



The relationship between university sports environment, exercise motivation, and exercise behavior

La relación entre el entorno deportivo universitario, la motivación para el ejercicio y el comportamiento de ejercicio

Authors

Zengyin Yan¹,
Wannaporn Sumranpat Brady²

¹Maharakham University, (Thailand)

²Maharakham University, (Thailand)

Corresponding author:
Wannaporn Sumranpat
Wannaporn.su@msu.ac.th

How to cite in APA

Yan, Z., & Wannaporn Sumranpat Brady. (2025). The Correlation of University Sports Environment, Exercise Motivation, and Exercise Behavior. *Retos*, 68, 1086–1096. <https://doi.org/10.47197/retos.v68.115163>

Abstract

Background: This study examines the relationships among university sports environment, exercise motivation, and physical activity behavior, with the aim of informing strategies to enhance exercise engagement among university students.

Methodology: A cross-sectional design was employed, utilizing a combination of cluster sampling and purposive sampling. Data were collected from 3,918 Chinese university students (1,978 males, 1,940 females; aged 18–22) using the University Sports Environment Scale, Exercise Motivation Scale, and Physical Activity Rating Scale-3. Descriptive statistics and correlation analyses were conducted using SPSS 27.0, while structural equation modeling (SEM) in AMOS 26.0 was applied to assess the hypothesized relationships.

Results: The SEM analysis demonstrated acceptable model fit. Key findings indicated that: The university sports environment had a significant positive effect on both exercise motivation ($\beta=0.792, p<0.001$) and physical activity behavior ($\beta=0.25, p<0.001$). Exercise motivation significantly predicted physical activity behavior ($\beta=0.19, p<0.001$). A partial mediation effect was observed, with exercise motivation mediating the relationship between the sports environment and physical activity behavior (indirect effect=0.198, $p < 0.001$).

Conclusions: The findings suggest that both university sports environment and exercise motivation are critical predictors of students' physical activity behavior. These results provide a theoretical foundation for designing targeted interventions to promote exercise engagement among university students.

Keywords

University Sports Environment; exercise motivation; exercise behavior; structural equation modeling.

Resumen

Antecedentes: este estudio examina las relaciones entre el ambiente deportivo universitario, la motivación al ejercicio y el comportamiento de la actividad física, con el objetivo de informar estrategias para mejorar el compromiso con el ejercicio entre los estudiantes universitarios.

Metodología: se utilizó un diseño transversal, utilizando una combinación de muestreo por conglomerados y muestreo intencional. Se recogieron datos de 3.918 estudiantes universitarios chinos (1.978 hombres, 1.940 mujeres; Entre 18 y 22 años) utilizando la University Sports Environment Scale, la Exercise Motivation Scale y la Physical Activity Rating Scale—3. Se realizó estadística descriptiva y análisis de correlación utilizando el programa SPSS 27.0, mientras que se aplicó el modelo de ecuaciones estructurales (SEM) en AMOS 26.0 para evaluar las relaciones hipotéticas.

Resultados: el análisis SEM demostró un ajuste aceptable del modelo. Los hallazgos clave indicaron que: el ambiente deportivo universitario tuvo un efecto positivo significativo tanto en la motivación al ejercicio ($\beta=0,792, p<0,001$) como en el comportamiento de actividad física ($\beta=0,25, p<0,001$). La motivación al ejercicio predijo significativamente el comportamiento de actividad física ($\beta=0,19; p<0,001$). Se observó un efecto de mediación parcial, con la motivación al ejercicio mediando la relación entre el ambiente deportivo y el comportamiento físico (efecto indirecto=0,198; $p<0,001$).

Conclusiones: los hallazgos sugieren que tanto el ambiente deportivo universitario como la motivación al ejercicio son factores predictores críticos del comportamiento de actividad física de los estudiantes. Estos resultados proporcionan una base teórica para el diseño de intervenciones dirigidas a promover la participación de los estudiantes universitarios en el ejercicio.

Palabras clave

Entorno deportivo universitario ; motivación para el ejercicio ; comportamiento del ejercicio ; modelado de ecuaciones estructurales.



