

Moderated Mediation Model of Passion and Perseverance in Effect of College Students' Physical Movement on Bliss through Peer Group Cohesiveness

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Abstract: In recent years, in China, due to the one-sided pursuit of the enrollment rate, and the increasingly severe employment pressure has caused students to lack time for physical movement, and their physical fitness has declined every year. If this problem is not effectively resolved, it will affect the healthy growth and bliss experience of young people. Therefore, the country has issued several laws and directions to promote the health of adolescents, hoping to solve this unfavorable situation. This research aims to confirm the combined model of mediation and moderation of passion and perseverance in the effect of peer group cohesiveness between physical movement and the bliss of college students and explore the plans to improve bliss. This study used a quantitative approach and 333 respondents from 3 colleges and universities in Nanjing, China, were selected using a purposive sampling method. For the analysis, frequency, reliability, correlation, and moderated mediation effect analysis were performed. The results are in the followings. First, physical movement had a significant and positive association with passion and perseverance, peer group cohesiveness, and bliss. Passion and perseverance had a significant and positive association with peer group cohesiveness and bliss. Peer group cohesiveness had a significant and positive association with bliss. Second, the conditional indirect effect was proved when the passion and perseverance was high. This study confirmed that passion and perseverance contributes to the path through which physical movement of college students increases bliss via peer group cohesiveness.

Keywords: Physical Movement, Peer Group Cohesiveness, Passion and Perseverance, Bliss, Moderated Mediating Effect

1. Introduction

The development of Chinese society while bringing people a better life, also strengthens people's pursuit of bliss, and college students are no exception. Bliss is the concrete embodiment of a good life. In recent years, the physique of students in our country has shown a downward trend, especially the decline in the physique of college students is more prominent, and the phenomenon of obesity among students is more serious. The country has issued a number of documents, especially the "Healthy China Action (2019-2030)" [1], which put forward requirements and solutions to solve the current situation that exam-oriented education keeps students away from sports, solve the situation that the level of Chinese students in a physical health is declining yearly for college students, improve their current quality of life and bliss index of life.

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Although there are many academic conerens on the bliss of college students, the research on physical movement and bliss is limited. The bliss of college students is a psychological index to measure their overall health in mental and physical state and the quality of study and life. At present, college students are affected by various factors such as studies, employment, emotions, and making friends, resulting in a relatively lower level of bliss. Many studies have proved that physical movement improves the mind and body health of university students, and it also has a certain predictive effect on bliss[2]. University students are a group with significant social relationships and have social needs. Peer group cohesiveness critically contribute to the mental and physical improvement of university students for their mental health. Physical movement, as a highly interactive activity, has a good role in promoting peer group cohesiveness[3]. A good peer group cohesiveness promotes interaction and support in emotions, concepts, and information, and strengthens their social network. The acceptance and support of peers are conducive to coexistence so that university students maximize their emotional and social needs, experience more positive emotions, and then improve their bliss[4]. Therefore, based on these studies, it was to confirm whether peer group cohesiveness mediates the link between physical movement and bliss.

On the other hand, passion and perseverance is referred as to a successful trait in the 21st century. People with high passion and perseverance promote peer group cohesiveness, and moderate the increased of physical movement and peer group cohesiveness[5].

Therefore, this study tried to confirm the effect of physical movement on bliss through peer group cohesiveness and the moderated mediation model of passion and perseverance. The two questions are proposed as follows. First, what is the relationship between physical movement, passion and perseverance, peer group cohesiveness, and bliss? Second, does passion and perseverance moderate the mediating effect of peer group cohesiveness between physical movement and bliss?

2. Theoretical Background

2.1 Physical Movement and Bliss

Physical movement is defined as the human choice to apply various sports activities and combine them with nature to develop physical abilities and promote health, fitness, mental strength, cultural life, and leisure activities[6]. In other words, it is a type of activity such as bodybuilding, fitness, leisure activities, etc. that is aimed at improving physical and mental abilities[7]. Physical movement is performed with the goal of maintaining and enhancing physical fitness through specific planning, arrangement of relevant content, and repeated movements of the body[8]. To sum up, physical movement is a physical activity behavior that enhances physical fitness and promotes health through a series of activities.

