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Structural Relationships Between Physical Education Course Happiness, Peer Relationships, and School Satisfaction: A Mediation Model Analysis



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A B S T R A C T

Objective: The emotional and social processes students experience in school life, beyond their academic performance, are fundamental components of their overall well-being. Physical education classes provide a unique learning environment with opportunities for positive emotions, social interaction, and peer relationships, contributing to students' broader school experiences. However, the social processes underlying the association between happiness experienced in physical education classes and school satisfaction remain insufficiently understood. Therefore, this study examined the relationship between physical education course happiness and school satisfaction among middle school students and investigated whether peer relationships statistically mediated this association.

Methods and Materials: We used a correlational design with 614 volunteer students aged 10–15 years from four middle schools in Malatya, Türkiye. Physical education course happiness was specified as the predictor, school satisfaction as the outcome, and peer relationships as the mediator.

Findings: The findings revealed significant positive direct associations between physical education course happiness and peer relationships ($\beta = .268, p < .001$) and between physical education course happiness and school satisfaction ($\beta = .124, p < .001$), as well as a significant positive association between peer relationships and school satisfaction ($\beta = .462, p < .001$). Furthermore, the indirect association between physical education course happiness and school satisfaction through peer relationships was statistically significant ($\beta = .124, p < .001$), while the total association was also positive and significant ($\beta = .248, p < .001$). The proposed model explained 25.9% of the variance in school satisfaction.

Conclusion: These findings indicate that greater happiness in physical education is associated with higher school satisfaction both directly and indirectly through more positive peer relationships. Given the cross-sectional correlational design, these pathways should be interpreted as statistical associations rather than evidence of causal relationships.

Keywords: Physical Education, School Satisfaction, Peer Relationships, Positive Emotions, Adolescents

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1. Introduction

In recent years, increasing emphasis in education has been placed on promoting students' emotional, social, and psychological well-being alongside their academic achievement (1, 2). Approaches grounded in positive psychology and positive education emphasize that schools should cultivate not only cognitive competence but also students' happiness, life satisfaction, resilience, and overall well-being (3-5). Accordingly, educational environments are increasingly viewed as ecosystems of well-being in which students develop academically, emotionally, and socially. This perspective is largely based on Seligman's PERMA model (6), which proposes that positive emotions, engagement, relationships, meaning, and accomplishment constitute the core dimensions of flourishing. Consequently, the PERMA model provides the conceptual foundation of positive education and suggests that students' emotional experiences within school are closely associated with their overall happiness and life satisfaction.

The PERMA framework further suggests that students' emotional experiences and social relationships within school are fundamental determinants of their overall well-being. Indeed, school experiences and peer relationships represent two of the most influential domains contributing to adolescents' life satisfaction (7). Previous studies consistently demonstrate that students who establish supportive friendships at school report higher psychological well-being and greater life satisfaction (8-10). Likewise, UNESCO's Happy Schools initiative (11) places student happiness at the center of educational quality and recommends evaluating schools not only through academic performance but also through students' well-being. Consequently, school satisfaction has increasingly been recognized as an essential indicator of educational quality alongside academic achievement.

School satisfaction reflects students' overall evaluation of their school experiences and constitutes an important indicator of subjective well-being. Previous research consistently demonstrates that school satisfaction is strongly associated with adolescents' overall life satisfaction (2, 12). Students who perceive school as a safe, enjoyable, and supportive environment tend to demonstrate healthier lifestyles, greater academic engagement, and more developed social competencies (13). Conversely, boredom, social exclusion, and insufficient support are associated with lower levels of school satisfaction and psychological well-being (14-16). Therefore, school satisfaction represents a

comprehensive indicator of school climate and student welfare that extends beyond academic outcomes. Moreover, students' positive attitudes toward school have been associated with a wide range of educational outcomes, including attendance, academic achievement, and school engagement (17, 18). A considerable proportion of these emotional and social experiences emerges within highly interactive learning environments such as physical education classes.

