The Efficacy of Excellence Motivation on Colleges' Excellence Behaving Based on Data Analysis

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Abstract
Based on the theoretical results of previous studies in social psychology, a mediation model was constructed to explore the mechanism of action. A mediation model was constructed to explore the mechanism of action between college students' exercise motivation and exercise behavior, focusing on the mediating role of exercise commitment in the relationship. We randomly select 293 college and university students for the study, using the exercise motivation scale (MPAM-R) simplified version, the exercise commitment scale and the exercise behavior questionnaire. The results showed that: (1) after controlling for gender, grade, and major, exercise motivation had a significant positive predictive effect on exercise behavior; (2) sports commitment played a partially mediating role in the relationship between exercise motivation and exercise behavior; this direct effect (0.32) and mediating effect (0.09) accounted for 78.05% and 21.95% of the total effect (0.41), respectively.

Keywords: *Exercise motivation; Exercise behavior; Sports commitment; Data Analysis; Mediating effect test*

1 INTRODUCTION

In recent years, with the introduction of a series of slogans such as "nationwide fitness" and other related policy documents, people across the country have become more active in physical exercise. The sudden onset of the "COVID-19" has put people back on the fast track to enhance their physical and mental fitness and exercise capacity. At the same time, there are some problems in the exercise behaviour that cannot be ignored, as university students, who are regarded as a pioneer and reserve force to promote the socialist modernization of the country, are to a certain extent slipping in the persistence of physical exercise [1]. Therefore, while we pay full attention to the cultural knowledge and technical theoretical level of contemporary university students, we should also pay attention to the changes in the development of their own psychological quality, i.e. the current situation of the development of the exercise behaviour level of contemporary university students.

2 METHOD

2.1 Subject of the study

A random sample of university students of different majors and genders was selected for the study in Jinan Universities, and 293 questionnaires were collected. The age of the respondents ranged from 18 to 24 years old, including 159 males, accounting for 54.27% of the total number, and 134 females, accounting for 45.73% of the total number. There were 139 physical education majors, accounting for 47.40 per cent of the total; 154 non-physical education majors, accounting for 52.6 per cent of the total.

2.2 Research Tools

2.2.1 Exercise Behaviour Scale

A literature search was conducted for the design of this questionnaire based on the content and purpose of the study. A literature search was conducted using the keywords "exercise behavior" and "influencing factors", and the initial scale of 15 questions, divided into two dimensions of persistence and exercise attempts, was compiled in a questionnaire star and distributed online to the respondents.

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2.2.2 Motivation to Exercise Scale (MPAM-R) Simplified

Based on the *Motives for Physical Activities Measure* developed by Frederick and Ryan, Chen Shanping revised the *Motivation to* Exercise Scale (MPAM-R) Simplified. [2]. After simplification, it was divided into five dimensions: health, appearance, fun, ability, and socialization [3]. Using a 5-point Likert scale, the subject's score on the scale was averaged by adding all item scores; the higher the score, the more pronounced his or her motivation to exercise. The Cronbach's α coefficient for this scale in this study was 0.96.

2.2.3 Campaign Commitment Scale

A revised version of the Physical Activity Commitment Scale developed by Wilson et al. was used [6]. It was divided into six dimensions: commitment to exercise, enjoyment of exercise, choice of participation, personal commitment, social constraint, and social support [9]. A 5-point Likert scale was used, and the subject's score on the scale was averaged by summing all item scores; the higher the score, the stronger their commitment to exercise. The Cronbach's alpha coefficient for this scale in this study was 0.92.

2.3 Data processing

Through the results of the questionnaire star output (Microsoft Excel format), the 54 data collected for the first time were tested for reliability and validity, factor analysis using the software SPSS 20.0, and removed the items that did not meet the headings; the questionnaire data collected for the second time were analyzed and validated using AMOS 22.0 for the rationality of the questionnaire and the data collected to construct a structural equation model [7]. Based on the full use of descriptive statistics, correlation analysis, regression analysis, factor analysis and other mathematical and statistical analysis methods, the mediating effect was analyzed using structural equation model and the effect of the mediating model was derived from the test of bootstrap.

3 RESULTS AND ANALYSIS

3.1 Test of reliability of the exercise behavior scale

3.1.1 Discriminant test

Item discrimination test, also called item analysis, is a test of how well the items discriminate or distinguish between the questions to be measured. The pretest sample was 54 current college students, and the data from the 54 questionnaires collected for the first time were first arranged in order of total score from smallest to largest, and the two ends of the total score were grouped at 26% (14 people) each. The first 14 were named the low group, the last 14 were named the high group, and the middle part (26) were named the others, and independent sample t-tests were conducted on the high and low groups. From the data, the two question items X1 and X6 were not significantly different in the high and low subgroups for the discrimination test and should be removed. The remaining 13 question items in the questionnaire were well discriminated in the high and low grouping for discrimination, with t-values reaching significant levels.

