

The Interplay Between Adolescents' Sports Moral Emotions and Achievement Motivation: The Moderating Role of Grade Level



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Abstract: Moral sentiment, recognized as a latent catalyst for tendencies toward moral behavior, has stimulated considerable interdisciplinary interest. Functioning as a pivotal psychological factor in the formation of adolescent character and conduct, the relationship between sports moral sentiment and achievement motivation is marked by intricate dynamics. Through the lens of physical education in the digital age, this study investigates the underlying mechanisms linking adolescents' sports moral sentiment with achievement motivation, paying particular attention to the moderating effect of grade level. The findings are intended to furnish innovative perspectives and strategic methodologies for the field of physical education. Grounded in developmental psychology, this study employed the Achievement Motivation Scale and the Adolescent Sports Moral Character Scale to conduct a survey among 438 students from a secondary school in Kunming, Yunnan Province, utilizing digital questionnaires for data collection. Statistical analyses conducted using SPSS 27.0 revealed that sports moral sentiment exerts a significant influence on achievement motivation, with grade level serving as a moderating factor in this relationship. Correlation analysis demonstrated a statistically significant positive association between sports moral sentiment and achievement motivation ($r = 0.480$, $p < 0.001$). Further moderation analysis confirmed that grade level significantly moderates the relationship between sports moral sentiment and achievement motivation ($p < 0.01$). The findings provide robust evidence for a substantial linkage between adolescents' sports moral sentiment and their achievement motivation, with empirical data indicating that sports moral sentiment serves as a reliable predictor of achievement motivation. The moderating role of grade differences underscores the necessity of systematically integrating moral sentiment education into physical education curricula. In light of the distinct psychological developmental characteristics of students across different junior secondary grade levels, tailored pedagogical strategies should be formulated. These efforts are ultimately directed toward enhancing academic motivation and fostering students' holistic development.

Keywords: adolescents, sports moral emotions, achievement motivation, moderating effect

1. Introduction

In recent years, moral sentiment has re-emerged as a subject of scholarly interest across diverse disciplines, including philosophy, psychology, neuroscience, economics, genetics, and sociology

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(Blair & Fowler, 2008), progressively establishing itself as a significant determinant driving predispositions toward moral conduct (Arsenio, 2013; Ma et al., 2025; Gao et al., 2025). These affective states originate from an individual's evaluative judgments and value assessments (Nussbaum, 2001). Positive affective dimensions encompass pride,

gratitude, and elevation, whereas negative dimensions comprise guilt, shame, and sympathy (Malti & Latzko, 2012; Tracy et al., 2007). Moral disengagement, in turn, attenuates negative emotional responses to antisocial behavior and increases the likelihood of reported antisocial conduct, thereby partially mediating anticipated guilt (Stanger et al., 2013).

Within the domain of physical education, emotional states exert a determinative influence on students' experiential engagement and proactive involvement, directly shaping their willingness to participate in classroom activities and subsequent physical exercise regimens (Ntoumanis & Standage, 2009; Jang et al., 2010; Cheon & Reeve, 2015; Gao et al., 2025). Positive affective states such as enjoyment and authentic pride significantly enhance students' interest in and adherence to physical activities (Nie et al., 2025). Adolescents prone to experiencing authentic pride demonstrate a greater propensity for prosocial behavior, whereas those inclined toward hubristic pride and narcissism among athletes show increased likelihood of antisocial conduct (Stanger et al., 2021). Conversely, negative emotions, including anxiety and shame substantially undermine participation motivation (Arnold & Fletcher, 2021; Lirola et al., 2025; Nie et al., 2025). In the collective pursuit of shared objectives, the emergence of disagreements and emotional fluctuations becomes virtually inevitable. Conversely, behaviors directed toward opponents manifest considerable heterogeneity: certain actions may be characterized as strategic gamesmanship—complying with formal regulations while violating the spirit of sportsmanship—whereas others approximate direct physical or verbal aggression (Kavussanu, 2026; Kavussanu et al., 2013). Furthermore, during competitive engagement, as anxiety and exertion intensity peak, the enjoyment derived from competitive and cooperative interactions transcends what is typically experienced in individual contexts (Ring et al., 2022).