Bliss is the idea of goodness, that the realization of one's potential is bliss[9]. The study of bliss has mainly been developed from two perspectives: hedonism focuses on defining bliss in the dimension of pleasure and avoidance of pain, while euphoria which focuses on demonstrating one's abilities[10]. On the other hand, Bliss is limited to areas necessary for everyday life. It is a whole evaluation of the quality of wellbeing set by oneself, including three parts: satisfaction with life, positive emotion, and negative emotion[11]. To sum up, bliss is a judgment made by individuals based on their inner standards to measure their emotional changes, social adaptation, and quality of life in a certain time.

The emergence of positive psychology recognized that happiness is an important means of human development. Exercise psychology studies have confirmed that bliss is closely related to university students' exercise support, body self-esteem, and self-efficacy[12]. At the same time, the gradual relaxation exercise method is used to intervene in individual anxiety, so as to examine the positive impact of physical activities on bliss. Additional research has confirmed that physical movement is

closely linked to the whole bliss of healthy adults[13]. There is an empirical analysis of the correlation between different exercise intensities, exercise time, and different exercise frequencies of university students on the test results of bliss and personality attitudes, affirming the effect of physical activity on bliss[14].

2.2 The Mediating Role of Peer Group Cohesiveness

Peer group cohesiveness have been a hot topic in positive psychology in recent years. It has the functions of mutual recognition, sharing bliss, and sharing fear[15]. The broad sense of interpersonal relationship should include the relationship between all people in society, and all aspects of the relationship between people[16]. Many studies have shown that a good peer group cohesiveness enables individuals to obtain better social support and reduce loneliness[17]. To sum up, a peer group cohesiveness is a kind of inner distance and connection between people in the process of interacting with each other, which reflects the psychological state of individuals or groups meeting their needs.

Physical movement promotes the consolidation and development of peer group cohesiveness, and developing peer group cohesiveness is one of the basic motivations for individuals to participate in the exercise, and peer group cohesiveness are significantly positively correlated with exercise frequency. Some studies have also pointed out that the social relationship during exercise is more socially supportive than the non social relationships such as objective environment[18]. In an integrated study on sportsmanship, exercise, and mental health targeting middle school students, it was found that sports friendship and sports activities have a two-way relationship that promotes each other. Sports friendship effectively predicts physical movement behavior and participation in sports activities maintains positive peer group cohesiveness. produced an irreplaceable role[19].

In the research on related issues of migrant youth, it is found that school interpersonal relationships (such as peer group cohesiveness, and teacher-student relationships) are an important source of adolescent bliss experience, Positive peer group cohesiveness and negative peer group cohesiveness have significantly different effects on their bliss, Among them, positive companionship improve their subjective well-being[20]. A better companionship in physical movement is conducive to creating a positive exercise atmosphere, improving individual bliss, and promoting the mental health of adolescents[21].

In the survey targeting university students, the comprehensive effect of physical movement and peer group cohesiveness on bliss was verified using a structural equation modeling method. It was confirmed that there is a mediating effect of peer group cohesiveness on the effect of physical movement on bliss [4]. The external utility view of sports participation is dedicated to the study of social interaction and social communication with others. This relationship brings bliss to individuals[22]. A 12-week, 2-stage follow-up survey was conducted on 1,201 junior high school students in Shanghai, and the cross-lag research design was used to find that peer group cohesiveness is both a causal variable and a moderating variable in the causal relationship between subjective exercise experience and leisure exercise habits. Regular physical movement for teenagers in their spare time is conducive to strengthening interpersonal interaction and obtaining a pleasant experience[23]. Because physical movement has an impact on the peer group cohesiveness of adolescents, it has an impact on their bliss. Therefore, this paper wants to verify whether there is a mediating effect of peer group cohesiveness between university students' physical movement and bliss.

2.3 The Moderating Role of Passion and Perseverance

Passion and perseverance is unswerving efforts and continuous interest to achieve higher and long-term goals even in the face of difficulties and adversities, and is the unremitting force towards the goals

you want to achieve[24]. Passion and perseverance which is also called willpower is a trait that people intentionally overcome difficulties and achieve set goals[25]. Individuals with a higher level of passion and perseverance tend to persevere in their areas of interest. At the same time, they do things they are good at and interested in their performance expectations[26].