Unlike most academic subjects, physical education provides a unique educational context that simultaneously integrates physical activity and social interaction, thereby addressing students' physical, emotional, and psychosocial needs. By engaging students in meaningful physical activity, physical education lessons promote enjoyment, positive emotions, and peer interaction, thereby contributing to positive school experiences (19, 20). Previous research indicates that enjoyment and satisfaction experienced during physical education significantly enhance students' overall school satisfaction (2, 21). Similarly, students reporting more positive emotional experiences during physical education tend to demonstrate stronger school attachment and higher school satisfaction (2, 22). According to Fredrickson's Broaden-and-Build Theory (23), positive emotions broaden individuals' cognitive and behavioral repertoires while strengthening social resources and resilience. Likewise, Self-Determination Theory (24) proposes that satisfying students' needs for competence, autonomy, and relatedness enhances intrinsic motivation and psychological well-being. Supporting this perspective, students satisfied with their physical education experiences demonstrate greater intrinsic motivation, which is positively associated with school engagement and academic achievement (25, 26). Collectively, the PERMA model, Broaden-and-Build Theory, and Self-Determination Theory provide a robust theoretical framework for understanding how physical education contributes to students' overall well-being.

Another important contribution of physical education lies in its capacity to facilitate positive peer relationships. Team sports and collaborative activities create opportunities for communication, cooperation, and meaningful social interaction. Through shared physical activities, students strengthen friendships, provide mutual support, and develop positive interpersonal relationships (27, 28). Recent evidence indicates that students who establish positive peer relationships during physical education report significantly higher school satisfaction (29). Furthermore, students who

feel accepted and supported by their peers experience lower anxiety and stronger school belonging (30, 31). Conversely, peer victimization and social exclusion during physical education are associated with lower school satisfaction and reduced motivation (32, 33). These findings suggest that positive peer relationships may constitute an important mechanism linking enjoyable physical education experiences to school satisfaction.

A recent study by Norman et al. (22) reported a positive association between physical education course happiness and school satisfaction among middle school students. Although this finding provides important evidence regarding the relationship between students' emotional experiences in physical education and their broader evaluations of school, the social processes underlying this association remain less clearly understood. In particular, peer relationships may represent an important interpersonal mechanism through which positive experiences in physical education are associated with students' school satisfaction. Accordingly, the present study extends previous research by examining physical education course happiness, peer relationships, and school satisfaction within an integrated mediation model, thereby focusing on the potential social pathway linking positive emotional experiences in physical education to students' overall satisfaction with school.

Based on the available theoretical and empirical evidence, happiness experienced during physical education classes is expected to enhance students' school satisfaction both directly and indirectly through positive peer relationships. Positive emotional experiences during physical education may directly strengthen students' daily school experiences, whereas supportive friendships established through physical education may indirectly increase students' emotional attachment and sense of belonging to school (2, 21, 23, 24, 29). Consequently, physical education can be viewed as a holistic educational context that promotes students' physical development while simultaneously supporting their emotional well-being, social connectedness, and school adjustment. This perspective is fully consistent with the central principles of positive education, which advocate the creation of supportive, engaging, and flourishing school environments.

Accordingly, the present study aimed to examine the mediating role of peer relationships in the relationship between physical education course happiness and school satisfaction among middle school students. The proposed

conceptual model illustrating the hypothesized relationships among the study variables is presented in Figure 1. Based on the theoretical framework and previous empirical findings, the following hypotheses were formulated:

H1. Physical education course happiness positively influences peer relationships.

H2. Peer relationships positively influence school satisfaction.

H3. Physical education course happiness positively influences school satisfaction.

H4. Peer relationships mediate the relationship between physical education course happiness and school satisfaction.

2. Methods and Materials

2.1 Participants

The minimum required sample size was determined using G*Power 3.1.9.7. An a priori power analysis was conducted for linear multiple regression with two predictors, assuming a small effect size ($f^2 = .02$), $\alpha = .05$, and statistical power of .80. The analysis indicated a minimum required sample size of approximately 485 participants. To increase statistical precision and ensure an adequate sample for the proposed analyses, the final analytic sample comprised 614 students.

