RESEARCH ON THE RELATIONSHIP BETWEEN SOCIAL COGNITION AND PHYSICAL EXERCISE BEHAVIOR OF COLLEGE STUDENTS IN THE ERA OF MOBILE MEDIA

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Abstract

The main objective of this study is to explore how the use of mobile social media affects social cognition and physical activity habits of college students in Guangxi. A comprehensive research approach was adopted, combining a web-based questionnaire with detailed expert interviews to deeply analyze the interconnections between social cognition, mobile social media use, and physical exercise behavior, and to assess how individual differences affect this relationship. The analysis results revealed a significant positive relationship between social cognition and physical exercise behavior, and pointed out that mobile social media participation had a positive effect on promoting physical exercise. In addition, it was found that individual attributes such as gender, height and weight significantly affected the participation in physical exercise, and male students and students with moderate body size showed higher propensity to exercise.

Keywords: Social Cognition; Mobile Social Media; Physical Exercise Behavior; Individual Feature; College Students.

1. INTRODUCTION

In today's digital 21st century, mobile social media has become an important force in shaping the lifestyle of the young generation. With the widespread use of smartphones and the rapid expansion of social networks, especially in regions with rich cultural diversity such as Guangxi Zhuang Autonomous Region, they have had a profound impact on the daily life and habits of college students. As a vibrant group in society, physical activity among university students is not only crucial for individual health, but also a key indicator of social well-being and cultural progress. Although physical exercise is widely recognized to significantly improve physical fitness and mental health, participation in physical exercise is influenced by multiple factors, such as individual habits, social environment, and cultural background. Therefore, a deep understanding of physical activity behavior of college students is essential for advocating a healthy lifestyle and improving the overall well-being of society. This study aims to make up for the shortcomings of the existing literature by using empirical research to clarify how mobile social media use and social cognition specifically affect physical activity behavior of college students in Guangxi. In the wave of globalization and information technology, mobile social media provides a new way for the promotion of physical activities and the cultivation of exercise habits with its convenience, interactivity and entertainment. In view of the divergent conclusions of existing studies on the impact of mobile social media on physical activity behavior, further in-depth research is particularly necessary.

2. LITERATURE REVIEW

With the rise of mobile social media, its wide application among young people has become a new trend of information dissemination and social interaction. Especially in Guangxi Zhuang Autonomous Region, an area with remarkable cultural diversity, the use of mobile social media and its impact on physical exercise habits of college students, became the focus of this study. The academic community generally believes that physical exercise has a positive impact on the physical and mental health of college students (Smith, 2015). However, the degree of participation in physical exercise is affected by various factors such as individual habits, social environment and cultural background (Johnson et al., 2016).

As an emerging information dissemination channel, mobile social media has attracted the attention of academia for its potential to promote physical exercise. Some studies have pointed to the ability of social media to provide health information and social support to motivate people to exercise (Fardouly et al., 2015; Lee, 2017). Nonetheless, there is no consensus among academics on how mobile social media specifically acts on physical exercise behavior. Some studies have highlighted the positive effects of social media, such as encouraging physical exercise by sharing health information and enhancing social connections (Wang & Chen, 2018). However, some studies have pointed out that the possible negative effects of social media, such as social comparison and information overload, may reduce people's participation in exercise (Vanclay, 2015).

Social cognition, including self-efficacy and expected outcomes, is a key factor affecting physical exercise behavior (Bandura, 1986). Although previous studies have explored the role of social cognition in physical exercise, how mobile social media affects physical exercise behavior through social cognitive mechanisms still needs further investigation. The purpose of this study was to clarify the influence of social cognition and mobile social media use on physical exercise behavior of college students in Guangxi through empirical analysis, and provide theoretical support for colleges and educators to develop effective physical exercise promotion strategies.

3. RESEARCH OBJECTS AND METHODS

3.1 Object of Study

From May to June 2024, this study implemented an online questionnaire survey for the students of non-African sports majors in 26 public higher education institutions in Guangxi Zhuang Autonomous Region, and used the Questionnaire Star platform for data collection. The total number of questionnaires initially collected was 622. In order to ensure the reliability of the data, we excluded the questionnaires that were submitted for less than 90 seconds, and excluded those that had the same answer options (for example, all the options were the highest or lowest scores) to ensure that invalid or unserious responses were excluded, thus ensuring the accuracy of the research results. After a strict screening process, we finally confirmed 463 questionnaires as valid data, with an effective rate of 74.43%. All respondents who participated in the survey had given explicit informed consent. In addition, this study included a series of expert

interviews, where we invited senior professionals such as PE teachers, deans of PE schools, and heads of PE teaching departments, who hold at least associate professor titles, to collect their professional insights on factors influencing college students' physical exercise behaviors. A total of 15 experts participated in this interview, and the insights they provided greatly enriched our understanding of the influencing factors of college students' physical exercise behavior and provided valuable primary materials for the research.

