

Research on the Impact of College Students' Social Physique Anxiety on Physical Exercise Behavior

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Abstract

This study focuses on the impact of college students' social physique anxiety on their physical exercise behavior. Social physique anxiety (SPA) refers to the anxious emotion experienced by individuals in social situations due to the fear of negative evaluations of their physique by others. A questionnaire survey was conducted among college students sampled from universities to collect data on their SPA levels and physical exercise behaviors, including exercise frequency, duration, and project selection. Statistical methods such as correlation analysis and regression analysis were used to process the data. Exercise behavioral intention drives exercise behavior through attitude, subjective norm, and perceived behavioral control, verifying the applicability of the Theory of Planned Behavior; SPA is positively correlated with exercise intention, or affects behavior through mediating/moderating paths; exercise intensity, duration, and frequency are holistic, and psychological variables reinforce each other; physical discomfort has no significant correlation with exercise and social anxiety. It is suggested to develop an "exercise motivation profile" tool and implement a "sports ambassador program", carry out group counseling for high-anxiety groups and provide low-social-pressure exercise options, and jointly offer "body mindfulness" courses to guide rational cognition of body functions.

Keywords

College students; Exercise behavior; Social physique anxiety; Structural equation model

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1. Introduction

In contemporary society, with the improvement of people's material living standards and changes in aesthetic concepts, individuals' attention to their own body shape

has shifted from pure health needs to the social pursuit of an "ideal figure", which is more prominent among college students^[1]. College students are in an important stage of physical and mental development, standing at the

intersection of self-identity establishment and social role exploration. Their sensitivity to appearance and concern about others' opinions are much higher than those of other age groups, especially in today's digital era where social media penetrates every aspect, cultural phenomena such as "appearance economy" and "body involution" have become prevalent^[2,3]. Social physique anxiety (SPA), that is, the psychological burden caused by individuals' fear of negative evaluations of their body shape or appearance by others, has begun to become a major issue affecting college students' mental health^[4].

As the cornerstone of promoting physical and mental health, participation in physical exercise has become complicated due to the existence of SPA. On one hand, anxiety may prompt individuals to improve their body shape through exercise. On the other hand, anxiety may also induce exercise avoidance or irrational exercise behaviors^[5-8]. In this context, exploring the impact mechanism of college students' SPA on physical exercise behavior not only involves the scientific guidance of individual health behaviors but also has practical urgency for optimizing the mental health education system in colleges and universities^[9-11]. Targeting the common phenomenon of SPA among college students, this study aims to provide a solid theoretical framework and targeted strategic suggestions. By in-depth exploring this issue, it is intended to help college students understand and effectively manage their physical anxiety, and promote their mental health and personal growth.

Theoretically, this study is based on Chinese social culture (such as the "pale, thin, and young" aesthetic), reveals the dynamic correlation between college students' SPA and physical exercise behavior, verifies the local applicability of classic theories, provides a basis for colleges and universities to construct targeted intervention strategies (such as body image cognitive counseling and non-judgmental exercise scenarios), and offers path references for educational policy formulation (physical education curriculum reform, health literacy improvement) and campus culture construction. It helps alleviate the alienation of exercise behavior caused by appearance anxiety and promotes the coordinated development of college students' physical and mental health.

2. Research subjects and methods

2.1. Research subjects

The research subjects are full-time undergraduate students of Shaanxi University of Technology, covering students from different majors. A stratified sampling method was used to select 50 students from each of the 15 secondary colleges for the survey. As Shaanxi University of Technology is a comprehensive ordinary institution of higher education, investigating students of this university can reflect the basic situation of SPA and physical exercise behavior of college students to a certain extent.

2.2. Research methods

2.2.1. Literature review method

Based on the Theory of Planned Behavior and empirical research on SPA, this study searched 62 relevant literature sources from databases such as CNKI, PubMed, PsycINFO, Psychology and Behavioral Sciences Collection, and Web of Science. A total of 15 literature related to this study were selected through induction, summary, and systematic review.

