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Physical Fitness and Self-Confidence: A Correlational Study on Badminton Extracurricular Students

Dayu Satria Pratama[1A-E*], Mela Suhariyanti[2B-D], Eki Aldapit[3B-D], Guntur Yulisatria[4B-D]

[1,2,3,4] Universitas Muhammadiyah Kotabumi, Lampung, Indonesia

dayusatria50@gmail.com[1*], mela.suhariyanti@umko.ac.id[2], eki.aldapit@umko.ac.id[3], guntur@umko.ac.id[4]

ABSTRACT

Adolescence is a critical developmental period in which physical growth and psychological formation, particularly self-confidence, occur simultaneously. Participation in structured sports activities is assumed to provide not only physiological benefits but also psychosocial advantages. This study aimed to analyze the relationship between physical fitness and self-confidence among students participating in badminton extracurricular activities. A quantitative approach with a correlational design was employed. The sample consisted of 76 junior and senior high school students in North Lampung selected using total sampling. Physical fitness was assessed through a standardized test battery covering flexibility, speed, muscular strength, agility, and aerobic endurance. Self-confidence was measured using the Rosenberg Self-Esteem Scale (RSES), comprising 10 items on a 4-point Likert scale. Data were analyzed using descriptive statistics, Pearson Product Moment correlation, and the coefficient of determination. The results showed that students' physical fitness levels were predominantly in the moderate category (36.8%), followed by good (27.6%) and very good (11.8%). The mean self-confidence score was 29.84 (SD = 4.12), indicating a moderate-to-high level. Correlation analysis revealed a positive and significant relationship between physical fitness and self-confidence ($r = 0.472$; $p < 0.05$), with a coefficient of determination of 22.2%. These findings indicate that better physical fitness is associated with higher self-confidence. It can be concluded that badminton extracurricular programs contribute not only to students' physical development but also to strengthening psychological aspects. Therefore, extracurricular training should be designed holistically to support adolescent development.

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INTRODUCTION

Adolescence represents a critical developmental period characterized by identity exploration, emotional fluctuation, and the consolidation of self-confidence as a core psychological construct (Ramadhan et al., 2024). During this transitional stage, students encounter academic pressure, peer comparison, and evolving social roles that shape their self-perception and belief in personal competence (Y. Zhang & Qin, 2023). Empirical findings

indicate that low self-confidence in adolescents is associated with decreased classroom participation, avoidance of leadership roles, and vulnerability to anxiety and stress (X. Zhang & You, 2025). Within school settings, self-confidence becomes not only a personal attribute but also a determinant of academic engagement and social adaptation. Educational institutions have implemented various character development programs to strengthen students' confidence. Most interventions, however, emphasize cognitive and social approaches. Cognitive Behavioral Therapy (CBT) and Rational Emotive Behavior Therapy (REBT) have proven effective in restructuring maladaptive thought patterns and improving self-belief (Hasanah et al., 2025). Similarly, critical thinking development and decision-making training contribute to enhanced self-competence in academic and sports contexts (Steffen, 2013). Socially oriented strategies such as peer mentoring and group counseling foster supportive environments that positively influence self-concept (Stankov et al., 2017). While these approaches are beneficial, they predominantly frame self-confidence as a cognitive–social construct, potentially underestimating the embodied and experiential dimensions of adolescent development. In contrast, physical experiences through structured sports participation may provide mastery experiences, social recognition, and physiological adaptation that strengthen self-confidence. However, empirical exploration of this physical–psychological linkage within school-based extracurricular contexts remains limited. Although sports are widely recognized as tools for character building, the extent to which objective physical fitness indicators correlate with general self-confidence among non-elite adolescent participants requires deeper investigation. This issue becomes increasingly relevant considering the growing concerns about sedentary lifestyles and declining youth fitness levels globally (López, 2024; Muniyappa, 2024). Therefore, examining physical fitness not merely as a performance variable but as a psychosocial development factor constitutes an urgent academic inquiry.

