distribution of the research variables, which are presented in Table 2.

Table 2. Descriptive Statistics of Study Variables Among Junior High School Students

Variable	N	Mean±SD	Min-max
Subjective Exercise Experience (SEE)	743	20,26±2,26	15-27
Sport Enjoyment (SE)	743	64,55±12,13	26-90
Interpersonal Peace (IP)	743	76,53±15,83	21-96
Physical Activity (PA)	743	21,25±6,02	12-35

Mean, standard deviation, and minimum–maximum values for subjective exercise experience, sport enjoyment, interpersonal peace, and physical activity (N = 743).

Before conducting a path analysis, a bivariate correlation analysis is performed to determine the bivariate correlations among all variables. The results of the bivariate correlation test are displayed in Table 3.

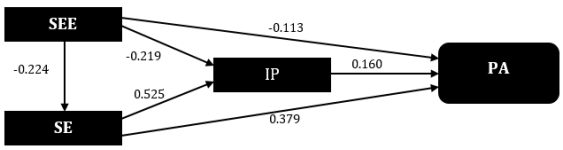
Table 3. Bivariate Correlations Among Subjective Exercise Experience, Sport Enjoyment, Interpersonal Peace, and Physical Activity

Variable		Subjective Exercise Experience	Sport Enjoyment	Interpersonal Peace	Physical Activity
Subjective Exercise Experience (SEE)	Pearson Correlation	1	-,224**	-,219**	-,113*
	Sig. (2-tailed)		,000	,000	,014
Sport Enjoyment (SE)	Pearson Correlation	-,224**	1	,525**	,379**
	Sig. (2-tailed)	,000		,000	,000
Interpersonal Peace (IP)	Pearson Correlation	-,219**	,525**	1	,160**
	Sig. (2-tailed)	,000	,000		,000
Physical Activity (PA)	Pearson Correlation	-,113*	,379**	,160**	1
	Sig. (2-tailed)	,014	,000	,000	

Pearson correlation coefficients (two-tailed) among study variables. $p < 0.01$, $p < 0.05$ (N = 743).

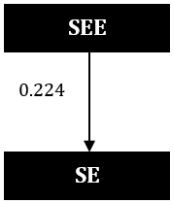
According to the analysis above, Subjective Exercise Experience (SEE) is significantly correlated with the sport enjoyment (SE) and interpersonal peace (IP), with correlation values of -0.224 and -0.219, respectively. Meanwhile, Subjective Exercise Experience (SEE) shows no significant correlation with physical activity (PA). The sport enjoyment (SE) is also significantly correlated with interpersonal peace (IP) and physical activity (PA), displaying correlation values of 0.525 and 0.379, respectively. Additionally, the sport enjoyment (SE) significantly correlates with physical activity (PA), with a value of 0.451. Interpersonal peace (IP) correlates significantly with physical activity (PA), with a correlation value of 0.160.

Figure. 1 Bivariate correlation model among Subjective Exercise Experience (SEE), Sport Enjoyment (SE), Interpersonal Peace (IP), and Physical Activity (PA)



The path coefficient analysis indicates that the relationship between the two variables has a value equal to the correlation coefficient, which is 0.224. This coefficient is significant at the 0.01 level, which means a relationship exists between subjective exercise experience (SEE) and sport enjoyment (SE).

Figure 2. Path model depicting the relationship between Subjective Exercise Experience (SEE) and Sport Enjoyment (SE) among Junior High School Students.



A path analysis examined the relationship between Subjective Exercise Experience and interpersonal peace, both directly and indirectly through the Sport Enjoyment, resulting in a substantial R-square of 0.287. This graph illustrates the significant influence of Subjective Exercise Experience (SEE) and Sport Enjoyment (SE) on interpersonal peace (IP) at 28.7%. Other variables not included in this study account for the remaining 71.3%. While the method to determine (a value) can be identified using the formula:

