

# A Study on the Promotive Effects of Physical Education on College Students' Lifelong Exercise Behavior: An Analysis of the Moderating Role under the "Healthy China" Strategy

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**Abstract:** *With the release and implementation of the "Healthy China 2030" blueprint, "universal health" has become a core focus across educational, social, and policy domains. Physical education in universities plays an indispensable role in helping students develop healthy attitudes and lifelong exercise habits. From an interdisciplinary perspective (education, sociology, public health), this study explores how university physical education can effectively promote the formation of lifelong exercise behaviors among students and evaluates the moderating or amplifying effects of the "Healthy China" strategy. Factors such as a diverse sports curriculum, high-quality facilities, faculty, and health policy awareness significantly correlate with student participation in and persistence with exercise. Importantly, the Healthy China strategy enhances these effects; students with greater awareness of the policy show increased willingness to engage in extracurricular physical activities and improved health literacy. These findings provide empirical support for improving physical education programs, fostering student interest in physical activities, and enhancing promotion of the Healthy China initiative.*

**Keywords:** *Physical Literacy, Intervention Strategies, Holistic Education, Sports Integration*

## 1. Introduction

With increasing national emphasis on health and physical education, the "Healthy China 2030" blueprint explicitly elevates nationwide fitness to a state strategy, promoting multi-departmental collaboration in education, health, and sports to enhance the public's health literacy (State Council of the People's Republic of China, 2016). Under this policy framework, university physical education not only shoulders the traditional responsibility of improving students' physical fitness but also plays a crucial role in fostering a "lifelong exercise mindset," enhancing health literacy, and implementing the "Healthy China" initiative [1].

However, in the actual teaching environment of universities, the setup and assessment of physical education courses are often influenced by factors such as the credit system, academic and employment pressures, and constraints on venues and funding [2]. Students' understanding and sustained interest in sports often remain superficial, limited to merely passing physical education classes. While some students meet the basic requirements in course grading, not many develop stable, enduring exercise habits. After graduation, most students gradually return to a sedentary or exercise-deficient lifestyle [3]. How the "Healthy China" strategy is implemented among university students still faces many practical and conceptual challenges, and there is a lack of systematic analysis combined with empirical research.

In metropolitan areas like Shanghai, universities have higher expectations and more room for practice in sports education reform and the cultivation of high-quality, healthily developing students. Shanghai University of Science and Technology has certain advantages in facilities and teaching staff, but how to translate these advantages into sustained exercise behavior and positive health values among students requires deeper research and theoretical guidance. Based on this, our study focuses on "the mechanisms through which university physical education promotes lifelong exercise behavior among college students" within the policy context of the "Healthy China" strategy, aiming to explore significant factors in the teaching process that influence long-term exercise willingness and behavior and to assess the moderating or amplifying role of policy awareness in this relationship.

While existing studies have focused on the short-term impact of university physical education on students' physical fitness and health levels [4], there is a lack of a systematic analysis model and

longitudinal research on how to cultivate "lifelong exercise behavior" through curriculum setting and teaching practices. By focusing on the student population at Shanghai University of Science and Technology and integrating multidisciplinary theories, this study aims to fill this academic gap, offering new research ideas and theoretical insights.

One of the real challenges faced by university physical education is the disconnect between credit requirements and the cultivation of lasting exercise habits. By collecting firsthand data through surveys and interviews and combining statistical analysis with qualitative content, this study seeks to identify key factors affecting students' persistence in and stability of exercise interests, thereby providing practical teaching and management recommendations to enhance the effectiveness of university physical education.

Whether or not universities succeed in fostering health awareness and lifelong exercise habits among students directly affects whether the grand strategy of "Healthy China" can take root among young people [5]. This study can offer targeted policy recommendations for educational authorities and school policymakers, such as how to more efficiently invest resources in curriculum design, policy promotion, and venue construction, ensuring that students maintain active exercise habits after leaving university and gradually extend these habits to a broader population.

## 2. Theoretical Foundation and Research Hypotheses

### 2.1. Theoretical Foundation

#### a) Social Ecological Model

The Social Ecological Model suggests that individual health behavior is shaped not only by personal factors (such as motivation, cognition, and attitude) but also by the surrounding environment (family, school, community, and social policies). This model is particularly useful in explaining why students in different universities or policy environments might exhibit significant differences in their lifelong exercise behaviors, even when physical education conditions are similar [6].