3.2 Questionnaire

3.2.1 Questionnaire Design

This study carefully prepared the interview outline according to the research purpose, and carried out in-depth interviews according to the principle of information saturation, in order to clearly define the status of college students in social cognition and mobile social media use and its influencing factors. Based on the existing research on physical exercise behavior of college students and verified scales, we independently developed the "Questionnaire on the Influence of Social Cognition and mobile social media use on Physical exercise behavior of college students". The questionnaire covered a wide range of basic demographic characteristics of the participants, such as gender, age, school year, weight, and height. Social cognition was assessed through four dimensions: self-efficacy, expected outcomes, goal setting, and perceived barriers, comprising a total of 20 items. A 5-point Likert scale (ranging from 1 to 5) was used for scoring, and the total social cognition score was the average of the scores of each dimension, reflecting the strength of an individual's social cognition ability.

The evaluation of mobile social media use similarly covers four dimensions: interactive engagement, fitness content acceptance, social support, and interactive experience, containing the same number of items. The scoring method is consistent with the social cognitive assessment, where a higher score indicates that an individual is more active and engaged on social media. The assessment of physical exercise behavior was carried out through four dimensions of behavioral intention, subjective norm, cognitive behavioral control and comprehensive attitude, also containing 20 items. Using a 5-point Likert scale, the total physical exercise behavior score is the average of the scores of each dimension, with higher scores indicating that the individual is more inclined to adopt a healthy lifestyle.

3.2.2 Reliability and Validity of the Questionnaire

The internal consistency of the questionnaire was verified by Cronbach α coefficient 0.975, which indicated a high reliability of the questionnaire. In addition, the validity of the questionnaire was further confirmed by performing an exploratory factor analysis (EFA). The scales for social cognition, mobile social media use, and physical exercise behavior successfully passed the KMO and Bartlett tests, which are important steps to evaluate data fit.

After the analysis of the factor loading matrix, the evaluation of the variance contribution rate, and the appropriate adjustment of the factor structure, the social cognitive scale was refined into four constituent elements: self-efficacy, expected outcome, goal setting, and perceived barriers. The mobile social media use scale is then composed of three elements: interactive

experience, acceptance of fitness content, and engagement. As for the Physical exercise behavior scale, it is divided into two main elements: the initiative and persistence of exercise and the perception of the value of exercise.

3.3 Statistical analysis

In this study, SPSS 25.0 software was used for statistical analysis of the collected data. For categorical data, it is presented as frequencies and percentages. For continuous data, the mean ($\overline{X}\pm S$) is used. In view of the fact that the continuous data does not meet the assumption of normal distribution, this study uses non-parametric test methods to evaluate the differences between different characteristic groups in social cognition, mobile social media use and physical exercise behavior of college students. To explore the effects of social cognition and mobile social media use on physical exercise behavior, Spearman correlation coefficient was used to measure the correlation between variables, and multiple linear regression models were used to quantify the specific effects of these variables on physical exercise behavior. The statistical significance of the study results was determined by a p-value less than 0.05.

3.4 Expert Interviews

3.4.1 Content of Expert Interviews

In particular, a series of in-depth interviews were conducted with 15 experts with deep experience in relevant fields from 26 public universities. These interviews focused on exploring three key topics: the facilitating effect of social cognition on physical exercise behavior of college students, the potential push or influence of mobile social media on physical exercise behavior, and the main drivers shaping physical exercise behavior of college students.

3.4.2 Processing and analysis of interview data

After completing the interviews, we performed professional transcription work on all the recordings to generate detailed textual materials. To organize and analyze these rich data effectively, NVIVO qualitative analysis software was used in this study. Using the coding capabilities of NVIVO, the research team was able to systematically process the text data and identify key themes and patterns, which not only improved the efficiency of data analysis, but also enhanced the accuracy and reliability of the results.

