Journal of Information Systems Engineering and Management
2025, 10(36s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Investigate the Influences of the Psychological Needs Model on Students' Intentions Toward Physical Activity in Chinese Higher Educational Institutions

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ARTICLE INFO

Received: 20 Dec 2024

Revised: 12 Feb 2025

Accepted: 22 Feb 2025

ABSTRACT

This study examines the influence of the psychological needs model on students' intentions to participate in physical activity in Chinese higher education institutions, as well as the relationship between all of the variables. A purposive sample method was used to select 512 respondents from four levels of operation and funding sources: public undergraduate, public vocational, private undergraduate, and private vocational. The reliability and validity of the questionnaires were verified. Data analysis methods include frequency analysis, descriptive statistical analysis, percentage, mean, standard deviation, and variable correlation analysis. This study found that the key factors of psychological needs of college students participating in physical activities, motivations for physical activity among college students, the theory of planned behavior among college students, and behavior intention among college students were moderately valued.

Keywords: Psychological needs, motivation, theory of planned behavior, behavior intention, Chinese college student

INTRODUCTION

The modernization of human society has been continuously advanced by the continued advancement of global science and innovation. This has resulted in significant changes in the way individuals live, work, and learn, including an increase in the use of electronic products, a decrease in physical activity, and a rise in inactive behavior (Rafique et al., 2022; Waxman, 2004).

According to Durstine et al., (2013); Marcus et al., (2006), significant research relates physical inactivity with the initiation and progression of several metabolic conditions. In addition, the Disease Risk Survey study identifies physical inactivity as a significant global mortality risk factor and a major public health challenge confronting society today (World Health Organization, 2010).

Significantly, an examination of the increasing overall fall in physical activity levels among university students globally provides some evidences, as do factors such as academic pressure, technology developments, and lifestyle changes. This is the thing to look out for in low-intensity physical activity. According to Craig et al. (2003), the physical activity intensity was categorized as low, moderate, and high levels, determined by examining the relationship among human heart rate, physiological sensation,

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Journal of Information Systems Engineering and Management
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e-ISSN: 2468-4376
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and energy expenditure. Some theories, such as Jang et al. (2021) and Xinyi et al. (2023), argue that the recent pandemic, the current heavy reliance on electronic devices, and overall levels of exercise are all predicted to decline. Furthermore, some theorists, such as Irwin (2004), argue that in Australia, investigations of physical activity levels among university students have revealed that approximately 40% of students fail to achieve appropriate levels of physical activity.

In terms of psychological needs, they play an important role in student exercise motivation, influencing their propensity to engage in and maintain physical activity. In accordance with self-determination theory, achieving the fulfillment of three key psychological needs—autonomy, competence, and relatedness—has a direct impact on how students perceive and participate in physical activity. When students feel autonomy—having the freedom to choose exercises they enjoy—they develop a positive attitude toward physical activity and are more likely to incorporate it into their routine willingly. Some theorists, such as Leyton-Roman et al. (2020), argue that by using the self-determination theory as a theoretical foundation, the study examined how effectively motivational variables predicted students' willingness to participate in physical activity. They found that teachers and policymakers who can understand and support students' need for autonomy in physical activity have the potential to significantly increase student participation. Importantly, some studies have also looked at how teaching models and personalized learning can work together in physical education classes. These studies stress how important the teaching environment is as a personalized support and how making changes to the lessons at the right time can help improve the effectiveness of both teaching and learning (Yun et al., 2020).

According to the information mentioned above, the researcher was interested in improving the physical activity level of college students, and this is a material part of accelerating the health of the whole human. The application of psychological theories has become crucial to elucidate and forecast the exercise patterns of college students. The government, educational institutions, and healthcare providers can use the results as a guideline to implement comprehensive measures. This can not only promote the development of personal health and exercise habits but also help improve the sustainable competitiveness of national young talents, reduce government expenditure on medical security, contribute to the healthy and stable development of the national economy, and promote the achievement of global sustainable development goals, all of which are of important practical significance.

LITERATURE REVIEW

The research studies and literature related to the present research were thoroughly reviewed as follows.

