

Structural Relationship between Motivation, Adherence, Satisfaction and Loyalty of Adolescent Sports Behavior Participants in China

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Abstract: The main purpose of this study is to examine the structural relationship between motivation, adherence, satisfaction, and loyalty among participants in sports behavior among Chinese university students. The research method focuses on five universities in Hunan Province. This study collected 750 questionnaires. This study used SPSS 24 and AMOS software for analysis. The research results indicate that the motivation of sports behavior among college students has a significant positive impact on satisfaction, adherence, and loyalty. Adherence has a significant positive impact on satisfaction and loyalty. Satisfaction has a significant positive impact on loyalty. Finally, adherence and satisfaction can partially mediate the relationship between motivation and loyalty. This study verifies the structural relationship between motivation, adherence, satisfaction, and loyalty in sports behavior among Chinese university students. Motivation is the most important factor affecting participant loyalty, while adherence has the least impact on participant satisfaction and loyalty. Therefore, university sports management personnel should pay more attention to the enthusiasm of participants in order to attract more students to participate in sports activities and maintain their interests.

Keywords: Hunan Province; Participants; Motivation, Adherence; Satisfaction Loyalty

1. Introduction

According to the Healthy China 2030 Plan, the number of people participating in sports activities was approximately 360 million in

2015, 435 million in 2020, and 530 million in 2030. And the government is striving to cultivate young people's sports hobbies by implementing a youth sports promotion plan. Basically, youth sports promotion programs can enable teenagers to master more than one sports skill and ensure that they participate in sports activities for no less than one hour every day. And college students are an extremely important part of teenagers. Therefore, studying university sports participants and their influencing factors is of great significance for promoting the health of college students.

However, there are also many obstacles to the development of sports in universities. The main factors affecting the participation of universities in sports behavior include campus management system, hardware facilities, inadequate coordination of diversified management, and low teacher level. In order to attract more college students to participate in sports, promote physical health and enjoy the fun of sports. Therefore, research on adolescent sports behavior is very important.

A person directly participates in sports as a routine activity, not only does it mean an obsession with sports, but it also includes continuous participation in sports, including intensity and duration of exercise. Sports adherence can refer to an individual's determination to continue engaging in a particular sport and their persistence in sports[1]. Motivation is a key factor in students' sustained sports adherence behavior. Assuming that motivation is positively correlated with adherence and satisfaction. Previous studies have also found that strengthening students' learning motivation can improve learning satisfaction and efficiency [2].

Motivation can be defined as an activity in which a person participates in order to achieve personal goals and achieve happiness and satisfaction. that individuals can directly interact with the environment, feel their abilities, and create achievements. Pelletier proposed the Motor Motivation Scale (SMS), which is widely used to measure motor motivation. They proposed that motivation is a continuum from intrinsic motivation to extrinsic motivation based on self-determination theory, and developed three sub dimensions of intrinsic motivation and extrinsic motivation. They argue that cognitive motivation can be defined as the satisfaction gained through learning, exploring, or attempting to understand new concepts (such as learning how to engage in new sports activities) [3].

In addition, in sports, behavioral loyalty is usually measured by the frequency of attendance over a period of time .The research related to loyalty in the entertainment industry is mainly focused on service providers[4]. Therefore, when university administrators set sports development goals, Attention should be paid to students who participate less frequently or rarely participate in sports activities, or to college students who participate more frequently. Therefore, in the context of this study, we hope that the motivation, engagement, and satisfaction of adherence will be related to loyalty.

Therefore, the purpose of this study is to establish a sports behavior structure model for Chinese university students and verify the relationship between motivation, adherence, satisfaction, and loyalty. The survey results provide reference for the development of sports participation behavior in Chinese universities. To attract more college students to participate in sports and cultivate the habit of lifelong participation in sports.

