



Aesthetic Enhancements to Sports Facilities and Adolescent Physical Activity: A Mediation Analysis of Motivational Mechanisms

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Abstract

Introduction: Environmental characteristics of sports facilities, including aesthetic quality, are increasingly recognized as determinants of adolescent physical activity (PA). However, the psychological mechanisms linking facility aesthetics to activity participation remain underexplored.

Objective: This study examined the effect of aesthetic enhancements to sports facilities on adolescents' PA participation, testing autonomous motivation as a mediating factor.

Methods: A cross-sectional survey was conducted with 412 adolescents aged 13–18 years from public and private secondary schools. Participants completed validated instruments assessing perceived facility aesthetics (PEAS), autonomous motivation (BREQ-3), and PA participation (PAQ-A). Structural Equation Modelling (SEM) with bootstrapping was employed to assess direct and indirect relationships.

Results: Aesthetic enhancements were positively associated with autonomous motivation ($\beta = .48, p < .001$) and PA participation ($\beta = .12, p = .027$). Autonomous motivation significantly predicted PA ($\beta = .46, p < .001$). Mediation analysis revealed a significant indirect effect of aesthetic enhancements on PA through autonomous motivation ($\beta = .22, 95\% \text{ CI}: .14-.31$), indicating partial mediation. The total effect of aesthetic enhancements on PA was $\beta = .34 (p < .001)$.

Conclusion: Adolescents' perceptions of aesthetically enhanced sports facilities positively influence their motivation and participation in PA. Improving the visual appeal of sports facilities may increase adolescents' motivation to be active, suggesting investments in facility aesthetics can promote PA.

Keywords: Adolescent Behavior, Environment Design, Motivation, Exercise, Sports Facilities

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1. Introduction

Adolescence is a critical period of life marked by rapid physical, psychological, and social development, during which habits and behaviors - such as physical activity (PA) - are established and can have long-lasting health impacts. Enhancing the aesthetic quality of sports facilities during this stage may strengthen adolescents' motivation to engage in exercise, making visually appealing environments a practical strategy to promote regular PA (1). Regular participation in PA during adolescence is widely recognized as a critical determinant of immediate and long-term health (2). Adolescents who engage in sufficient PA demonstrate improved physical fitness, healthier body composition, better mental health, and enhanced cognitive functioning (3,4). Conversely, low levels of PA contribute to rising rates of overweight, obesity, anxiety, and lifestyle-related diseases among young people (5,6). Despite extensive global and national efforts to promote PA, participation levels among adolescents have remained consistently below recommended guidelines (1,4). This persistent inactivity crisis underscores the need to investigate not

only individual-level determinants of behavior but also environmental factors that shape young people's motivation and capacity to be active.

Among the broad environmental determinants of PA, the availability, accessibility, and condition of sports facilities have been widely acknowledged as influential (7). Schools, community parks, and public sport complexes represent some of the most common settings in which adolescents are encouraged to engage in PA (8,9). However, the mere presence of facilities does not automatically translate to increased sport involvement. Recent scholarship has emphasized the importance of environmental quality - particularly aesthetic qualities - in shaping perceptions, motivation, and ultimately participation (10). Aesthetic enhancements - such as improved lighting, vibrant colors, greenery, murals, modernized courts, and visually appealing design elements - are increasingly considered essential components of youth-friendly sport spaces (11). These enhancements may not necessarily alter the structural capacity of facilities but can substantially transform the user experience, making sports spaces more inviting, enjoyable, and psychologically stimulating.



Theoretical models of PA behavior provide strong justification for examining the influence of aesthetic characteristics on adolescents' motivation. The Self-Determination Theory (SDT) posits that motivation exists along a continuum from controlled to autonomous, and that environments supporting psychological needs (autonomy, competence, and relatedness) promote more self-determined motivation (12,13). Aesthetic environments may enhance feelings of comfort, belonging, pride, and enjoyment, which contribute to intrinsic and autonomous forms of motivation (14). Moreover, the Stimulus-Organism-Response (SOR) framework suggests that environmental stimuli – such as attractive or visually appealing spaces – evoke internal psychological responses that shape behavioral outcomes (15). Within this framework, aesthetic enhancements function as stimuli that influence psychological states, which in turn determine PA behavior.

