

Study on Behavioral Characteristics of Physical Exercise and Their Influencing Factors Among University Students

Yuanzhuo Zhang ^{1, a}, Xinrou Xie ^{2, b}, Anhui Fan ^{1, c, *}

¹China College of Physical Education, Southwest University, Chongqing, China

²College of Primary Education, Chongqing Normal University, Chongqing, China

^a298946772@qq.com, ^b1460501724@qq.com, ^c3975181248@qq.com

*Corresponding author: Anhui Fan

Abstract

Physical exercise is a crucial means of promoting the physical health of university students. This study employed literature review, questionnaire surveys, interviews, and mathematical statistics to investigate the characteristics of physical exercise behavior among students at Southwest University. A total of 269 valid questionnaires were collected. The questionnaire content primarily covered regular exercise participation, exercise intensity, and the application of the Physical Activity Rating Scale (PARS-3). Statistical analysis revealed that overall exercise frequency and intensity were at a good level; however, the physical exercise level was predominantly concentrated in the low to moderate range, with few individuals at a high level. Approximately half of the students had regular exercise habits, and significant gender differences existed in exercise frequency, duration, intensity, and level. It is recommended that university students participate more actively in physical exercise, with a particular need to enhance exercise intensity.

Keywords

Physical exercise; Exercise frequency; Exercise duration; Exercise level; Exercise intensity.

1. Introduction

With the rapid development of society and changes in lifestyle, the physical health issues of the university student population have garnered widespread attention. Although university campuses provide abundant sports facilities and resources aimed at encouraging students to actively participate in physical exercise to improve their physical fitness and health levels, multiple studies in recent years have indicated a declining trend in the physical health levels of university students. University students are at a crucial stage for physical and mental health development and personality socialization. Investigating physical exercise behavior aims to promote active participation in sports among students and enhance the physical/mental benefits of such activities. This constitutes a critical challenge requiring urgent attention in university sports policy development.(Dong, B. L., 2017). This phenomenon not only concerns individual student development but also poses a potential threat to the nation's future development and societal health. Therefore, exploring the characteristics of university students' physical exercise behavior and its influencing factors is of significant importance for formulating effective interventions to enhance their physical health levels. Physical exercise plays an indispensable role in enhancing physical fitness and mental health, while also yielding marked benefits for university students' peer relationships and subjective well-being(Chen, Z. Y. & Yu, P., 2015)(Rao, S. R. & Shi, H., 2025). Contemporary students face multiple psychological

pressures, such as academic and employment stress, coupled with lifestyle changes like prolonged sedentary behavior and reliance on electronic devices. These factors lead to insufficient exercise frequency and intensity, subsequently affecting physical fitness and health status. Understanding the characteristics of university students' physical exercise behavior and its underlying influencing factors holds guiding significance for conducting targeted health promotion activities and exercise interventions. University students, as the backbone of the nation's future development, their health status concerns not only their personal futures but also the sustainable development of society and the long-term interests of the country. However, reports of declining physical fitness among university students have frequently appeared in recent years, drawing high attention from all sectors of society. By conducting in-depth research on university students' physical exercise behavior and its influencing factors, a scientific basis can be provided for formulating relevant policies and measures, thereby effectively improving the physical health status of university students. Although existing research has to some extent explored the importance of physical exercise for university students, systematic analysis of the characteristics of their exercise behavior and its influencing factors remains insufficiently deep. Especially in the rapidly changing social environment, the factors influencing university students' physical exercise behavior are increasingly complex, necessitating a multi-dimensional analysis and understanding of their behavioral patterns and influencing mechanisms. Therefore, research on the characteristics of university students' physical exercise behavior and its influencing factors has significant theoretical and practical importance.