2.2.2. Questionnaire survey method

The rationale of research tools selection are as follows:

- (1) SPA scale: This scale is derived from the International SPA Scale and was revised by Chinese scholar Xu according to cross-cultural research in China to adapt to the Chinese cultural and linguistic context^[5]. It includes 15 items and uses a Likert-5 scale for scoring, ranging from 1 point for "completely inconsistent with me" to 5 points for "completely consistent with me". A lower score indicates a lower level of SPA, and vice versa indicates a high level of SPA. The reliability and validity of the scale have been repeatedly verified in domestic studies;
- (2) Physical exercise behavior scale: The amount of exercise is evaluated from three dimensions: exercise intensity, duration, and frequency, using a five-level scoring method with scores from 1 to 5. Exercise volume score = intensity × (duration - 1) × frequency. The criteria for evaluating exercise levels are defined as: insufficient exercise behavior is less than 9 points, moderate exercise behavior is 9-27 points, and sufficient

exercise behavior is more than 27 points;

- (3) Physical exercise behavioral intention scale: Physical exercise attitude scale (8 items), subjective norm scale (5 items), perceived behavioral control scale (6 items), and behavioral intention scale (8 items). The physical exercise behavioral intention scale compiled based on the Theory of Planned Behavior uses a Likert-5 scale for scoring, ranging from 1 point for “completely inconsistent with me” to 5 points for “completely consistent with me”.

The pre-research data (see the procedure of questionnaire distribution and collection) were only used for the reliability and validity test of the scales. The results of the reliability and validity test are shown in the following table. It indicates that the reliability and validity of the research tools are decent and can be used in this study (Table 1).

Table 1. Statistical table of reliability and validity test of research tools

Tool	Validity (Cronbach's α)	Reliability (Test-retest reliability coefficient)
Social physique anxiety scale	0.833	0.895
Physical exercise behavior scale	0.852	0.901
Physical exercise behavioral intention scale	0.864	0.810

Before distributing the scales, the electronic scales were edited using “Wenjuanxing” (a popular online questionnaire platform in China). A total of 15 investigators were recruited from student cadres of 15 secondary colleges before the scale distribution. Training was conducted on March 10, 2025, before the scale distribution.

The process of distributing the scales: politely entering self-study classrooms → introducing the content of the survey and privacy protection → explaining the filling requirements → distributing the scales and waiting for respondents to fill them out → observing data in the background.

On the basis of pre-research, 100 college students

were visited on March 11, added to a group, and electronic scales were distributed in the group. On March 18, another 100 scales were distributed. The pre-research data were only used for the reliability and validity test of the scales and were not included in the research results. On March 25, 750 scales were distributed in the formal research, and 712 valid scales were recovered, with an effective recovery rate of 95%.

2.2.3. Mathematical statistics method

Data are expressed as mean \pm standard deviation (SD). SPSS 22.0 statistical software was used for descriptive statistics and correlation analysis, and AMOS 23.0 software was used for the construction and testing of the structural equation model. The statistical significance level was set at $\alpha = 0.05$.

3. Results and analysis

3.1. Current situation of college students' physical exercise behavior

3.1.1. Exercise intensity

The overall exercise intensity of college students is moderate or above, indicating that college students have a certain pursuit of exercise intensity and possess a certain level of sports ability. High-intensity exercise (including “unsustained” and “sustained”) accounts for 46.3% in total, reflecting that high-intensity exercise is somewhat popular among college students.

3.1.2. Exercise duration

More than half of the students exercise for more than 21 minutes per session, indicating that most people can ensure a certain duration of effective exercise. The most common interval is 31–59 minutes, reflecting that college students prefer a “moderate and efficient” exercise mode, balancing time management and exercise effects.