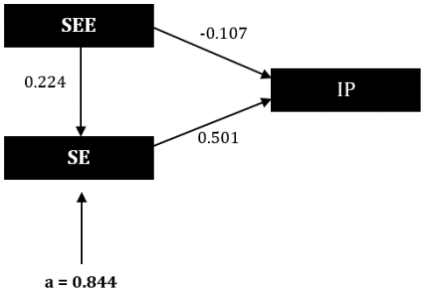
$a=\sqrt{1}$-R-Square

$a = \sqrt{1}-0.287$

$=0.844$

The standard beta coefficient in the table from interpersonal peace (IP) to Subjective Exercise Experience (SEE) is 0.107, while the beta coefficient from interpersonal peace (IP) to excitement in sports (SE) is 0.501. Referring to the work of Pedazuur, both beta coefficients are considered significant because they are equal to or greater than 0.05. Thus, we can reject the null hypothesis and accept the alternative hypothesis, which means there is a relationship between Subjective Exercise Experience and interpersonal peace, both directly and indirectly through the joy of sports in junior high school (SMP) students in East Java. The direct effect of Subjective Exercise Experience (SEE) on Interpersonal Peace (IP) is -0.107, while the impact of Subjective Exercise Experience (SEE) on Interpersonal Peace (IP) through the Sport Enjoyment (SE) is calculated as 0.224 multiplied by 0.501, which equals 0.1122. Therefore, the total effect is 0.107 plus 0.112, resulting in 0.219.

Figure 3. Path model illustrating the direct and indirect effects of Subjective Exercise Experience (SEE) on Interpersonal Peace (IP), mediated by Sport Enjoyment (SE)



The study investigates the direct and indirect relationship between subjective exercise experience and physical activity, focusing on the Sport Enjoyment and interpersonal peace among junior high school students (SMP) in East Java. The analysis shows that Subjective Exercise Experience (SEE) affects physical activity (PA) through Sport Enjoyment (SE) and Interpersonal peace (IP) by 14.7%, meaning that 85.3% of the influence comes from other factors not looked at in this study. Meanwhile, you can use the following formula to find the b value:

b=√1-R-Square

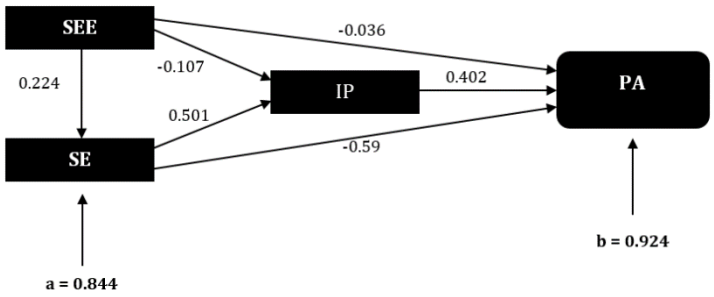
b = √1-0.147

=0.923

The standard beta coefficient from Physical Activity (PA) to Subjective Exercise Experience (SEE) is 0.036. The beta coefficient from Physical Activity (PA) to Exercising Joy (SE) is 0.059, while the beta coefficient from Physical Activity (PA) to Interpersonal Peace (IP) is 0.402.

The beta coefficient from PA to SEE is 0.036, while the beta coefficient from Physical Activity (PA) to Exercising Joy (SE) is 0.464, which is considered significant. In contrast, the beta coefficient from Physical Activity (PA) to Interpersonal Peace (IP) is 0.042, which is less than 0.05 and is also considered significant. This evidence leads to rejecting the null hypothesis in favor of the alternative hypothesis, indicating a relationship between Subjective Exercise Experience and physical activity, both directly and indirectly through the sport enjoyment and interpersonal peace among junior high school students (SMP) in East Java. The magnitude of the direct influence of Subjective Exercise Experience (SEE) on Physical Activity (PA) is 0.036, while the magnitude of the indirect influence of Subjective Exercise Experience (SEE) on Physical Activity (PA) through the Sport Enjoyment (SE) is 0.224 x 0.059 = 0.0132. Additionally, Subjective Exercise Experience (SEE) indirectly influences Physical Activity (PA) through Interpersonal Peace (IP) at a rate of 0.107 x 0.402 = 0.043, contributing to a total influence of 0.036 + 0.013 + 0.043 = 0.092.