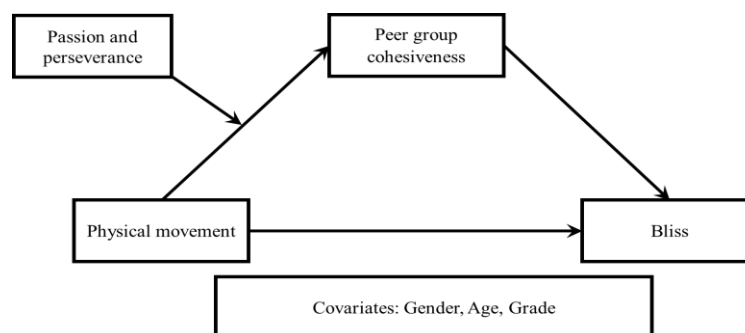
The intensity, time, and frequency of physical movement activities are positively correlated with passion and perseverance level and effort factors. The higher the intensity, time, and frequency of physical movement activities of junior high school students, the higher their passion and perseverance level[27]. Physical movement helps to enhance the mental wellbeing of students. physical movement improves the individual's self-awareness and self-confidence, makes the individual have a good emotional state, and helps to hone the individual's passion and perseverance[28].

passion and perseverance level not only directly predicts the level of mental health, but it also has an indirect effect on mental health through mature coping styles, so as to effectively ease the relationship between peers[27]. It is found that passion and perseverance has a plus influence on peer group cohesiveness. The more the level of passion and perseverance, the better the peer group cohesiveness[29]. To cultivate students' passion and perseverance through physical activities, it is necessary to diversify teachers' abilities and exercise methods to solve cognitive and emotional problems or conflicts that arise during the learning process and form better peer group cohesiveness[30]. Considering these previous studies, this paper also examines whether passion and perseverance mediates the effects of physical movement on peer group cohesiveness to enhance bliss.

3. Methods

3.1 Research Model

As for the research model, as shown in [Fig. 1], it was established to verify the moderated mediating effect (conditional indirect effect) that passion and perseverance moderates the path of physical movement → peer group cohesiveness → bliss. This model was analyzed according to the procedure of moderated mediating analysis, Model No. 7 in PROCESS macro ver. 4.2.



[Fig. 1] Research Diagram

3.2 Participants and Data Collection Procedure

In this study, an temporary sampling technique was used to recruit university students from 3 universities and universities in Nanjing, and data were collected using questionnaire. The data collection was conducted after obtaining consent from the students, and the respondents were notified that they could stop at any time if they wished, and a simple return gift was provided after the survey was completed. The survey was conducted in March 2023, and any university student at the selected university could respond. After excluding missing data and invalid questionnaires, a total of 333 valid

questionnaires were obtained.

According to gender, the number of female students was more, 201, there were 162 male students, by age, 18-19 years old had the largest number, with 235 people, 20-22 years old had 96 people, 2 people over 22 years old, divided by grade, the number of first-year university students is the largest, with 331 students.

3.3 Instrumentation

3.3.1 Physical Movement

The physical movement was measured by physical exercise scale developed by Liang Deqing of Wuhan Institute of Physical Education and others[31]. It consists of 3 items (intensity, time, and frequency to assess the exercise situation), using a Likert scale with 5-point. Higher response rate indicates more physical movement. Cronbach α of reliability for physical movement was .700.

3.3.2 Bliss

The bliss scale was measured by happiness compiled by Campbell et al.[32]. The scale has 8 items in total, and the items are scored from 1 to 7 on a Likert scale. The more the response rate, the more satisfactory the bliss. Cronbach α for bliss reliability was .891.

3.3.3 Peer Group Cohesiveness

The peer group cohesiveness was measured by peer relationships scale which was developed by Asher[33], and translated by the researcher. The scale has 16 items and measures on a Likert scale with 4-point. The higher the response rate on the scale, the better the peer group cohesiveness. Cronbach α for peer group cohesiveness reliability was .915.