Participants were volunteer middle school students aged 10–15 years attending four middle schools in Malatya, Türkiye. Students were recruited through the participating schools in cooperation with school administrations. Eligibility criteria required participants to be enrolled as full-time middle school students, be able to understand and complete the self-report questionnaires, provide informed assent, and have written consent from a parent or legal guardian. Because all participants were under the age of 18, both parental/legal guardian consent and student assent were required prior to participation.

Questionnaire administration was supervised by the researchers, and participants were encouraged to respond to all items before submitting their forms in order to minimize missing data. Only sufficiently completed questionnaires were included in the final analytic dataset. The final sample consisted of 614 students.

The study procedures were conducted in accordance with the Declaration of Helsinki and relevant ethical principles. Participant confidentiality and anonymity were maintained throughout the research process. Detailed demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic characteristics of the participants

Variable		$\bar{X}$	SD
Age (years)		12.68	1.15
		n	%
Gender	Male	296	48.20
	Female	318	51.80
Grade	5th	105	17.1
	6th	123	20.0
	7th	181	29.5
	8th	205	33.4

Note: $\bar{X}$ = Mean, SD = Standard Deviation

Table 1 presents the demographic characteristics of the participants. The mean age of the students was 12.68 years ($SD = 1.15$). Of the participants, 48.2% were male ($n = 296$) and 51.8% were female ($n = 318$). Regarding grade level, 17.1% were in 5th grade ($n = 105$), 20.0% in 6th grade ($n = 123$), 29.5% in 7th grade ($n = 181$), and 33.4% in 8th grade ($n = 205$).

2.2 Research Model

This study was conducted within the framework of a correlational design. In the theoretical model, physical education course happiness was conceptualized as the independent variable, school satisfaction as the dependent variable, and peer relationships in physical education class

as the mediating variable. The model aimed to examine the theoretically proposed direct and indirect associations among these variables.

Analyses were conducted using data obtained from 614 middle school students who met the inclusion criteria. Ethical approval for the study was obtained from the Social and Humanities Research and Publication Ethics Committee of İnönü University (Approval No: 5; Date: November 6, 2025). The research process was carried out in full compliance with ethical principles, and all responsibilities regarding participant rights and research integrity were meticulously observed. The model is presented in Figure 1. The study aimed to evaluate the direct and indirect effects among the specified constructs in line with the proposed hypotheses.

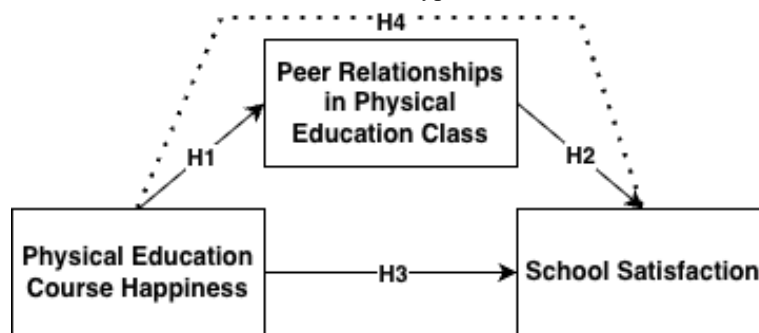


Figure 1. Structural Model of the Relationships Among Physical Education Course Happiness, Peer Relationships in Physical Education Class, and School Satisfaction

2.3 Data Collection Instruments

Prior to data collection, the required permissions for the use of all measurement instruments employed in the present study were obtained from the relevant scale developers or rights holders. The data collection instruments used in this study were administered in a standardized order to facilitate a clear and consistent response process. The order of the scales followed a gradual structure, beginning with general

emotional experiences, moving to perceptions of social relationships, and concluding with overall evaluations of school life. Accordingly, the first instrument administered was the Demographic Information Form, which included items on age, gender, and grade level to collect participants' basic demographic characteristics.