3.1.3. Exercise frequency

Nearly 50.4% of students exercise 3 times or more per week, indicating that more than half of the students have established regular exercise habits. However, 22.7% of students exercise less than 3 times per month, reflecting that some college students lack exercise initiative and need more guidance.

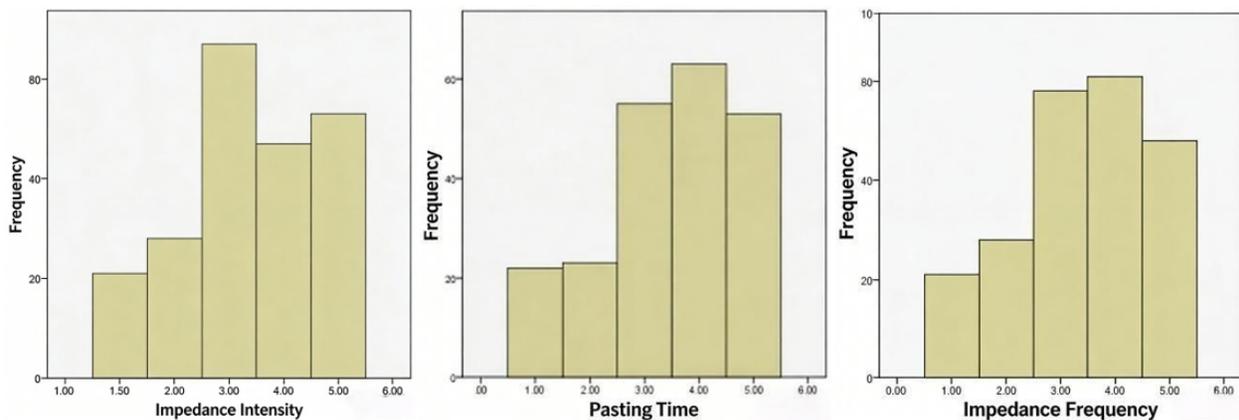


Figure 1. Current situation of college students' exercise behavior.

Table 2. K-S Normality Test results of scores in each dimension of the scales (n = 712)

Main variable	Measurement variable	Mean ± SD	Statistic	P-value
Social physique anxiety	Worry about others' negative evaluations	3.23 ± 0.50	0.122	0
	Discomfort with physical self-presentation	2.94 ± 0.33	0.131	0
	Anxiety about social comparison	3.05 ± 0.48	0.151	0
Exercise behavioral intention	Exercise attitude	3.66 ± 1.04	0.288	0
	Subjective norm of exercise	3.60 ± 1.10	0.249	0
	Perceived behavioral control of exercise	3.58 ± 1.09	0.25	0

3.2. Current situation and characteristics of college students' SPA and exercise behavioral intention

The results of the normality test show that $P < 0.05$ indicates rejecting the null hypothesis (the null hypothesis is that the observed values are normally distributed). It indicates that the data of body image and SPA are not normally distributed (Table 2). Therefore, non-parametric tests were used for data analysis.

3.3. Comparison of psychological variable scores among college students with different exercise behavior levels

According to the results of non-parametric tests, college students with insufficient exercise behavior have a significantly higher level of worry about others' negative evaluations than those with moderate and sufficient exercise behavior; the more insufficient the exercise behavior, the stronger the worry. A higher score of exercise attitude indicates a more negative attitude. The

insufficient exercise behavior group has the most negative attitude, and the sufficient group has the most positive attitude, indicating that the more sufficient the exercise behavior, the stronger the positive attitude towards exercise. A higher score of subjective norm indicates less perceived social pressure to exercise.

The insufficient exercise behavior group perceives the least social pressure, and the sufficient group perceives the most, suggesting that college students with sufficient exercise behavior are more likely to feel the driving force of exercise from society (such as others' expectations). A higher score of perceived behavioral control indicates more perceived obstacles to exercise. The insufficient exercise behavior group perceives the most obstacles, and the sufficient group perceives the least, indicating that college students with sufficient exercise behavior are more confident in their ability to overcome obstacles and persist in exercise. Worrying about others' negative evaluations, anxiety about social comparison, exercise attitude, subjective norm, and perceived behavioral

control are all significantly correlated with the level of exercise behavior. Moreover, the insufficient exercise behavior group shows more prominent negative psychological states (worry, anxiety, negative attitude) and low self-efficacy (high perceived obstacles).