3.3.4 Passion and Perseverance

The passion and perseverance was measured by the grit scale proposed by Duckworth and Quinn[34] and compiled by the researcher in this study. The scale contains a total of 8 items, 4 items measuring the consistency of interest, and 4 items measuring the continuity of effort. It was measured on a Likert scale with 5-point, and the more the response rate, the better the level of passion and perseverance. Cronbach α value of reliability for passion and perseverance was .629.

3.3.5 Control Variables

Among the general characteristics affecting mediating and dependent variables, gender, age, and grade were analyzed after controlling.

3.4 Data Analysis

The collected data was analyzed using SPSS PC+ Win. ver. 25.0 and SPSS PROCESS macro 4.2. The statistical techniques used were frequency, reliability, correlation, and moderated mediation effect analysis. Bootstrap was used to verify the moderated mediation effect.

4. Results

4.1 Correlation and Basic Analysis

The results of the correlation between physical movement, passion and perseverance, peer group

cohesiveness, and bliss are presented in [Table 1]. Physical movement had a significant positive correlation with passion and perseverance ($p < .01$), had a significant positive correlation with peer group cohesiveness ($p < .01$), and bliss ($p < .01$). Passion and perseverance had a significant positive correlation with peer group cohesiveness ($p < .01$) and bliss ($p < .01$). And peer group cohesiveness showed a positive correlation with bliss ($p < .01$). The overall correlation coefficient ranges between .181 and .460. From the analysis of these results, there is no multicollinearity.

[Table 1] Correlation and Frequency Analysis of Main Variables

	1	2	3	4
1. Physical movement	1			
2. Passion and perseverance	.202**	1		
3. Peer group cohesiveness	.203**	.446**	1	
4. Bliss	.181**	.244**	.460**	1
M	9.2583	3.0498	3.6075	3.8405
SD	2.8727	0.53358	. 0.61958	0.69781

** $p < .01$

4.2 The Moderated Mediation Model of Passion and Perseverance

The moderated mediation effect used PROCESS macro Model No. 7 proposed by Hayes[35]. The research results are presented in [Table 2] and [Table 3]. Looking at the parametric model, physical movement had no significant effect on peer group cohesiveness.

Looking at the result variable model, the influence of physical movement on bliss is not meaningful, and the moderating variable, passion and perseverance, had a significantly positive effect on peer group cohesiveness ($B = .4310$, $p < .001$). The interaction term between physical movement and passion and perseverance had a significantly positive effect on bliss ($B = .0699$, $p < .001$), so passion and perseverance moderated the association between physical movement activity and peer group cohesiveness.

Looking at the conditional effect of the independent variable according to the value of passion and perseverance, the conditional effect was significant in $M + SD$ when the passion and perseverance were high ($B = .0505$, $.0199 \sim .0812$), and when the passion and perseverance were in $M + SD$, it played a moderating role in increasing the effect of the physical movement on peer group cohesiveness.

The Johnson-Neyman method was applied to identify the significant level of the conditional effect according to the passion and perseverance value. The moderating effect was significant in the level where passion and perseverance were lower than $B = -.6621$, and 5.7057% of the survey subjects fell into this level. Also, the moderating effect was significant in the level where passion and perseverance were higher than $B = .1467$, and 30.3303% of the participants fell into this level.

[Table 2] Results of Moderating Mediation Effect Analysis of Passion and Perseverance

Classification	Paramotor model (DV: peer group cohesiveness)			Result variable model (DV: Bliss)		
	Coeffect	SE	t value	Coeffect	SE	t value
Constant	3.7546	.4068	9.2294***	1.8128	.5240	3.4595***
IV Physical movement	.0133	.0115	1.1491	.0184	.0133	1.3762
Moderator Passion and perseverance	.4310	.0581	7.4177***			

Interaction item	Physical movement × passion and perseverance	.0699	.0189	3.6901***		
Highest order unconditional interaction	R ² change	.0305				
	F	13.6170***				
Mediator	Peer group cohesiveness	-	-	-	.4900	.0573
Covariates	Gender	-.1607	.0681	-2.3604*	-.0516	.0793
	Age	-.0517	.0333	-1.5506	.0038	.0385
	Grade	.1990	.3795	.5224	.3325	.4400
Model Summary	R ²	.5185			.4712	
	F	19.9824***			18.6681***	