2. Method

2.1 Subject

As the most important part of teenagers, the study of sports behavior among college students is of great significance. Hunan, as one of the provinces with the largest number of universities in China, has a total of 128 universities. Changsha, the capital of Hunan Province, is one of the most representative

cities in China, with a total of 57 universities. Therefore, this study takes Hunan Province as the research object, conducts a questionnaire survey through cluster sampling, and collects 750 valid questionnaires.

2.2 Measurement

The instruments used in this study were developed and modified based on the measurement methods used in previous studies. A professor and two doctoral students majoring in social sports evaluated the effectiveness of the measurement project to ensure its effectiveness and feasibility. The research questionnaire mainly consists of four parts: motivation, Adherence, satisfaction, and behavioral loyalty.To avoid personal bias, a 5-point Likert scale was used, with a range set from 1 (strongly disagree) to 5 (strongly agree). The questionnaire survey was developed based on a comprehensive literature review conducted for this study.

In the first part, several measurement items were designed to evaluate various aspects of motivation. Motivation is measured using three subscales: intrinsic motivation (IM), extrinsic motivation (EM), and unmotivated (Am) [3]. Motor motivation scale showed high reliability and strongly predicted post visit outcomes.

In the first part of the questionnaire, a total of 7 questions were designed to measure motivation, including 2 IM items, 3 EM items, and 2 Am items. At the same time, the motivation questionnaire includes questions such as "because I am happy to learn more about sports". In the second part, we conceptualize and measure adherence based on Beaton [5], who identified hedonic value (HV), centrality (Ce), and symbolic value (SV) as the three components of exercise adherence, each consisting of three items. The questionnaire includes 9 items, such as "Sports are very interesting" and "I found that a lot of my life revolves around sports. "The third part is a satisfaction statement. Five questions were compiled by referring to Ng's scale [6]. Examples in the satisfaction questionnaire include "I am good at sports". The fourth part is behavioral loyalty, defined as the participant's behavioral intention using four different questions. Including "I often talk about sports with friends", "I usually play sports games on TV", "I am willing to learn

sports", and "I participate in sports every week".

2.3 Survey Procedure

This study randomly selected college students from Hunan Province as the research subjects. It is one of the provinces with the largest number of universities in China. The study conducted a questionnaire survey using cluster sampling method. There are 14 prefecture level cities in Hunan Province. We are centered around Changsha, the capital of Hunan Province. Firstly, it is the economic and political center with the largest number of universities, with 128 universities in Hunan Province, of which 57 are located in Changsha, accounting for 44.5%. Then, we divided Hunan Province into five regions: east, west, north, south, and central; Randomly select a city from each region (namely Zhuzhou City, Yiyang City, Yueyang City, Xiangtan City, and Changsha City). Finally, randomly select a university from each city and distribute 150 questionnaires within that university. Finally, randomly select a university from each city and distribute 150 questionnaires within that university. The questionnaire survey was conducted through the online questionnaire distribution tool "Questionnaire Star". Participants voluntarily agreed to participate in this study through QQ and WeChat groups. Because it is an online survey, anonymity is also guaranteed.

After distributing the questionnaire, A total of 776 questionnaires were collected. When completing the questionnaire, 26 questionnaires were excluded due to disagreement, incomplete answers to questions, and selection of the same data. Finally, 750 questionnaires were used for subsequent analysis. The effective rate of this questionnaire is 95.8%, which meets the requirements of statistical analysis.

2.4 Data Analysis

In this study, multiple statistical methods were used for data analysis. Firstly, descriptive analysis, reliability analysis, and validity analysis were conducted using SPSS24. Evaluate the internal consistency of each structure using Cronbach's Alpha. Validity analysis was conducted using KMO and Bartlett's tests. Secondly, use Amos to test its regulation and regulatory effectiveness.

3. Result

3.1 Measurement Model

From Table 1, it can be seen that the Cronbach's alpha of motivation α is .896, And the Cronbach's alpha of each dimension α All greater than .800, This indicates that the questionnaire scale used in this study has good reliability. The KMO value is .934, and the Bartlett's sphericity test value is 17798.274, which is significant at the .000 level, indicating that the questionnaire scale is suitable for factor analysis. When the factor loadings of all measurement indicators are above 0.5 and have a significant level, The average variance extraction (AVE) is greater than 0.5, When the composite reliability index is greater than 0.6, This indicates that the scale has convergent validity [7].

