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The effect of participation motivation and exercise commitment of college students participating in fitness in Korea and China on body image and subjective well-being

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Abstract. Based on theoretical research concerning college students' motivation for participating in fitness activities, sports engagement, body image, and subjective well-being, this paper constructs a model of the impact mechanism involving participation motivation, sports engagement, body image, and subjective well-being. Utilizing survey data collected from universities in South Korea and China, the study employs structural equation modeling to test the hypotheses. The findings reveal that both intrinsic and extrinsic motivations, the two dimensions of participation motivation, significantly influence body image among Chinese and South Korean college students. Similarly, both intrinsic and extrinsic motivations significantly affect subjective well-being. Sports engagement has a significant impact on both body image and subjective well-being. Body image, in turn, influences subjective well-being and mediates the relationship between intrinsic motivation, extrinsic motivation, sports engagement, and subjective well-being. The research model varies depending on nationality.

Keywords: fitness activities, participation motivation, sports engagement, body image, subjective well-being

1. Introduction

The development of modern science and technology, the improvement of living standards, and the increase in leisure time have contributed to the enhancement of social and cultural levels. However, the rapid development of society has altered people's lifestyles and habits, leading to insufficient physical activity and irregular dietary patterns, which have gradually become characteristics of the high incidence of diseases among modern individuals [1]. Not only do these factors jeopardize physical health, but they also trigger mental illnesses. This has heightened people's demand for physical health and the pursuit of happiness, leading to an increasing number of individuals engaging in fitness activities such as exercise and strength training [2]. All human exercise behaviors are driven by specific motivations,exercise motivation serves as the psychological impetus or internal drive that encourages individuals to participate in physical activities. It possesses the characteristics of activating human behavior and maintaining a certain intensity of activity during sports engagements [3].

The university stage is a critical phase in life, marking the beginning of an individual's genuine pursuit of personal meaning and purpose. Research on the subjective well-being and happiness education of college students, who represent over 23% of their peer group and are considered part of the social elite, has garnered widespread attention from the educational community and society at large. This focus is closely tied to the overall development of students' lives and will have a profound impact on the construction of a harmonious society. Therefore, investigating the relationship between college students' motivation to participate in fitness activities and their subjective well-being is a highly meaningful research topic. This study will employ structural equation modeling to conduct an in-depth analysis of fitness participation behavior from the perspective of participation motivation. The findings aim to provide theoretical insights and practical guidance for enhancing college students' engagement in fitness activities and improving their subjective well-being.

2. Research hypotheses

Sports participation motivation is the internal drive that encourages an individual to engage in physical activities. It represents the uptake of the functions of sports and the impetus for realizing the value of sports. As a prerequisite for participation in sports, it serves as the foundation for eliciting enthusiasm, initiative, and creativity in sports practice. The research results of Gong Lanxiu indicate that the sense of pleasure derived from intrinsic motivation can have an impact on subjective well-being [3].

Similarly, Shi Weiqi's findings reveal a significant correlation between the extrinsic motivation related to appearance factors among female gym members and their subjective well-being [4]. Based on these insights, the following hypotheses are proposed in this study:

H1: Motivation for participating in fitness activities has a significant positive impact on subjective well-being.

H1-1: Intrinsic motivation has a significant positive impact on subjective well-being.

H1-2: Extrinsic motivation has a significant positive impact on subjective well-being.

In addition, motivation has a positive impact on body image. Zhao Yongfeng's research findings indicate that in this consumer society, an ideal body image can be achieved through maintaining and transforming the body, and an increasing number of people can derive happiness from this process, satisfying their intrinsic needs [5]. Howson's research results show that in a consumer society, people not only focus on health but also pay more attention to appearance, using the body as a medium for self-expression [6]. Therefore, this paper proposes the following hypotheses:

H2: Motivation for participating in fitness activities has a significant positive impact on body image.

H2-1: Intrinsic motivation has a significant positive impact on body image.