#### b) Self-Determination Theory (SDT)

Self-Determination Theory [7], proposed by Deci and Ryan, emphasizes the role of intrinsic and extrinsic motivation in sustaining behavior. In the context of university physical education, fostering intrinsic motivation—through engaging, enjoyable, and meaningful activities—can help students develop and maintain lifelong exercise behaviors. The theory highlights the importance of autonomy, competence, and relatedness, which are essential for cultivating sustainable exercise habits in students.

#### c) Policy Intervention Theory

Policy Intervention Theory posits that policies, particularly those related to public health and education, can shape environmental factors and guide individual behavior. The "Healthy China" strategy, as a macro-level policy, can subtly influence students' physical activity behaviors by promoting health awareness and encouraging engagement in regular exercise [8]. This study hypothesizes that students' awareness and support for health policies will amplify the positive effects of physical education on their lifelong exercise behavior.

### 2.2. Research Model and Hypotheses

Based on the above theoretical foundations and literature review, the following hypothetical model is proposed:

- Physical Education Quality → Lifelong Exercise Behavior
- Policy Awareness (Moderating Variable)

Hypothesis 1 (H1): The quality of university physical education (PE) has a significant positive effect on students' lifelong exercise behavior. This includes factors such as the diversity of the curriculum, teacher quality, facility availability, and the teaching evaluation system.

Hypothesis 2 (H2): The awareness of the "Healthy China" strategy moderates the relationship between physical education quality and lifelong exercise behavior. Specifically, students with higher awareness and support for the policy will show a stronger positive relationship between physical education and their exercise behavior.

### 3. Research Design and Methods

This study adopts a mixed-methods approach, integrating quantitative and qualitative data. A survey will be conducted with university students from Shanghai University of Science and Technology, focusing on the quality of physical education, students' lifelong exercise behaviors, and their awareness of the "Healthy China" strategy. The survey will use Likert scales to measure the quality of physical education (including curriculum diversity, teacher quality, and facility availability), lifelong exercise behaviors (such as exercise frequency and future exercise intentions), and policy awareness (familiarity with and support for the "Healthy China" strategy).

To ensure a representative sample, stratified random sampling will be used, with participants from different academic years. The data will be analyzed using descriptive statistics, multiple regression analysis, and structural equation modeling (SEM) to test the hypotheses. SEM will specifically examine how policy awareness moderates the relationship between physical education quality and lifelong exercise behavior.

Qualitative interviews will complement the survey data, providing deeper insights into students' experiences with physical education and their attitudes toward the "Healthy China" strategy. The interviews will be analyzed thematically, focusing on key factors that influence lifelong exercise behaviors and policy awareness.

### 4. Results and Analysis

#### 4.1. Descriptive Statistics and Reliability & Validity Testing

A total of 500 questionnaires were distributed, and 473 valid responses were received, yielding an effective response rate of 94.6%. Among the valid samples ( $N = 473$ ), 54.5% were male and 45.5% were female. The distribution of students across academic years was relatively balanced, with first-year students comprising 25.4%, second-year students 27.3%, third-year students 24.1%, and fourth-year students 23.2%. In terms of academic discipline, 56.7% of students were from science and engineering programs, and 43.3% were from humanities and management programs.

In terms of the quality of physical education courses, the mean score for overall course quality was 3.72 ( $SD = 0.58$ ), for lifelong exercise behavior it was 3.64 ( $SD = 0.66$ ), and for policy awareness regarding the "Healthy China" strategy it was 3.35 ( $SD = 0.69$ ). These results indicate that, overall, students showed a moderate to high level of satisfaction with physical education courses and expressed a positive attitude toward exercise behavior. However, awareness of the "Healthy China" strategy was somewhat lacking, as students generally rated their understanding of the policy at a moderate level.

To ensure the reliability and validity of the scales used in the survey, internal consistency and structural validity were tested for the following key scales: Physical Education Quality Scale (PEQ), Lifelong Exercise Behavior Scale (LSB), and Policy Awareness Scale (PAS).