According to moral development theory, adolescence constitutes a critical period marked by

significant transformations in moral reasoning capacities (Gibbs, 2003; Kohlberg, 1984; Piaget, 1981). During this developmental phase, adolescents' emotional states and early experiences substantially shape the information they attend to in specific contexts, the conclusions they derive, and their subsequent behavioral responses (Pinker, 2011). Physical activity, through neurochemical mechanisms involving serotonin and norepinephrine release, rapidly induces positive affective states (Rasmussen & Laumann, 2013), thereby significantly alleviating symptoms of anxiety and depression (Karagiorgakis & Blaker, 2021). Regular engagement in physical exercise further enhances psychological resilience among students confronting academic stressors (Qiu et al., 2025), enabling more effective coping with challenges while simultaneously mitigating stress-related negative emotions (Dexter et al., 2021). These neurophysiological findings substantiate the intrinsic connection between affective experience and motivational drives (Aydede, 2014; Brady, 2019).

Achievement motivation represents an intrinsic psychological drive that compels individuals to pursue success and excellence in task performance (Nicholls, 1982). Elliot and McGregor (2001) established and empirically validated the prominent 2×2 achievement goal framework, which categorizes individual achievement goals into four distinct orientations: mastery-approach (focusing on task mastery and competence development), mastery-avoidance (concerned with avoiding misunderstanding or failure to master tasks), performance-approach (aiming to demonstrate competence relative to others), and performance-avoidance (directed toward avoiding demonstrations of incompetence before others). Relevant educational research indicates that students possessing more complex and adaptive achievement motivation profiles typically employ proactive time management strategies, thereby enhancing their effectiveness in accomplishing diverse academic requirements (Wolters et al., 2025). Furthermore, the implementation of adaptive gamification

environments in science education (Zourmpakis et al., 2023b; Papadakis et al., 2024) has been empirically demonstrated to significantly enhance primary school students' motivation for scientific learning (Zourmpakis et al., 2023a; Zourmpakis et al., 2024). The predictive efficacy of achievement goals on intrinsic satisfaction manifests domain-specific variations: research indicates that intrinsic satisfaction in academic contexts is predominantly influenced by task-oriented goals, whereas in physical education settings it is primarily predicted by individual competence perceptions (Duda & Nicholls, 1992). Further empirical investigations reveal that within physical education contexts, mastery-oriented, self-referenced, and task-focused achievement goals collectively contribute to significantly enhancing students' motivational engagement in sports (Lin et al., 2023). Concurrently, in adolescent sports participation, intrinsic motivation serves as a positive predictor of positive affect, while amotivation significantly predicts negative emotional states (Standage et al., 2005). Developmental trajectories further reveal significant fluctuations in student motivation across grade levels (Cooper, 2001b). Substantial empirical evidence indicates that students in lower grades demonstrate heightened engagement levels (Regueiro et al., 2015), whereas a progressive decline in motivational intensity is observed as students advance to higher educational stages (Hong et al., 2009; Trautwein et al., 2006).

2. Research Objectives

Current research reveals that investigations into the relationship between moral emotions and motivation have predominantly concentrated on general educational contexts (Satka & Garneva, 2024), while exhibiting a pronounced scarcity within physical education settings. Furthermore, existing studies have largely neglected developmental characteristics specific to different educational stages, resulting in insufficiently targeted approaches in physical education practices concerning both moral emotional development and achievement motivation.

Against this contextual backdrop, the present study specifically addresses two fundamental research questions:

1. *Does a statistically significant relationship exist between adolescents' sports moral emotions and their achievement motivation?*
2. *Does grade level serve a moderating function in the relationship between adolescents' sports moral emotions and achievement motivation?*

3. Theoretical Basis and Research Hypotheses

This study establishes its theoretical framework upon the foundational principles of moral sentiment theory and achievement motivation theory. Hume's theory of moral sentiments provides the philosophical underpinning, positing that moral judgments originate from affective experiences (Hume, 1978/2000). Building upon this premise, the present research proposes that moral sentiment within physical education contexts constitutes a complex evaluative mechanism formed through dynamic interactions between affective intuition and situational cognition.