In the present study, $\chi^2=217.833$, $df = 84$, $\chi^2/df=2.593$, GFI, AGFI, IFI, CFI, TLI, NFI are all greater than .900, and RMSEA=.045. The questionnaire has a good fit, indicating that the structure validity of the questionnaire is good.

Table 1 shows the convergence effectiveness of the measurement model tested by using factor loading and mean variance extraction (AVE). The results indicate that structural items account for over 50% of the variance of each potential factor. In addition, the structural reliability exceeded the threshold of 0.5 and the results met all thresholds. In addition, the structural reliability exceeded the threshold of 0.5 and the results met all thresholds.

To evaluate the effectiveness of discrimination, Fornell and Larcker were used as evaluation criteria[8]. Therefore, it was determined that the square root of AVE for each potential construct was higher than the correlation between potential constructs. The test indicators used in discriminant validity testing include the square root extracted from the mean variance of latent variables and the correlation coefficient of latent variables. Table 2 shows that the minimum score for the square root of AVE corresponding to the four variables is 0.723, which is greater than the maximum value of the correlation coefficient between variables, which is .689, this shows that the discriminant validity is good.

3.2 Structural Model

The structural model is shown in Table 3, with

a total chi square (df=84) of 218.833, where CFI=. 945, RMSEA=. 045, AGFI=. 970, NFI=. 948, and CFI=. 966 meet common critical

values.All factor loads, S E. Both C.R. and C.R. are significant.

Table 1. Confirmatory factor analysis results

Construct	Items	Std.	Cronbach's α	SMC	CR	AVE
Motivation	Intrinsic motivation	0.762	0.886	0.521	0.817	0.598
	Extrinsic motivation	0.833		0.694		
	Amotivation	0.861		0.579		
Intrinsic motivation	1. Because I am happy to learn more about sports	0.795	0.834	0.601	0.844	0.731
	2. Because practicing sports reflects my essence	0.908		0.861		
	3. Because I like sports as a way to develop myself	0.828		0.789		
Extrinsic motivation	4. Because I have found that sports are a great way to develop oneself	0.841	0.885	0.759	0.892	0.733
	5. Because if I don't spend time doing it, I will feel bad about myself	0.827		0.651		
	6. I used to have good reasons to practice sports, but now I'm asking myself if I should continue	0.836		0.542		
Amotivation	7. I feel I can't succeed in sports	0.786	0.821	0.471	0.672	0.506
Adherence	Hedonic value	0.807	0.935	0.757	0.85	0.655
	Centrality	0.703		0.645		
	Symbolic value	0.721		0.564		
Hedonic value	1.Sports make me feel happy	0.776	0.881	0.587	0.884	0.719
	2.Practicing sports satisfies me	0.843		0.728		
	3.I really enjoy sports	0.918		0.843		
Centrality	4.I have found that a lot of my life revolves around sports	0.905	0.941	0.819	0.941	0.842
	5. Sports occupy a central position in my life	0.933		0.874		
	6. I often talk about sports with others	0.913		0.834		
Symbolic value	7.Sports can tell me who I am	0.945	0.938	0.856	0.939	0.836
	8.Sports tell me something about me	0.785		0.783		
	9.Sports show others what kind of person I am	0.913		0.871		
Loyalty	1.I often talk about sports with my friends	0.931	0.945	0.867	0.946	0.814
	2.I am willing to practice sports	0.803		0.74		
	3.I usually watch sports matches on TV	0.925		0.837		
	4.I practice sports every week	0.915		0.814		
Satisfaction	1.I practice sports every week	0.911	0.937	0.83	0.939	0.755
	2.I have the ability to excel in sports	0.849		0.712		
	3.In sports, I have a say in how to do things	0.921		0.867		
	4.When practicing sports, I have the opportunity to make decisions	0.949		0.863		
	5.I have a good relationship with people in the sports industry	0.718		0.504		