H2-2: Extrinsic motivation has a significant positive impact on body image.

Li Yanping's research indicates that participating in and engaging with sports plays an important role in shaping adolescents' body shape, physical form, and body image [7]. Shen Chaohuang's research shows that the more actively individuals participate in proactive leisure sports activities, the more positively they perceive the essence of life, thereby enhancing subjective well-being and exerting a positive influence on it [8]. Peng Yan's research results demonstrate that intrinsic motivation leads to increasingly positive body image and higher levels of subjective well-being [9]. Based on the above findings, this paper proposes the following hypotheses:

H3: Engagement in fitness activities has a significant positive impact on body image. H4: Engagement in fitness activities has a significant positive impact on subjective well-being. H5: Body image has a significant positive impact on subjective well-being. H6: The mediating effect of body image.

Based on the aforementioned theoretical analysis, the research model designed in this paper is illustrated in the Figure1.

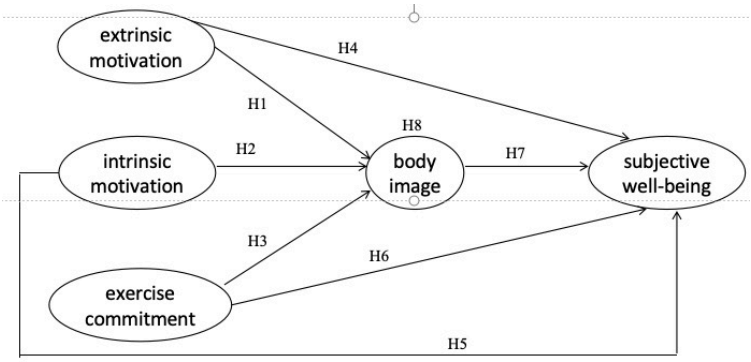

Figure 1. Research model

3. Research subjects and methods

3.1. Sample and data collection

This study selected a total of 812 college students participating in fitness activities as research subjects, including 406 students from 5 universities in Seoul, Gyeonggi-do, and Chungcheongnam-do in South Korea, and 406 students from 5 universities in Jiangsu, Shaanxi, Zhejiang, and Anhui provinces in China. A total of 812 questionnaires were distributed, and all 812 questionnaires were valid. The demographic information of the survey respondents is shown in Table 1.

Table 1. General characteristics of the research subjects

Division	content	N	percentage%
Nationality	South Korea	406	50%
	China	406	50%
Gender	Man	422	52%
	Woman	390	48%
Major	Humanities Major	180	22.2%
	Social Siences Major	148	18.2%
	Natural Siences Major	162	20%
	Engineering Major	202	24.9%
	Art and Sports Major	120	14.8%
Grade	Grade1	192	23.6%
	Grade2	204	25.1%
	Grade3	240	29.6%
	Grade4	176	21.7%

Table 1. Continued

Fitness experience	Within 3 months	40	4.9%
	3~6 months	130	16%
	6 months~1 year	292	36%
	1~2 years	158	19.5%
	2~3 years	106	13.1%
	More than 3 years	86	10.6%
Frequency of weekly exercise	Once a week	80	9.9%
	Twice a week	142	17.5%
	3 times a week	206	25.4%
	4 times a week	156	19.2%
	5 times a week	76	9.4%
	6 times a week	116	14.3%
	7 times a week	36	4.4%
Time per exercise	Within 30 minutes	104	12.8%
	30 minutes~1 hours	290	35.7%
	1 hours~1.5 hours	192	23.6%
	1.5 hours~2 hours	126	15.5%
	More than 2 hours	100	12.3%
Sum		812	100%

