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Research on the Influence of College Physical Education on the Sports Behavior Habits of Female College Students from the Perspective of Emotional Experience

This study investigates how college physical education affects the exercise habits of female students. In response to the global challenge of promoting healthy lifestyles and insufficient exercise participation among female college students, a correlation model was constructed to examine the relationship between emotional experiences and exercise behavior. Using stratified random sampling, 100 sophomore female students enrolled in aerobics courses were selected as research subjects. Emotional experiences and exercise behavior characteristics were assessed through standardized scales, and SPSS 26.0 was used for correlation analysis and regression modeling. Results indicate a significant positive correlation between emotional experience and exercise habits ($r = 0.536$, $p < 0.001$). Emotional variables explain 28.7% of behavioral variation. Prediction is strongest in the Low Emotional Experience Group ($n = 30$, $R^2 = 0.315$), while the High Emotional Experience Group ($n = 12$) exhibits behavioral attenuation after emotional saturation. This study innovatively reveals the gradient attenuation in the emotion–exercise relationship and supports the applicability of the emotion regulation need theory in exercise contexts. It is recommended to construct an emotion-oriented curriculum system to enhance exercise participation through engaging project design, achievement reinforcement, and differentiated intervention strategies. Limitations include the small sample size and the inability to infer causality from the cross-sectional design. Future multicenter longitudinal studies are needed to further explore the underlying mechanisms.

Keywords: emotional experience, physical education teaching in colleges and universities, sports behavior habits, female college students

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Introduction

Globally, the promotion of healthy lifestyles has become a key priority for governments and educational institutions. However, the convenience brought by modern technology and the Internet has altered dietary habits, increased life stress, and reduced leisure and exercise time, leading to declining physical activity levels. This reduction negatively impacts health and raises the risk of chronic diseases and physical function deterioration [1]. In addition, foreign studies have also pointed out that there is a phenomenon of insufficient exercise in the lifestyles of college students, but healthy lifestyles can effectively control and improve the physical fitness and BMI of obese adolescents [1]. Physical education courses in colleges and universities play an important role in promoting exercise behavior habits of female college students. The design and teaching methods of physical education courses have an important impact on students' exercise motivation and behavior. For example, providing diverse sports projects, personalized choices, and introducing psychological skills training can effectively improve students' anxiety levels and personal coping resources [2]. In addition, the integration of self-supported teaching styles and mental health education in physical education courses can reduce students' fear and anxiety about failure, thereby promoting their active participation in physical activities [2].

Despite these benefits, female college students in China still face multiple challenges in their exercise behaviors and habits. These issues not only compromise their physical and mental health but also hinder their ability to maintain long-term participation in exercise. First, insufficient exercise time and lack of regularity are common. A survey of ordinary undergraduate universities in Guiyang shows that 42.08% of female college students are mainly busy with their studies during their leisure time, and 35.68% of the students have irregular and unstable time periods for participating in sports activities. This reflects that they have obvious deficiencies in time management, and it is difficult for them to form stable exercise habits [3]. Second, the

exercise intensity and frequency of female college students are also generally low. Although a considerable number of students participate in physical exercise, their exercise intensity and frequency are often insufficient to meet the health-promotion standards, and the frequency and time of exercise are still inadequate. Their sports behavior is more out of interest or short-term goals rather than long-term health needs [4]. Third, psychological barriers and emotional distress are also evident. Many students report negative emotions such as apathy, laziness, fear of effort, anxiety, low self-esteem, shyness, and timidity in relation to sports, all of which weaken their motivation and persistence [5]. Moreover, the structure and teaching methods of PE courses do not always align with female students' needs, with some reporting that the content is monotonous and fails to spark interest [6].