However, there are no significantly correlated variables, where discomfort with physical self-presentation has no difference among different exercise behavior levels, which may be related to the stable influence of individual body image on this variable and its weak correlation with short-term exercise behavior. The results suggest that improving the level of college students' exercise behavior can start from reducing social evaluation anxiety, enhancing positive attitudes towards exercise, and reducing perceived obstacles (Table 3).

3.4. Correlation analysis among variables

According to the results of correlation research, it is found that exercise intensity, duration, and frequency are significantly positively correlated with each other. Worrying about others' negative evaluations and anxiety about social comparison are significantly positively correlated with exercise behavior, while discomfort with physical self-presentation has no significant correlation with exercise behavior. Exercise attitude, subjective norm, and perceived behavioral control are highly synergistic, and all are significantly positively correlated with exercise behavior, and also have a moderately significant positive correlation with anxiety about social comparison (Table 4).

Table 3. Non-parametric test results of college students with different exercise behavior levels (n = 712)

Variable	Sufficient exercise behavior	Moderate exercise behavior	Insufficient exercise behavior	Test statistic	P-value
Worry about others' negative evaluations	2.71 ± 0.36	3.02 ± 0.48	3.42 ± 0.43	73.68	0.000
Discomfort with physical self-presentation	2.96 ± 0.29	2.89 ± 0.37	2.95 ± 0.35	0.895	0.639
Anxiety about social comparison	2.75 ± 0.40	2.73 ± 0.51	3.19 ± 0.45	36.07	0.000
Exercise attitude	1.96 ± 0.40	3.08 ± 1.32	4.23 ± 0.32	99.46	0.000
Subjective norm of exercise	1.86 ± 0.56	2.79 ± 1.05	4.21 ± 0.44	115.92	0.000
Perceived behavioral control of exercise	1.90 ± 0.53	2.79 ± 1.26	4.16 ± 0.44	106.44	0.000

Table 4. Pearson correlation analysis among college students' SPA and exercise behavior variables (n = 712)

EI	ET	EF	EF	NE	NE	SP	SP	SC	SC	AE	AE	EN	EN	EC
EI	1													
ET	.587**	1												
EF	.582**	.596**	1	1										
NE	.470**	.408**	.507**	.507**	1	1								
SP	.032	.040	-.066	-.066	.150*	.150*	1	1						
SC	.373**	.322**	.337**	.337**	.335**	.335**	.168*	.168*	1	1				
AE	.701**	.732**	.727**	.727**	.520**	.520**	-.025	-.025	.399**	.399**	1	1		
EN	.679**	.695**	.701**	.701**	.537**	.537**	.018	.018	.413**	.413**	.879**	.879**	1	
EC	.694**	.699**	.726**	.726**	.556**	.556**	.066	.066	.405**	.405**	.890**	.890**	.873**	1

Note: *: Significantly correlated at the 0.05 level (two-tailed). **: Significantly correlated at the 0.01 level (two-tailed). EI: Exercise intensity; ET: Exercise duration; EF: Exercise frequency; NE: Worry about others' negative evaluations; SP: Discomfort with physical self-presentation; SC: Anxiety about social comparison; AE: Exercise attitude; EN: Subjective norm of exercise; EC: Perceived behavioral control of exercise.

3.5. Path analysis of college students' SPA and exercise behavior

College students' physical exercise behavior may be jointly affected by SPA and exercise behavioral intention, and there may be correlations and influence relationships among SPA, exercise behavioral intention, and exercise behavior. Therefore, the mean scores of each dimension of body image and SPA were used as observed variables of exogenous latent variables. The calculated values of physical activities of different intensities were used as observed variables of endogenous latent variables (Table 5).