Despite growing interest in environmental aesthetics in related fields such as urban design, environmental psychology, and landscape planning, the sport science literature has been slower to integrate aesthetic qualities into its understanding of adolescent PA behavior. The majority of existing research focuses on functional features of sport facilities – such as availability, safety, surface quality, or equipment – while aesthetic dimensions are frequently overlooked or treated as peripheral (16,17). Yet, qualitative and observational studies consistently suggest that adolescents value beauty, modernity, and visually pleasing spaces, describing such environments as “cool,” “motivating,” and “comforting” (18). These sentiments highlight the need for empirical research that quantitatively examines how aesthetic enhancements may influence adolescents' PA participation through psychological mechanisms.

Furthermore, previous research on facility characteristics and sport participation often treats adolescents as passive recipients of environmental conditions (19,20). However, PA behavior is not solely a direct response to external stimuli; it is also shaped by internal motivational processes. Motivation is a complex psychological construct involving beliefs, values, emotions, and expectations about participating in PA (21). Adolescents are particularly sensitive to environmental cues because they are in a developmental stage marked by heightened responsiveness to social, emotional, and aesthetic influences (22). Therefore, integrating motivational mechanisms into environmental studies is essential for capturing a more accurate and holistic understanding of how facility enhancements shape behavior.

In addition to its theoretical contributions, investigating aesthetic enhancements has significant practical implications. Schools and community planners around the world face financial constraints that limit their ability to construct new sport facilities or undertake major infrastructure upgrades. Aesthetic improvements, however, often require relatively modest investment compared with structural renovations. If proven effective, low-cost enhancements – such as repainting courts, adding greenery, introducing street art, or improving lighting – could serve as scalable strategies for promoting PA in resource-constrained environments. By identifying which aesthetic features most strongly influence

motivation, decision-makers can prioritize investments that produce the greatest behavioral impact.

Moreover, adolescent preferences for visually appealing and socially meaningful spaces are evolving in the digital age. Young people increasingly engage with environments that are “Instagrammable,” aesthetically expressive, and socially engaging. Facilities that resonate with these aesthetic preferences may better capture adolescents' interest, enhance their sense of connectedness to the space, and promote repeated usage. Understanding the motivational pathways that link aesthetic enhancements to participation is therefore not only relevant for health promotion but also for designing youth-centered recreational environments.

Given these considerations, the present study aims to investigate the relationship between aesthetic enhancements to sports facilities and adolescent PA participation, focusing specifically on the mediating role of motivational mechanisms. This research contributes to the field of PA and health by integrating environmental aesthetics with well-established motivational theories and employing advanced mediation analysis. The findings will offer new insights into how aesthetic improvements can create psychologically supportive environments that encourage adolescents to engage in regular PA.

This study is important because it highlights how the design and visual appeal of sports facilities can influence adolescents' PA through motivational pathways. While many interventions focus on programs or equipment, this research shows that the environment itself – its aesthetics and attractiveness – can play a key role in encouraging exercise during a formative period of life. Understanding these mechanisms provides practical insights for schools, communities, and policymakers to create spaces that naturally motivate young people to be more active, supporting long-term health and well-being.

2. Methods

2.1. Study Design

This study employed a cross-sectional, quantitative research design using a structured questionnaire to examine the relationships between aesthetic enhancements to sports facilities, motivational mechanisms, and adolescent PA participation. A mediation model was tested using Structural Equation Modelling (SEM) to evaluate the indirect effects of facility aesthetics on PA through motivation. SEM is used because it allows simultaneous testing of complex relationships among variables while accounting for measurement error, and bootstrapping is applied to obtain robust standard errors and confidence intervals, especially for indirect effects that may violate normality. Both techniques assume an adequate sample size, and while SEM traditionally assumes multivariate normality, bootstrapping helps reduce the impact of deviations from this assumption. The study design aligns with contemporary behavioral research that seeks to understand environmental and psychological pathways influencing adolescents' sport participation.

2.2. Participants and Sampling Procedures

A total of 412 adolescents participated in the study, comprising students aged 13 to 18 years from both public and private secondary schools in the region. A multi-stage cluster sampling technique was employed, beginning with the random selection of schools from an official list provided by the Department of Education. Subsequently, classes within these schools were chosen through simple random sampling, and all students in the selected classes were invited to take part in the research. Inclusion criteria for participation included being enrolled in secondary school (Forms 1-5 or Grades 7-12), being within the age range of 13 to 18 years, being physically capable of engaging in regular PA, and providing informed assent along with parental or guardian consent. Conversely, students with medical conditions that limited their PA and those who failed to complete at least 80% of the questionnaire were excluded from the study. The sample size was justified as a minimum of 400 participants is recommended for SEM studies that involve multiple latent variables and mediation pathways. With 412 participants, the study successfully meets the statistical power requirements necessary for detecting small-to-medium effects and ensuring stable model estimation. Permission to conduct the research in schools was granted by the Ministry of Education and respective school authorities. Participation was voluntary, and anonymity was assured. Informed consent from parents/guardians and informed assent from adolescents were obtained before data collection.