In psychology, emotions are typically described as a subjective experience that involves an individual's perception of their own psychological state. They are "intense psychological disturbances that involve behavior, conscious experience, and visceral functions" [7]. The James-Lange theory posits that emotional experiences are the result of bodily reactions [8]. The Self-Determination Theory suggests that human behavioral motivation mainly stems from the fulfillment of three basic psychological needs: autonomy, competence, and relatedness. When these needs are met, individuals are more likely to develop intrinsic motivation and thus be more willing to participate in sports [9]. Moreover, a study by Kelly L. Simonton et al. (2023) also indicates that there is a significant positive correlation between positive emotions (such as enjoyment and pride) and exercise behavior [10]. Positive emotions (such as enjoyment and excitement) are the strongest predictors of exercise behavior, while negative emotions (such as boredom and frustration) are negatively correlated with exercise behavior [11].

Developing healthy exercise behaviors brings multi-dimensional benefits to female college students, supporting physical health, mental well-being, and social adaptability. At the level of physical health, regular physical exercise can effectively enhance cardiopulmonary function, optimize body fat percentage, and body posture [12]. At the same time, rhythmic training such as aerobic exercise can significantly improve female students' physical self-esteem, forming a virtuous cycle in aspects such as muscle strength, flexibility, and weight management [13]. In terms of mental health, physical activities significantly improve emotional states through the stress-release mechanism and reduce negative psychological indicators such as anxiety and hostility. In particular, sports forms such as sports dance and aerobics have special effects on improving sensitivity in interpersonal relationships and paranoid tendencies [14]. Long-term participation can further enhance mental toughness and self–efficacy [12]. On the level of social adaptation, the cooperation and competition mechanisms in team sports can systematically cultivate communication skills and a sense of collective belonging [15], expand social networks, and strengthen social support systems [16]. Therefore, long-term adherence to physical exercise helps to cultivate perseverance, discipline, and teamwork spirit among female college students, and these qualities have far-reaching impacts on their future study, work and life.

Methods and materials

1 Research object

In this study, female sophomore undergraduates who selected the specialized aerobics course in the second semester of the 2023-2024 academic year at Shenyang Normal University were used as the sampling frame, and the stratified random sampling method was employed to select the samples. First, all the students who selected the course were divided into 6 natural teaching classes according to the administrative establishment of the college, forming non-overlapping sampling strata. Then, one class was selected from each stratum according to the principle of simple random sampling. Finally, a total of 100 subjects from 2 complete teaching classes were included. The demographic characteristics of the sample showed that the average age of the subjects was 19.2 ± 0.7 years (ranging from 18.3 to 20.1 years). All the subjects met the status of full-time undergraduates, and the average attendance rate of physical education courses in the previous three semesters was ≥85%. Before the study was carried out, the research protocol had been reviewed and approved by the Ethics Committee of Shenyang Normal University (Ethics Approval Number: 102772021RT004), ensuring that the research process strictly adhered to ethical guidelines and fully protected the rights and safety of the subjects.

2 Research Methods

2.1 Literature Review Method

To ensure the breadth and depth of the literature, this study selected internationally authoritative English databases and domestic core Chinese databases as the main sources of information. The following key-

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words were used to conduct searches in both Chinese and English databases: ("emotion" OR "affective response") AND ("Physical Education" OR "Sports Instruction") AND ("Exercise Behavior" OR "Physical Activity"). The PRISMA process was adopted to build a literature screening system. Regarding the inclusion criteria, the publication time of the literature was restricted from January 1, 2005, to July 31, 2025, to ensure the research's cutting—edge nature; the literature type was strictly limited to peer—reviewed academic journal papers; the research subjects must be clearly identified as undergraduate students in regular universities; the research content must involve physical education teaching in universities, emotional/affective experiences of female college students, and exercise behavior/physical activity levels. The exclusion criteria included studies with duplicate publications, non-compliant research subjects, insufficient content relevance, and incomplete data. After the above screening process, a total of 45 pieces of literature met the inclusion criteria of this study and were included in the final systematic analysis. These literatures provide empirical evidence for an in-depth exploration of how physical education teaching in universities can shape the exercise behavior habits of female college students by influencing their emotional experiences.