3.5.1. Construction and verification results of the structural equation model of influencing factors of college students' exercise behavior

According to the standardized result equation model of influencing factors of college students' exercise behavior obtained by AMOS software analysis (Figure 2), the structural equation model has good fit according to the data test and analysis (Table 6). It suggests that college students' SPA and exercise behavioral intention jointly affect exercise behavior.

3.5.2. Analysis of structural equation model results

Exercise behavioral intention has a significant positive

Table 5. Assignment table of model variables

Variable name	Processing method
Exercise intensity	Assigned 1, 2, 3, 4, 5
Exercise duration	Assigned 1, 2, 3, 4, 5
Exercise frequency	Assigned 1, 2, 3, 4, 5
Worry about others' negative evaluations	$(-S1 + S4 + S6 + S9 + S12 - S14 + 12) \div 6$
Discomfort with physical self-presentation	$(S2 - S7 + S10 - S11 - S13 + S15 + 18) \div 6$
Anxiety about social comparison	$(-S3 + S5 + S8 + 6) \div 3$
Exercise attitude	$(A1 + A2 + A3 + A4 + A5 + A6 + A7 + A8) \div 8$
Subjective norm of exercise	$(B1 + B2 + B3 + B4 + B5) \div 5$
Perceived behavioral control of exercise	$(C1 + C2 + C3 + C4 + C5) \div 5$

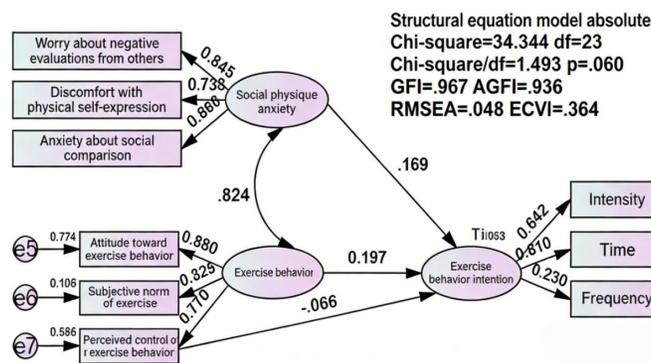


Figure 2. Standardized structural equation model of influencing factors of college students' exercise behavior.

Table 6. Summary of model tests

Index	CMIN/DF	GFI	RMSEA	NFI	IFI	TLI	CFI
Good fit	$1 \leq NC \leq 3$	≥ 0.9	≤ 0.05	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9
Reasonable fit	$3 < NC \leq 5$	≥ 0.8	≤ 0.08	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
Model	1.493	0.967	0.048	0.985	0.990	0.970	0.924
Evaluation	Good	Good	Reasonable	Good	Good	Good	Good

impact on perceived behavioral control and subjective norm of exercise ($P < 0.001$), with coefficients of 1.039 and 1.032 respectively, indicating that individuals with stronger exercise intention have higher self-efficacy (perceived behavioral control) and perceived social support (subjective norm), and the influence intensity is similar.

As a reference item (coefficient fixed at 1), exercise attitude has a direct positive correlation with exercise behavioral intention, verifying the basic driving role of attitude on intention. Exercise behavioral intention has a significant positive impact on exercise behavior ($P < 0.001$), with a coefficient of 0.866, indicating that intention is a direct driving factor of exercise behavior; the stronger the intention, the more active the actual exercise behavior.

The impact of perceived behavioral control on exercise behavior is not significant ($P > 0.05$), with a negative coefficient but small absolute value, which may suggest that the direct effect of self-efficacy on exercise behavior is limited, or it affects indirectly through intention (mediation effect analysis is needed).