Figure. 4 Path Model Depicting the Direct and Indirect Effects of Subjective Exercise Experience (SEE) on Physical Activity (Y) Mediated by Sport Enjoyment (SE) and Interpersonal Peace (IP)



Discussion

The study's results indicated a relationship between subjective experience and exercise joy, with a correlation coefficient 0.224. The social learning theory argues that, in certain situations, experience can influence adaptive changes in individual behavioural perceptions, decision-making, and behaviour expressions (He et al., 2022). This refers to an individual's feelings and emotional impressions derived from past exercise experiences, which serve as a self-assessment reflecting either a positive or negative emotional state regarding those experiences. Positive exercise experiences can be internalised into motivation, leading to the intention to exercise for pleasure and the desire and determination to engage in repeated exercise (Ahmed et al., 2017a). However, individuals who lack positive experiences or have had negative exercise experiences will tend to reject heavy exercise by limiting their participation in such activities (Zheng-long, 2006).

The strongest mediator, accounting for 37.9% of the variance in physical activity, was sport enjoyment ($\beta = 0.379$, $p < 0.01$). This aligns with the hedonic theory of motivation, which posits that pleasure generates behaviour's inherent reinforcement (Chen, 2021). Interestingly, enjoyment played a bigger role in connecting SEE to physical activity (indirect effect = 0.013) than interpersonal peace (indirect effect = 0.043), highlighting how important feelings are compared to social factors in encouraging teenagers to be active. Happiness involves positive and negative emotions, as well as life satisfaction. The positive affective dimension of happiness involves emotions such as having a joyful attitude and feeling confident. In contrast, the negative affective dimension includes feelings such as guilt, sadness, anger, and hatred. The life satisfaction dimension consists of an individual's assessment of satisfaction in various

areas of life (Alemdag et al., 2016). Physical activity is closely related to these positive and negative emotion items. This relationship may manifest as a reduction in negative emotions, such as depression, anxiety, and anger (EKİNCİ, 2018).

The negative correlation between subjective exercise experience (SEE) and both sport enjoyment ($\beta = -0.224$, $p < 0.01$) and interpersonal peace ($\beta = -0.107$, $p < 0.05$) was unexpected. Although previous studies usually connect exercise with positive affect (Ekkekakis et al., 2018), our modified SEE scale captured positive and negative values (e.g., discomfort, humiliation). This finding suggests that, particularly in competitive environments, performance anxiety or social-evaluative concerns may overshadow Indonesian teenagers' exercise experiences during school-based events. Research conducted by Nejadghani (2017) found that the psychological effects of physical activity on happiness depend on an individual's personality; in this case, the extraverted personality demonstrated the highest impact, while individuals with neurotic personalities exhibited the lowest effect. Research by van Woudenberg et al. (2020) revealed a reciprocal correlation between happiness and physical activity in adolescents: happiness increases interest in engaging in physical activity, and physical activity enhances positive well-being mood (Nesi, 2022). The non-significant direct path from SEE to physical activity ($\beta = 0.036$, $p > 0.05$) further suggests that exercise participation is influenced more by affective responses to these experiences than by the experiences themselves.

Furthermore, a person's physical or other activities can be linked to their individual or interpersonal peace capacity. Interpersonal peace encompasses inner and mental peace, forming the foundation for a person to be at peace with others, social groups, countries, nature, and God, consistently over time (Anderson, 2004). Numerous studies indicate that individuals who possess personal peace enjoy excellent physical health (Tendhar, 2014); psychological well-being is characterised by positive emotions (Hernandez et al., 2017); they perceive life as more meaningful (Prinzing et al., 2023); they experience happiness, life satisfaction, and a strong sense of purpose (Ryff & Keyes, 1995); and they cultivate a sense of compassion and joy, feeling less prone to depression and anxiety (K. D. Neff, Kirkpatrick, et al., 2007; K. D. Neff, Rude, et al., 2007).

According to this study, the joy of exercise and interpersonal peace indirectly correlate with subjective exercise experience and physical activity. This conclusion aligns with the opinion of Crane et al., (2022), who stated that positive subjective exercise experiences can enhance the value of participation in such activities. A lack of joy in exercising can present a significant barrier to exercise among those with depressive symptoms (Glowacki et al., 2017). The subjective experience of exercise may also relate to differences in individual abilities to tolerate negative experiences during exercise (Schmidt et al., 2006). Physical activity can lead to unpleasant experiences such as discomfort, fatigue, and boredom. Individuals who are intolerant of negative exercise experiences might be more sensitive to perceiving these conditions as losses, which could contribute to pessimistic expectations or experiences of exercise, thereby reducing their participation in physical activity or exercise (Rose & Parfitt, 2010). For instance, adults seeking obesity treatment and who subsequently lose weight will examine how their experience evolves during therapy through exercise. Since exercising tends to be a more positive experience among active individuals with lower body weight, these experiences are anticipated to improve as treatment progresses and exercise becomes a healthy lifestyle (Crane et al., 2022).