2.2 Questionnaire Survey Method

This study adopted the standardized questionnaire survey method, targeting full-time female undergraduate students at Shenyang Normal University. It systematically investigated the influencing mechanism of emotional experiences on sports behavior habits in the context of physical education teaching. The data collection tools were selected from authoritative scales in the field of psychology:

The "Induced Emotion Scale" compiled by Professor Zhang Liwei was used to evaluate emotional responses during participation in physical education courses. This scale was constructed based on the two-factor theory of emotion, including a three-dimensional structure of pleasure, arousal, and dominance. After cross-cultural adaptation and modification, the α coefficient reached 0.87 (95% CI: 0.83-0.90), and the confirmatory factor analysis showed a good model fit ($\chi^2/df = 2.14$, CFI = 0.93, RMSEA = 0.05). The "Physical Exercise Habit Scale" by Professor Wang Kun [17] was used to measure the characteristics of extracurricular sports behaviors. This tool integrated the theory of planned behavior and the stage-change model, covering four-dimensional indicators of exercise frequency, intensity, duration, and situational dependence. Empirical tests showed that the α coefficient was 0.83 (95% CI: 0.79 — 0.86), and the confirmatory factor analysis confirmed its structural validity ($\chi^2/df = 1.89$, CFI = 0.91, RMSEA = 0.04).

A total of 100 questionnaires were distributed in the study. After data cleaning, 84 valid questionnaires were recovered, with an effective recovery rate of 84%. The sample data covered the dimensions of emotional responses during participation in physical education courses and the characteristics of extracurricular sports behaviors, providing a quantitative analysis basis for exploring the influence of physical education teaching in colleges on female undergraduate students' sports behavior habits from the perspective of emotional experiences.

2.3 Mathematical and Statistical Methods

This study adopted a multi-stage statistical analysis strategy to systematically analyze the influencing mechanism of emotional experiences on sports behaviors. The data analysis process was as follows:

First, data pre-processing was carried out on the **SPSS 26.0** platform. The double-entry method was used to ensure the accuracy of the original data. Multiple imputation techniques were used to handle missing values, and box-plot analysis and Z-score standardization were combined to detect outliers, ensuring that the data quality met the requirements of statistical analysis. In the modeling analysis stage, the study followed a progressive analysis logic: First, descriptive statistical analysis was used to summarize the distribution characteristics of variables; then, Spearman's rank correlation analysis was used to initially explore the association direction and intensity between emotional experiences and various dimensions of sports behaviors; finally, a multivariate linear regression model was constructed to systematically test the independent predictive effect of emotional experiences on sports behaviors. Statistical tests strictly followed the principle of two-sided hypothesis testing, with a significance threshold of $\alpha = 0.05$ set. The standardized β value of the regression coefficient and the coefficient of determination R^2 were reported as effect-size indicators. Through systematic quality control and a progressive modeling strategy, this analysis framework provided a rigorous empirical basis for quantitatively analyzing the psychological mechanism of the influence of emotional experiences on sports behaviors.

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Results and Discussion

1 Descriptive Statistical Characteristics of the Scores of Female College Students' Exercise Behavior Habits

Based on 84 valid samples (without missing values), this study conducted a systematic descriptive statistical analysis on the scores of female college students' physical exercise habits (Tab. 1). In terms of central tendency indicators, the sample mean (M) was 62.61 points (standard error SE = 2.23), the median (Md) reached 66.20 points, and the mode (Mo) was concentrated at 84.00 points, forming a subgroup aggregation phenomenon centered on this score. The analysis of the degree of dispersion showed that the standard deviation SD = 20.42 (variance = 416.84), the range spanned 92 points (minimum value 13.00 → maximum value 105.00), and the coefficient of variation CV = 0.33 (> 0.15 threshold), jointly confirming the significant heterogeneity of the group's exercise behavior. The distribution pattern test revealed that the skewness coefficient g_1 = — 0.773 (standard error SE = 0.263). After standardized transformation, Z = — 2.94 (|Z|>1.96, p <.05), indicating that the data distribution showed a significant negative skewness (left-skewed), and 65.5% of the sample scores were higher than the mean. The kurtosis coefficient g_2 = 0.310 (SE = 0.520), and the standardized Z = 0.60 (|Z|<1.96, p >.05), indicating that the distribution pattern had no significant difference from the normal distribution but showed a slightly peaked feature. This result supported the theory of the positive aggregation effect of sports participation. The group with a mode of 84 points had a prominent proportion, and the range from 13 to 105 points verified the hypothesis of the continuous spectrum of exercise behavior (Sallis et al., 2012). The limitation of this study was that potential moderating variables, such as professional background was not included, and future studies need to analyze the sources of variation through stratified analysis.