Conditional effect of physical movement according to passion and perseverance

Passion and perseverance	Effect(B)	se	t value	LLCI	ULCI
-.5336 (M-SD)	-.0240	.0151	-1.5907	-.0537	.0057
.0000(M)	.0133	.0115	1.1491	-.0094	.0360
.5336 (M+SD)	.0505	.0156	3.2463**	.0199	.0812

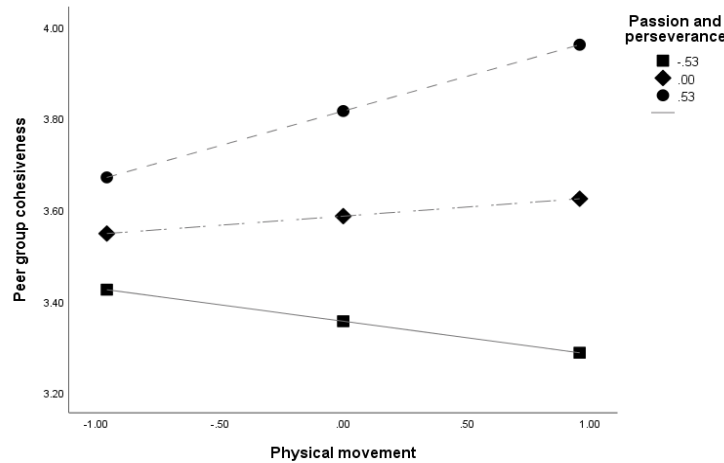
Johnson-Neyman's Conditional Effect Significance Area

Passion and perseverance	Below(%)	Above(%)
-.6621	5.7057	94.2493
.1467	69.6697	30.3303

Passion and perseverance	Effect(B)	se	t value	LLCI	ULCI
-1.9069	-.1200	.0376	-3.1398**	-.1939	-.0461
⋮					
-.6889	-.0349	.0171	-2.0337*	-.0686	-.0011
-.6621	-.0330	.0168	-1.7693*	-.0660	.0000
-.4859	-.0207	.0145	-1.4233	-.0493	.0079
⋮					
.1232	.0219	.0118	1.8464	-.0014	.0452
.1467	.0235	.0120	1.9673*	.0000	.0470
.3262	.0361	.0133	2.7199**	.0100	.0621
⋮					
1.9502	.1495	.0390	3.8315***	.0728	.2263

* $p < .05$, ** $p < .01$, *** $p < .001$

Since the conditional effect was significant, it was presented in [Fig. 2]. The conditions for passion and perseverance were given as M, M±1SD, and the independent variable was displayed on the X-axis and the dependent variable on the Y-axis. When passion and perseverance were at M+SD, peer group cohesiveness increased steeply as physical movement increased. On the other hand, when passion and persistence were in M-SD when physical movement increased, peer group cohesiveness actually decreased. In other words, the impact of physical movement on peer group cohesiveness was different when passion and persistence were high and low.



[Fig. 2] The Moderating Effect of Passion and Perseverance

The direct effect and conditional indirect effects of physical movement on bliss were reviewed. The direct effect between physical movement and bliss was .0184 (-.0079 ~ .0446), which was insignificant because 0 existed between the bootstrap lower limit (BootLLCI) and the upper limit (BootULCI) within the 95% confidence interval.

[Table 3] Direct and Conditional Indirect Effects of Physical Movement on Bliss

Direct effect (physical movement → bliss)				
Effect(B)	se	t value	LLCI	ULCI
.0184	.0133	1.3762	-.0079	.0446
Conditional indirect effect (physical movement → peer group cohesiveness → bliss)				
Passion and perseverance	Effect(B)	BootSE	BootLLCI	BootULCI
-.5336	-.0118	.0087	-.0302	.0044
.0000	.0065	.0061	-.0063	.0187
.5336	.0048	.0069	.0119	.0393
Moderated mediation index				
	Index	BootSE	BootLLCI	BootULCI
Passion and perseverance	.0342	.0093	.0181	.0544