3.2. Questionnaire design and variable measurement

The measurement of the "participation motivation" variable in the scale was primarily based on the LIM (Leisure Motivation Scale) developed by Vallerand and Losier, as well as the work of Wessinger and Bandalos. It was revised and adapted from the scale developed by Park Jae-Sung, dividing participation motivation into two dimensions: extrinsic motivation and intrinsic motivation. Extrinsic motivation includes three sub-factors: health and physical fitness, social interaction, and external display. Intrinsic motivation comprises two sub-factors: enjoyment, skill development, and a sense of achievement, totaling 13 indicators; The "sport commitment" scale was developed based on the questionnaire created by Scanlan et al. [10], adapted and utilized by Jung Yong-Gak [11], and further modified according to the scale used by Park Sang-Woo [12]. It is divided into two sub-factors: cognitive commitment and behavioral commitment, comprising a total of 8 indicators; The body image scale was developed based on the questionnaire created by Marsh, Riohands, Jonson, Roch, and Tremaayne [13], utilizing the questionnaire from Son Ga-Jin's study [14], and further modified and supplemented, resulting in a total of 9 indicators; The subjective well-being scale was adapted from Fazio's questionnaire [15], with subjective well-being comprising six sub-factors: vitality, health, life satisfaction, comfort, and self-regulation, totaling 14 questions.

3.3. Reliability and validity testing

This study utilized SPSS 26.0 statistical software and AMOS 29.0 structural equation modeling software to conduct reliability and validity tests for all variables. The specific results are presented in Table 2. In terms of reliability, the Cronbach's α values for all latent variables ranged between 0.828 and 0.945. Additionally, the Composite Reliability (CR) values for all latent variables exceeded the recommended threshold of 0.7,

indicating good internal consistency of the measurement model. Furthermore, the standardized factor loading values for all measurement items, except for two, ranged between 0.696 and 0.828, exceeding the recommended minimum threshold of 0.5. Additionally, in this study, the Average Variance Extracted (AVE) for each construct, except for extrinsic motivation, was above the recommended threshold of 0.5, meeting the AVE requirements for the constructs. In terms of fit indices, the good fit between the sample data and the measurement model indicates that the measurement indicators indeed belong to their corresponding variables.

In addition to the aforementioned convergent validity, the latent variables in the study should also demonstrate high discriminant validity. Discriminant validity was assessed using the AVE method, where the square root of the AVE for each latent variable was greater than the correlation coefficients between the latent variables, indicating that the measurement model has good discriminant validity. The results of the discriminant validity analysis are shown in Table 3. The data indicate that the square roots of the AVE values are all greater than the correlation coefficients between the variables, demonstrating that the latent variables have good discriminant validity.

Table 2. Confirmatory factor analysis results of latent variables

	variate	Non-standard load	S.E	C.R.	Standard load	AVE	α
Intrinsic Motivation	Technical achievment 6	1.000			0.807	0.569	0.903
	Technical achievment 5	0.941	0.053	17.749	0.774		
	Technical achievment 4	0.944	0.055	17.027	0.750		
	Technical achievment 3	1.029	0.053	19.255	0.820		
	Technical achievment 2	0.978	0.054	18.214	0.788		
	Technical achievment 1	1.017	0.053	19.053	0.814		
	Happyness 4	1.017	0.053	19.148	0.817		
	Happyness 3	0.994	0.052	19.017	0.813		
	Happyness 2	1.038	0.053	19.510	0.828		
	Happyness 1	1.051	0.054	19.385	0.824		
External Motivation	Healthy physical strength 1	1.000			0.717	0.282	0.828
	Healthy physical strength 2	0.984	0.183	5.369	0.276		
	Healthy physical strength 3	0.980	0.068	14.435	0.737		
	Healthy physical strength 4	0.963	0.064	15.104	0.771		
	Healthy physical strength 5	0.836	0.152	5.498	0.283		
	Show off 1	0.847	0.061	13.996	0.715		
	Show off 2	0.970	0.068	14.198	0.725		
	Show off 3	1.056	0.072	14.747	0.753		
	Show off 4	0.906	0.062	14.565	0.744		
	Social interaction 1	0.883	0.064	13.856	0.708		
	Social interaction 2	0.944	0.065	14.530	0.742		
	Social interaction 3	0.933	0.063	14.850	0.758		
	Social interaction 4	0.966	0.067	14.361	0.733		