Recent empirical studies demonstrate consistent associations between physical activity, physical fitness, and psychological well-being in adolescents. A meta-analytic review by Cadenas-Sanchez et al. (2021) reported a pooled correlation of 0.206 between physical fitness and mental health indicators, suggesting a modest but significant relationship. Cardiorespiratory fitness and muscular strength, in particular, have been linked to higher levels of self-esteem and emotional stability (Bou-Sospedra et al., 2021). These findings align with Self-Determination Theory, which posits that competence experiences derived from physical mastery contribute to intrinsic motivation and positive self-perception. Furthermore, longitudinal studies reveal that adolescents who maintain higher physical fitness levels demonstrate better emotional regulation and resilience (Liu et al., 2024). Enjoyment in sports participation has also been identified as a mediator between physical engagement and sustained confidence development (Fernandez Lifante, 2016). From a neurophysiological perspective, regular physical training enhances endorphin production and reduces cortisol levels, contributing to improved mood and psychological stability (Reyna, 2025). In sports science literature, the relationship between physical fitness and performance outcomes is well established (Dharani et al., 2020; Hidayat et al., 2022; Umar & Fadillah, 2019). However, most studies focus on elite or competitive athletes,

emphasizing technical achievement rather than psychosocial growth. Within badminton contexts, research often centers on agility, reaction time, and anaerobic endurance as determinants of match success, yet rarely connects these fitness components with broader self-confidence constructs in school-aged participants. Emerging interdisciplinary perspectives advocate for integrative models linking physical competence with psychosocial adaptation. López (2024) and Muniyappa (2024) emphasize that structured sports engagement may serve as a protective factor against mental health decline among adolescents. Nevertheless, empirical studies explicitly measuring objective physical fitness indicators such as VO_2max, muscular endurance, flexibility, and agility and correlating them with validated self-confidence scales within school extracurricular programs remain scarce. This limitation highlights the need for context-specific research bridging sports science and educational psychology.

Despite accumulating evidence supporting the positive relationship between physical activity and psychological well-being, several conceptual and methodological gaps persist. First, much of the existing literature examines physical activity frequency rather than objective physical fitness levels. Physical activity represents behavioral engagement, whereas physical fitness reflects physiological adaptation and capacity. These constructs are related but distinct. Few studies operationalize fitness using standardized testing protocols and directly correlate the results with validated measures of general self-confidence among adolescents in school contexts. Second, previous research predominantly focuses on competitive or elite athletes (Liu et al., 2024; Reyna, 2025), limiting generalizability to ordinary students participating in extracurricular sports. School-based extracurricular programs differ significantly from elite training environments in terms of intensity, goals, and motivational climate. Therefore, extrapolating findings from athlete populations may not accurately represent psychosocial outcomes in educational settings. Third, studies often concentrate on sport-specific confidence (e.g., sport self-efficacy) rather than general self-confidence applicable to academic and social domains. This distinction is critical because general self-confidence influences broader life competencies beyond sports performance. The absence of research linking badminton extracurricular fitness levels with general self-confidence in adolescents constitutes a clear empirical gap. Fourth, within the Indonesian educational context, empirical publications examining physical fitness as a psychosocial development predictor remain limited in SINTA-indexed journals. Strengthening locally grounded evidence is essential for contextual relevance and policy development in school-based physical education programs. Collectively, these gaps underscore the need for correlational research that integrates objective physical fitness assessment with validated psychological measurement among school students engaged in structured extracurricular sports activities.

Based on the identified theoretical and empirical gaps, this study aims to analyze the relationship between physical fitness levels and general self-confidence among students participating in badminton extracurricular activities within a formal school setting. Specifically, the research investigates whether higher levels of cardiorespiratory endurance, muscular strength, agility, and flexibility are positively associated with stronger