The direct impact of SPA on exercise behavior is not significant ($P > 0.05$), with a coefficient of 0.455 but not reaching the significant level, indicating that the

direct effect of social anxiety on exercise behavior is weak, which may have indirect path differences from the conclusion in the previous correlation analysis that “exercise behavior is positively correlated with anxiety about social comparison”.

Worry about others’ negative evaluations is the core dimension of SPA (reference item, coefficient fixed at 1), directly defining the anxiety level. Anxiety about social comparison is significantly positively correlated with SPA ($P < 0.001$), with a coefficient of 0.713, indicating that anxiety about social comparison is a major contributing factor to SPA.

The correlation between discomfort with physical self-presentation and SPA is not significant ($P > 0.05$), with a coefficient of only 0.099, suggesting that physical self-perception has a weak direct impact on social anxiety, which is consistent with the previous conclusion that “exercise behavior has no correlation with physical discomfort” (Table 7).

3.5.3. Effect path analysis

The paths are as outlined:

- (1) Exercise behavioral intention is significantly positively correlated with SPA, which may reflect that individuals with high exercise intention are

Table 7. Unstandardized output results of weight coefficients of each variable

Path relationship between variables	Path relationship between variables	Path relationship between variables	Estimate	S.E.	C.R.	P	Label
Perceived behavioral control of exercise	<---	Exercise behavioral intention	1.039	.037	27.908	***	par_7
Exercise behavior	<---	Exercise behavioral intention	.866	.202	4.283	***	par_3
Exercise behavior	<---	Perceived behavioral control of exercise	-.057	.137	-.419	.676	par_9
Exercise behavior	<---	Social physique anxiety	.455	.383	1.186	.236	par_10
Anxiety about social comparison	<---	Social physique anxiety	.713	.118	6.027	***	par_1
Discomfort with physical self-presentation	<---	Social physique anxiety	.099	.079	1.254	.210	par_2
Worry about others’ negative evaluations	<---	Social physique anxiety	1.000				
Exercise attitude	<---	Exercise behavioral intention	1.000				
Intensity	<---	Exercise behavior	1.000				
Duration	<---	Exercise behavior	1.013	.086	11.729	***	par_4
Frequency	<---	Exercise behavior	1.020	.085	11.991	***	par_5
Subjective norm of exercise	<---	Exercise behavioral intention	1.032	.039	26.579	***	par_6

more likely to care about the evaluation of their exercise performance in social scenarios (such as worrying about others' views on their exercise intensity and frequency), thereby increasing anxiety about potential negative evaluations;

- (2) The direct positive effect of exercise behavioral intention on exercise behavior is significant, which is consistent with the Theory of Planned Behavior, indicating that psychological intention is the core driving force for behavior implementation, and enhancing intention can effectively promote exercise behavior;
- (3) The direct impact of SPA on exercise behavior is not significant, which may be because the relationship between the two is regulated by mediating variables (such as exercise intention and self-efficacy). Social anxiety may indirectly promote behavior by enhancing exercise intention (such as exercising to improve image) rather than being directly related;

The previous correlation analysis showed that exercise behavior is positively correlated with anxiety about social comparison, but the structural equation model did not support the direct effect, suggesting that attention should be paid to the complex paths between variables (such as indirect effects or the influence of confounding variables (Table 8)).

4. Discussion

4.1. Positive correlation between exercise behavioral intention and SPA: The double-edged sword effect of self-presentation motivation

This study found that college students' exercise behavioral intention is significantly positively correlated with SPA

(standardized coefficient 0.824, $P < 0.001$), which can be explained from the perspective of self-presentation theory. Individuals with high exercise intention tend to regard exercise as an opportunity for self-presentation in social scenarios (such as showing a self-disciplined image through sports check-ins and participating in team competitions), thereby increasing their sensitivity to others' evaluations. For example, individuals who choose high-intensity exercise may pay more attention to whether their performance meets the social stereotype of "sports experts". This pursuit of a "positive self-image" instead increases the worry about potential negative evaluations (such as worrying about being laughed at for incorrect movements). In addition, social comparison theory points out that individuals with high intention often make horizontal comparisons of their exercise goals with others (such as "my classmate exercises 5 times a week, am I self-disciplined enough"). This upward comparison is likely to cause fluctuations in self-efficacy, which in turn transforms into social anxiety. This finding suggests that in interventions to promote exercise intention, it is necessary to incorporate "de-evaluative" cognitive training to help individuals establish exercise motivation oriented towards self-improvement rather than over-reliance on social feedback^[12].