In the second stage, the Physical Education Course Happiness Scale was administered to assess students'

positive emotional experiences and overall happiness during physical education lessons. This was followed by the Peer Relationships Scale in Physical Education Class, which measured students' levels of communication, cooperation, support, and social interaction with their peers during physical education. In the final stage, the Overall School Satisfaction Scale was applied to evaluate students' general satisfaction, sense of belonging, and emotional attachment to their school environment.

This structured order of administration was designed to help students naturally recall emotional and social processes while responding, thereby enhancing the internal consistency and reliability of the data collection process.

2.3.1 Physical Education Course Happiness Level Scale

To measure middle school students' levels of happiness during physical education classes, the Physical Education Course Happiness Level Scale, developed by Uğraş and Serbes (34), was used. The original development study resulted in a one-dimensional structure consisting of nine items. Responses are rated on a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). The minimum possible score is 9, and the maximum is 45, with higher scores indicating greater physical education course happiness. The internal consistency coefficient reported in the original study was Cronbach's $\alpha = .857$. Confirmatory factor analysis (CFA) indicated acceptable fit for the single-factor structure ($\chi^2/df = 2.690$, GFI = .944, CFI = .938, AGFI = .904, NFI = .907, RMSEA = .079). In the present study, the Cronbach's α coefficient was .934, and CFA results also demonstrated acceptable model fit ($\chi^2/df = 4.53$, GFI = .964, CFI = .979, NFI = .973, RMSEA = .076). These results confirm that the scale is a valid and reliable instrument for assessing students' happiness in physical education lessons.

2.3.2 Peer Relationships Scale in Physical Education Class

To assess peer relationships in physical education and sports classes, the Peer Relationships Scale in Physical Education Class, developed by Yücekaya, Sağın, and Uğraş (35), was employed. The scale consists of nine items rated on a 5-point Likert scale ranging from 1 ("Never") to 5 ("Always"), with total scores ranging from 9 to 45. CFA results from the original study indicated acceptable model fit ($\chi^2/df = 3.10$, CFI = .937, TLI = .913, RMSEA = .073, SRMR = .056). In the current study, the Cronbach's α

coefficient was .772, and CFA results also showed acceptable model fit ($\chi^2/df = 2.56$, GFI = .977, CFI = .968, NFI = .948, RMSEA = .050). These findings support the validity and reliability of the scale for evaluating peer relationships in physical education classes.

2.3.3 Overall School Satisfaction Scale

To measure school satisfaction, the Comprehensive School Satisfaction Scale for Children, originally developed by Randolph, Kangas, and Ruokamo (36) and adapted into Turkish by Telef (37), was used. The scale comprises six items in a unidimensional structure, rated on a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Possible scores range from 6 to 30, with higher scores indicating higher levels of school satisfaction. The Cronbach's α coefficient reported in the Turkish adaptation study was .89, and CFA results indicated acceptable to good model fit ($\chi^2/df = 3.45$, RMSEA = .06, GFI = .98, NFI = .99, RFI = .98, CFI = .99, IFI = .99). In the present study, the Cronbach's α coefficient was .831, and CFA results also demonstrated acceptable fit ($\chi^2/df = 3.97$, GFI = .982, NFI = .976, RFI = .954, CFI = .982, IFI = .982, RMSEA = .070). These indicators support the scale's validity and reliability within the Turkish sample.

2.4 Data Collection Procedure

Participants were informed in advance about the purpose, scope, and confidentiality principles of the study, and the data collection process was conducted entirely on a voluntary basis. Prior to data collection, the required official administrative permission to conduct the study in the participating schools was obtained from the relevant educational authority. Data collection was subsequently coordinated with the administrations of the four participating middle schools in Malatya, Türkiye. Data were collected between November 17 and 21, 2025, in classroom settings at these four schools, under the direct supervision of the researchers. To minimize distraction and disruption to regular school activities, data collection was conducted during class hours and outside examination periods.