self-confidence profiles. The novelty of this research lies in four principal contributions: (1) Integrative Conceptual Framework, This study positions physical fitness as both a physiological indicator and a psychosocial development factor, bridging sports science and educational psychology within an extracurricular school context; (2) Objective Measurement Approach, Unlike studies relying solely on self-reported physical activity, this research employs standardized physical fitness testing to obtain objective data, enhancing methodological rigor; (3) Non-Competitive Educational Focus, By examining students engaged in badminton extracurricular programs rather than elite athletes, the study expands generalizability to broader adolescent populations; and (4) Contextual Contribution to SINTA Literature, The findings are expected to enrich national academic discourse by providing empirical evidence relevant to Indonesian school environments, supporting evidence-based development of extracurricular sports programs. In theoretical terms, this study reinforces the competence–confidence linkage proposed in motivational and developmental frameworks. In practical terms, the results may inform educators and coaches that improving students' physical fitness can simultaneously contribute to strengthening psychological resilience and self-confidence. If a significant correlation is confirmed, extracurricular badminton programs may be strategically optimized not only to enhance physical capacity but also to foster holistic adolescent development. Ultimately, understanding the relationship between physical fitness and self-confidence contributes to a more comprehensive educational paradigm one that recognizes the body and mind as integrated systems in adolescent growth.

METHODS

This study used a quantitative approach with a correlational design to analyze the direction and strength of the relationship between physical fitness levels and self-confidence in students participating in extracurricular badminton activities (Iting et al., 2024; Creswell & Creswell, 2018). A correlational design was chosen because it allows for the identification of associations between variables without treatment manipulation, in accordance with the principles of contemporary educational psychology and sport science research (Hair et al., 2019). The study population was junior high and high school students participating in extracurricular badminton activities in Kotabumi. The sampling technique used purposive sampling with the following criteria: (1) active participation in training for at least 6 months to ensure physiological adaptation (Lloyd et al., 2016; Granacher et al., 2019), and (2) willingness to participate. The sample size was 116 students (46 males and 30 females), meeting the minimum recommendation for correlation analysis with a statistical power of 0.80 at a significance level of 0.05 (Faul et al., 2019).

Physical Fitness Instruments

Fitness was measured using a physical fitness test battery that included flexibility (sit-and-reach), speed (30-meter dash), muscular strength and endurance (push-ups, sit-ups, wall sits), agility (side step test), and cardiorespiratory endurance (beep test). These

components represent the main dimensions of adolescent physical fitness as recommended in international literature (Ortega et al., 2018; Tomkinson et al., 2017).

The content and construct validity of school fitness tests have been reported to be high in various Asian and European studies (Cadenas-Sanchez et al., 2021; Nurhidayah, 2024). Cardiorespiratory endurance, measured through the beep test, has a strong correlation with VO_2max ($r > 0.80$) in adolescent populations (Lang et al., 2018). The reliability of the muscle strength and agility tests also demonstrated an ICC coefficient of > 0.85 (Granacher et al., 2019). All measurements were conducted following a standardized protocol to ensure data consistency and accuracy.

Self-Confidence Instrument

Self-confidence was measured using the Rosenberg Self-Esteem Scale (RSES), a global self-evaluation instrument widely used in adolescent populations (Schmitt & Allik, 2019). The Indonesian adaptation has undergone confirmatory factor validity testing with a stable unidimensional model (Alwi & Razak, 2022). Internal reliability demonstrated a Cronbach's alpha of 0.82–0.88 in various studies of Indonesian adolescents (Putra et al., 2023). The total score was obtained by summing all items after reverse scoring the negative items, so higher scores indicate stronger levels of self-confidence.

Table 1.

Measurement Instruments and Indicators

Variable	Instrument	Components	Validity & Reliability	Source (last 10 years)
Physical Fitness	Fitness Test Battery	Flexibility, Speed, Strength, Agility, Endurance	ICC > 0.85; VO_2max correlation r > 0.80	Ortega et al., 2018; Lang et al., 2018; Cadenas-Sanchez et al., 2021
Self-Confidence	RSES (Indonesia)	Global Self-Evaluation	Alpha 0.82–0.88; unidimensional model	Alwi & Razak, 2022; Schmitt & Allik, 2019

Research Procedures

The study began with an explanation of the objectives and procedures to respondents and informed consent was obtained in accordance with ethical principles of educational research (American Educational Research Association, 2018). Fitness measurements were first conducted in a structured session supervised by the researcher and a trainer. Afterward, respondents completed a self-confidence questionnaire independently with assistance to ensure understanding of the items.