Table 2. Inter construct correlation

	Mean	SD	AVE	Motivation	Adherence	Satisfaction	Loyalty
Motivation	3.449	.843	.538	.723			
Adherence	3.618	.958	.635	.421**	.819		
Satisfaction	3.420	1.027	.745	.368**	.431**	.879	
Loyalty	3.334	1.125	.824	.689**	.546**	.532**	.912
** $p < 0.01$							

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The structural model is shown in Table 3, with a total chi square (df=84) of 218.833, where CFI=. 945, RMSEA=. 045, AGFI=. 970, NFI=. 948, and CFI=. 966 meet common critical values. All factor loads, S.E. Both C.R. and C.R. are significant.

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Table 3. Model Fit for Structural Equation Model

Model	χ^2	df	χ^2/df	GFI	AGFI	NFI	CFI	RMSEA
218.833		84.000	2.593	.945	.970	.948	.966	.045
Decision			≤ 5	$\geq .90$	$\geq .90$	$\geq .90$	$\geq .90$	$\leq .080$

From Figure 1 and Table 4, it shows that motivation has a significant positive impact on adherence ($\beta=.407$, $p < 0.001$). The model's explanation percentage for participation is 16.5%. Motivation has a significant positive impact on satisfaction ($\beta=. 322$, $p<0.001$), adherence has a significant positive impact on satisfaction ($\beta=. 260$, $p<0.001$), the model's

explanation percentage for satisfaction is 24%. Motivation has a significant positive impact on loyalty ($\beta=.554$, $p<0.001$). Adherence has a significant positive impact on loyalty ($\beta=.134$, $p < .001$). Satisfaction has a significant positive impact on loyalty ($\beta = .309$, $p < .001$) and the explanation percentage of model to loyalty is 65.9%.

Table 4. Summary of Hypotheses Testing

Paths	Estimate	S.E.	C.R.	p	β	R^2	Results
motivation → adherence	.403	.042	9.691	***	.407	.165	Supported
motivation → satisfaction	.296	.039	7.491	***	.322	.240	Supported
adherence → satisfaction	.241	.038	6.364	***	.260		Supported
motivation → loyalty	.768	.052	14.791	***	.554	.659	Supported
adherence → loyalty	.187	.043	4.322	***	.134		Supported
satisfaction → loyalty	.466	.047	9.824	***	.309		Supported
*** $p<0.001$							

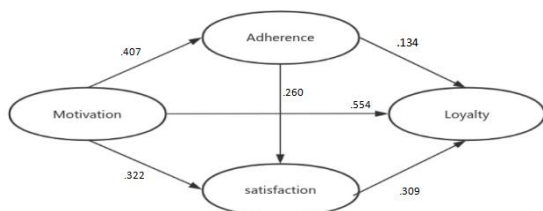


Figure 1. Structural Equation Model

4. Discussion

In previous studies, few scholars have comprehensively explored motivation, adherence, satisfaction, and loyalty together. In addition, previous scholars mostly focused on sports consumption, sports goods, sports venues, sports clubs, and fans. However, the four variables of motivation, adherence, satisfaction, and loyalty have not yet been simultaneously used in research on university sports in China. The aim of this study is to explore the effects of motivation, adherence, and satisfaction on the loyalty of sports participants in a campus context, as well as their interrelationships. Moreover, this article also theoretically expands the relevant research on college sports.