4.2. Core driving role of exercise behavioral intention: Localization verification of the theory of planned behavior

The research results strongly support the core hypothesis of the Theory of Planned Behavior: Exercise behavioral intention has a direct positive effect on exercise behavior (standardized coefficient 0.197, $P < 0.001$), and forms a three-dimensional driving model through exercise attitude, subjective norm, and perceived behavioral control. Among them, exercise attitude serves as the cognitive

Table 8. Path coefficients and test results

Path	Effect	Standardized coefficient	Significance	Establishment
Social physique anxiety and exercise behavioral intention	Correlation	0.824	0.000	Yes
Exercise behavioral intention → Exercise behavior	Positive direct effect	0.197	0.000	Yes
Social physique anxiety → Exercise behavior	Positive direct effect	0.169	0.236	No

foundation (such as “exercise is necessary for a healthy lifestyle”), subjective norm as the social environmental pressure (such as “my roommate invites me to work out together”), and perceived behavioral control as the executive confidence (such as “I can reasonably arrange exercise time”). The three form a psychological closed loop of “intention-behavior” transformation through high synergy (correlation coefficient 0.873~0.890). The research results are consistent with the confirmed research results, but this study further reveals the particularity of Chinese college students: the role intensity of subjective norm (standardized coefficient 1.032) is slightly higher than that of perceived behavioral control (1.039), which may reflect that under the collectivist culture, the social support from peers has a more significant impact on behavioral decisions^[13].

4.3. Indirect impact path of SPA: Potential explanation of mediation effect

Although the direct effect of SPA on exercise behavior is not significant ($P = 0.236$), its strong correlation with exercise intention (0.824) suggests a complex indirect mechanism of action. Combined with the results of the structural equation model, it is speculated that there may be two paths as follows:

- (1) The positive mediation path of “SPA → exercise intention → exercise behavior”, that is, individuals generate the motivation to “improve their image through exercise” due to worrying about others’ evaluations (such as “I won’t be talked about my body shape after losing weight”), thereby indirectly promoting behavior;
- (2) The negative moderation path of “SPA → perceived behavioral control → exercise behavior”. Highly anxious individuals may reduce their self-efficacy due to excessive attention to social evaluations (such as “unable to complete exercise under the gaze of others”), thereby inhibiting behavior.

The conclusion in the previous correlation analysis that “exercise behavior is positively correlated with anxiety about social comparison” may be the result of the offset of these two paths. Future research needs to introduce mediation tests to quantify the effect size of each path.

4.4. Dimension differences of SPA: Social evaluation takes priority over body image

The structural equation model of SPA shows that “worry about others’ negative evaluations” (reference item coefficient 1) and “anxiety about social comparison” (coefficient 0.713, $P < 0.001$) are the core constituent dimensions, while “discomfort with physical self-presentation” (coefficient 0.099, $P > 0.05$) contributes weakly. This result indicates that college students’ social anxiety is essentially “relationship-oriented” rather than “self-oriented”, they care more about their self-image in the eyes of others than mere dissatisfaction with their own physique. It is worth noting that the insufficient exercise behavior group has a significantly higher score in the “worry about others’ evaluations” dimension (3.42 ± 0.43 vs. 2.71 ± 0.36), which may be related to the ambiguous social reference caused by their lack of exercise experience: occasional exercisers are more likely to regard others’ reactions as evaluation signals because they are not familiar with the rules of sports scenarios, while regular exercisers form a “de-socialized” exercise mode through habituation (such as focusing on the exercise itself rather than others’ eyes)^[14].