Data Analysis

Data were analyzed using descriptive and inferential statistics. Normality tests were performed using the Shapiro–Wilk test to ensure data distribution (Ghasemi & Zahediasl, 2019). The relationship between physical fitness and self-confidence was analyzed using the Pearson Product Moment test at a significance level of 0.05 (Field, 2018). The magnitude of the relationship was interpreted based on Cohen's (2013) criteria: small (r=0.10), moderate (r=0.30), and strong (r≥0.50). The analysis was conducted using the latest statistical software to ensure computational accuracy.

Dayu Satria Pratama[1A-E*], Mela Suhariyanti[2B-D], Eki Aldapit[3B-D], Guntur Yulisatria[4B-D]
dayusatria50@gmail.com[1*]

RESULTS AND DISCUSSION

Result

This study involved 76 students participating in extracurricular badminton (46 males; 30 females). Descriptive analysis was used to describe the distribution of physical fitness and self-confidence categories, and Pearson correlation tests were used to examine the relationships between variables. This approach aligns with recommendations for quantitative analysis in adolescent sport psychology research (Field, 2018; Hair et al., 2019).

Description of Physical Fitness Components

Table 2.
Distribution of Categories for Each Physical Fitness Component (N = 76)

Component	VG	G	M	P	VP	Dominant Category
Flexibility	10 (13,2%)	22 (28,9%)	28 (36,8%)	12 (15,8%)	4 (5,3%)	Medium
Speed	12 (15,8%)	24 (31,6%)	25 (32,9%)	10 (13,2%)	5 (6,6%)	Medium
Muscle Strength	11 (14,5%)	26 (34,2%)	23 (30,3%)	12 (15,8%)	4 (5,3%)	Good
Agility	8 (10,5%)	18 (23,7%)	24 (31,6%)	18 (23,7%)	8 (10,5%)	Medium
Aerobic Endurance	6 (7,9%)	15 (19,7%)	23 (30,3%)	20 (26,3%)	12 (15,8%)	Medium

The majority of fitness components fall into the medium category. This finding is consistent with global reports that school-aged adolescents' fitness tends to be moderate due to fluctuating physical activity patterns (Tomkinson et al., 2017; Ortega et al., 2018). Muscular strength showed relatively better performance (predominantly in the "good" category), supporting the findings of Granacher et al. (2019) that repetitive racquet-based training can improve functional strength in adolescents. Conversely, aerobic endurance and agility had a higher proportion of "poor" categories. This aligns with a study by Cadenas-Sanchez et al. (2021), which found that cardiorespiratory capacity is the component most susceptible to decline in non-athletic school populations. This situation suggests the need for structured endurance training interventions in extracurricular programs.

Overall Physical Fitness

Table 3.
Distribution of Total Physical Fitness Scores

Category	Frequency	Percentage (%)
Very Good	9	11,8
Good	21	27,6
Medium	28	36,8
Poor	13	17,1
Very Poor	5	6,6
Total	**76**	**100**

A total of 64.4% of students were in the medium-good category, indicating sufficient physical capacity to support exercise activities. According to López (2024) and Muniyappa (2024), a moderate level of fitness is sufficient to provide psychological benefits, although increasing to the "good" category will have a more significant mental impact.

Student Self-Confidence

Table 4.
Distribution of Self-Confidence (RSES)

Category	Score Range	Frequency	Percentage (%)
Very Good	35–40	9	11,8
Good	29–34	23	30,3
Medium	23–28	28	36,8
Poor	17–22	12	15,8
Very Poor	10–16	4	5,3
Total		**76**	**100**

The average self-confidence score was 29.84 (SD = 4.12), falling within the moderate-high category. This finding aligns with research by Bou-Sospedra et al. (2021), which found that physically active adolescents tend to have higher self-esteem than less active adolescents. The predominance of the moderate and good categories (67.1%) indicates that participation in badminton extracurricular activities has the potential to strengthen perceptions of self-competence through successful experiences and social support (Liu et al., 2024; Reyna, 2025).