The conditional indirect effect is significant because 0 does not exist between the bootstrap lower limit (BootLLCI) and the upper limit (BootULCI) within the 95% confidence interval at M+1SD

(.0084, .0002 to .0213) when the passion and perseverance is high(M+SD). Therefore, the moderated mediating effect was verified. On the other hand, the conditional indirect effect was not significant when the passion and perseverance was medium (M) and low (M-1SD), so the moderated mediating effect was not verified. Also, the moderated mediating index was .0342 (.0181 ~ .0544), which was significant. Judging from these results, the moderated mediating effect of passion and perseverance on the path from physical movement to bliss through peer group cohesiveness was verified.

5. Discussion and Conclusion

First, physical movement had a significant positive correlation with passion and perseverance, peer group cohesiveness, and bliss. These results are in line with the findings[4] that the higher the physical movement, the better the bliss and peer group cohesiveness. When physical movement increases, it means that the content or time of participation in physical exercise for university students has increased, so that they make more companions, communicate with each other, support and care, and experience positive and happy emotions. On the other hand, physical movement showed a positive correlation with passion and perseverance and peer group cohesiveness, which is partially in line with a result of the study that as university students increase their physical movement, their peer group cohesiveness also improves[18]. In addition, the research result that physical movement has a positive correlation with passion and perseverance and bliss was consistent with the results that passion and perseverance and bliss have a positive correlation[27], and passion and perseverance and peer group cohesiveness have a positive correlation[29]. Therefore, to improve the bliss of university students, it is necessary to increase the research on body movement, passion and perseverance, and peer group cohesiveness, and establish a positive mechanism to promote the bliss of university students on this basis.

Second, it was analyzed whether passion and perseverance moderate the relationship between physical movement and peer group cohesiveness. The interaction term between physical movement and passion and perseverance had a positive and significant effect on peer group cohesiveness, and therefore, passion and perseverance moderated the relationship between physical movement and peer group cohesiveness[30].

In addition, as a result of analyzing the conditional effect, which is the effect of the physical movement according to the three conditions of $M \pm SD$ and M on peer group cohesiveness, the conditional effect of the physical movement was not significant when passion and perseverance were $M-SD$ and M , but it was significant in the value of $M+SD$.

Furthermore, to determine whether passion and perseverance moderate the pathway of physical movement \rightarrow peer group cohesiveness \rightarrow bliss, the conditional indirect effect of physical movement on bliss was analyzed. The conditional indirect effect was significant because 0 does not exist between the bootstrap lower limit (Boot LLCI) and the upper limit (Boot ULCI) within the 95% confidence interval at $M+1SD$ of passion and perseverance ($B=.5336$, .0119 ~ .0393). Therefore, the moderated mediating effect of passion and perseverance was verified. On the other hand, the conditional indirect effect was not significant when the passion and perseverance were medium (M) and low (M-1SD).

These results suggest that when wanting to enhance the bliss of university students through physical movement, an intervention plan is needed to promote this effect, which is possible by enhancing the university student's passion and perseverance. In particular, when the passion and perseverance were medium or low, the moderating effect and the moderated mediating effect of passion and perseverance were not significant, so it is necessary to increase the passion and perseverance to a high level. For this reason, university students who do not take part in physical movement very much, improve their bliss by improving their passion and perseverance, promoting interpersonal communication, and forming good peer group cohesiveness.

In conclusion, it was proved that body movement has a more good effect on bliss with the increase of

peer group cohesiveness and passion and perseverance.

Limitations and recommendations of the study are discussed next. First of all, physical movement has no significant effect on peer group cohesiveness, but according to other research, physical movement promotes peer group cohesiveness[23]. Therefore, it is necessary to identify these causal relationships through follow-up studies. Secondly, physical movement did not significantly affect bliss, but according to previous research, the influence of physical movement on bliss is significantly positive[14], which is related to diversity degree of exercise intensity, exercise time, and different exercise frequency. Therefore, it is necessary to identify these causal relationships through follow-up studies.

Despite these limitations, this study would contribute to increasing the influence of physical movement on bliss, making university students actively participate in physical movement, improving their physical fitness, and promoting their health.

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