4. RESEARCH RESULTS

4.1 Analysis of qualitative results

Social cognition and mobile social media have profound and complex effects on the formation of college students' physical exercise behavior. Through detailed coding and visual analysis of the interview data using NVIVO software, we successfully captured several core themes including social cognition, mobile social media use, and physical exercise behavior. The identification of these themes not only provides a solid background support for quantitative data analysis, but also highlights the rich experience and diversity of different individuals in physical exercise behavior. The relevant analysis results and topic patterns are visualized in Figures 4-1 and 4-2.
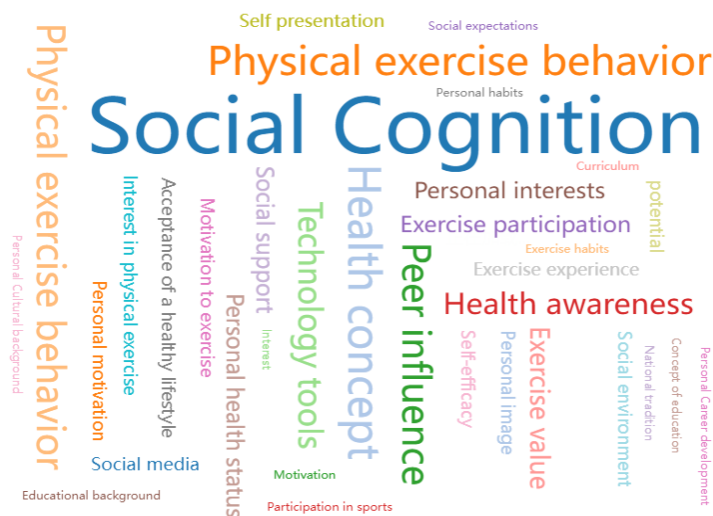
Figure 4.1: The nodes encode the hierarchical graph

Figure 4.2: The nodes encode the hierarchical graph

4.1.1 Physical exercise behavior

In the field of physical education, professionals have generally reached a consensus that physical exercise is of irreplaceable importance for the overall growth of college students. In particular, they emphasized the key role of physical exercise in strengthening students' physical fitness, reducing their academic burden, and cultivating teamwork and leadership skills. Specifically, as shown in Table 4-1, the number of coded reference points for "Campus Sports Culture" versus "Academic pressure" highlights the general recognition of the positive value of physical exercise among the experts and the agreement on the importance of developing good exercise habits.

4.1.2 Social cognition and Physical exercise

In the in-depth interviews, experts generally pointed out that social cognition plays a crucial role in motivating college students to participate in physical exercise behavior. They emphasized that when students have positive social perceptions, such as acceptance of a healthy lifestyle and increased self-efficacy, this will significantly increase their intrinsic motivation to engage in physical exercise. In addition, the experts also mentioned that social environmental factors and the sports culture in the campus have a direct impact on the formation and maintenance of students 'exercise habits. These ideas are presented and analyzed in detail in Table 4-1.

4.1.3 Impact of Mobile Social Media

When discussing the impact of mobile social media on physical exercise behavior, experts agreed that this emerging communication platform provides new incentive mechanisms and support avenues for promoting physical exercise. They mentioned that social media, as a place for information sharing and communication, enables students to obtain sports inspiration, exchange personal exercise experience, participate in online fitness challenges and other activities. These interactions undoubtedly enhance students 'enthusiasm and persistent willingness to participate in sports activities. The positive evaluation of the experts is reflected in the node coding of "Mobile Social Media", and this finding is supported and presented with specific data in Table 4-1.

Table 4.1: Number of coded reference points for first-level nodes, second-level nodes, and third-level nodes

First-Level	Second-Level	Third-Level	Encode Reference Points
Effect （143）	Social Cognition （31）	Exercise participation	3
		Motivation to exercise	2
		Exercise value	4
		Exercise habits	1
		Self-efficacy	2
		Acceptance of a healthy lifestyle	2
		Physical exercise behavior	9
		Attitudes and motivation towards physical exercise	8
	Mobile Social Media （32）	Exercise experience	2
		Self-presentation	2
		Social support	3
		potential	2
		Motivation	1
		Health concept	10
		Interest	1
		Physical exercise behavior	8
		Interest in physical exercise	2
		Participation in sports	1
	Physical Exercise Behavior （70）	Curriculum	1
		Technology tools	6
		Social environment	2
		Social expectations	1
		Social media	2