2. Research on University Students' Physical Exercise Behavior

Physical exercise behavior is currently a hot topic in the field of public health research, with multiple definitions existing for the concept. Chinese scholar Tang Guojie defines physical exercise behavior as purposeful and conscious physical activities undertaken during leisure time using sports methods and means to pursue physical and mental health or other objectives (Tang, G. J., & Cong, H. P., 2009). Other research suggests that exercise behavior, primarily for health purposes, refers to physical activities conducted during leisure time with a certain intensity, frequency, and duration (Liu, N. et al., 2018). Through literature review, it can be established that physical exercise behavior is the process by which individuals or groups participate in various sports activities to improve physical health, enhance physical capacity, enjoy themselves, or achieve sports goals. This behavior can be planned sports training or active activities in daily life, involving various forms and intensities of exercise. Current research on university students' physical exercise behavior primarily includes investigations into the current status of their exercise behavior, exploration of reasons influencing this status, and discussions on behavior change in master's and doctoral theses (Han Y. J., 2003). However, the main focus remains on the current status and influencing factors. When describing the current status of university students' physical exercise behavior, the main characteristics involved include types of sports participated in, exercise frequency, exercise duration, time of exercise, exercise intensity, exercise motivation, and the classification of exercise behavior stages. Yu Zunyuan, taking Yangzhou University as an example, surveyed the physical exercise behavior of its students, mainly investigating the time of exercise, and found that the largest proportion of students exercised between 4-6 PM and 6-9 PM (Yu, Z. Y., 2018). Research by Zhang Qing et al. investigated multiple variables, including types of sports participated in, exercise motivation, and exercise time. They found that most students at South China University of Technology liked physical exercise, but a small portion did not. Meanwhile, students' exercise motivations were mainly liking it, enhancing physical fitness, weight loss/body shaping, and stress relief. Regarding the choice of sports, the top three were running, fitness training, and basketball. Furthermore, concerning the time for exercise, more people

chose evenings, mainly due to ample free time without classes and hot weather during the day (Zhang, Q. & Mo, L. M., 2020). Besides understanding the overall current status, some studies have conducted further comparisons. Research by Yang Peipei et al. compared differences in physical exercise behavior based on gender, grade level, and different universities. They found that female students had higher average weekly exercise frequency, duration, and intensity than male students. Regarding grade level, higher-grade students had poorer exercise status than lower-grade students, but no differences were found between different universities (Yang, P. P. & Zhou, X. X., 2018). Research by Luo Pingjing et al., besides understanding the characteristics of exercise behavior, also classified university students' physical exercise behavior stages. The study divided students into pre-contemplation, contemplation, preparation, action, and maintenance stages, revealing a typical "small at both ends, large in the middle" pattern (Luo, P. J. et al., 2019). It is evident that research on the current status of university students' physical exercise behavior mainly focuses on investigating exercise frequency, duration, and intensity. Furthermore, concerning exercise behavior stages, there is a need to promote behavior change and increase the proportion of students in the physical exercise maintenance stage.

Numerous factors influence university students' physical exercise behavior, including personal, family, and social aspects. Wang Zhiqin's research examined the impact of these factors from four dimensions: family factors, personal factors, school factors, and social factors. It found that family economic status, family environment, and parents' awareness of physical exercise all influence their children's exercise behavior. Regarding personal factors, aspects like gender, age (Molanorouzi, K., Khoo, S. & Morris, T., 2015), and sports awareness are important influences. For school factors, the importance the school places on physical education courses also affects students' exercise behavior. Additionally, social factors are a major influence; due to the development of the internet, food delivery industry, and short videos, students' physical activity is reduced (Wang, Z. Q., 2018). Zhang Ling et al. explored influencing factors from different perspectives. Through questionnaire surveys and empirical research, they found that exercise motivation, external pressure, and peer effects influence university students' physical exercise behavior. Investigating the mechanism, they found that peer effects played a complete mediating role between external pressure and physical exercise. This highlights the importance of peers in university students' physical exercise behavior (Zhang, L. & Li, J. Y., 2022). Other research points out that exercise awareness, free time, venue facilities, physical condition, and conformity psychology are also significant factors influencing university students' physical exercise behavior (Ma, Y. H., 2019). Research by Li Ming et al. found that university students' attitudes towards physical exercise, their grade level, and gender were influencing factors (Li, M & Wang, F. C., 2022). Li Zhiqiang's research explored the impact of the family sports atmosphere on university students' physical exercise behavior. He indicated that sports awareness within the family, knowledge of physical exercise, family economic support for sports facilities, and parents' own exercise time all influence their children's exercise behavior (Li, Z. Q., 2019). University students exhibit considerable individual discretion in physical exercise engagement, where subjective affective states significantly influence participation (Zhang, Q. Y. et al., 2024). Consequently, educational institutions could leverage social media platforms to implement gamified interventions—such as targeted sports knowledge dissemination and "fitness challenge" check-in incentives—to enhance exercise adherence (Fang, B. B. et al., 2025). Sustaining student vitality and enthusiasm during physical activities fosters greater psychological investment in each exercise session. When students perceive social support, recognition, and communal attention through these engagements, they experience heightened exercise-induced pleasure, satisfaction, improved motor skills, and meaningful friendships (Fu, H. S. et al., 2025). It is evident that family factors are indeed one of the important influences on children's physical exercise behavior. In summary, numerous