The results of the reliability and validity testing are shown in the table 1:

*Table 1: Reliability and Validity Testing of the Scales*

Scale Name	Cronbach's $\alpha$	KMO Value	Bartlett's Test of Sphericity (Sig.)	Cumulative Explained Variance (%)
Physical Education Quality Scale (PEQ)	0.891	0.854	$p < 0.001$	67.4%
Lifelong Exercise Behavior Scale (LSB)	0.873	0.829	$p < 0.001$	65.1%
Policy Awareness Scale (PAS)	0.852	0.801	$p < 0.001$	62.7%

The Cronbach's  $\alpha$  values for all three core scales were greater than 0.85, indicating high internal consistency. The KMO values for the scales were all above 0.80, suggesting that the data was suitable for factor analysis. Bartlett's test of sphericity was significant ( $p < 0.001$ ) for all scales, indicating that the variables had significant intercorrelations. Additionally, the cumulative explained variance for each scale was over 60%, indicating that the factors accounted for a large proportion of the total variance. These results demonstrate that the reliability and validity of the scales were at an acceptable level, providing a solid foundation for further statistical analysis.

#### 4.2. Structural Equation Modeling (SEM) Analysis

To systematically explore the relationships between latent variables and the moderating effect of policy awareness, Structural Equation Modeling (SEM) was employed. SEM allows for the simultaneous testing of multiple relationships in a single model, providing a more comprehensive understanding of the causal paths and moderating effects involved.

The fit indices indicate that the model fits the data well. The  $\chi^2/df$  ratio is 2.47, which is below the threshold of 3, suggesting a good fit between the model and the data. The CFI and TLI values are both above 0.90, which indicates a good model fit. The RMSEA value is 0.051, and the SRMR value is 0.046, both of which are well below the recommended thresholds of 0.08, confirming that the model's fit is acceptable.

Once the model fit was confirmed, we examined the path coefficients to assess the direct and moderating effects of the variables.

Table 2: Multiple Regression Analysis Results

Variable	Model 1 (Control Variables)	Model 2 (Main Effects)	Model 3 (Interaction Term)
Constant	3.218*** (0.05)	3.067*** (0.05)	2.952*** (0.05)
Physical Education Quality (PEQ)	—	0.395*** (0.04)	0.372*** (0.04)
Policy Awareness (PCA)	—	0.241** (0.03)	0.191** (0.03)
PEQ × PCA (Interaction Term)	—	—	0.128* (0.02)
Gender (Female = Reference Group)	0.021 (0.05)	0.019 (0.05)	0.020 (0.05)
Academic Year (1st Year = Reference Group)	-0.062 (0.03)	-0.049 (0.03)	-0.046 (0.03)
Major (Humanities & Management = Reference Group)	0.045 (0.04)	0.052 (0.04)	0.049 (0.04)
R <sup>2</sup>	0.032	0.251	0.269
Adjusted R <sup>2</sup>	0.021	0.243	0.257
F Value	1.787	1.787	28.192***
F Value (Adjusted)	—	—	26.505***

Note: Standard errors are in parentheses

\*\*\*p < 0.001, p < 0.01, p < 0.05

As shown in Table 2:

**Physical Education Quality → Lifelong Exercise Behavior:** The path coefficient was 0.48 (p < 0.001), indicating that the quality of physical education has a significant positive effect on lifelong exercise behavior.

**Policy Awareness → Lifelong Exercise Behavior:** The path coefficient was 0.31 (p < 0.01), showing that policy awareness also positively influences exercise behavior, though its effect is smaller than that of physical education quality.

**Moderating Effect of Policy Awareness:** The moderating effect of policy awareness was tested through a multiple-group analysis. For students with high policy awareness, the path coefficient between physical education quality and lifelong exercise behavior was 0.57, which is significantly higher than the path coefficient of 0.44 for students with low policy awareness. This suggests that the more students are aware of the "Healthy China" policy, the stronger the impact of physical education quality on their lifelong exercise behavior.

These results confirm that the quality of physical education plays a critical role in promoting lifelong exercise behaviors, and that the awareness of the "Healthy China" policy moderates this relationship, amplifying the effect of physical education on exercise behavior.