2.3. Data Collection Procedures

Data were gathered through a self-administered paper-and-pencil questionnaire, which was distributed during regular class sessions. Trained research assistants provided participants with an overview of the study's objectives, confidentiality measures, and guidance on how to complete the questionnaire. The estimated time for completion was around 20 to 25 minutes. To mitigate social desirability bias, students filled out the survey individually and anonymously, with no teachers present during the data collection process. Participants were also informed that there were no right or wrong answers, further encouraging honest responses.

2.4. Measurements

Validated and widely used instruments were selected to measure each construct.

2.4.1. Aesthetic Enhancements to Sports Facilities

The Perceived Environmental Aesthetics Scale (PEAS) was modified to evaluate how adolescents perceive the aesthetic quality of sports facilities in their schools and communities (23). This validated subscale is frequently utilized within the Physical Activity Neighborhood Environment Studies (PANES) framework (24). The scale encompasses various aspects, including visual appeal, the presence of greenery and natural elements, color, cleanliness, overall design, lighting quality, and modernity. Participants responded to these items using a 5-point Likert scale, where a score of 1 indicates strong disagreement and a score of 5 indicates strong agreement, with higher scores reflecting more

favorable perceptions of the facilities' aesthetics. Ten experts evaluated for content validity with a CVI of 0.94 and a CVR of 0.90. This study reported reliability coefficients of $\alpha=0.88$ for this scale, indicating high reliability.

2.4.2. Motivation Toward Physical Activity

This study utilized the Behavioral Regulation in Exercise Questionnaire-3 (BREQ-3), a well-established tool grounded in SDT, to evaluate motivational mechanisms (25). This instrument captures a comprehensive range of motivation, including amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation. The primary emphasis of the research was on autonomous motivation, encompassing identified, integrated, and intrinsic forms, which were considered as potential mediators. Following the guidelines of Self-Determination Theory, composite scores for autonomous motivation were calculated, with participants rating items on a 5-point scale from 0 (not true for me) to 4 (very true for me). Ten experts evaluated for content validity with a CVI of 0.92 and a CVR of 0.88. This study reported reliability coefficients of $\alpha = .91$ for this scale, indicating high reliability.

2.4.3. Adolescent Physical Activity Participation

Adolescent engagement in moderate-to-vigorous PA (MVPA) was assessed using the Physical Activity Questionnaire for Adolescents (PAQ-A), a widely recognized self-report tool utilized globally (26). This questionnaire summarizes PA levels over the past week, incorporating various aspects such as activities during physical education classes, involvement in organized sports, and general activity during lunch, after school, evenings, and weekends. The responses are averaged to yield a final activity score that ranges from 1, indicating low activity, to 5, representing high activity. Ten experts evaluated for content validity with a CVI of 0.90 and a CVR of 0.92. This study reported reliability of $\alpha=0.82$ for this scale, indicating relatively high reliability.

2.4.4. Demographic and Control Variables

A demographic form was utilized to gather information on several key variables, including age, gender, socioeconomic status as indicated by parental education, the type of school attended (public or private), and access to sports facilities outside of school. These factors were evaluated for their potential role as covariates in the SEM framework.

2.5. Statistical Analysis

Data analysis was conducted using IBM SPSS 29 for descriptive statistics and preliminary data screening, while SEM was performed with SmartPLS. Initially, the data underwent a screening process to identify missing values, outliers, normality (assessed through skewness and kurtosis), and multicollinearity. Cases with over 20% missing data were excluded, and remaining missing values, which were less than 3%, were addressed using Expectation-Maximization (EM) estimation. For reliability and validity testing, internal consistency was evaluated through Cronbach's alpha and Composite Reliability (CR) for all scales. Convergent validity was confirmed by examining

Average Variance Extracted ($AVE \geq .50$) and standardized factor loadings ($\geq .60$), while discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio ($HTMT < .85$). The SEM was employed to investigate the proposed mediation model linking aesthetic enhancements to motivation and subsequently to PA participation. Two models were analyzed: the Measurement Model, which focused on confirmatory factor analysis to evaluate factor loadings, fit indices, and validity, and the Structural Model, which estimated both direct and indirect pathways. The significance of mediation was determined through bootstrapping with 5,000 resamples, and model fit indices were assessed against

commonly accepted thresholds, including $CF \geq .90$, $TLI \geq .90$, $RMSEA \leq .08$, and $SRMR \leq .08$.