National tradition	1	
Campus Sports Culture	11	
Time management skills	7	
Educational background	1	
Concept of education	1	
Academic pressure	10	
Peer influence	8	
Health awareness	5	
Personal Career development	1	
Personal Cultural background	1	
Personal image	2	
Personal motivation	2	
Personal interests	3	
Personal health status	3	
Personal habits	1	

4.2 Analysis of quantitative results

Based on the in-depth discussion of the qualitative analysis results, quantitative data will be introduced in this section to further broaden our research horizons. These data not only validate the findings of the qualitative study, but also provide quantitative evidence. By applying descriptive statistics, we give an overview of the basic characteristics of the dataset. Subsequently, through correlation analysis, we assessed the mutual associations between social cognition, mobile social media use, and physical exercise behavior. In addition, to gain insight into the complex relationships among these variables, we also employed multiple linear regression analysis, which allowed us to accurately measure the specific effects of each variable on physical exercise behavior.

Table 4.2: Independent sample non-parametric test analysis of social cognition, mobile social media use and physical exercise behavior scores of college students with different characteristics ($\overline{X}\pm S$)

Variable	Options	N	SC		MSM		PEB	
			(x±s)	P	(x±s)	P	(x±s)	P
Gender	male	258	3.92 ±0.66	0.000	3.50 ±0.76	0.167	3.85 ±0.67	0.000
	famale	205	3.70 ±0.54		3.40 ±0.69		3.65 ±0.58	
Grade	Freshman	148	3.95 ±0.61	0.742	3.46 ±0.76	0.315	3.78 ±0.61	0.135
	Sophomore	203	3.81 ±0.62		3.43 ±0.74		3.73 ±0.65	
	Junior	82	3.80 ±0.57		3.44 ±0.65		3.73 ±0.61	
	Senior	30	3.90 ±0.59		3.66 ±0.79		3.93 ±0.71	
Height	Less than 150cm	5	2.86 ±0.86	0.000	2.79 ±0.81	0.096	2.70 ±0.77	0.000
	150-160cm	112	3.72 ±0.56		3.41 ±0.64		3.66 ±0.51	
	161-170cm	175	3.80 ±0.61		3.40 ±0.73		3.71 ±0.65	
	171-180cm	138	3.93 ±0.63		3.54 ±0.77		3.88 ±0.65	
	181cm and above	33	3.95 ±0.54		3.66 ±0.78		4.00 ±0.64	
Weight	Less than 50kg	100	3.76 ±0.49	0.004	3.42 ±0.63	0.160	3.65 ±0.52	0.000
	51-60kg	170	3.75 ±0.67		3.44 ±0.74		3.73 ±0.64	
	61-70kg	111	3.97 ±0.63		3.53 ±0.75		3.93 ±0.61	
	71-80kg	49	3.95 ±0.47		3.56 ±0.82		3.89 ±0.76	
	81kg and above	33	3.70±0.69		3.26 ±0.77		3.48 ±0.65	

4.2.1 Average scores of each dimension of social cognition, mobile social media use and physical exercise behavior

The average score of college students' social cognition was (3.82±0.62), and the average score of each dimension from high to low was as follows: self-efficacy (3.85±0.86), perceived barriers (3.84±0.93), goals (3.79±0.92), expected results (3.75 0.94); The total average score of mobile social media use was (3.46±0.73), and the average score of each dimension from high to low was: fitness content acceptance (3.66±0.76), interactive experience (3.59±0.81), interactive participation (3.12±0.91); The total average score of physical exercise behavior was (3.76±0.64), and the average score of each dimension from high to low was: exercise initiative and persistence (3.55±0.77), exercise value perception (3.97±0.62). See Table 4-2.

4.2.2 Independent sample non-parametric test analysis of social cognition, mobile social media use and physical exercise behavior scores

In terms of social cognition, male, freshman, 181cm and above, and 61-70kg college students had higher social cognition scores. Except grade group, the differences among other groups were statistically significant (P <0.05). In terms of mobile social media use, male, senior, 181cm and above and 71-80kg college students had higher mobile social media use scores, and there was no significant difference between groups (P <0.05). In terms of physical exercise behavior, male, senior, 181cm and above and 61-70kg college students had higher physical exercise behavior scores. Except for grade group, the differences among other groups were statistically significant (P <0.05). See Table 4-2.