Self-determination theory

The concept of the Self-determination theory was developed in the 1980s by American psychologists Deci Edward and Ryan Richard M. He proposed a theory of human behavioral motivation in 1985,

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which emphasizes the autonomy of individuals and places the degree of self-determination of individual behavior at the core of the study. This theory holds that individuals are born with the potential for psychological growth and self-realization, and this potential will prompt individuals to engage in activities that they are interested in and contribute to their ability development, thus making individuals have a tendency in the creative, intrinsic, and innate self-development. However, the circumstances required for an individual to achieve self-growth are still affected and restricted by the external social environment self-determination is a choice of behavior made by an individual because of full understanding of personal needs and external environment. Self-determination theory argues that fulfilling three fundamental psychological needs is important. This idea states that individuals' psychological needs change over time and are closely related to their mental health and well-being. The psychological needs include a sense of competence, a sense of autonomy, and relatedness (Ryan & Deci, 2000b). The psychological need for competence refers to an individual's assurance in their ability to accomplish a task or accept a challenge when engaging in a behavior. Engagement in physical endeavors necessitates specific skills and competencies, such as running. Individuals possessing fundamental running skills and abilities will exhibit more confidence in successfully engaging in the activity. In this study, the sense of competence pertains to the fundamental talents and capacities of college students in physical activities, as well as the confidence they experience when effectively executing specific physical activities. The psychological need for autonomy means that an individual can make behavioral choices independently based on a profound understanding of personal needs and the surrounding environment and is not affected by external pressure. In other words, participation in physical activity itself is not affected by external pressure and is determined by the individual's own needs and the sports environment provided. In this paper, the sense of autonomy means that college students participate in physical activities based on their needs and the surrounding sports environment, without the intervention of external pressure. Additionally, relatedness needs to indicate that individuals feel a lasting connection to others in their behavior. This connection comes from interacting with others with understanding, support, and respect. In the Chinese government and schools for a long time, vigorously promoting students to participate in physical and mental health has had the beneficial effect of being widely recognized. Therefore, when individuals participate in sports activities, they will get understanding and support from teachers, classmates, and family members, so their support will increase a sense of identity for such behaviors. In this paper, relatedness refers to the sense of identity that college students can feel through the understanding and support of teachers, classmates, and family when they participate in sports activities.

Theory of Planned Behavior

The Theory of Planned Behavior clarifies how psychological needs such as autonomy, competence, and relatedness enhance attitudes, subjective norms, and perceived behavioral control. These factors influence an individual's intention to engage in physical activity. Psychological needs have a direct

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impact on attitudes toward exercise because students who have the freedom to decide on their own activities are more likely to have positive attitudes toward physical activity and to have strong behavioral intentions. Similarly, competence, or a belief that one has the ability to carry out activities successfully, enhances confidence and encourages a proactive attitude to exercise. Students are more likely to develop positive attitudes and engage with physical activity in the long term when they feel improvements in their physical activity levels. According to the theory of planned behavior, relatedness, also known as a need for social connection, has a significant influence on subjective norms, which are defined as a sense of social pressure for participating in physical activity. Students are more likely to regard physical activity as a socially valued behavior, which in effect increases the motivation to participate on a regular basis. This is because they feel encouraged by their peers, their families, or fitness communities. Furthermore, expertise has a considerable impact on perceived behavioral control, which is a measure of an individual's self-assurance in their capacity to participate in and continue physical activity. The implementation of the theory of planned behavior in the domain of physical activity is comprehensive, encompassing primary and secondary school students, college students, the elderly, healthy individuals, patients with various conditions, and differences in gender across diverse contexts. Its application in physical activity commenced earlier and continues to be relevant today. Experts in this domain broadly acknowledge the Theory of Planned Behavior (TPB) and its efficacy in forecasting individual physical activity behavior.