3. Results

3.1. Demographic Characteristics of Participants

A total of 412 adolescents participated in the study. **Table 1** presents the demographic profile. The sample included a nearly equal proportion of male and female adolescents, with the majority enrolled in public schools. Most participants fell within the 15–16-year age range.

Table 1. Demographic Characteristics of Participants (n=412).

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	201	48.8
	Female	211	51.2
Age (years)	13-14	118	28.6
	15-16	162	39.3
	17-18	132	32.0
School Type	Public	294	71.4
	Private	118	28.6
Parental Education	Primary or below	67	16.3
	Secondary	195	47.3
	Tertiary	150	36.4
Access to External Sports Facilities	Yes	249	60.4
	No	163	39.6

3.2. Descriptive Statistics and Reliability Analysis

Descriptive statistics and reliability indices for all major study variables are presented in **Table 2**. Mean values indicate moderately positive perceptions of facility aesthetics, mid-to-high levels of autonomous

motivation, and moderate engagement in PA. All scales demonstrated acceptable to excellent reliability ($\alpha > .80$), meeting recommended psychometric standards. The AVE values exceeded .50, supporting convergent validity.

Table 2. Descriptive Statistics and Reliability of Study Variables.

Variable	Items	Mean	SD	Cronbach's α	CR	AVE
Aesthetic Enhancements (PEAS)	8	3.64	0.71	.88	.90	.58
Autonomous Motivation (BREQ-3)	12	3.21	0.77	.91	.93	.62
Physical Activity Participation (PAQ-A)	9	2.89	0.63	.82	.85	.54

3.3. Correlation Analysis

Pearson correlation coefficients among variables are presented in **Table 3**. The results showed that there is a significant correlation between aesthetic

enhancements with autonomous motivation ($r = .48$, $p < .001$) and PA participation ($r = .36$, $p < .001$). As well, autonomous motivation was significantly correlated with PA participation ($r = .52$, $p < .001$).

Table 3. Correlations Among Study Variables.

Variables	1	2	3
1. Aesthetic Enhancements	—	.48***	.36***
2. Autonomous Motivation	—	—	.52***
3. Physical Activity Participation	—	—	—

*** $p < .001$

3.4. Measurement Model (Confirmatory Factor Analysis)

The measurement model exhibited a satisfactory fit, indicated by a χ^2/df ratio of 2.41, a CFI of 0.94, a TLI of 0.93, an RMSEA of 0.059, and an SRMR of 0.047. Furthermore, all standardized factor loadings were above 0.60, which reinforces the construct validity of the model.

3.5. Structural Model and Mediation Results

A structural equation model was employed to investigate both the direct and indirect impacts of aesthetic enhancements on participation in PA, mediated by autonomous motivation. The results

indicated that the structural model exhibited a good fit, with the following fit indices: $\chi^2/df = 2.53$, CFI = .93, TLI = .92, RMSEA = .061, and SRMR = .051.

3.5.1. Direct Effects

Table 4 and **Figure 1** show the standardized path coefficients. Aesthetic enhancements significantly predicted autonomous motivation ($\beta = .48$, $p < .001$). Autonomous motivation strongly predicted PA ($\beta = .46$, $p < .001$). The direct effect of aesthetics on PA was weaker but remained significant ($\beta = .12$, $p = .027$), indicating partial mediation.

Table 4. Direct Effects in the Structural Model.