#### 4.3. Interview Analysis and Qualitative Insights

The findings from the interviews corroborated the quantitative results. The interviewees highlighted several factors influencing their lifelong exercise habits:

**Curriculum Diversity and Quality:** Students expressed that a more diverse and engaging physical education curriculum motivated them to participate in regular physical activity. The involvement of

professional and enthusiastic instructors also played a key role in sustaining their interest in exercise.

**Policy Awareness:** Students who were more aware of the "Healthy China" strategy were more likely to incorporate physical exercise into their daily routines. Many interviewees mentioned that understanding the broader health policies made them feel more responsible for maintaining a healthy lifestyle.

**Supportive Environment:** Students noted that having easy access to sports facilities and being part of a campus culture that promoted physical activity made it easier for them to develop long-term exercise habits.

#### ***4.4. Major Findings and Implications***

**Impact of Physical Education Quality on Lifelong Exercise Behavior:** High-quality physical education, characterized by diverse curricula, skilled instructors, and adequate facilities, significantly promotes lifelong exercise behavior.

**Moderating Effect of Policy Awareness:** The level of awareness of the "Healthy China" strategy moderates the relationship between physical education quality and lifelong exercise behavior. The higher the students' awareness of health policies, the stronger the impact of physical education on their exercise habits.

**Environmental and Institutional Support:** The availability of good sports facilities and a campus culture that encourages physical activity are crucial in fostering long-term exercise habits.

These findings provide practical insights for improving university physical education programs, enhancing policy communication, and creating environments that support students' physical activity beyond graduation. Universities should focus on raising awareness about national health policies and integrating them more effectively into their physical education curricula to promote lifelong health among students.

## **5. Discussion**

### ***5.1. The Internal Mechanisms of the Relationship between University Physical Education and Lifelong Exercise Behavior***

The results of this study align with the general conclusions found in both domestic and international literature: university physical education is one of the leading factors in the formation of exercise habits during adolescence and young adulthood. From the perspective of Self-Determination Theory, when students are provided with diverse and enjoyable physical education courses, supported by professional instruction and positive feedback, they are more likely to develop intrinsic motivation and form long-term exercise habits. The university years are a key period in a person's development, as students are both physically maturing and refining their social cognition. The exercise habits formed during this stage tend to have lasting effects.

### ***5.2. The Moderating Effect of Policy Awareness on Exercise Behavior Formation***

The "Healthy China" strategy, as a macro-level public health policy, has the potential to influence university students' attitudes toward exercise and health. The study reveals that students who are more aware of the policy and its goals are more likely to see exercise as a critical aspect of their personal growth and social health. As policy awareness increases, students tend to internalize the importance of physical activity, which leads to a greater likelihood of adopting exercise as a lifelong behavior.

The results suggest that policy awareness serves as a form of environmental support that enhances students' motivation to engage in physical exercise, as described by the Social Ecological Model. When students recognize the broader societal and governmental emphasis on health, they are more likely to make physical activity a part of their routine, reinforcing the positive effects of physical education programs.

### ***5.3. Comparison with Existing Research and Contributions***

This study extends previous research in several key ways:

**Incorporation of Policy Factors:** This study introduces the moderating effect of policy awareness in the relationship between university physical education and lifelong exercise behavior, which has been less explored in existing literature.

**Quantitative and Qualitative Integration:** By combining quantitative surveys with qualitative interviews, this study provides a more holistic view of how physical education and national health policies affect students' exercise behavior, offering a richer understanding of the mechanisms at play.

**Context-Specific Insights:** Focusing on Shanghai University of Science and Technology, a university with considerable resources, this study provides valuable case-specific insights into how policy and educational environments can be aligned to foster lifelong exercise habits in Chinese university students.

#### **5.4. Research Limitations and Future Directions**

Future studies could focus on conducting cross-regional comparative research across different types of universities, which would provide more comprehensive insights into the interaction between policy, educational environments, and exercise behaviors. Additionally, interdisciplinary collaboration with fields such as psychology and sports medicine could help to further explore the physiological and psychological mechanisms of exercise behavior.

Through continuous effort in both longitudinal and interdisciplinary studies, it is hoped that university physical education will not only remain a mandatory subject but will become a lasting force in promoting physical health, mental well-being, and the broader goals of national fitness and the "Healthy China" initiative.

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