4.5. Multi-dimensional synergy of exercise behavior: Dual roles of physiological inertia and psychological consistency

The high positive correlation among exercise intensity, duration, and frequency (0.582~0.596, $P < 0.01$) can be attributed to the “behavioral inertia effect”. Once an individual establishes an exercise habit in a certain dimension (such as running 3 times a week), they will naturally increase the intensity or duration to maintain physiological adaptation (such as improving endurance). At the same time, the synergy of psychological variables (attitude - subjective norm - perceived behavioral control) forms a “self-reinforcing cycle”. A positive attitude enhances the perception of subjective norm (such as taking the initiative to join a sports community), and social support further improves self-efficacy (such as others’ recognition enhances the confidence of “I can persist”). This physical and mental linkage mechanism suggests that intervention measures can adopt a strategy of “breaking through a single dimension → multi-dimensional collaborative improvement”. For example,

first establish a regular habit through a “21-day frequency check-in” plan, and then gradually guide the advancement of intensity and duration.

4.6. Stability of physical self-perception: Limitations of interventions on trait cognition

The study confirms that “discomfort with physical self-presentation” has no significant correlation with exercise behavior and SPA, which is consistent with the “trait stability” theory of body image. As an overall cognitive evaluation of one’s own body, body image is affected by long-term factors such as childhood experiences, media culture, and family environment, and short-term exercise behavior is difficult to change the deep cognitive structure. For example, some students with sufficient exercise in this study still reported high physical discomfort (2.96 ± 0.29), which may be because they regard exercise as a means to “correct body defects” rather than a process of accepting their bodies. This suggests that interventions for physical anxiety need to include long-term cognitive-behavioral therapy (such as mindfulness body scan and de-idealized body shape training) rather than relying solely on exercise interventions ^[15].

5. Conclusions and suggestions

5.1. Conclusions

Exercise behavioral intention is a direct predictor of exercise behavior, forming a three-dimensional driving model of “cognition–social–self-efficacy” through the combined effects of exercise attitude, subjective norm, and perceived behavioral control, thereby confirming the applicability of the Theory of Planned Behavior among college students. SPA is significantly and positively associated with exercise intention but does not exert a direct influence on exercise behavior. Instead, its effects may operate through mediating or moderating mechanisms involving exercise intention or self-efficacy, with worry about others’ evaluations and anxiety related

to social comparison emerging as its core dimensions. Exercise intensity, duration, and frequency are highly positively correlated, reflecting the integrity and inertia of exercise behavior, while the strong coupling among psychological variables (correlation coefficient > 0.87) indicates that attitudes, social support, and self-efficacy mutually reinforce one another. In contrast, discomfort with physical presentation shows no significant association with either exercise behavior or social anxiety, suggesting that it is primarily shaped by long-term cognitive patterns rather than short-term behavioral changes.

5.2. Suggestions

The suggestions are as outlined:

- (1) Develop an “exercise motivation profile” tool to assess individual motivation types (such as health-oriented, social-oriented, and image-oriented) through questionnaires and provide personalized intervention plans. Implement a “sports ambassador program” at the class level, select active students as “sports role models”, and improve subjective norms through peer influence;
- (2) For high-anxiety groups (score > 3.5), carry out group counseling on “social evaluation desensitization”. Provide “non-competitive, low-exposure” exercise options for students with low intention and high anxiety, such as indoor aerobics, online follow-up courses, and hiking, to reduce public social evaluation pressure;
- (3) Cooperate with the psychological counseling center to offer a series of “body mindfulness” courses. Through activities such as meditation, body scan, and artistic expression (such as body graffiti), help students establish the cognition that “the body is a tool rather than an ornament” and reduce excessive attention to body shape.

Disclosure statement

The authors declare no conflict of interest.

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