factors influence physical exercise behavior. Research needs to consider classifying these influencing factors and determining corresponding factors according to a logical framework. Analysis of current research reveals that personal factors include gender, age, grade level, time availability, and personal sports awareness. Family factors include parents' sports awareness and behavior, and the family's sports environment and facilities. Peer support and peers' exercise behavior are also influential. Additionally, the school's venue facilities, curriculum design, and the importance the school places on sports also play a role. Therefore, a comprehensive perspective is needed to observe the influencing factors of physical exercise behavior.

3. Research Methods

This study focuses on the characteristics of physical exercise behavior among university students, primarily investigating exercise frequency, duration, intensity, and physical activity levels, and analyzing differences based on gender, age, BMI, and educational level. Using "physical exercise", "university students", "sports activities", etc., as main Chinese search terms, literature searches were conducted in databases such as CNKI, Wanfang, and VIP, covering the period from database inception to the present. Using "sport", "physical exercise", "exercise activities", "college students", "university students", "undergraduates", etc., as English search terms, searches were conducted in English databases such as Web of Science, PubMed, and Springer to provide a theoretical foundation. Based on literature review, the "Questionnaire on Characteristics of University Students' Physical Exercise Behavior and Its Influencing Factors" was developed. The survey subjects were students enrolled at Southwest University, with a total of 350 questionnaires distribute

3.1. Questionnaire Design.

The questionnaire content mainly comprised two parts. The first part collected basic information, including gender, age, height, weight, and educational level. The second part focused on investigating the characteristics of physical exercise behavior, including 2 single-choice questions and one established scale. One question was "Do you exercise regularly?", another was "Usual exercise intensity". The established scale used was the Physical Activity Rating Scale (PARS-3) revised by Liang Deqing (Liang, D. Q., 1994) to assess individual physical exercise levels. PARS-3 consists of exercise intensity, duration per session, and exercise frequency. Each item is rated on a 5-point scale (1-5 points). The physical exercise volume score = Exercise frequency score × (Exercise time score - 1) × Exercise intensity score (Chen, A. G., Yin, H. C. & Yan, J., 2010). Scores range from 0 to 100, with higher scores indicating higher physical exercise levels. Research typically categorizes physical exercise levels into 3 grades: low exercise level ≤19 points, moderate exercise level 20-42 points, high exercise level >43 points (Yang, G. et al., 2021).

3.2. Questionnaire Distribution and Collection.

This study adopted a stratified sampling method. Questionnaires were collected online via Questionnaire Star. A total of 301 questionnaires were collected. After deleting 32 questionnaires due to patterned responses, completion time less than 1 minute, or inconsistent responses, 269 valid questionnaires were finally recovered, yielding an effective response rate of 89.37%. Basic information of the respondents is shown in Table 1.

3.3. Statistical Analysis.

Microsoft Excel was used for data organization and basic screening, removing unqualified data. SPSS 26.0 was used to analyze the data on university students' physical exercise behavior characteristics. Descriptive statistics and difference tests (significance level set at $p < 0.05$) were

primarily employed. Linear regression was used for influencing factor analysis (significance level set at $p < 0.05$).

Table 1. Basic Information of Respondents.

Variable	Category	Number (n)	Percentage (%)
Gender	Male	169	62.8
	Female	100	37.2
Age	18-24 years	247	91.8
	25-29 years	22	8.2
Height (cm)		171.80±13.16	
Weight (kg)		65.30±8.37	
BMI	≤18.5	27	10.0
	18.5-24	183	68.0
	24-28	43	16.0
	≥28	16	5.9
Educational Level	Undergraduate	227	84.4
	Postgraduate	42	15.6

4. Results

4.1. Physical Exercise Characteristics of Southwest University Students.

4.1.1. Basic Analysis of Regular Exercise Among Students.

The survey found that among the 269 respondents, 56.5% reported exercising regularly. Comparatively, the proportion of male students exercising regularly was slightly higher than that of female students (Table 2)

Table 2. Regular Exercise Status of Southwest University Students.