In the domain of achievement motivation, the expectancy-value theory (Eccles et al., 1983; Pintrich & Schunk, 1996) serves as the core theoretical foundation. This framework maintains that achievement-oriented behaviors are jointly influenced by two dimensions: expectancy (beliefs about one's capabilities) and value (perceptions of task importance). The current study innovatively integrates moral sentiment as a moderating variable within this framework, proposing that in morally-significant contexts such as physical education, moral sentiment influences motivation formation by modulating the relationship between expectancy and value perceptions (Atkinson, 1957; Eccles et al., 1983).

Based on theoretical synthesis, existing research has established the positive correlation between achievement motivation and sportsmanship (Ntoumanis & Standage, 2009), while simultaneously revealing how affective feedback from moral decision-making reinforces subsequent

behaviors (Malti & Latzko, 2012). These findings substantiate the following research hypotheses:

H1: Adolescents' sports moral sentiment significantly positively predicts their achievement motivation.

H2: Grade level moderates the relationship between sports moral sentiment and achievement motivation.

4. Research Methodology

4.1 Research procedure

This study employed a cross-sectional quantitative research design (Bryman, 2016), conducted in May 2025. Notably, the questionnaire administration occurred after nine weeks of instructional delivery, ensuring participants had acquired foundational exposure to statistical concepts. To enhance student engagement in the research process, we implemented methodological recommendations proposed by Lavidas et al. (2022). Furthermore, during the preliminary briefing preceding the survey administration, participants were explicitly advised regarding the critical importance of sincere responses for ensuring research validity.

Ethical considerations pertaining to individual privacy were rigorously addressed throughout the research process. Previous empirical investigations have demonstrated that enhanced privacy protections and anonymity provisions correspond with reduced levels of social desirability bias (Krumpal, 2013; Dodou & de Winter, 2014).

4.2 Participants

The study recruited participants from the complete student population undertaking Physical and Health Education courses at a secondary school in Kunming, Yunnan Province, with all involvement being voluntary. A final cohort of 438 students was selected for inclusion, comprising 260 seventh-grade and 178 eighth-grade participants, with a gender distribution of 227 females and 211 males. Following acquisition of informed consent from school administration, homeroom teachers, and the students themselves, all available students from the

designated classes were included in the survey cohort.

From the initial distribution of 450 questionnaires, invalid responses—including blank, incomplete, and patterned submissions—were systematically excluded during data processing, resulting in 438 valid questionnaires retained for analysis. This yielded a valid response rate of 97.3%.

4.3 Research tools

4.3.1 Achievement motivation scale

Study for the assessment of achievement motivation, we adopted the Chinese adaptation (Ye & Hagtvet, 1992) of the Achievement Motivation Scale. This original scale was first developed by Nygård and Gjesme in 1973, and its applicability has been verified in earlier research involving Chinese middle school student participants (A. B. Zhou, 1997). The reliability analysis demonstrated excellent internal consistency for the measurement instrument, with the full scale achieving a Cronbach's α coefficient of 0.86. Both subscales exhibited strong reliability indices: the motivation to approach success subscale yielded $\alpha=0.88$, while the motivation to avoid failure subscale showed $\alpha=0.91$. These psychometric properties consistently met established measurement standards, confirming the scale's robust reliability for research application.

4.3.2 Adolescent sports moral character scale

To more accurately assess adolescents' sports moral sentiment, the present investigation incorporated methodological refinements to the "Moral Content Judgment in Sports Questionnaire" developed by Proios (2010) and the "Sports Moral Sentiment" subscale from the Adolescent Sports Morality Scale formulated by Liu (2024). These adaptations were deliberately aligned with established patterns of adolescent psychophysical development to enhance ecological validity.

The instrument comprises two secondary indicators operationalized through 21 specific dimensions, employing a five-point Likert scale ranging from "strongly disagree" to "strongly agree." Higher scores on the subscale indicate stronger moral sentiment tendencies demonstrated by adolescents

within physical activity contexts. With internal consistency coefficients ranging from 0.6 to 0.9, the scale provides a psychometrically sound assessment tool for evaluating adolescents' sports moral sentiment in the present investigation.