Path	β	SE	CR	p-Value
Aesthetic Enhancements → Autonomous Motivation	.48	.06	8.13	<.001
Autonomous Motivation → Physical Activity Participation	.46	.07	6.57	<.001
Aesthetic Enhancements → Physical Activity Participation (Direct Path)	.12	.05	2.21	.027*

*p < .05

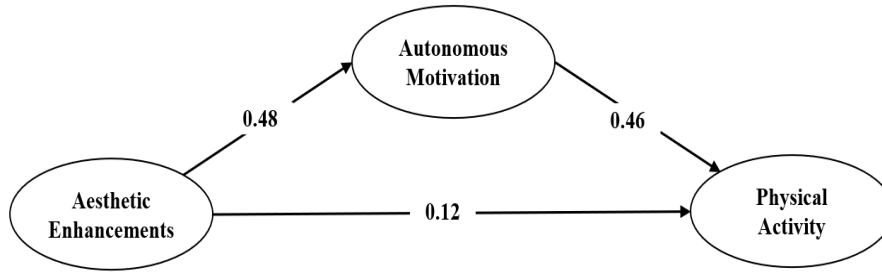


Figure 1. Research Model in the form of β Coefficient

3.5.2. Indirect (Mediation) Effects

Bootstrapping with 5,000 resamples was used to test mediation. Table 5 presents the indirect pathways.

Because the 95% CI did not include zero, the indirect effect is significant.

Table 5. Bootstrapped Indirect Effects.

Indirect Path	β (Indirect)	Boot SE	95% CI (Lower, Upper)	Result
Aesthetic Enhancements → Autonomous Motivation → Physical Activity Participation	.22	.04	(.14, .31)	Significant

3.5.3. Total Effects

The total effect indicates that aesthetic enhancements are a meaningful predictor of

adolescent PA when both direct and mediated paths are included.

Table 6. Total Effects.

Path	β (Total)	p-Value
Aesthetic Enhancements → Physical Activity Participation	.34	<.001

4. Discussion

The present study examined how aesthetic enhancements to sports facilities influence adolescent PA participation, with a focus on the mediating role of autonomous motivation. Using a large sample of adolescents and validated instruments, this research provides new evidence on the psychological mechanisms linking environmental aesthetics and PA—a relationship that has been suggested theoretically but rarely tested empirically in the adolescent population. Findings demonstrate that aesthetic enhancements have both direct and indirect effects on PA participation, with autonomous motivation emerging as a significant mediator. These results underscore the importance of considering environmental aesthetics as a meaningful determinant of adolescents’ PA behavior.

One of the most noteworthy findings of this study is the moderate and significant relationship between adolescents’ perceptions of aesthetic enhancements and their autonomous motivation toward PA. Adolescents who reported higher levels of aesthetic quality in sports facilities also reported stronger intrinsic, identified, and integrated forms of motivation. This aligns with principles of the SDT, which posits that environments supportive of psychological needs can foster more self-determined forms of motivation (12,13). Aesthetic environments may act as supportive contexts that enhance feelings of comfort, competence, and enjoyment – key ingredients for autonomous motivation.

The significant positive association between aesthetic enhancements and PA participation suggests that adolescents are more likely to be active in spaces they perceive as clean, attractive, modern, and visually stimulating. These findings extend the existing literature, which has traditionally focused on structural or functional characteristics of sports facilities, such as equipment availability, safety, or accessibility. While these features are undoubtedly important, the present findings highlight those aesthetic aspects – such as colors, murals, lighting, natural elements, and design quality – also meaningfully influence behavior. This is consistent with environmental psychology research showing that aesthetically pleasing environments promote approach behaviors, positive emotions, and place attachment (27,28).

The primary aim of this study was to test whether autonomous motivation mediates the relationship between aesthetic enhancements and PA participation. The mediation analysis supported a partial mediation, with autonomous motivation accounting for a substantial portion of the overall effect. This indicates that aesthetic enhancements influence PA participation both directly and indirectly by improving motivation.

The indirect pathway can be understood through the SOR framework (14,15). In this model, aesthetic enhancements function as environmental stimuli that shape adolescents’ psychological organism (motivation), which in turn influences their response (PA participation). Adolescents may interpret

aesthetically pleasing facilities as welcoming, youth-friendly, and enjoyable, enhancing intrinsic motivation. This supports the notion that environmental aesthetics are not merely superficial features but can carry emotional and symbolic meaning that influences internal psychological states.

Moreover, the SDT framework provides a useful explanation for why aesthetics matter. Attractive facilities may help satisfy the psychological need for competence (feeling capable in a pleasant environment), relatedness (feeling connected to a space designed for youth), and autonomy (feeling free and motivated to engage voluntarily). These needs are core to autonomous motivation and have been consistently linked to sustained PA engagement (12,13).