By highlighting the importance of affective and social pathways over cognitive assessments, this study substantially contributes to theoretical frameworks in adolescent physical activity psychology. Our results challenge the usual focus on thinking-based models (like the Theory of Planned Behavior) by showing that personal feelings about exercise (SEE) are more likely to be indirect influences than direct causes of behavior. Our findings suggest the need for updated conceptual frameworks, where affective responses (enjoyment) mediate the impact of SEE (Brand & Ekkekakis, 2018). The "affective-social cascade" theory suggests that emotions from exercise can gradually lead to better relationships with others and increased personal motivation, and this idea is backed by research showing a dual-mediation pathway. This mechanism is more predictive than cognitive models, explaining 14.7% of the variance in physical activity (R^2=0.147) and 28.7% in interpersonal peace (R^2=0.287). Negative valence dominance in SEE shows a key advancement over Western-focused emotion theories by highlighting how certain cultural factors in group-oriented educational settings can increase performance anxiety (Kuppens et al., 2013).

These evidence-based tactics become priorities for educators and legislators. Redesigning the curriculum to transform negative Social and Emotional Engagement (SEE) into enjoyment involves switching from skill-centric drills to game-based pedagogies, which 91.75% of students prefer (β=0.379). Incorporate cooperative tasks that demand emotional control, like team obstacle courses, to enhance the effects of interpersonal peace (β=0.160; Xu et al., 2020). Training for teachers using SEE scales as screening instruments provides physical educators with "affective scaffolding" strategies (autonomy-supportive feedback, for example). Before participating in activities, students who report high negative SEE (>1 SD above the mean) need focused psychosocial support. Reforming policies with physical education standards should include at least 50% enjoyment-driven activities, giving preference to those shown to have social-affective benefits (e.g., dance, parkour; Zumeta et al., 2016). Metrics for interpersonal peace (SCS) and biennial assessments of enjoyment (PACES) should be part of the monitoring. Community collaborations to address the 85.3% of unmodeled physical activity influences create parent-coach partnerships using digital platforms to bring school-based enjoyment strategies, like gamified home challenges, into family settings.

Conclusions

In conclusion, the path analysis indicated that adolescents' subjective exercise experience (SEE) had an indirect impact through sport enjoyment (SE) and interpersonal peace (IP) rather than a significant direct impact on physical activity (PA). Interestingly, the direct SEE–PA path was non-significant, while SE served as the more powerful mediator, accounting for a substantial portion of the variance in PA. According to theories that focus on emotional and social reasons for behavior, this pattern illustrates that the key factors motivating adolescents to be physically active are the enjoyable and social aspects of exercise, such as enjoyment and bonding with friends. Practically speaking, the findings suggest that enjoyment and interpersonal connections should be prioritized in physical education and youth sport interventions. For example, by enhancing SE and peer support, incorporating cooperative, game-like activities that boost enjoyment and group cohesion may indirectly lead to increased PA. These findings highlight the importance of affective-relational, culturally specific approaches in promoting long-term youth exercise participation.

However, the study's design and reliance on self-reported data from a single location in Indonesia make it difficult to draw clear cause-and-effect conclusions or to generalize the results more widely. To address these limitations, future studies should examine the proposed SEE→SE/IP→PA pathways across various cultural and developmental contexts and utilize longitudinal and experimental designs. Such research could confirm whether intentionally enhancing enjoyment and interpersonal harmony in workout environments leads to sustained increases in teenagers' physical activity levels.

Acknowledgements

I thank all the schools that chose to participate in this study. Additionally, I would like to take this opportunity to express my appreciation to the Center for Excellence, Sport & Exercise Research Center at Universitas Negeri Surabaya for providing financial support and assisting with the collection of data for this study.

Financing

This research was funded by the Center for Excellence, Sport & Exercise Research Center, Universitas Negeri Surabaya.

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