3.1.2 Confidence analysis

Reliability refers to the magnitude of variability in the consistency between different test results obtained from the analysis of the scale after several tests in the actual testing process of the experimental study, i.e. measuring Cronbach's alpha coefficient. Hair, Black and Babin et al. in their book Multivariate Data Analysis (7th edition) argue that in multidimensional scales it is only necessary to state the Cronbach's alpha coefficient for each dimension; in exploratory studies, the Cronbach's alpha coefficient for immature scales need only be greater than 0.6 [4]. The coefficients of the scale (with items X1 and X6 removed) are shown in Table 1, with coefficients greater than the minimum required value for each dimension, all meeting the test of scale reliability, indicating a high level of internal consistency across all dimensions of the compiled scale.

Table 1: Cronbach's alpha coefficient for each dimension

dimensionality	persistence	exercise attempt
Cronbach's alpha	0.91	0.83

3.1.3 Validity analysis

KMO and Bartlett's sphericity tests were conducted on the recovered pretest questionnaire data to test the suitability of the scale for factor analysis. According to the KMO determination criteria proposed by Kaiser in 1974, a KMO value of not less than 0.5 is required to satisfy the condition of conducting factor analysis. In Table 2, the KMO values of all dimensions are greater than the minimum required value of 0.5, and the chi-square values of both dimensions reach a significant status at the 0.05 level, so both dimensions of this compilation scale are suitable for factor analysis.

Table 2: Table of KMO and Bartlett's test of sphericity

dimensionality	KMO	approximate cartesian	df	Sig
persistence	0.87	268.23	28	0
Exercise Attempt	0.74	101.00	10	0

The question items within the two dimensions identified by the scale were rotated using the maximum variance method to derive the factor loadings for each dimensional question item. X1 to X15 represent the 15 question items in the exercise behavior scale, respectively, and after deleting two question items, X1 and X6, the values of factor loadings for each remaining question item are greater than 0.5, which indicates that each question item has a strong relationship with the common factor of its dimension.

The motor behavior scale data were analyzed using principal component analysis (pca), which contains a test of the total explained variance on each dimension within the scale, and then the eigenvalues of each dimension were extracted by the maximum variance method assisted by orthogonal rotation set to 1. The results of the analysis of each dimension were summarized, and the summarized results are shown in Table 3. If the explained variance of each dimension after extraction can exceed 60%, it indicates that the factors retained after extraction are quite satisfactory [10]. As can be seen from Table 3, the percentage of explainable variance for each dimension of the scale is the ideal value that is higher than 60% for all of them. Thus, the results of the analysis of the two dimensional factors of the measurement scale reached a high standard, indicating that the scale is quite reasonable in terms of question items and dimensional compilation.

Table 3: Summary of the amount of variance explained by the four dimensions

Dimen-sionality	aggrega te	Variance %	Cumulative %
persistence	4.94	61.75	61.75
Exercise Attempt	3.96	60.27	60.27

3.2 Analysis of the current exercise behavior of college students

3.2.1 Analysis of the general status of exercise behavior of college students

In order to examine the current status of exercise behavior among college students, this study conducted a descriptive statistical analysis of exercise behavior and its two dimensions. The results showed that the mean of the total exercise behavior score (M=4.03), the mean of the persistence dimension (M=4.02), and the mean of the exercise attempt dimension (M=4.06) were higher than the theoretical median of 3 on a 5-point scale, indicating that the college students in this study had a better exercise behavior status and their exercise behavior resided at a better level.

3.2.2 Analysis of gender differences in college students' exercise behavior

In order to examine whether there is a difference in college students' exercise behavior in terms of gender, an independent sample t-test was conducted with exercise behavior and the means of its two dimensions as the dependent variable and gender as the independent variable. The results showed that the mean value of exercise behavior of contemporary male college students group is significantly higher than that of female college students group, and the exercise persistence of male college students is also significantly higher than that of female college students, so there is a significant difference in physical exercise behavior of contemporary college students in terms of gender [8].