The research results indicate a positive correlation between motivation and adherence, which supports the hypothesis mentioned earlier. The research results indicate a positive correlation between motivation and adherence, which supports the hypothesis mentioned earlier [9]. One of the few studies by scholars Kyle and Absher on the relationship between motivation and adherence[10]. They studied the motivation and adherence dimensions of leisure campers and found that motivation is a prerequisite for sustained adherence. Similarly, researchers have found that the internal and external dimensions of motivation are very helpful for the adherence of leisure tennis players. That maintaining motivation for continuous learning leads to more people being involved in learning goals. This article focuses on college students as the research object. The motivation and adherence level of the research also support the above viewpoint. According to the data results of this study, motivation has a significant positive impact on loyalty and satisfaction, this is consistent with previous research by scholars. The results of this study indicate that motivation has the greatest impact on participant loyalty. Given

that previous studies have already noted this, the strong relationship between motivation and loyalty is not surprising, and it is consistently believed that travel driven motivation is positively correlated with destination loyalty. argue that the results of structural equation modeling indicate that fan motivation has a strong predictive power on fan loyalty. Motivation has a significant positive impact on loyalty. On the other hand, research results indicate that motivation has a significant promoting effect on the improvement of participant satisfaction, which has been widely recognized in the academic community. Previous studies have also found that strengthening students' learning motivation can improve learning satisfaction and efficiency [2]. Although this study is based on universities in Hunan Province, it is similar to sports clubs in society. By participating in sports behavior, the satisfaction and loyalty of sports participants can be improved, which also indicates that the motivation of sports participants is positively correlated with loyalty and satisfaction in the campus environment.

According to the data results of this study, motivation has a significant positive impact on loyalty and satisfaction, which is consistent with the research of scholars. The results of this study indicate that motivation has the greatest impact on participant loyalty. The conclusion is that motivation has a significant positive impact on loyalty. On the other hand, research results indicate that motivation has a significant promoting effect on the improvement of participant satisfaction, which has been widely recognized in the academic community. Previous studies have also found that strengthening students' learning motivation can improve learning satisfaction and efficiency [2].

Scholars believe that loyalty is the result of adherence [11]. The loyalty of college sports participants is closely related to their adherence or continuation in sports. The results of this study indicate that adherence has the least impact on participant loyalty (standardized regression coefficient=0.144). Although by studying these relationships, contributions have been made to the literature, Previous studies have not combined the exploration of the concepts related to university sports participation with the three

structures of motivation, adherence, and loyalty.

Research data shows that adherence has a significant positive impact on satisfaction. Sports adherence has a direct impact on competition satisfaction. College students have a certain subjective understanding of sports when participating in sports, so they are more satisfied with sports. Some research explored the relationship between motivation, adherence, and loyalty of sports audiences under Australian football rules.[12]

Satisfaction also has a significant positive impact on loyalty. The satisfaction of student sports participants with college physical education teaching has a significant impact on loyalty. By increasing the enthusiasm of sports participants, it will enhance their adherence and satisfaction in sports, which is more conducive to loyalty and willingness to continue participating in the project.

5. Conclusion and Implication

This study aims to examine the structural model of adolescent participation in sports behavior and investigate the relationship between motivation, adherence, satisfaction, and loyalty of college students in participating in sports behavior. The research results indicate that the motivation of college sports participants has a significant positive impact on adherence, satisfaction, and loyalty; adherence has a significant positive impact on satisfaction and loyalty; Satisfaction has a significant positive impact on loyalty. There is a direct overall impact between motivation and loyalty, indicating that adherence plays a partial mediating role between motivation and loyalty. In addition, motivation significantly affects loyalty through the chain mediation effect of adherence and satisfaction.

Based on previous research, When all four variables of motivation are involved, adherence, satisfaction, and loyalty, many scholars tend to study the model from the relationship between psychology, marketing, tourism, sports and leisure. There is an exploration of the relationship between the enthusiasm, adherence, and loyalty of sports audiences under Australian football rules. However, no scholars have analyzed the relationship between sports loyalty and motivation, adherence, and satisfaction among college students, which is the starting point of

this article. Therefore, based on the background of campus sports Adherence, this article establishes a model of motivation, adherence, satisfaction, and loyalty, and studies the correlation between them. The research results indicate that the views of previous scholars have been validated in different contexts. This also proves that the revised reference scale is applicable to campus sports.