4.3.3 Data collection and processing

The assessment procedures were administered by local school homeroom teachers and subject instructors through group testing sessions organized by class. The research strictly adhered to the principle of informed consent throughout the data collection process. All acquired data underwent statistical analysis utilizing SPSS 27.0 and AMOS 28.0 software packages, with subsequent graphical representations generated through Visio application.

5. Results

5.1 Control and examination of common method bias

Given that all data in this study were collected through self-report questionnaires, potential common method bias was addressed using Harman's

single-factor test. All measurement items across the studied variables were subjected to exploratory factor analysis simultaneously. The results indicated that the first common factor accounted for 28.476% of the variance, falling below the 40% threshold. This suggests the absence of substantial common method bias, thereby supporting the validity of proceeding with subsequent data analyses.

5.2 Descriptive analysis

The investigation employed an online questionnaire-based methodology, with 450 questionnaires distributed and 438 valid responses collected, yielding a response rate of 97.3%. The study cohort comprised students from seventh and eighth grades, including 211 male participants (48.2%) and 227 female participants (51.8%). The seventh-grade subgroup consisted of 126 males and 134 females, collectively representing 59.4% of the total sample, while the eighth-grade subgroup included 85 males and 93 females, accounting for 40.6% of participants (as presented in Table 1).

Table 1 Data Collection Summary

Grade Level	Male (N=211)	Female (N=227)	Total/Percentage
Grade 7	126	134	260/59.4%
Grade 8	85	93	178/40.6%
Total/Percentage	211/48.2%	227/51.8%	438/100%

5.3 Independent samples T-test analysis

As presented in Table 2, significant gender differences emerged in achievement motivation ($t = 2.595$, $p = 0.010$), with male students demonstrating substantially higher achievement motivation levels ($M = 10.52$, $SD = 1.270$) compared to their female counterparts ($M = 7.22$, $SD = 1.275$). This finding aligns with theoretical frameworks positing gender differentiation in early adolescent achievement motivation development, potentially reflecting differential impacts of socio-cultural expectations and physical activity participation patterns across

genders. Conversely, no statistically significant gender differences were observed in sports moral sentiment ($t = -0.863$, $p = 0.389$), suggesting that moral sentiment development may maintain cross-gender consistency within adolescent populations, with its formation more likely influenced by shared school physical education culture and common curricular experiences.

Table 2 Independent Samples T-test Analysis Across Genders

Variable	Gender	Mean	Condition	Levene's Test for Equality of Variances		t-test for Equality of Means						
				F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
											Lower	Upper
Achievement	Male	10.52	Equal Variances	1.948	0.163	2.595	436	0.010	3.297	1.270	0.800	5.794
Motivation	Female	7.22	Unequal Variances			2.586	424. 591	0.010	3.297	1.275	0.791	5.802
Sports Moral Emotions	Male	37.180 1	Equal Variances	13.37 2	<0.001	-0.863	436	0.389	-.57321	0.66441	-1.879 06	0.7326 4
	Female	37.753 3	Unequal Variances			-0.858	413. 139	0.392	-.57321	-.66839	-1.887 08	0.7406 6

5.4 Correlation analysis

Based on the analytical data presented in Table 3, A significant positive correlation was observed between achievement motivation and sports moral sentiment ($r = 0.480$, $p < 0.01$), supporting the theoretical proposition that moral sentiment functions as a facilitative factor for motivation. Concurrently, grade level demonstrated significant negative

correlations with both achievement motivation ($r = -0.203$, $p < 0.01$) and sports moral sentiment ($r = -0.114$, $p < 0.05$), preliminarily indicating a synchronous decline in students' motivational levels and moral sentiment as they advance through grades. This observed pattern establishes a logical foundation for subsequent examination of grade level's moderating role.