Prior to participation, students were informed that participation was voluntary, that their responses would be used solely for scientific purposes, and that all information would be treated confidentially. Since all participants were under 18, an informational letter and parental consent form detailing the study's aim, scope, ethical principles, and confidentiality procedures were distributed to parents

through the participating school administrations. Only students with written parental consent were included. Students also provided their own informed assent before completing the instruments. Participants were informed that there were no right or wrong answers and that responses should reflect their honest personal evaluations.

Data were collected using a structured data collection form designed specifically for the aims of the study. After demographic information was obtained, the measurement instruments were administered in a predetermined order: the Physical Education Course Happiness Scale, the Peer Relationships Scale in Physical Education Class, and the Overall School Satisfaction Scale. Participants were instructed to complete all items before submitting the questionnaire in order to minimize missing data. Questionnaire completion was supervised by the researchers, and students were able to request clarification regarding the response procedure when necessary. Each administration took approximately 10 minutes. The environment was kept quiet, organized, and free from distractions. Clear written and verbal instructions were provided to ensure that participants understood the response procedure and could complete the questionnaires consistently. All responses were collected anonymously and were not linked to any personal identifiers. The obtained data were used exclusively within the scope of the present study.

2.5 Data Analysis

Data analyses were conducted using the JASP statistical software package (version 0.18.3.0; University of Amsterdam, Amsterdam, the Netherlands). Normality of the data distributions was assessed through skewness and kurtosis values, which were found to fall within the acceptable range of ± 2 (38-40). These findings indicated that the assumption of normality was met.

In computing the total score of the Peer Relationships Scale, scores obtained from the Conflict subdimension were reverse-coded and then combined with the Harmony subdimension to produce the Peer Relationships score used in analyses.

Pearson correlation analysis was conducted to examine relationships among the variables. Prior to path analysis within a structural equation modeling framework, several assumptions were assessed. Linearity was visually evaluated using scatterplots, and multicollinearity was assessed using tolerance and variance inflation factor (VIF) values. All values were within acceptable limits ($VIF < 5$, $Tolerance > 0.20$) (41).

In the research model, physical education course happiness was positioned as the independent variable, school satisfaction as the dependent variable, and peer relationships as the mediating variable. To test the statistical significance of the mediation effect, the bootstrap method with 5,000 resamples was employed. The obtained 95% confidence intervals were examined to evaluate the significance of indirect effects; the absence of zero within the interval indicated a statistically significant mediation effect (42). In addition to bootstrap analysis, z-values were reported to further support the robustness of the mediation analysis (see Table 3). The significance level for all statistical analyses was set at $p < .05$.

3. Results

The findings obtained in the study are presented below through tables and figures. In this context, the relationships between physical education course happiness, peer relationships in physical education, and school satisfaction are presented in Table 2.

Table 2. Descriptive statistics, correlation coefficients, and collinearity values for the study variables

Variables	PEH	PR	SS	$\bar{x}$	SD	Skewness	Kurtosis	Tolerance	VIF
PEH	-	0.267**	0.248**	4.01	0.96	-1.278	1.261	0.912	1.097
PR	-	-	0.494**	4.23	0.88	-0.878	0.978	0.733	1.364
SS	-	-	-	3.73	0.83	-0.777	0.343	0.742	1.348

PEH = Physical Education Course Happiness, PR = Peer Relationships, SS = School Satisfaction

** $p < .001$

Table 2 presents the descriptive statistics, correlation coefficients, and collinearity values for the variables included in the study. The means ($\bar{x}$), standard deviations

(SD), and skewness–kurtosis values indicate that all variables met the assumption of normal distribution. The mean scores were 4.01 (SD = 0.96) for Physical Education

Course Happiness (PEH), 4.23 (SD = 0.88) for Peer Relationships (PR), and 3.73 (SD = 0.83) for School Satisfaction (SS). Pearson correlation analysis revealed significant and positive relationships among all variables: a significant positive correlation was found between PEH and PR ($r = .267, p < .001$), and between PEH and SS ($r = .248, p < .001$).