Table 2. Continued

Exercise Commitment	Behavioral engagement 4	1.000			0.765	0.518	0.896
	Behavioral engagement 3	0.930	0.062	14.947	0.726		
	Behavioral engagement 2	0.995	0.062	15.979	0.770		
	Behavioral engagement 1	0.944	0.066	14.237	0.696		
	Cognitive engagement 4	0.965	0.062	15.550	0.752		
	Cognitive engagement 3	1.015	0.065	15.549	0.752		
	Cognitive engagement 2	0.946	0.063	15.110	0.733		
	Cognitive engagement 1	1.033	0.065	15.788	0.762		
Subjective well-being	Subjective well-being 14	1.000			0.745	0.552	0.945
	Subjective well-being 13	1.017	0.065	15.171	0.759		
	Subjective well-being 12	1.015	0.062	16.290	0.784		
	Subjective well-being 11	0.997	0.066	15.065	0.731		
	Subjective well-being 10	0.924	0.062	15.009	0.728		
	Subjective well-being 9	0.931	0.059	15.662	0.757		
	Subjective well-being 8	1.037	0.067	15.446	0.747		
	Subjective well-being 7	0.981	0.064	15.284	0.740		
	Subjective well-being 6	0.882	0.061	14.538	0.708		
	Subjective well-being 5	0.953	0.067	14.288	0.696		
	Subjective well-being 4	0.894	0.061	14.752	0.717		
Subjective well-being	Subjective well-being 3	0.990	0.067	14.812	0.720		
	Subjective well-being 2	0.931	0.061	15.283	0.740		
	Subjective well-being 1	0.960	0.065	14.738	0.716		

Table 2. Continued

Body Image	Appearance management 1	1.000			0.379	0.386	0.831
	Appearance management 2	1.015	0.142	7.168	0.725		
	Appearance management 3	1.123	0.157	7.178	0.728		
	Appearance management 4	0.953	0.135	7.061	0.687		
	Physical attractiveness 1	1.070	0.150	7.127	0.709		
	Physical attractiveness 2	0.858	0.123	6.958	0.654		
	Physical attractiveness 3	1.008	0.143	7.073	0.691		
	Physical attractiveness 4	1.050	0.146	7.183	0.730		

*Statistically significant C.R. values: all $p < 0.001$*Model fit indices: RMSEA: 0.017, CFI: 0.988, TLI: 0.987

Table 3. AVE and correlation coefficients

	Constructs	M	SD	Correlativity				
				1	2	3	4	5
1	Intrinsic Motivation	3.616	0.972	1				
2	External Motivation	4.022	0.766	0.320***	1			
3	Exercise Commitment	3.725	0.840	0.295***	0.238***	1		
4	Body Image	4.081	0.731	0.310***	0.263***	0.262***	1	
5	Subjective well-being	3.870	0.739	0.465***	0.426***	0.437***	0.436***	1

Note: *** indicates $p < 0.001$.

4. Research results

4.1. Hypothesis testing

The standardized path coefficients of the structural equation model indicate that:

Intrinsic motivation ($\beta = 0.255$, $p < 0.001$) and exercise engagement ($\beta = 0.190$, $p < 0.001$) have a significant positive impact on body image, while extrinsic motivation ($\beta = 0.161$, $p < 0.05$) also positively influences body image. Intrinsic motivation ($\beta = 0.233$, $p < 0.001$), extrinsic motivation ($\beta = 0.255$, $p < 0.001$), exercise engagement ($\beta = 0.245$, $p < 0.001$), and body image ($\beta = 0.278$, $p < 0.001$) all have a significant positive impact on subjective well-being. Therefore, H-1, H-2, H-3, H-4, H-5, H-6, and H-7 are all supported. The specific hypothesis testing results are shown in Table 4.