Correlation Test of Physical Fitness and Self-Confidence

Table 5.
Pearson Correlation Test Results

Variable	r	Sig. (p)	N
Physical Fitness × Self-Confidence	0,472	0,000	76

The results showed a positive and significant correlation ($r = 0.472$; $p < 0.05$). Based on Cohen's (2013) criteria, this value falls into the moderate correlation category. The coefficient of determination ($r^2 = 0.222$) indicates that physical fitness explains 22.2% of the variation in self-confidence. This finding supports the meta-analysis by Cadenas-Sanchez et al. (2021), which reported a significant relationship between fitness and mental health in adolescents. However, 77.8% of the variation in self-confidence is influenced by other factors such as social support (Stankov et al., 2017), competitive experience (Liu et al., 2024), intrinsic motivation (Ryan & Deci, 2020), and family environment (Zhang & Qin, 2023). Conceptually, these results support the Self-Determination Theory, which states that experiences of physical competence contribute to the formation of self-confidence (Ryan & Deci, 2020). Empirically, these findings confirm that physical fitness in the context of school extracurricular activities is not only an indicator of physical performance, but also a relevant psychosocial factor in adolescent development.

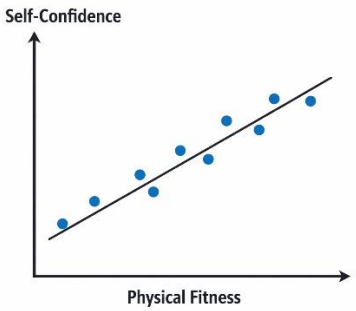

Figure 1.
Visual Variable Relationship

Dayu Satria Pratama[1A-E*], Mela Suhariyanti[2B-D], Eki Aldapit[3B-D], Guntur Yulisatria[4B-D]
dayusatria50@gmail.com[1*]

The diagram shows a positive trend: the higher the physical fitness, the higher the self-confidence. Overall, students participating in extracurricular badminton activities had moderate-good fitness and self-confidence levels. The relationship between the two was significant and at a moderate level. This confirms that improving physical fitness has the potential to significantly contribute to strengthening students' self-confidence in the context of formal education.

Discussion

This study yielded two key findings that enrich the study of sports psychology and school-based physical education. First, extracurricular badminton activities have been shown to contribute to the development of physical fitness in adolescent students. Second, this increase in fitness has a positive and significant relationship with student self-confidence. These two findings emphasize the position of school sports as not merely an additional activity, but rather a vehicle for simultaneously developing physical and psychological capacity.

Badminton Extracurricular Activities and Physical Fitness Development

The dominance of the "moderate to good" fitness category indicates that active involvement in badminton training provides significant physiological stimulation. During adolescence, rapid development occurs in the neuromuscular, hormonal, and cardiorespiratory systems (Simanjuntak et al., 2024). The literature shows that structured racquet-based training can improve muscle strength, coordination, and aerobic capacity (Granacher et al., 2019; Lloyd et al., 2016). These findings align with Ortega et al. (2018), who emphasized that adolescent physical fitness is significantly influenced by involvement in programmed physical activity. In fact, Tomkinson et al. (2017) reported that students actively involved in school sports demonstrated better fitness profiles than sedentary groups. In the context of extracurricular badminton, training patterns involving repetitive movements such as lunges, short sprints, and rapid changes of direction contributed to increased agility and explosive strength (Prasetyo & Djawa, 2021; Prayitno & Winarno, 2021). Although most students were still in the moderate category, these achievements remain significant considering the study population was not competitive athletes. López (2024) and Muniyappa (2024) emphasized that moderate fitness levels in adolescents are sufficient to provide physiological and psychological benefits, particularly in preventing mental health decline. Conceptually, these results support the youth physical development model, which posits that systematic exercise stimulation during adolescence results in long-term positive adaptations (Lloyd et al., 2016). Thus, badminton extracurricular activities can be viewed as a preventative intervention to address the decline in adolescent fitness, which has been reported globally to be experiencing a stagnant or even declining trend (Cadenas-Sanchez et al., 2021).