Additionally, the relationship between PR and SS was also significant and positive ($r = .494, p < .001$). In the collinearity analysis, all tolerance values exceeded .20, and all VIF values were below 5 (Tolerance range: .733–.912; VIF range: 1.097–1.364), indicating no multicollinearity issues in the dataset.

Table 3. Findings on direct, indirect, and mediating effects

Direct effects				95% Confidence Interval			
			β	Std. Error	z-value	P	Lower Upper
PR	→	SS	0.462	0.032	14.251	< .001	0.398 0.525
PEH	→	SS	0.124	0.036	3.454	< .001	0.054 0.194
PEH	→	PR	0.268	0.037	7.152	< .001	0.195 0.341
Indirect effects				95% Confidence Interval			
			β	Std. Error	z-value	P	Lower Upper
PEH	→	PR → SS	0.124	0.020	6.321	< .001	0.085 0.162
Total effects				95% Confidence Interval			
			β	Std. Error	z-value	P	Lower Upper
PEH	→	SS	0.248	0.038	6.538	< .001	0.173 0.322
The variance explained							
				R^2			
SS				0.259			
PR				0.072			

PEH = Physical Education Course Happiness, PR = Peer Relationships, SS = School Satisfaction.

Table 3 presents the direct, indirect, and total effects among the variables, along with the variance explained (R^2) for each endogenous construct. The direct effects indicate that PR significantly predicts SS ($\beta = 0.462, SE = 0.032, z = 14.251, p < .001, 95\% CI [0.398, 0.525]$). PEH also had significant direct effects on SS ($\beta = 0.124, SE = 0.036, z = 3.454, p < .001, 95\% CI [0.054, 0.194]$) and on PR ($\beta = 0.268, SE = 0.037, z = 7.152, p < .001, 95\% CI [0.195,$

$0.341]$). The indirect effect of PEH on SS through PR was significant ($\beta = 0.124, SE = 0.020, z = 6.321, p < .001, 95\% CI [0.085, 0.162]$). The total effect of PEH on SS was also positive and significant ($\beta = 0.248, SE = 0.038, z = 6.538, p < .001, 95\% CI [0.173, 0.322]$). Together, PEH and PR explained 25.9% of the variance in SS. Additionally, PEH accounted for 7.2% of the variance in PR.

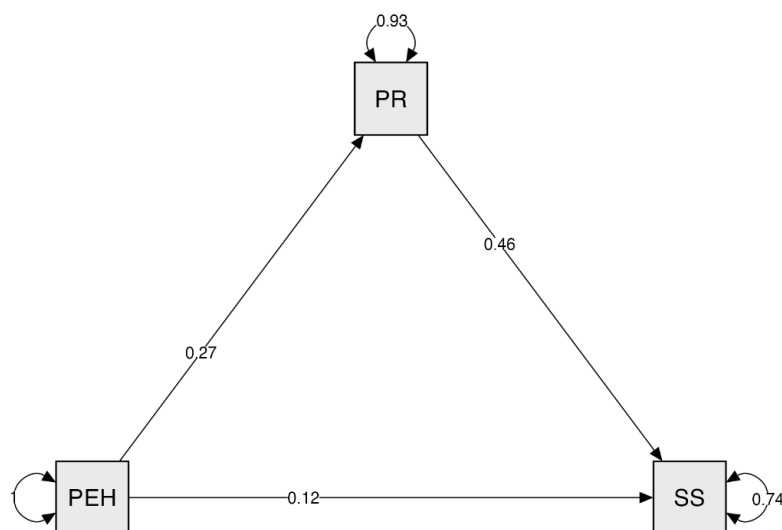


Figure 2. Mediation model of peer relationships in the relationship between physical education course happiness and school satisfaction

Figure 2 displays the hypothesized mediation model examining the mediating role of PR in the relationship between PEH and SS. The model shows that the direct effect of PEH on PR is positive ($\beta = 0.27$). Similarly, the direct effects of PR on SS ($\beta = 0.46$) and PEH on SS ($\beta = 0.12$) were also positive. The error variances were PEH = 1.00, PR = 0.93, and SS = 0.74, respectively.