Table 3 Correlation Analysis Among Key Variables

Variable	Achievement Motivation	Sports Moral Emotions	Grade Level
Achievement Motivation	1		
Sports Moral Emotions	0.480**	1	
Grade Level	-0.203**	-0.114*	1

*Note: ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

5.5 Linear regression analysis

To elucidate the underlying mechanisms among variables, this study constructed hierarchical regression models (presented in Table 4). After controlling for gender, sports moral sentiment demonstrated a stable positive predictive effect on achievement motivation (Model 2: $\beta = 0.469$, $p < 0.001$), reaffirming the robust association between

these constructs. More significantly, upon introducing the interaction term between sports moral sentiment and grade level, the coefficient emerged as significantly negative ($\beta = -0.633$, $p = 0.005$). This finding statistically confirms that grade level serves as a significant moderator in the relationship between sports moral sentiment and achievement motivation.

Table 4 Linear Regression Analysis of Achievement Motivation: Comparison Across Models

Model → Dependent Variable	Predictors	R ²	Adjusted R ²	Standardized Coefficient Beta	t-value	p-value
1→Achievement Motivation	Gender (Control)	0.501	0.251	-0.143	-3.452	< 0.001
	Sports Moral			0.486	11.697	< 0.001
	Emotions					
2→Achievement Motivation	Gender (Control)	0.522	0.272	-0.141	-3.440	< 0.001
	Sports Moral			0.469	11.365	< 0.001
	Emotions					
	Grade Level			-0.146	-3.552	< 0.001
3→Achievement Motivation	Gender (Control)	0.534	0.285	-0.147	-3.612	< 0.001

5.6 Moderating effect analysis

Moderation analysis conducted using Hayes' Process macro (presented in Table 5) further quantified this relationship. The direct effect of sports moral sentiment on achievement motivation

was 0.479 ($p < 0.01$), while the moderating effect of grade level was -0.136 ($p < 0.01$) with a 95% confidence interval of [-0.216, -0.056], excluding zero. This result reaffirms the robustness of the moderating effect.

Table 5 Analysis of Moderating Effects on Achievement Motivation: Sports Moral Emotions, Grade Level, and Their Interaction

Moderating Effect	Effect	SE	LLCI	ULCI
Sports Moral Emotions → Achievement Motivation	0.479	0.041	0.399	0.560
Grade Level → Achievement Motivation	-0.151	0.041	-0.232	-0.071
Interaction: Sports Moral Emotions × Grade Level → Achievement Motivation	-0.136	0.041	-0.216	-0.056
Gender (Covariate) → Achievement Motivation	-0.146	0.041	-0.226	-0.066

Figure 1, comprising both conceptual (A) and statistical (B) diagrams, systematically elucidates the moderating role of grade level in the relationship between sports moral sentiment and achievement motivation. The statistical diagram (B) not only reaffirms the robust positive predictive effect of sports moral sentiment on achievement motivation ($\beta = 0.479$, $p < 0.001$) but, more significantly, reveals the adverse influence of grade progression: grade level not only directly and negatively predicts achievement motivation ($\beta = -0.151$, $p < 0.001$) but

also demonstrates a significantly negative interaction effect with sports moral sentiment ($\beta = -0.136$, $p < 0.001$). This finding indicates that as students advance through grade levels, the facilitative effect of sports moral sentiment on achievement motivation becomes substantially attenuated, thereby providing crucial empirical evidence supporting the theoretical proposition that adolescents experience adaptive challenges in intrinsic motivation development throughout their academic progression.

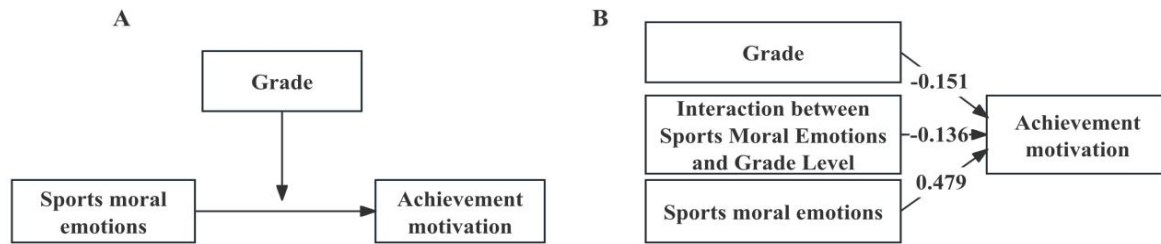


Figure 1 Conceptual Diagram (A) and Statistical Chart (B) of the Moderating Effect of Grade Level on the Relationship Between Sports Moral Emotions and Achievement Motivation