Relationship between Physical Fitness and Self-Confidence

The second finding showed a significant positive correlation between physical fitness and self-confidence ($r = 0.472$; $r^2 = 22.2\%$). This result is consistent with the meta-

analysis by Cadenas-Sanchez et al. (2021), which found a significant relationship between fitness and mental health indicators in adolescents. Theoretically, this relationship can be explained through Self-Determination Theory (Ryan & Deci, 2020), which positions the experience of competence as a basic psychological need. When students successfully improve their endurance, strength, or agility, they experience a mastery experience that reinforces positive self-evaluations. Benitez-Sillero et al. (2024) showed that increased physical fitness is directly associated with increased self-esteem in school-going adolescents. Ruiz-Montero et al. (2020) also confirmed that successfully completing physical challenges increases perceptions of self-competence. In badminton, successfully executing a powerful smash, surviving a long rally, or winning an internal match can strengthen students' self-confidence. Liu et al. (2024) found that positive physical performance experiences correlated with improved emotional regulation and resilience in adolescents. Neuropsychologically, physical activity increases the release of endorphins and serotonin, which contribute to positive mood and improved self-perception (Reyna, 2025). Thus, improved fitness impacts not only the body but also an individual's psychological structure.

Contribution of Fitness and Other Psychosocial Factors

Although fitness contributes 22.2% to self-confidence, this figure demonstrates that the formation of self-confidence is multidimensional. Van Zanden et al. (2015) and Milfayetty (2018) emphasize that self-confidence is influenced by the interaction of physical, social, and psychological factors. Coach support plays a crucial role. Armstrong-Carter et al. (2019) showed that a positive relationship between coach and athlete increases feelings of competence and psychological safety. Shukla & Srivastava (2025) added that a supportive motivational climate strengthens adolescents' self-belief. Furthermore, group dynamics and experiences of collective success are also influential. Hassan & bin Surat (2024) found that participation in a sports team increases a sense of belonging, which impacts positive self-evaluations. Therefore, extracurricular badminton activities provide a space for both social and physical learning.

Theoretical and Practical Implications

Theoretically, this study broadens the understanding that physical fitness is not merely an indicator of physical performance, but also a determinant of adolescent psychological development. These findings support an integrative approach between sports science and educational psychology (Bou-Sospedra et al., 2021; Ryan & Deci, 2020). Practically, schools need to optimize extracurricular programs with a periodized training approach that balances aerobic, strength, and agility components (Granacher et al., 2019). A structured program not only improves fitness but also strengthens students' self-confidence. Furthermore, coaches need to instill character-based coaching strategies, including providing positive feedback, rewarding effort, and creating a psychologically safe training environment (Armstrong-Carter et al., 2019).

Overall Synthesis

Overall, the results of this study confirm that extracurricular badminton has strategic value in adolescent development. Through structured and ongoing training,

students achieve increased physical fitness, which is correlated with increased self-confidence. While fitness is not the sole determinant of self-confidence, it is an important foundation in developing a sense of self-competence. In the context of formal education, a holistic approach that integrates physical and psychological development is urgently needed to produce a generation of adolescents who are physically healthy, mentally strong, and confident in facing social and academic challenges.

CONCLUSION

This study concluded that the physical fitness level of students participating in badminton extracurricular activities was generally in the moderate (36.8%) category, followed by good (27.6%) and very good (11.8%) categories, indicating that the extracurricular program has contributed to building a foundation for adolescent fitness. The average self-confidence score of 29.84 (SD = 4.12) also fell into the moderate-high category, with 67.1% of students falling into the moderate and good categories. Correlation tests showed a positive and significant relationship between physical fitness and self-confidence ($r = 0.472$; $p < 0.05$), with a contribution of 22.2% ($r^2 = 0.222$). These findings conceptually support the notion that physical competence experiences contribute to positive self-evaluations and the development of adolescent self-confidence.

However, the correlational design does not allow for causal inferences, and the limited sample size (N = 76) limits the generalizability of the results. The use of self-report instruments also has the potential for subjective bias, and other psychosocial variables have not been comprehensively controlled. Therefore, further research is recommended to expand the sample characteristics, integrate social support and intrinsic motivation variables, and use a mixed methods approach to develop a more holistic and evidence-based extracurricular development model.

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It is hoped that the results of this research will provide conceptual and practical contributions to the development of physical education, sports psychology, and evidence-based extracurricular coaching models in the school environment, particularly in efforts to integrate physical development and character building in students in a holistic and sustainable manner.

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