4. Discussion

This study contributes to the understanding of how emotional and social processes within the school context shape students' well-being by revealing the structural relationships among happiness experienced in physical education classes, peer relationships, and school satisfaction among middle school students. The findings demonstrated that happiness experienced during physical education significantly predicted school satisfaction. This result aligns with prior studies showing that satisfaction derived from physical education enhances students' overall school satisfaction (2, 25). Moral-García et al. (2) reported that students who feel high satisfaction in physical education exhibit increased satisfaction with both school and life, and that this effect stems not only from participation in physical activity but also from feelings of success and enjoyment experienced during the lessons. This finding underscores that students are motivated not only by the academic dimension of school but also by its emotional atmosphere.

Another core result of the study is the strong effect of peer relationships on school satisfaction. The findings are in line with prior research suggesting that peer support and positive peer interactions enhance students' school satisfaction (43, 44). Gempp and González-Carrasco (43) found that the effect of peer relationships on adolescents' life satisfaction occurs entirely indirectly through school satisfaction. This suggests that students' social connections at school lie at the center of their overall happiness within the school environment. The literature emphasizes that peer acceptance and feelings of social support help students perceive themselves as part of a community, which, in turn, enhances school satisfaction (45). The present study deepens this understanding by showing that peer relationships not only directly influence school satisfaction but also serve as a mediating mechanism through which happiness in physical education is transferred to school satisfaction, demonstrating how social interactions intertwine with emotional processes.

The findings can also be strongly interpreted within the framework of positive psychology theories. According to

Seligman's (6) PERMA model, well-being consists of five core components: positive emotions, engagement, relationships, meaning, and accomplishment. Happiness experienced during physical education corresponds to the component of positive emotions, while peer relationships directly align with the relationships dimension. Thus, experiencing happiness during lessons facilitates the formation of positive peer relationships, ultimately enhancing overall school satisfaction. From the perspective of Self-Determination Theory (46), happiness in physical education is rooted in the satisfaction of students' basic psychological needs. When students' needs for autonomy, competence, and relatedness are fulfilled during physical education, their intrinsic motivation increases, supporting lesson satisfaction as well as school engagement. Teacher support fostering students' sense of autonomy, collaboration-building activities nurturing belongingness, and experiences of successful performance all contribute to the reciprocal reinforcement of happiness and school satisfaction.

Similarly, the Broaden and Build Theory (23) posits that positive emotions broaden individuals' cognitive and social resources. In this context, happiness experienced during physical education may encourage students to behave in more open, supportive, and empathetic ways during social interactions. Over time, this can lead to the formation of stronger social networks and contribute to a more supportive school environment. Indeed, Wang et al. (47) noted that positive peer relationships enhance students' subjective well-being, an effect mediated by optimism and effective emotion regulation.

The practical implications of the findings highlight the central role of physical education not only in physical development but also in social and emotional learning. Activities that require students to work together, collaborate, and support one another foster the development of an inclusive school culture. Teachers adopting autonomy supportive and inclusive instructional styles help students feel valued and competent (48). Furthermore, promoting a mindset that prioritizes growth and enjoyment over performance in physical education contributes to the sustainability of positive emotions and, consequently, school satisfaction. In this regard, it is essential that teachers create emotionally safe classroom climates and design activities that promote cooperation. Such practices operationalize the positive emotions and relationships components of the PERMA model in the daily school setting.