Table 1

Descriptive Statistical Analysis

	n	M	SD	Skewness (Z)	Kurtosis (Z)	Min	Max	Range
Emotional	84	16.86	17.71	2.05***(7.81)	5.57***(10.70)	-12.00	84.00	96.00
Exercise Habit Score	84	62.61	20.42	-0.77***(-2.94)	0.31(0.60)	13.00	105.00	92.00
$^{***}p < 0.001$, $^{**}p < 0.01$ (for skewness and kurtosis Z-values)								

2 Analysis of the Three-Level Differentiation and Group Heterogeneity of Female College Students' Emotional Experiences

Based on 84 valid samples (N = 84), this study conducted a systematic descriptive statistical analysis of female college students' emotional experiences in physical education contexts. The results revealed both the overall distribution and heterogeneous structure of their emotional responses (Tab. 1). The total emotional scores demonstrated a wide distribution range (range = 96.00), with the mean value (M = 16.86, SE = 1.93) indicating that the overall emotional experience tended to be above a moderate level. However, the relatively large standard deviation (SD = 17.71) and variance (S^2 = 313.74) suggested significant interindividual differences in emotional responses, exhibiting notable dispersion characteristics.

Using the standard deviation grouping method, emotional experience scores were categorized into low (<12), medium (12-27), and high (>27) emotional experience groups (Tab. 2). The Low Emotional Experience Group (n = 30, M = 2.67, SD = 5.87) exhibited substantial internal variability, indicating that the emotional states within this group were relatively unstable, potentially influenced by factors such as motor competence, body image, or social comparison. The Medium Emotional Group (n = 30, M = 21.33, SD = 2.94) clustered around the theoretical median, reflecting that most students maintained a balanced state of emotional activation and regulation during physical education classes. Although the High Emotional Experience Group (n = 12, M = 31.08, SD = 2.43) had a limited sample size, its small standard deviation indicated relatively consistent and positive emotional experiences, suggesting that physical education teaching significantly enhanced emotional states for some students.

Regarding distributional morphology, the overall emotional scores exhibited pronounced positive skewness (g_1 = 2.05, SE = 0.26) and relatively high kurtosis (g_2 = 5.57, SE = 0.52), indicating a right-tailed, leptokurtic distribution. Most students' emotional scores clustered in the low-to-medium range, while a small number of extremely high scores inflated the overall mean. Both the median (16.00) and mode (18.00) were lower than the mean, further confirming the asymmetric nature of the right-skewed distribution. Percentile analysis revealed that 25% of participants scored below 6.60, 50% below 16.00, and 75% below 21.00,

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thereby outlining the cumulative distribution of emotional experiences. In conclusion, the emotional experiences of female college students in physical education contexts demonstrate marked group heterogeneity and distributional skewness. Furthermore, the small sample size in the high-emotion subgroup may limit the stability of parameter estimates. Subsequent studies should improve the representativeness of this group by expanding the sample size or implementing more stringent grouping criteria.

Table 2

Three-Level Classification of Emotional Experience

Group	n	Mean ± SD	SE	Range
Low Emotional Experience Group	30	2.67 ± 5.87	1.07	-12.00 ~ 9.00
Medium Emotional Experience Group	30	21.33 ± 2.94	0.54	17.00 ~ 27.00
High Emotional Experience Group	12	31.08 ± 2.43	0.70	28.00 ~ 36.00
Skewness is significant (p <.01), with a standardized test statistic Z = -2.74.				