3.2.3 Analysis of professional differences in college students' exercise behavior

To examine whether college students' exercise behaviors differed by major, an independent samples t-test was conducted with major (whether the college was a physical education major) as the independent variable and the mean of physical exercise behaviors and its two factors as the dependent variable. The results showed that contemporary college students had significant major differences in exercise behavior in their participation in sports activities ($t=3.88$, $p<0.001$), as demonstrated by the fact that college students majoring in physical education had significantly higher exercise levels than those majoring in other majors. Further analysis of the two dimensions of exercise behavior revealed that contemporary college students majoring in physical education were significantly more persistent in participating in physical activity than non-physical education college students ($t=4.06$, $p<0.001$) and significantly higher in their attempts to participate in physical activity ($t=2$, $p<0.05$), which may be related to

the professionalism of physical education majors certain relationship.

3.2.4 Analysis of Grade Differences in College Students' Exercise Behavior

In order to examine whether there were differences in college students' physical activity behavior across grades, a one-way ANOVA was conducted with the means of the two dimensions of exercise behavior as the dependent variable and the grades (freshman, sophomore, junior, senior, graduate and above) as the independent variables. The results showed that there were significant differences in college students' participation in physical activity behavior across grades, specifically in terms of exercise persistence. From the LSD test, it can be seen that the participation in physical exercise persistence of graduate students and above is significantly smaller than that of juniors, sophomores, seniors, and freshmen, indicating that the level of participation in physical exercise persistence of freshmen is relatively high, and the level of participation in physical exercise persistence of graduate students and above is the lowest.

3.3 Correlation analysis of exercise motivation, exercise commitment and exercise behavior

Gender, grade, and major were recoded and tested for correlations with exercise motivation, sports commitment, and exercise behavior and their two dimensions (Table 4). The results showed that gender had a significant negative correlation with exercise motivation and exercise behavior (persistence dimension), grade had a significant negative correlation with sports commitment, major had a significant negative correlation with exercise motivation, sports commitment, and exercise behavior (persistence and exercise attempts), and exercise motivation had a significant positive correlation with sports commitment and exercise behavior (persistence and exercise attempts).

Table 4: Correlation analysis of exercise motivation, sports commitment and exercise behavior

Variable	sex	grade	Specialty	Motivation to exercise	Campaign Commitment	Exercise behavior
sex	1					
grade	0.13 *	1				
specialty	0.23 **	0.18 **	1			
Motivation to exercise	-0.14*	-0.05	-0.15*	1		
Campaign Commitment	-0.32**	-0.19 **	-0.38**	0.45**	1	
Exercise behavior	-0.14*	-0.06	-0.22**	0.41**	0.38 **	1
persistence	-0.15**	-0.06	-0.23**	0.40**	0.4 **	0.91**
Exercise Attempt	-0.06	-0.04	-0.12*	0.25**	0.19 **	0.74**

3.4 Analysis of the mediating role of sports commitment between exercise motivation and exercise behavior

The results of the correlation analysis showed that the variables and their dimensions were significantly correlated with each other. Therefore, in this study, a structural equation model was constructed using motivation to participate in physical activity as the independent variable, exercise behavior to perform physical activity as the dependent variable, and commitment to exercise as the mediating variable among contemporary school students. In addition, gender, grade and major were found to be significantly correlated between the main variables in the correlation analysis, so gender, grade and major were used as control variables to construct the structural equation model (Figure 1).

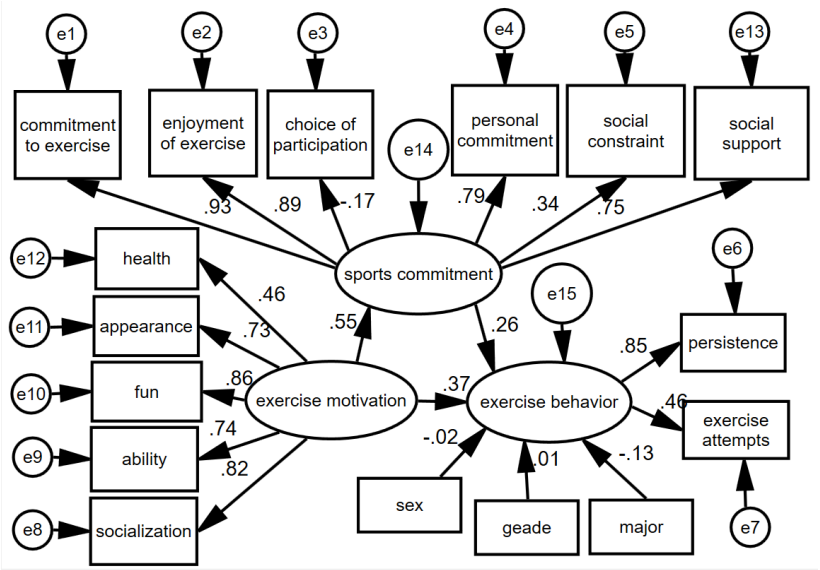

Figure 1: Schematic representation of the mediating role of sports commitment between exercise motivation and exercise behavior

The model in this study revealed that exercise motivation and sports commitment both significantly predicted exercise behavior among college students. The total effect of sports motivation to exercise behavior path, the direct effect of exercise motivation to exercise behavior path, and the indirect effect of exercise motivation through the mediation of sports commitment to exercise behavior path were all significant. This indicates that exercise motivation and sports commitment are strong predictors of physical activity participation among contemporary college students.