6. Discussion

6.1 The relationship between sports moral emotions and achievement motivation

This study empirically validates the positive predictive effect of sports moral sentiment on achievement motivation (supporting Hypothesis H1), thereby illuminating the intrinsic linkage between affective factors and motivational systems within physical education contexts. Specifically, students' moral sentiment experiences—including rule compliance awareness and team responsibility perception developed through sports activities—evolve into intrinsic drivers for pursuing excellence via the psychological pathway of “affective experience-value internalization.” This mechanism finds theoretical explanation through the lens of self-determination theory: the cultivation of sports moral sentiment effectively satisfies students' relational and identity needs, consequently reinforcing their autonomous motivation for sports participation. This discovery aligns closely with contemporary educational psychology's social-emotional learning framework, collectively indicating that moral sentiment development in physical education transcends character formation to constitute a fundamental impetus for sustaining student engagement and fostering self-transcendence.

6.2 The moderating role of grade level in the relationship between sports moral emotions and achievement motivation

This study confirms the moderating effect of grade level on the relationship between sports moral sentiment and achievement motivation (supporting Hypothesis H2). As students progress to higher

grades, the explanatory power of moral sentiment on achievement motivation demonstrates systematic attenuation. This trend reflects a concerning phenomenon of value alienation in physical education curriculum design—specifically, a structural shift in educational emphasis from affective cultivation toward instrumental rationality. This is manifested through distinct pedagogical approaches: lower grades emphasize fostering emotional engagement through gamified instruction, whereas higher grades prioritize skill acquisition and performance evaluation. Such transition in curricular focus transforms students' participation motivation from intrinsic affective experience to extrinsic task completion, ultimately diminishing the driving efficacy of moral sentiment on achievement motivation.

These findings carry significant implications for educational practice: without establishing a coherent moral sentiment cultivation framework across all academic stages, the educational function of physical education will continue to weaken with grade advancement.

Future research should advance through three dimensions: first, conducting cross-cultural comparative studies to examine the operational mechanisms of this relationship under different educational systems; second, designing educational intervention experiments to verify the efficacy of moral sentiment development programs; third, employing mixed-methods approaches to systematically analyze contextual variables and educational elements influencing this relationship.

7. Conclusion

This study substantiates that sports moral sentiment serves as a stable positive predictor of academic achievement motivation, yet this association demonstrates significant attenuation with grade progression, revealing a structural paradox within contemporary physical education systems where educational efficacy diminishes as students advance academically. The concurrent finding that gender influences achievement motivation but not moral sentiment suggests distinct developmental trajectories for these constructs. These empirical insights necessitate a systematic reconceptualization of physical education policy across academic stages, particularly calling for curricular innovations at senior secondary levels to reestablish the synergistic interaction between moral sentiment and achievement motivation, thereby fully realizing the unique potential of physical education in cultivating students' holistic character development.

Declarations

Ethical Approval and Consent to Participate

The experimental methods involving all human participants in this study strictly adhered to relevant guidelines and regulations. Moreover, the experimental protocol of this study has been approved by the Academic Ethics Committee of the Faculty of Psychology at Beijing Normal University. All experimental procedures were conducted in accordance with the ethical guidelines established by the committee, as well as the 1964 Declaration of Helsinki and its subsequent amendments or equivalent ethical standards, ensuring the ethical compliance of the research. We confirm that informed consent was obtained from all participants under the age of 16 and their legal guardians.

Consent for Publication

The authors confirm that this manuscript represents original research, has not been published in any other journal or publication, and is not under simultaneous consideration by any other journal.

Competing Interests

The authors declare that there are no competing financial or non-financial interests that could be perceived as influencing the research.

Generative AI Disclosure

The authors affirm that no generative artificial intelligence tools were used in the creation of this manuscript.

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Data access

The data supporting the findings are available within the article.

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