The presence of a significant direct effect, even after accounting for motivation, suggests that aesthetic enhancements may influence PA through additional pathways, such as increased enjoyment, social interaction, perceived safety, and energy levels. Some adolescents may simply prefer being active in visually stimulating environments, independent of long-term motivational processes. This provides a nuanced understanding of how aesthetics function - both as a psychological catalyst and as an environmental attractor.

The findings of this study resonate with previous research indicating that attractive physical environments encourage PA, particularly among young people. Studies examining parks, playgrounds, and urban recreation spaces have similarly found that greenery, cleanliness, and overall design quality are associated with increased PA levels. However, this study extends prior work by focusing specifically on sports facilities rather than general outdoor environments, and by testing a mediation model rather than simple associations. Few studies have examined aesthetics within the context of school or community sports facilities, despite their relevance to structured and unstructured youth PA.

The strong role of autonomous motivation aligns with findings from numerous motivation-based PA interventions (7,21,29-32). Previous studies have shown that adolescents with higher autonomous motivation are more likely to engage in regular PA, participate in sports, and maintain active lifestyles over time (21,33). The present study reinforces these findings and adds a new dimension: the physical environment itself may be one of the antecedents that foster autonomous motivation.

This study's findings contribute to both environmental and motivational theories of PA. First, they highlight that environmental aesthetics should be integrated more explicitly into ecological models of PA behavior. While traditional models emphasize availability and access, aesthetic components may influence psychological pathways that are equally important for adolescent engagement. Second, the study extends SDT by identifying environmental aesthetics as a potential antecedent to autonomous motivation. Research on SDT has traditionally focused on social factors, such as coaching style or peer support. However, the physical environment may also play a role in shaping need-supportive experiences, particularly in youth settings where environmental cues strongly influence emotional responses. Third, the partial mediation outcome suggests a dual-process mechanism, where aesthetics influence behavior both through internal psychological processes and through

direct environmental appeal. This supports the idea that PA behavior is shaped by a combination of internal and external factors, emphasizing the importance of multi-level interventions.

Despite its contributions, this study has several limitations. First, the cross-sectional design limits causal interpretations. Longitudinal studies or experimental designs involving actual facility renovations would provide stronger causal evidence. Second, reliance on self-report instruments may introduce recall or social desirability biases. Future research could incorporate objective measures such as accelerometers, observational audits, or environmental sensors. Third, the study focused on adolescents in one geographical region; findings may not generalize to all cultural or socioeconomic contexts. Aesthetic preferences may differ across communities, and future studies should consider cultural relevance when evaluating aesthetic cues. Finally, while autonomous motivation was a significant mediator, other psychological variables - such as enjoyment, perceived safety, or social connectedness - could also play important roles. Expanding the mediation model to include multiple psychological pathways would provide a more comprehensive understanding.

4.1. Conclusion

Overall, this study demonstrates that aesthetic enhancements to sports facilities are meaningful predictors of adolescent PA participation, both directly and through the mediating effects of autonomous motivation. The findings highlight the importance of designing visually appealing and psychologically supportive environments to encourage active lifestyles among young people. By integrating environmental aesthetics into PA promotion strategies, schools and communities can foster healthier, more engaging spaces that motivate adolescents to be active.

The research findings present significant practical implications for educational institutions, community planners, and policymakers. Aesthetic improvements, which are generally low-cost and straightforward to implement, serve as an effective and scalable approach to encourage PA among adolescents. Schools might explore options such as repainting sports courts in bright colors, incorporating murals and artwork designed by students, enhancing lighting and cleanliness, introducing greenery, and modernizing signage and layouts. These modifications can make sports facilities more appealing without requiring substantial financial investment. The observed positive impact on motivation indicates that such enhancements could lead to lasting behavior changes rather than just temporary spikes in participation. Additionally, community planners and local governments can leverage aesthetic design principles in public recreational areas, as adolescents often select activity spaces based on their visual and social attractiveness, potentially increasing the usage of parks and sports facilities. For sport program administrators, recognizing the importance of aesthetics can guide strategies aimed at boosting youth engagement, retention, and satisfaction, prompting coaches and educators to create visually stimulating environments that resonate with contemporary youth culture.

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Footnotes

Authors' Contribution: This study was carried out solely by the corresponding author.

Conflicts of Interest

Non to declare.

Data Availability: The data that support the findings of this study are openly available upon request from the corresponding author.

Ethical Approval: The author confirms that all steps and requirements of this study comply with ethical guidelines. Participants were informed about the characteristics of the study and gave written informed consent.

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