3.5 A test of the mediating effect of sports commitment between exercise motivation and exercise behavior

Following the steps of the mediating effect test, the direct effect of exercise motivation on exercise behavior was first tested, and then the significance of the model fit and path coefficient was tested by adding sports commitment as a mediating variable [5]. A simple mediation model4 in the SPSS macro prepared by Hayes (2012) was used to further test the mediating role of sports commitment on college students' motivation to participate in physical activity exercise and exercise behavior, controlling for gender, grade, and whether they were a physical education major.

First, the indicators of the direct effect model with exercise motivation as the independent variable and exercise behavior as the dependent variable were CMIN/DF=2.81, RMR=0.04, GFI=0.93, AGFI=0.88, CFI=0.92, and RMSEA=0.08. The data indicated that the model fit well. Combining this with Table 5 yielded a significant direct path coefficient for exercise motivation on exercise behavior (B=0.41, t=6.96, p<0.001). The results indicate that exercise motivation has a significant positive predictive effect on exercise behavior of college students. When mediating variables were put in, the positive predictive effect of exercise motivation on exercise behavior remained significant (B=0.32, t=5.06, p<0.001). The positive predictive behavior of exercise motivation on sports commitment was significant (B=0.37, t=7.78, p<0.001), as was the positive predictive effect of sports commitment on exercise behavior (B=0.23, t=3.30, p<0.001).

Finally, the bootstrap method was used to test the direct effect of exercise motivation on exercise behavior and the mediating effect of putting in the mediating variable sports commitment in the bootstrap 95% confidence interval of the data showed that the upper and lower limits of the interval did not include 0 in it (Table 6). It shows that college students' motivation to participate in sports and exercise not only positively predicts exercise behavior directly, but also indirectly through the mediating effect of sports commitment, which is part of the partial mediating effect model, and this direct effect (0.32) accounts for 78.05% of the total effect (0.41) and the mediating effect (0.09) accounts for 21.95% of the total effect (0.41).

Table 5: Mediator model tests for campaign commitment

Resulting variables	Control variables	Fitted indicators		Coefficient Significance	
		R2	F	B	t
Exercise behavior		0.19	17.22		
	sex			-0.06	-0.85
	grade			0	-0.17
	specialty			-0.19	-2.78 *
	Motivation to exercise			0.21	2.56 ***
Campaign Commitment		0.35	38.62		
	sex			-0.27	-2.93 ***
	grade			-0.05	-2.15 *
	specialty			-0.29	-3.24 ***
	Motivation to exercise			0.15	2.78 ***
Exercise behavior		0.22	16.43		
	sex			-0.01	-0.10
	grade			0.01	0.24
	specialty			-0.12	-1.73
	Motivation to exercise			0.21	3.06 ***
	Campaign Commitment			0.23	2.30 ***

Table 6: Decomposition of total, direct and mediated effects

	Effect	BootSE	BootLLCI	BootULCI	Relative Effect Value
aggregate effect	0.41	0.08	0.28	0.57	
direct effect	0.32	0.07	0.20	0.49	78.05%
intermediary effect	0.09	0.03	0.03	0.16	21.95%

4 CONCLUSION

There are significant differences in the exercise behavior of college students and especially in the exercise persistence, male college students are significantly higher than female college students. In terms of exercise persistence and exercise attempts, physical education majors are significantly higher than non-physical education majors, which fully reflects the professionalism of physical education majors. The level of exercise behavior of college students showed a decreasing trend with the increase of grade, i.e., the higher the grade, the lower the level of exercise. There is a significant positive correlation between college students' exercise motivation, sports commitment and exercise behavior, the stronger the exercise motivation,

the better the sports commitment, the higher the level of exercise behavior; on the contrary, the weaker the exercise motivation, the worse the sports commitment, the lower the level of exercise behavior. Exercise motivation not only predicted exercise behavior directly, but also was able to predict exercise behavior through the mediating effect of sports commitment, which belonged to the partial mediating effect model, and this direct effect (0.32) and mediating effect (0.09) accounted for 78.05% and 21.95% of the total effect, respectively.

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