The research results indicate that motivation is the main driving factor for college students to maintain their enthusiasm and loyalty to sports when engaging in sports activities. This is beneficial for university administrators to develop effective strategies based on motivation theory to cultivate and enhance the loyalty of participants to sports. Given the heterogeneity of sports and different performances on the field, a loyal supporter base is crucial for the survival of clubs.

From the research results, it can be seen that the motivation of college students to participate in sports has the greatest impact on loyalty, which is closely related to the hobbies and values of the participants. Therefore, in order to ensure loyalty to participating in sports, school administrators should cultivate students' interests and establish good values, and promote the interest of college students in participating in sports behavior. The 2030 Healthy China Outline proposes to support the cultivation of interests and hobbies among young people, and to form a healthy lifestyle value system.

China is a vast country, which leads to significant differences between universities in the north and south. Therefore, the size and area of the sample cannot cover everything. Therefore, in future research, a variety of sports projects will be considered to expand the scope of research and provide more references for the healthy development of adolescents.

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References

[1] Kovács, K. (2022). A survey of the

Interrelation between sports and persistence among students in five countries. *Journal of College Student Retention: Research, Theory & Practice*, 23(4), 1018-1041.

- [2] Wu, T. J., & Tai, Y. N. (2016). Effects of multimedia information technology integrated multi-sensory instruction on students' learning motivation and outcome. *EURASIA Journal of Mathematics, Science and Technology Education*, 12(4), 1065-1074. <https://doi.org/10.12973/eurasia.2016.1552a>.
- [3] Pelletier, L. G., Tuson, K. M., Fortier, M. S., Vallerand, R. J., Briere, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology*, 17(1), 35-53. <https://doi.org/10.1123/jsep.17.1.35>.
- [4] Chai, W., & Hu, Z. M. (2020). Structural Relationship among Service Quality, Relationship Quality, Satisfaction and Loyalty of Public Sport Centers in Jilin Province. *Asia Pacific Journal of Applied Sport Sciences*, 1(3), 21-38. doi: <https://doi.org/10.46695/ASCS.1.3.2>.
- [5] Beaton, A. A., Funk, D. C., Ridinger, L., & Jordan, J. (2011). Sport involvement: A conceptual and empirical analysis. *Sport management review*, 14(2), 126-140. <https://doi.org/10.1016/j.smr.2010.07.002>.
- [6] Ng, J. Y., Lonsdale, C., & Hodge, K. (2011). The Basic Needs Satisfaction in Sport Scale (BNSSS): instrument development and initial validity evidence. *Psychology of Sport and Exercise*, 12(3), 257-264. <https://doi.org/10.1016/j.psychsport.2010.10.006>.
- [7] Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis: Pearson new international edition*. Pearson New International Edition.
- [8] Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.1177%2F002224378101800104>.

- [9] Funk, D. C., Ridinger, L. L., & Moorman, A. M. (2004). Exploring origins of involvement: Understanding the relationship between consumer motives and involvement with professional sport teams. *Leisure Sciences*, 26(1), 35-61. <https://doi.org/10.1080/01490400490272440>.
- [10] Kyle, G. T., Absher, J. D., Hammitt, W. E., & Cavin, J. (2006). An examination of the motivation— involvement relationship. *Leisure Sciences*, 28(5), 467-485. <https://doi.org/10.1080/01490400600851320>.
- [11] Beaton, A. A., Funk, D. C., Ridinger, L., & Jordan, J. (2011). Sport involvement: A conceptual and empirical analysis. *Sport management review*, 14(2), 126-140. <https://doi.org/10.1016/j.smr.2010.07.002>.
- [12] Kim, S., Morgan, A., & Assaker, G. (2021). Examining the relationship between sport spectator motivation, involvement, and loyalty: A structural model in the context of Australian Rules football. *Sport in Society*, 24(6), 1006-1032. <https://doi.org/10.1080/17430437.2020.1720658>.