Regular Exercise	Overall (N=269)	Male (n=169)	Female (n=100)
Yes	152 (56.5%)	100 (59.2%)	52 (52.0%)
No	117 (43.5%)	69 (40.8%)	48 (48.0%)

4.1.2. Analysis of Exercise Frequency Among Students.

Overall, the exercise frequency of Southwest University students was good, with most students participating in exercise 1-2 times per week or more. A total of 115 students (42.7%) exercised 3 times per week or more. Half of the students exercised less frequently, with 8.9% exercising

less than once a month. There was a significant gender difference in exercise frequency, with a higher proportion of males engaging in high-frequency exercise. Males exercising 3 times or more per week accounted for approximately 29.74% of the total, while females only accounted for 13.01%. Comparatively, a statistically significant difference existed between males and females in the dimension of exercise frequency ($P < 0.05$).

Table 3. Exercise Frequency of Southwest University Students.

Exercise Frequency	Overall (N=269)	Male (n, n/N)	Female (n, n/N)
Less than 1 time/month	24 (8.9%)	11 (4.09%)	13 (4.82%)
2-3 times/month	37 (13.8%)	21 (7.81%)	16 (5.95%)
1-2 times/week	93 (34.6%)	57 (21.19%)	36 (13.38%)
3-5 times/week	67 (24.9%)	46 (17.10%)	21 (7.81%)
Approximately once daily	48 (17.8%)	34 (12.64%)	14 (5.20%)
t-value		2.384	
p-value		0.018	

4.1.3. Exercise Duration Among Students.

The survey found that most Southwest University students exercised for 30 minutes or more per session, with 29.4% exercising for over 60 minutes. However, it is noteworthy that 20.8% exercised for less than 20 minutes. The overall exercise duration of male students was generally longer than that of females. Males exercising for more than 30 minutes per session accounted for over 50% of the total, with those exceeding 60 minutes making up 20.82%. In contrast, females exercising for more than 30 minutes accounted for only about 17% of the total, with less than 10% exceeding 60 minutes. Comparatively, a statistically significant difference existed between males and females in the dimension of exercise duration ($P < 0.05$).

Table 4. Exercise Duration of Southwest University Students.

Exercise Duration	Overall (N=269)	Male (n=169)	Female (n=100)
≤10 minutes	15 (5.6%)	6 (2.23%)	9 (3.35%)
11-20 minutes	41 (15.2%)	23 (8.55%)	18 (6.69%)
21-30 minutes	66 (24.5%)	39 (14.50%)	27 (10.04%)
31-59 minutes	68 (25.3%)	45 (16.73%)	23 (8.55%)
≥60 minutes	79 (29.4%)	56 (20.82%)	23 (8.55%)
t-value		2.583	
p-value		0.010	

4.1.4. Analysis of Exercise Intensity Among Students.

The survey found that the overall exercise intensity of Southwest University students was primarily low and moderate, with fewer individuals engaging in high intensity. Half of the students participated in low-intensity exercise, while those engaging in moderate-to-high and high intensity accounted for about 15%. Comparatively, males participated in higher intensity exercise, while females predominantly engaged in low-intensity exercise. A statistically very significant difference existed between males and females in exercise intensity ($P < 0.001$).

Table 5. Exercise Intensity of Southwest University Students.

Exercise Intensity	Overall (N=269)	Male (n=169)	Female (n=100)
Low Intensity	139 (51.7%)	67 (24.91%)	72 (26.77%)
Moderate Intensity	88 (32.7%)	63 (23.42%)	25 (9.29%)
Moderate-to-High Intensity	25 (9.3%)	23 (8.55%)	2 (0.74%)
High Intensity	17 (6.3%)	16 (5.95%)	1 (0.37%)
t-value		6.451	
p-value		0.000	

Note: Low Intensity = Heart rate 50%-60% of max HR; Moderate = 60%-70%; Moderate-to-High = 70%-80%; High = >80% max HR.

4.1.5. Analysis of Physical Exercise Level Among Students.

Regarding the overall physical exercise level, half of the students were at a low level, 24.9% were at a moderate level, and only 21.9% were at a high level. From a gender perspective, the proportion of females at a high exercise level was lower, while males accounted for about 20% at the high level. A statistically very significant difference existed between males and females in physical exercise level ($P < 0.001$).