From a policy perspective, the findings suggest that physical education classes should be preserved and strengthened within school curricula. In many countries, the increasing emphasis on academic performance risks overshadowing dimensions of student well-being. However, as the present study indicates, happiness and social bonds formed in physical education enhance students' positive attitudes toward school and, consequently, their academic engagement. The World Health Organization (49) emphasizes that school-based physical activity programs are crucial in fostering lifelong healthy habits among young people. Therefore, physical education should be regarded as a cornerstone of educational policies aiming to promote students' physical and psychological well-being. Moreover, school-based programs designed to strengthen peer relationships such as peer mediation, teamwork activities, and group games may enhance school satisfaction. Positive school climate initiatives should promote environments in which students feel safe, valued, and supported. Such approaches can not only increase student happiness but also reduce absenteeism, boost motivation, and improve academic achievement.

Despite its contributions, this research has several limitations. First, the cross-sectional design limits inferences about the directionality and causality of the relationships. Although the proposed mediation pathway is theoretically coherent, causal claims cannot be confirmed without longitudinal or quasi-experimental designs that assess temporal ordering and reciprocal influence. Second, all data were collected from a single source through self-report measures. This raises the potential for common method bias and social desirability effects, indicating the need for future studies to include multiple informants (e.g., teachers, parents, peers) and multimethod assessments (e.g., observations, sociometric network indicators). Third, the sample was limited to a specific geographic region and educational context, which affects the generalizability of the findings. Comparative studies involving different regions, school types, and age groups would strengthen external validity. Fourth, potential variables not included in the model such as teacher support, dimensions of perceived school climate, academic achievement, socioeconomic status, and experiences of bullying may have confounding effects. Future research should utilize multilevel (student–classroom–school) models and comprehensive SEM approaches incorporating both mediators and moderators. Finally, collecting data at a single time point may amplify the influence of momentary emotional states. Repeated

measurements would allow for assessing internal stability and controlling seasonal or exam period effects.

5. Conclusion

This study identified positive associations among happiness experienced in physical education classes, peer relationships, and school satisfaction among middle school students. Greater physical education course happiness was associated with higher school satisfaction both directly and indirectly through more positive peer relationships. The statistically significant indirect pathway suggests that peer relationships may represent an important interpersonal mechanism linking students' positive emotional experiences in physical education with their broader evaluations of school. However, given the cross-sectional correlational design, the observed pathways should not be interpreted as evidence of causal relationships. These findings highlight physical education as an educational context in which students' emotional experiences and social relationships are closely associated with their overall school well-being.

Abbreviations

PEH: Physical Education Course Happiness, PR: Peer Relationships, SS School Satisfaction, CFA: Confirmatory Factor Analysis, SEM: Structural Equation Modeling

Authors' Contributions

M.A. contributed to Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft, and Writing – Review & Editing. İ.İ. contributed to Conceptualization, Methodology, Supervision, Validation, Project Administration, Writing – Review & Editing, and Correspondence. M.G. contributed to Methodology, Validation, and Writing – Review & Editing. Z.A. contributed to Investigation, Data Curation, and Writing – Review & Editing. T.Ç. contributed to Investigation, Data Curation, and Resources. R.P. contributed to Validation, Visualization, and Writing – Review & Editing. N.R. contributed to Formal Analysis, Validation, and Writing – Review & Editing. I.M. contributed to Supervision, Visualization, and Writing – Review & Editing. All authors read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Declaration

During the preparation of this manuscript, ChatGPT (OpenAI) was used solely for English-language editing, grammar correction, and improvement of readability. It was not used for study design, data generation or collection, statistical analysis, or scientific interpretation of the findings. All AI-assisted text was critically reviewed and approved by the authors. The authors take full responsibility for the accuracy, originality, and integrity of the manuscript.

Transparency Statement

The datasets generated and/or analyzed during the current study are not publicly available due to ethical and privacy considerations but are available from the corresponding author upon reasonable request.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

Ethical approval for this study was obtained from the Social and Humanities Research and Publication Ethics Committee of İnönü University (Approval No. 5; November 6, 2025). Written informed consent was obtained from the parents or legal guardians of all participants, and informed assent was obtained from the students prior to participation. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

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