Table 4. Hypothesis testing results based on the causal relationships among participation motivation, exercise engagement, body image, and subjective well-being

Hypothesis classification	Hypothetical path	Estimate (β)	S.E	C.R	*p*-value	Whether support or not
H-1	Intrinsic Motivation →Body Image	0.255	0.042	3.922	***	support
H-2	External Motivation →Body Image	0.161	0.052	2.862	**	support
H-3	Exercise Commitment →Body Image	0.190	0.046	3.353	***	support
H-4	Intrinsic Motivation →Subjective well-being	0.233	0.037	4.984	***	support
H-5	External Motivation →Subjective well-being	0.255	0.047	5.439	***	support
H-6	Exercise Commitment →Subjective well-being	0.245	0.041	5.257	***	support
H-7	Body Image →Subjective well-being	0.278	0.053	5.649	***	support

$p < 0.1$, ** $p < 0.01$, *** $p < 0.001$*Model fit indices: RMSEA: 0.017, CFI: 0.988, TLI: 0.987

4.2. Mediation effect verification

In this study, body image, as a parameter, was tested for significant indirect effects within the causal relationships between participation motivation, exercise engagement, and subjective well-being, demonstrating significant mediation effects.

Table 5. Significance verification results of mediation effects

The hypothesis regarding the mediating effect of body image between participation motivation, exercise engagement, and subjective well-being.			
H-8	Body image plays a significant mediating role between participation motivation, exercise engagement, and subjective well-being.		
Path	Direct Effect	Indirect Effect	Total Effect
Intrinsic Motivation→Body Image→Subjective well-being	0.365***	0.100***	0.465***
External Motivation→Body Image→Subjective well-being	0.334***	0.092***	0.426***
Exercise Commitment→Body Image→Subjective well-being	0.346***	0.091***	0.437***

* Two Tailed Significance: $p < 0.1$, ** $p < 0.01$, *** $p < 0.001$

The analysis results indicate that participation motivation and exercise engagement not only have a direct effect on subjective well-being but also exhibit an indirect effect mediated by body image, both of which are statistically significant. Additionally, in the causal relationships among the variables, intrinsic motivation, extrinsic motivation, and exercise engagement showed positive correlations with subjective well-being. The greater the intrinsic motivation, extrinsic motivation, and exercise engagement, the higher the level of subjective well-being. Notably, body image, as a significant parameter, positively contributes to enhancing subjective well-being. The specific test results are presented in Table 5.

4.3. Multi-group difference analysis between South Korea and China

The study examined the effects of participation motivation and exercise engagement on body image and subjective well-being among multiple groups in South Korea and China. The results showed that all factors of intrinsic motivation, extrinsic motivation, and exercise engagement had statistically significant impacts on body image and subjective well-being, with positive (+) effects observed in all cases. Furthermore, when examining the influence of participation motivation and exercise engagement factors on body image, the statistical values for intrinsic and extrinsic motivation were higher in China compared to South Korea, and the differences in these values were statistically significant. A multi-group analysis was conducted to assess the impact of participation motivation and exercise engagement on subjective well-being in South Korea and China. The results revealed that China placed greater emphasis on intrinsic motivation and exercise engagement than South Korea, and the effects of intrinsic motivation and exercise engagement on subjective well-being were more pronounced in China. The specific test results are presented in Table 6.