3 There is a Significant Positive Correlation between the Emotional Scores of Female College Students in Physical Education Teaching and Their Exercise Behavior Habits

This study revealed the quantitative correlation pattern between emotional experiences and exercise behavior habits through Pearson's product-moment correlation analysis (Tab. 3). The overall sample analysis (n = 84) showed that there was a significant positive correlation between the emotional experience scores and the exercise habit scores (r = 0.536, p <.001, 95% CI[0.370, 0.661]). The correlation coefficient exceeded the medium-effect-size threshold defined by Cohen (1988) (r > 0.50), indicating that emotional experiences could explain 28.7% of the variation in exercise behavior (R^2 = 0.287), reaching the recognized substantial prediction standard in the field of sports psychology (R^2 > 0.25; Gould et al., 2017).

The group-by-group analysis further revealed the heterogeneity of the correlation pattern. In the Low Emotional Experience Group (n = 30), there was a significant positive correlation between emotions and exercise habits (r = 0.561, p =.001), and the effect size (R^2 = 0.315) was higher than that of the overall sample, supporting the positive—cycle mechanism of "emotion improvement—exercise persistence" in which for every one—standard—deviation increase in emotional scores, the exercise habit scores increased by 0.561 standard deviations. In the Medium Emotional Group (n = 30), no significant correlation was found (r = 0.269, p =.150), and the emotional experience could only explain 7.2% of the variation in exercise habits (R^2 = 0.072), suggesting that the coordinated change trend weakened under the medium-emotional state. In the High Emotional Experience Group (n = 12), there was an insignificant negative trend (r = — 0.410, p =.186), which might reflect the exercise burnout effect after emotional saturation, but it was limited by the sample size (statistical power β = 0.23 < 0.80). These results confirmed the core role of the emotion-regulation theory in the Low Emotional Experience Group (M = 2.67), while the weak correlation in the High Emotional Experience Group (M = 31.08) might conform to the inverted-U theory, suggesting that the behavior-promotion effect attenuated after the emotion exceeded the threshold. The analysis results suggested that future studies could expand the sample size of the High Emotional Experience Group to verify the potential non-linear mechanism.

Table 3

Correlation Analysis between Emotional Experience and Exercise Behavior Habits

Group	Variable	M	SD	n**	r**	p**
Total Sample	Emotional Experience. Score	15.17	11.09	84.0	0.536**	<.001
Exercise Habit Score	67.44	16.64				
Low Emotional Experience Group	Emotional Experience. Score	2.67	5.87	30.0	0.561**	.001
Exercise Habit Score	58.03	17.62				
Medium Emotional Experience Group	Emotional Experience Score	21.33	2.94	30.0	0.269	.150
Exercise Habit Score	73.87	13.38				
High Emotional Experience Group	Emotional Experience Score	31.08	2.43	12.0	-0.410	.186
	Exercise Habit Score	75.83	13.04			
**indicates a significant correlation at the 0.01 level (two-tailed)						

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4 Prediction of the Heterogeneity of Female College Students' Emotional Experiences and the Stratified Moderating Effect

This study focused on the female college students' group, divided them into low, medium, and high groups according to the level of emotional experience, and used a linear regression model to explore the correlation between emotions and exercise habits. The results showed significant heterogeneity (Tab. 4). In model construction, the "emotional experience group" was used as the predictor variable, and the "physical exercise habit score" was used as the dependent variable. The forced-entry method was used to focus on the main-effect correlation.