Relationship between Self-determination theory and Motivation

Motivation is an important factor in an individual's effort to complete a task, including internal and external motivation. In other words, intrinsic motivation (exercising for happiness and personal satisfaction) and extrinsic motivation (exercising for external rewards or societal acceptance) influence how learners perceive and commit to physical activity. For example, a study on bicycle users discovered that both extrinsic and intrinsic motivation strongly explained willingness to ride bicycles (Wu et al., 2019), and another study on learning intention found the same conclusion (Kong et al., 2012). Other research, however, has revealed that different reasons have varying effects on behavioral intention to engage. A survey of employee knowledge sharing indicated that intrinsic motivation (self-energy efficiency, helpfulness, etc.) is significantly connected to shared intention, whereas extrinsic motivation (organizational rewards) has a low relationship to intention (Lin, 2007). Similarly, a study on exercise persistence intention discovered that intrinsic motivation positively influences intention. Extrinsic motivation has a strong negative impact (Lee et al., 2022). Within the context of the students' motivation, it plays a significant part in the formation of the components of the theory of planned behavior, which are attitudes, subjective norms, and perceived behavioral control. These components, in turn, have an effect on the intentions of the students to participate in physical activity.

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METHODOLOGY

The research design and instrument in this study employed a quantitative approach, utilizing questionnaires to gather information. The research survey is focused on 1.106 million college students from 65 colleges and universities in Chengdu, with an error margin of 5% and a reliability of 95%. According to Taro Yamane's formula, it is calculated that at least 400 college student respondents should be selected for the study, but in practice, the questionnaire is distributed through the Internet, and the actual number of collected questionnaires may be lower than the number distributed. Therefore, to guarantee the validity of the results of the study, the number of respondents was increased by 40% (Vanichbuncha, 2006), and the final sample size was 400 + (400 × 0.4) = 560. Then, they implemented the multistage sampling method, adhering to the different levels of operation and funding sources of universities. Universities are usually divided into four categories: public undergraduate, public vocational, private undergraduate, and private vocational. Next, the sample size is allocated according to the proportion of student numbers in the four universities; the student numbers published on the official websites of the above universities are 17,000, 29,000, 17,000, and 12,000, respectively, so the sample drawing quantities of each university are 129, 212, 129, and 90, respectively. Finally, using purposive sampling to select universities does not include sports students, with the total number of samples being 560 from four different types of universities. The data collection was carried out by the distribution questionnaires, with a total of 560 respondents. This indicates that 512 respondents, or 91.42 percent of the total, returned the questionnaire. Cronbach (2003) states that the coefficient value should be between 0.8 and 0.9. Cronbach's Alpha is an α coefficient between 0.8 and 0.9, indicating excellent scale reliability; if the coefficient is between 0.7 and 0.8, it means that the scale's reliability is acceptable; if the coefficient is below 0.6, it indicates that the scale's internal reliability is destitute and lacks reference value. In this study, the minimum acceptable value of the coefficient Cronbach's alpha was at least 0.7. The analysis data were used with social science statistical techniques, such as frequency, percentage mean, and standard deviation (SD), and the interpreted levels of frequency were employed.

RESULTS AND DISCUSSION

According to Table 1, the study's results showed that among the 512 survey respondents, the overall male-to-female ratio is around 52:48, which is fairly balanced. There were more male respondents than female respondents, but the ratio was still about the same. 19.1% of the surveyed students were underweight, with a total of 98 people, while the proportion of students with normal weight was the highest at 50.6%, and 155 students were overweight, accounting for 30.3%. The proportions of students from four different types of universities were 38.8%, 23%, 22.9%, and 15.2%, respectively. The private undergraduate school was selected because it had the highest total number of students, which met the sampling design requirements. The ratio of vocational and undergraduates was approximately 4:6, which was relatively balanced. The proportions of students from rural and urban areas were 47.1% and

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52.9%, respectively, which was close to 5:5, which basically corresponds to China's basic national situation recently, which is committed to strengthening rural urbanization. The survey included 21.7% freshmen, 25.4% sophomores, 26.8% juniors, and 26.2% seniors, resulting in relatively balanced proportions across the four grades.