Table 6. Differences in the research model between groups

Differences in the research model between groups of different nationalities			
H-9	The research model may vary between groups depending on nationality		
Path	(Overall) Estimate	(South Korea) Estimate	(China) Estimate
Intrinsic Motivation →Body Image	0.255***	0.212***	0.250***
External Motivation →Body Image	0.161***	0.157***	0.213***
Exercise Commitment →Body Image	0.190***	0.162***	0.130***
Intrinsic Motivation →Subjective well-being	0.233***	0.247***	0.323***
External Motivation →Subjective well-being	0.255***	0.226***	0.185***
Exercise Commitment →Subjective well-being	0.245***	0.249***	0.274***

$p < 0.1$, ** $p < 0.01$, *** $p < 0.001$

5. Discussion

First, the analysis of the causal relationships among intrinsic motivation, extrinsic motivation, exercise engagement, and body image revealed that both intrinsic and extrinsic motivation significantly influence body image. Participating in fitness activities can bring joy, improve fitness skills, and provide a sense of achievement, while also enhancing physical strength, showcasing a fit physique, and improving social skills. These intrinsic and extrinsic motivations contribute to an improved body image. Exercise engagement also has a significant impact on body image. The more one engages in exercise, the more one enjoys fitness activities, gradually leading to changes in body image, increased confidence in one's appearance, and a perception of looking more attractive, healthier, and more charismatic.

Second, the analysis of the causal relationships among intrinsic motivation, extrinsic motivation, exercise engagement, and subjective well-being showed that both intrinsic and extrinsic motivation significantly influence subjective well-being. The sense of joy derived from intrinsic motivation can positively impact subjective well-being. In this study, the fulfillment of extrinsic motivations, such as achieving a good physique through fitness, gaining confidence in one's body, and the social aspects of fitness, contributed to intrinsic subjective well-being. Exercise engagement also significantly affects subjective well-being, with higher levels of engagement leading to greater subjective well-being. Body image further significantly influences subjective well-being, as college students who participate in fitness activities and have a better body image tend to experience higher levels of subjective well-being.

Third, the participation motivation of college students engaging in fitness activities in both China and South Korea significantly influences subjective well-being. Through body image, the effect of enhancing subjective well-being can be achieved. In the relationship between participation motivation, exercise engagement, and subjective well-being, body image plays a mediating role.

Finally, the multi-group analysis of college students from China and South Korea participating in fitness activities revealed that intrinsic and extrinsic motivations significantly influence body image in both countries, but the impact is more pronounced in China compared to South Korea. In terms of the influence of exercise engagement on body image, both countries showed significant effects, but the impact was more significant in South Korea than in China. Regarding the influence of intrinsic motivation on subjective well-being, both countries demonstrated significant effects, but the impact was more pronounced in China than in South Korea. For extrinsic motivation's influence on subjective well-being, both countries showed significant effects, but the impact was more significant in South Korea. In the case of exercise engagement and body image influencing subjective well-being, both countries exhibited significant effects, but the impact was more pronounced in China than in South Korea.

6. Conclusion and recommendation

This study employed a structural equation model to systematically analyze the impact of participation motivation and exercise engagement on body image and subjective well-being among college students participating in fitness activities in China and South Korea. The main conclusions are as follows: First, intrinsic motivation, extrinsic motivation, and exercise engagement have a significant impact on body image. There is a proportional relationship between intrinsic motivation, extrinsic motivation, body image, and subjective well-being. Second, intrinsic motivation, extrinsic motivation, exercise engagement, and body image have a significant positive impact on subjective well-being. Third, body image plays a mediating role in the relationship between intrinsic motivation, extrinsic motivation, exercise engagement, and subjective well-being among college students participating in fitness activities in China and South Korea. The mediating effect

of body image in the relationship between intrinsic motivation, extrinsic motivation, exercise engagement, and subjective well-being varies depending on nationality, leading to differences in the research models.

This study has certain limitations and shortcomings. Future research could consider the following two aspects: First, this study surveyed college students from 5 universities in South Korea and 5 universities in China, which limits the generalizability of the results to other regions. Future studies could expand the survey to include other regions and countries. Second, this study only selected three variables—participation motivation, exercise engagement, and body image—to examine their impact on subjective well-being. However, the possibility of other potential variables influencing the research subjects cannot be ruled out.

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