This study used a hierarchical linear regression model to systematically examine the predictive effect of emotional states on exercise habits. The results showed that there was significant heterogeneity in the intergroup effects (Fig.). The Low Emotional Experience Group (n = 30) had a significant positive predictive effect on exercise habits (F (1,28) = 12.866, p = 0.001). The unstandardized regression coefficient B = 1.683 (95% CI [0.682, 2.684]) indicated that for every one-point increase in emotional scores, the exercise habit scores increased by 1.683 points. The standardized coefficient β = 0.561 (p = 0.001) suggested a medium-intensity effect (Cohen, 1988), and the model explained 31.5% of the variance (R^2 = 0.315). In the Medium Emotional Group (n = 30), the regression model was not significant (F (1,28) =2.190, p = 0.150). The emotional experience could only explain 7.3% of the variation in exercise habits (R^2 = 0.073). The standardized coefficient β = 0.269 (p = 0.150) suggested a positive trend but lacked statistical reliability. The High Emotional Experience Group (n = 12) showed a negative predictive trend contrary to the theoretical expectation (B=-2.200, β=-0.410), but the overall model was not significant (F (1,10) =2.018, p = 0.186), the explanation rate dropped to 16.8% (R^2 = 0.168), and it was limited by the sample size (statistical power 1 — β = 0.23). The effect-size gradient analysis showed that the predictive strength of emotional experiences on exercise habits showed a non-linear attenuation feature (R^2 = 0.315 in the Low Emotional Experience Group > R^2 = 0.168 in the High Emotional Experience Group> R^2 = 0.073 in the Medium Emotional Experience Group). This pattern supported the extended explanation of the emotion—regulation demand theory (Thayer, 1989): exercise behavior might play a role as an adaptive emotion—regulation strategy in the low—emotional state (M = 2.67, SD = 5.87), while the negative trend in the high emotional state (M = 31.08, SD = 2.43) might be related to the emotional saturation effect (Fredrickson, 2001), that is, the excessive abundance of emotional resources after exceeding a certain threshold might weaken the behavior—driving efficacy. At the practical level, it is recommended to implement differentiated interventions for different emotional groups: strengthen the positive feedback system of "emotion-exercise" for the Low Emotional Experience Group, explore non-emotional driving factors for individuals in the high-emotional state (Ryan & Deci, 2000), and include moderating variables such as environmental cues for the Medium Emotional Group to deepen the mechanism research. The problem of low statistical power caused by the insufficient sample size of the High Emotional Experience Group needs to be improved through stratified sampling and moderating variable analysis in future studies.