Table 1. Results of demographic frequency analysis (n=512)

Characteristic		Number	Percentage (%)
Gender	Male	265	51.8
	female	247	48.2
BMI	underweight	98	19.1
	Normal ranga	259	50.6
	overweight	155	30.3
Higher education institutions	Private bachelor's degree	199	38.8
	Public bachelor's degree	118	23.0
	Public Junior College	117	22.9
	Private vocational college	78	15.2
Degree	junior college	195	38.1
	Bachelor's degree	317	61.9
Place of Origin	Countryside	241	47.1
	City	271	52.9
grade	Freshman	111	21.7
	Sophomore	130	25.4
	Junior	137	26.8
	senior	134	26.2

Analysis of the psychological needs of college students participating in physical activities with descriptive statistics are presented in Table 2.

Table 2. Results of descriptive statistics of the psychological needs

Psychological Needs	Mean	Standard deviation	Level
Competence	3.368	0.986	Moderate
Autonomy	3.373	0.997	Moderate
Relatedness	3.440	0.962	Moderate

From what can be seen in Table 2, all three of the variables—competence, autonomy, and relatedness—had values that were considered to be moderate. In the one-sample t-test, all of the p-values are lower

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e-ISSN: 2468-4376
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than 0.001, which indicates that there is a significant difference between the test value and the actual value. The psychological needs fell into the moderate-level value category in terms of their level of ability. (mean=3.368, S.D.=0.986). When it came to the psychological needs, the levels of autonomy were of a modest level of satisfaction. (mean=3.373, S.D.=0.997). And the levels of relatedness between the psychological needs were of a value that was somewhere in the middle 3.440, with a standard deviation of 0.962. As a result of this study, it appears that the Chinese college students who were surveyed are largely in agreement with their psychological needs of relatedness, autonomy, and competence when proactively participating in physical activities. Furthermore, the average scores for these factors are reasonably near to one another throughout the whole range.

Analysis of motivations for physical activity among college students with descriptive statistics are presented in Table 3.

Table 3. Results of descriptive statistics of motivations

Motivations	Mean	Standard deviation	Level
Intrinsic motivation	3.449	1.094	Moderate
Extrinsic motivation	3.365	1.059	Moderate

As shown in Table 3, all of the characteristics that relate to the motivations for physical activity among college students have a degree of value that is considered to be moderate. In the one-sample t-test, all of the p-values are lower than 0.001, which indicates that there is a significant difference between the test value and what is actually measured. It was found that college students have modest levels of intrinsic motivation for engaging in physical activity. (3.449 is the mean, and 1.094 is the standard deviation). High levels of extrinsic motivation for physical activity were found among college students, however these levels were moderate. (3.365 is the mean, and 1.059 is the standard deviation), When it comes to the motivation for engaging in physical activities, this data implies that the Chinese college students who were surveyed are largely in agreement with the reason for both intrinsic motivation and extrinsic motivation.

Analysis of the theory of planned behavior for physical activity among college students with descriptive statistics are presented in Table 4.

Table 4. Results of descriptive statistics of Theory of Planned Behavior

Theory of Planned Behavior	Mean	Standard deviation	Level
Attitudes	3.411	1.035	Moderate
Subjective norms	3.333	1.059	Moderate
Perceived behavioral control	3.390	1.020	Moderate

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e-ISSN: 2468-4376
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Table 4 shows that all factors related to the theory of planned behavior for physical activity among college students have a moderate level of value. The p-values for the one-sample t-test are all less than 0.001, indicating a significant difference from the test value. The levels of attitudes for physical activity among college students were moderate (mean=3.411, S.D.=1.035). The levels of subjective norms for physical activity among college students were moderate (mean=3.333, S.D.=1.059). And the levels of Perceived behavioral control for physical activity among college students were moderate (mean=3.390, S.D.=1.020). This finding suggests that the surveyed Chinese college students generally agree on the theory of planned behavior for attitudes, subjective norms and perceived behavioral control regarding participation in physical activities.

Analysis of the behavior intention for physical activity among college students with descriptive statistics are presented in Table 5.