Table 6. Physical Exercise Level of Southwest University Students.

Exercise Level	Overall (N=269)	Male (n=169)	Female (n=100)
Low Level	143 (53.2%)	80 (29.74%)	63 (23.42%)
Moderate Level	67 (24.9%)	35 (13.01%)	32 (11.90%)
High Level	59 (21.9%)	54 (20.07%)	5 (1.86%)
t-value		4.750	
p-value		0.000	

4.2. Factors Influencing Physical Exercise Behavior of Southwest University Students.

4.2.1. Factors Influencing Exercise Frequency.

Linear regression analysis revealed that the model fit was poor ($R^2=0.07<0.6$), and no multicollinearity existed among the independent variables (all $VIF<5$). However, it is noteworthy that $P<0.001$, indicating that among the selected variables, some had a differential impact on exercise frequency. We found that weight and age influenced university students' exercise frequency. Additionally, interviews revealed that external factors like weather and time availability also affected exercise frequency. *"Chongqing summers are extremely hot, and winters are always rainy, both affect my going out to exercise (B202401)."* *"Our major had very heavy course loads in the first two years. I wanted to exercise but had no time, and was very tired at night. It's a bit better now (B202402)."* It is evident that besides personal subjective factors, objective factors also influence exercise frequency.

Table 7. Factors Influencing Exercise Frequency of Southwest University Students.

Model	Unstandardized Coefficient		Standardized Coefficient	t-value	Sig.	VIF
	B	Std.Error	Beta			
(Constant)	1.61	1.16		1.40	0.164	
Gender	-0.07	0.18	-0.029	-0.38	0.70	1.60
Weight	0.03	0.01	0.275	2.23	0.03	4.28
Age Group	-0.33	0.15	-0.142	-2.18	0.03	1.20
Education Level	0.25	0.21	0.079	1.21	0.23	1.19
BMI Category	-0.20	0.19	-0.116	-1.07	0.29	3.31
	R ²			0.07		
	F-value			3.73		
	p-value			0.003		
Dependent Variable: Exercise Frequency						

4.2.2. Factors Influencing Exercise Duration.

Linear regression analysis revealed that the model fit was poor ($R^2=0.19<0.6$), and no multicollinearity existed among the independent variables (all $VIF<5$). However, it is noteworthy that $P<0.001$, indicating that among the selected variables, some had a differential impact on exercise duration. We found that weight and age influenced university students' exercise duration. Additionally, the level of fatigue and physical state were also influencing factors for exercise duration. One interviewee stated: *"Sometimes after a demanding experiment,*

I just do simple exercise, no more than 1 hour, mainly light running or playing ball, just enough to sweat a little (B202403)." Another said: *"Recently, I've encountered many difficulties at school, feeling quite depressed and lacking energy for exercise. After a short while I don't feel like continuing. Previously, I exercised every other day for over 2 hours each time. Now it feels like forcing myself, but physical health is important (B202404).*" It is evident that physical and mental state is one of the main factors influencing exercise duration.

Table 8. Factors Influencing Exercise Duration of Southwest University Students.

Model	Unstandardized Coefficient		Standardized Coefficient	t-value	Sig.	VIF
	B	Std.Error	Beta			
(Constant)	-1.82	1.16		-1.58	0.164	
Gender	-0.26	0.18	-0.102	-1.40	0.70	1.60
Weight	0.02	0.01	0.213	1.79	0.03	4.28
Age Group	-0.22	0.15	-0.092	-1.45	0.03	1.20
Education Level	1.08	0.21	0.324	5.150	0.23	1.19
BMI Category	-1.82	1.16		-1.58	0.29	3.31
	R ²		0.19			
	F-value		7.70			
	p-value		<0.001			
Dependent Variable: Exercise Duration						