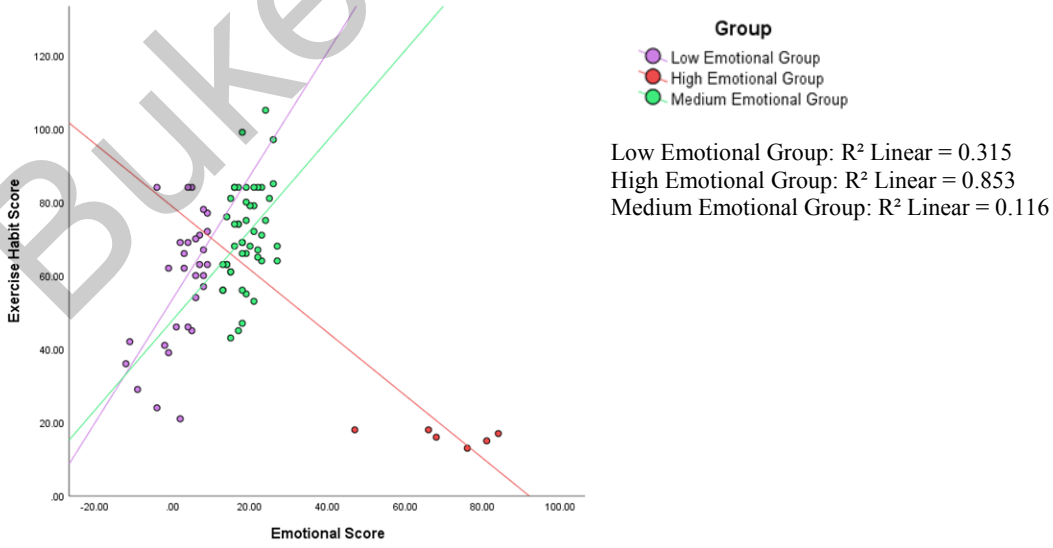

Figure. Exercise Habit Score by Emotional Score by Group

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Table 4

Regression Model Summary for Different Emotional Experience Groups

Group	Predictor Variable	B	SE B	β	t	p	F	df	R^2	Δ R^2
Overall Sample	(Constant)	55.240	2.622	-	21.067	<.001	33.085***	(1,82)	0.287	0.287
(n=84)	Emotional Score	0.804	0.140	0.536	5.752	<.001				
Low Emotion Group	(Constant)	53.545	2.985	-	17.937	<.001	12.866**	(1,28)	0.315	0.315
(n=30)	Low Emotional Score	1.683	0.469	0.561	3.587	.001				
Medium Emotion Group	(Constant)	47.711	17.838	-	2.675	.012	2.190	(1,28)	0.073	0.072
(n=30)	Medium Emotional Score	1.226	0.829	0.269	1.480	.150				
High Emotion Group	(Constant)	144.225	48.279	-	2.987	.014	2.018	(1,10)	0.168	0.168
(n=12)	High Emotional Score	-2.200	1.549	-0.410	-1.421	.186				
Significance markers: *** p <.001, ** p <.01 (Two-tailed test)										

Conclusions

This study systematically examines the heterogeneous mechanisms through which university physical education (PE) influences the exercise habits of female college students, employing a three-tiered analysis of emotional experiences. The analysis reveals distinct patterns across different emotional profiles. For the Low Emotional Experience Group, a significant positive driving effect was observed, robustly validating an "emotional improvement—exercise persistence" cyclical mechanism. Within the university PE context, positive instructional interventions effectively enhance these students' emotional states, which in turn motivates sustained exercise, thereby fostering a virtuous cycle. Conversely, the Medium Emotional Experience Group demonstrated no significant correlation between PE and exercise habits. This lack of association may be influenced by contextual factors, such as the level of peer support, instructor behavior, and physical conditions, including teaching facilities and venue quality, which might supersede the influence of emotional experience. Although limited by a small sample size, the High Emotional Experience Group exhibited an insignificant negative trend. This suggests a potential behavioral decline threshold after a state of emotional saturation is reached. When emotional states are highly positive, excessive emotional stimulation may paradoxically diminish exercise enthusiasm, leading to complacency. For instance, prolonged periods of intense excitement may elevate expectations to a level that subsequent exercise sessions cannot sustain, potentially resulting in boredom and undermining long-term habit formation. These findings provide two key theoretical contributions. First, they offer insights into the applicability of the Emotion Regulation Need Theory in PE settings, illustrating how students' distinct emotional experiences create differential needs for exercise-induced emotional regulation, which directly impacts their behavioral choices. Second, the results provide empirical evidence that supports the extension of the inverted U-shaped hypothesis to exercise contexts. The observed negative trend in the high-experience group aligns with the hypothesis's proposition that a factor's positive relationship with behavior can reverse beyond a certain threshold. From a practical perspective, this study underscores the significant role of emotions in female students' exercise experiences, offering actionable guidance for PE instructors. Teaching methods should be tailored to students' emotional profiles through tiered, precision-targeted interventions. For students with poor exercise moods, instructors should strengthen emotional motivation by setting personalized goals and employing positive feedback mechanisms to foster a sense of accomplishment and boost confidence. For students with moderate to high exercise motivation, the focus should shift to optimizing environmental factors, such as fostering positive peer interactions through cooperative activities, ensuring high-quality facilities, and adjusting instructional difficulty based on students' capabilities.

However, this study has several limitations. First, the small sample size of the High Emotional Experience Group limits the ability to comprehensively examine underlying mechanisms, potentially obscuring the nuanced relationship between intense emotional states and exercise behavior. Second, the geographic distribution of the sample was limited, as participants were drawn exclusively from a few selected institutions. This restricted sampling frame may affect the representativeness of the findings for the broader population of

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female undergraduates, thereby constraining the generalizability of the results. In light of these limitations, future research should prioritize the expansion of the overall sample size. Particular emphasis should be placed on recruiting a greater number of participants from the High Emotional Experience Group and other distinct subgroups to enhance statistical power and strengthen the robustness of the conclusions. Furthermore, broadening geographic coverage and diversifying institutional types—such as including universities from various regions and different tiers—would improve the external validity of the findings. Finally, employing a longitudinal design to track the evolution of emotional experiences and exercise habits over time could provide deeper insights into their dynamic interplay. This approach would thus enable more precise and forward-looking recommendations for university physical education programs.

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