Table 5. Results of descriptive statistics of Behavior intention

Behavior intention	Mean	Standard deviation	Level
Behavioral expectation	3.287	0.976	Moderate
Behavioral willingness	3.237	1.028	Moderate

According to the data presented in Table 5, all of the criteria that are related to the behavioral intention to engage in physical activity among college students have a degree of value that is moderate. Every single one of the p-values for the one-sample t-test is lower than 0.001, which indicates that there is a significant difference between the test value and the alternative value. Students in higher education had modest levels of behavioral expectations regarding their degree of physical activity (mean=3.287, S.D.=0.976). Moderate levels of behavioral willingness to engage in physical activity have been noted among college students. (mean=3.237, S.D.=1.028). Based on this finding, it appears that the Chinese college students who were surveyed tend to be in agreement with regard to the behavior intention for behavioral expectation and behavioral willingness for involvement with physical activities. Furthermore, the average scores for these two factors are very similar to one another, showing that there is not much of difference between them.

By analysis of the measured variables, the correlation between variables showed significant positive correlation. The details are presented in Table 6.

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e-ISSN: 2468-4376
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Table 6: The relationships between the variables

	Competence	Autonomy	relatedness	EM	IM	BA	SN	PBC	BE	BW
Competence	1									
Autonomy	0.513**	1								
relatedness	0.463**	0.511**	1							
EM	0.495**	0.438**	0.500**	1						
IM	0.405**	0.408**	0.409**	0.674**	1					
BA	0.469**	0.515**	0.454**	0.552**	0.499**	1				
SN	0.466**	0.492**	0.436**	0.561**	0.521**	0.590**	1			
PBC	0.468**	0.497**	0.457**	0.569**	0.478**	0.567**	0.574**	1		
BE	0.387**	0.410**	0.401**	0.482**	0.400**	0.428**	0.468**	0.493**	1	
BW	0.446**	0.438**	0.462**	0.534**	0.478**	0.497**	0.485**	0.476**	0.461**	1

Note: **At the 0.01 level (two-tailed), the correlation is statistically significant.

From Table 6, the three variables in the psychological needs scale are significantly positively correlated with intrinsic motivation, with P-values all less than 0.01 and correlation coefficients r all greater than 0. They are also significantly positively correlated with extrinsic motivation, with P-values all less than 0.01 and correlation coefficients r all less than 0. The intrinsic motivation in the motivation scale is significantly positively correlated with all variables in the theory of planned behavior scale, with P-values all less than 0.01 and correlation coefficients r all greater than 0. Extrinsic motivation is significantly and positively correlated with these variables, with P values less than 0.01 and correlation coefficients r greater than 0. The 5 variables in the theory of planned behavior scale are significantly positively correlated with the three variables in the psychological needs scale, with P-values all less than 0.01 and correlation coefficients r all greater than 0. This paper used a literature review to find the psychological needs model factors that affect college students' desire to play sports. These factors are the independent variable PN, the mediating variable motivation, the three antecedents in theory of planned behavior, and the dependent variable behavioral intention.

CONCLUSIONS

This study found moderately valued findings on psychological needs, motivations, the theory of planned behavior, and behavior intention in college students. In Chinese universities, academic pressure and employment competition increase psychological stress. Chinese college students' backgrounds and psychological needs studies inform this. Schools should use extracurricular physical activities to address students' essential psychological needs for autonomy, competence, and belonging. Traditional sports, team sports, and fitness classes can assist students in releasing stress. Students can relax throughout their busy academic lives and enjoy and feel accomplished while participating in these activities, improving their well-being and quality of life. This helps schools enhance students'

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physical and emotional health holistically. Through health education and publicity campaigns, schools can help students understand the importance of physical activity to their physical and mental health, improving their attitudes and participation intentions. Schools may hold health presentations, attract sports and health experts, and educate students about scientific exercise to achieve this goal. Nevertheless, the implications of this research are significant consequences for policymakers, academics, and stakeholders to better comprehend the issue.

ACKNOWLEDGMENTS

This academic article is part of the graduate student in the Doctor of Philosophy program at Institute of Science Innovation and Culture, Rajamangala University of Technology Krungthep, Bangkok, Thailand. The researcher expresses gratitude to all the referenced experts for their contributions to this study.

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