4.2.3 Correlation analysis of social cognition, mobile social media use and physical exercise behavior

As shown in Tables 4-3, Spearman correlation analysis revealed significant positive correlations between social cognition, mobile social media use, and physical exercise behavior among college students. Specifically, the correlation coefficient between social cognition and physical exercise behavior was 0.642, the correlation coefficient between mobile social media use and physical exercise behavior was 0.741, and the correlation coefficient between social cognition and mobile social media use was 0.528.

Table 4.3: Correlation analysis of social cognition, mobile social media use and physical exercise behavior

		PEB	SC	MSM
Spearman's rho	PEB	1.000		
	SC	.642**	1.000	
	MSM	.741**	.528**	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

4.2.4 Linear regression analysis of factors related to physical exercise behavior

Linear regression analysis was conducted with the mean score of physical exercise behavior of college students as the dependent variable and the mean score of social cognition and mobile social media use as the independent variables. The results showed that social cognition and

mobile social media use were significant positive predictors of physical exercise behavior. The R-square value of the regression model was 0.631, indicating that the model could explain 63.1% of the variation in physical exercise behavior. See Table 4-4.

Table 4.4: Multiple linear regression analysis of influencing factors of physical exercise behavior in college students (n=463)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.794a	0.631	0.629	0.38696	2.008

a. Predictors: (Constant), MSM, SC
b. Dependent Variable: PEB

After conducting a series of diagnostic tests of regression models and confirming their validity, we successfully constructed a quantitative model to describe the relationship between physical exercise behavior and social cognition and mobile social media use in college students. The establishment of this model helps us to understand the interaction and influence strength between these variables more deeply. The specific regression equation is as follows:

Physical exercise behavior =0.735+0.339×social cognition +0.5× mobile social media +ϵ

Statistical indicators such as detailed coefficients, standard errors, t-values, and significance levels of this regression equation can be found in Tables 4-5, which provide us with quantitative evidence of the fit of the model and the importance of each explanatory variable.

Table 4.5: Multiple linear regression analysis of influencing factors of physical exercise behavior in college students (n=463)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.735	0.118		6.228	0.000		
SC	0.339	0.034	0.329	10.021	0.000	0.747	1.339
MSM	0.500	0.028	0.576	17.569	0.000	0.747	1.339

a. Predictors: (Constant), MSM, SC
b. Dependent Variable: PEB

5. DISCUSSION

5.1 The relationship between social cognition and physical exercise behavior

It was found that there was a significant positive correlation between social cognition and physical exercise behavior, which was consistent with the social cognition theory proposed by Bandura (1986). The improvement of social cognition, especially the enhancement of self-efficacy and outcome expectation, significantly improved the motivation and behavior of college students to participate in physical exercise. This emphasizes that enhancing individual social cognition is an effective way to promote physical exercise behavior in physical exercise promotion strategies.

5.2 Positive effects of mobile social media use

The use of mobile social media showed a positive promotion of physical exercise behavior in this study. This is consistent with the findings of Lee (2017) on the impact of social media on health behaviors. The fitness information, social support and health behavior imitation provided by mobile social media provide new exercise motivation and support ways for college students, which indicates that the use of social media platforms for health promotion has broad prospects.

5.3 Influence of individual characteristics on physical exercise behavior

Individual characteristics such as gender, height and weight were also found to have a significant impact on physical exercise behavior. Males and students of moderate height and weight tend to be more active in physical exercise, which may be related to social gender role expectations and social aesthetic standards for body shape. This finding suggests that we should consider the influence of different individual characteristics and adopt differentiated interventions when developing health promotion strategies.

6. CONCLUSIONS AND SUGGESTIONS

6.1 Conclusions

Synthesizing the quantitative and qualitative analysis results of this study, we can draw the following conclusions:

1. Social cognition plays an important role in physical exercise behavior of college students in Guangxi, among which self-efficacy and outcome expectation are the key factors.

2. The use of mobile social media has a positive impact on promoting physical exercise behavior of college students, and provides a new platform for health information dissemination and social support.

3. Individual characteristics, especially gender and body size, have a significant impact on physical exercise behavior, suggesting that individual differences should be considered in health promotion strategies.

6.2 Recommendations

Based on the above conclusions, this study makes the following recommendations:

1. Colleges and universities should use mobile social media platforms to promote physical exercise and enhance students' awareness and participation in physical exercise.

2. Educators should consider the individual differences of students and develop targeted health promotion strategies, especially for women and students with special body shapes.

3. Schools should strengthen the social support system for physical exercise, such as the establishment of campus sports associations, organizing regular sports activities, so as to enhance students' motivation for physical exercise.

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