4.2.3. Factors Influencing Exercise Intensity.

Linear regression analysis revealed that the model fit was poor ($R^2=0.19<0.6$), and no multicollinearity existed among the independent variables (all $VIF<5$). However, it is noteworthy that $P<0.001$, indicating that among the selected variables, some had a differential impact on exercise intensity. We found that gender, education level, and BMI had statistically significant effects on university students' exercise intensity, with gender and education level showing very significant differences. Consistent with literature and preliminary data, males indeed tended towards higher *exercise* intensity than females. Notably, BMI also influenced the choice of exercise intensity. Exercise intensity is a factor influencing exercise expenditure; daily aerobic exercise is more conducive to weight loss, while resistance training benefits muscle gain. These three factors were also validated in interviews. *"I exercise for weight loss. I read online that losing weight requires aerobic exercise, mainly running. So I often run slowly for long periods, usually over an hour (B202405).*" *"I usually lift weights in the gym. I want to build bigger muscles, so I generally do heavy sets, mostly 5x5. I think intensity is crucial; if not arranged properly, you won't grow much. Previously the intensity was lower, growth was slow; now it's better*

(B202404). "It is evident that the choice of intensity is ultimately influenced by personal exercise goals and modalities.

Table 9. Factors Influencing Exercise Intensity of Southwest University Students.

Model	Unstandardized Coefficient		Standardized Coefficient	t-value	Sig.	VIF
	B	Std.Error	Beta			
(Constant)	-0.19	1.02		-0.18	0.85	
Gender	-0.73	0.16	-0.32	-4.51	<0.001	1.60
Weight	0.02	0.01	0.18	1.53	0.13	4.28
Age Group	-0.18	0.14	-0.08	-1.32	0.19	1.20
Education Level	0.75	0.19	0.24	4.02	<0.001	1.19
BMI Category	-0.36	0.17	-0.22	-2.15	0.03	3.31
		R ²		0.19		
		F-value		12.12		
		p-value		<0.001		

Dependent Variable: Exercise Intensity

4.2.4. Factors Influencing Physical Exercise Level.

Linear regression analysis revealed that the model fit was poor ($R^2=0.18<0.6$), and no multicollinearity existed among the independent variables (all $VIF<5$). However, it is noteworthy that $P<0.001$, indicating that among the selected variables, some had a differential impact on physical exercise level. We found that gender, weight, and education level influenced physical exercise level. Additionally, many other factors affect physical exercise level. Interviews revealed that awareness of sports, social support from friends and classmates, and personal interests also influenced the exercise level. "I used to hear that exercise can help lose weight, but it's too tiring and the results come slowly. It's better to just eat less (B202407)." Another interviewee stated: "My favorite sport is tennis, but you can't play alone; you need partners. Usually, we have a fixed group who play whenever we have time. If no one is available, I can't play (B202406)." It can be seen that the type of sport is also important; for partner or team sports, peer support is crucial. Furthermore, another interviewee recounted: "I am very passionate about sports, I just love it. Back in high school when I studied sports, I felt I could train endlessly without getting tired, but reading and doing homework tired me out quickly. As long as I'm on the sports field, I feel I have endless energy (B2024010)."

Table 10. Factors Influencing Physical Exercise Level of Southwest University Students.

Model	Unstandardized Coefficient		Standardized Coefficient	t-value	Sig.	VIF
	B	Std.Error	Beta			

Model	Unstandardized Coefficient		Standardized Coefficient	t-value	Sig.	VIF
(Constant)	-61.61	20.57		-3.00	0.003	
Gender	-10.12	3.25	-0.22	-3.11	0.002	1.60
Weight	0.44	0.20	0.26	2.23	0.03	4.28
Age Group	-2.99	2.72	-0.07	-1.10	0.272	1.20
Education Level	18.02	3.74	0.29	4.82	<0.001	1.19
BMI Category	-6.42	3.31	-0.20	-1.94	0.053	3.31
		R ²		0.18		
		F-value		11.43		
		p-value		<0.001		
Dependent Variable: Physical Exercise Level						

5. Conclusion

Physical exercise is particularly important for the physical and mental health of university students. Overall, exercise frequency and intensity were generally acceptable. However, the physical exercise level was primarily low to moderate, with few individuals at a high level. Approximately half of the students had regular exercise habits. Differences existed between male and female students in exercise frequency, duration, intensity, and level. This study also found that males tended towards more regular exercise. Gender differences existed in exercise frequency, duration, intensity, and physical exercise level, with males generally outperforming females. Males had higher exercise frequency, duration, intensity, and level than females. We found that weight and age were factors influencing university students' physical exercise. Additionally, influencing factors included time availability, physical and mental state, peer support, and weather conditions. Overall, numerous factors influence university students' physical exercise, but personal factors dominate. In the future, it is recommended that female students participate more actively in physical exercise, particularly needing to increase exercise intensity and frequency.

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