Introduction

University students face increasing academic demands, social obligations, and digital entertainment options, contributing to prolonged screen time and sedentary lifestyles (Dong, 2017). The convenience of food delivery services further reduces opportunities for incidental physical activity, as students can now obtain meals without leaving their residences (Lei et al., 2020; Liu et al., 2023). This decline in daily movement is compounded by excessive consumption of high-calorie foods and beverages, exacerbating health risks such as: Declining physical fitness (Lian & Li, 2019), Overweight/obesity (Chan et al., 2017; Karabulut et al., 2018; Yuan et al., 2021; WHO, 2020), Chronic diseases, including cardiovascular disorders and type 2 diabetes (WHO, 2020), Vision impairment (Li et al., 2019; Karthikeyan et al., 2022), Sleep disturbances (D'Aurea et al., 2022; Bai, 2022), Mental health challenges, such as anxiety (Ku et al., 2018; Stanczykiewicz et al., 2019; WHO, 2020) and depression (Kim et al., 2010; Liu et al., 2016; WHO, 2020). Collectively, these trends underscore the urgent need to address the erosion of physical activity among university populations.

In September 2021, China's Ministry of Education released the Eighth National Survey on Students' Constitution and Health, reporting overall improvements in physical fitness and health among Chinese students. However, the data also revealed persistent concerns, particularly the declining physical fitness of university students and insufficient physical activity levels among young adults (Gong, 2021). The university phase represents a critical transitional period from adolescence to adulthood (Zhang & Li, 2022) and serves as a pivotal stage for establishing long-term exercise habits and fostering lifelong sports participation (Liu et al., 2001). As the final stage of structured physical education within the academic system, university sports play a decisive role in facilitating the shift from school-based physical activity to lifelong sports engagement, with profound implications for students' future health and professional productivity (Liu et al., 2001; Xiao, 2015). Despite the institutional emphasis on physical education which is a mandatory course linked to graduation requirements in Chinese universities, student engagement remains largely compliance-driven. Research indicates that most university students participate in physical education primarily to fulfill academic obligations, with low rates of voluntary exercise and limited involvement in extracurricular sports clubs (Li & Zhu, 2020; Chen, 2022; Hou, 2023). This passive participation pattern poses significant challenges to promoting sustained physical activity and holistic well-being among university students.

Regular physical activity engagement among university students demonstrates significant positive associations with academic performance, healthy lifestyle development, psychological well-being, and social adaptation (Biddle et al., 2011; Singh et al., 2012; Wen, 2015; Li & Ji, 2016; Lu & Wang, 2019; Yan et al., 2019; Fang, 2020). The determinants of exercise behavior in this population are multifactorial, encompassing individual, environmental, and psychological dimensions (Zhang & Li, 2022; Hou, 2023). Environmental influences play a particularly salient role, with immediate physical surroundings directly impacting exercise initiation and maintenance (Rezende et al., 2015; Humpel et al., 2002; Hong & Li, 2022). University infrastructure, including sports facilities, equipment availability, and structured physical education programs, constitutes a fundamental prerequisite for sustained student engagement in physical activity and serves as a critical determinant in shaping exercise behaviors (Wechsler et al., 2000; Birnbaum et al., 2005; Johnston et al., 2007; McKenzie & Kahan, 2008; Wang, 2023). Concurrently, motivational factors provide the psychological impetus for behavioral engagement. As Chen et al. (2008) conceptualize, motivation represents the internal mechanism that initiates, sustains, and directs goal-oriented activities. In the domain of physical activity, exercise behavior emerges from the interplay between physiological needs and psychological motivation (Liu et al., 2001). Empirical evidence confirms a robust positive relationship between exercise motivation and physical activity participation among university students (Zhang & Li, 2022), with both intrinsic and extrinsic motivational constructs demonstrating significant behavioral facilitation effects (Chen et al., 2023; Wang, 2023). Notably, motivational intensity exhibits a dose-response relationship with exercise adherence, where stronger motivation correlates with greater behavioral persistence and enhanced quality of physical activity engagement.

In summary, university students' physical activity behavior is influenced by a complex interplay of multiple determinants. Grounded in existing theoretical frameworks and empirical evidence, this study systematically examines the tripartite relationship between university sports environment, exercise motivation, and physical activity behavior. The findings provide both theoretical and practical insights for



developing targeted interventions to enhance exercise engagement and optimize health outcomes among university populations.

Method

Study participants

This study was a cross-sectional study that used a combination of cluster sampling and purposive sampling to survey students in grades 1-4 at 20 universities in China, with ages ranging from 18 to 22 years. After removal of individuals with invalid responses (carelessly answered questionnaires such as monotonic responses, omissions, and multiple selections), there were 3918 samples. (Ollerenshaw & Creswell, 2002; Wu, 2010). The participants were comprised of 1978 males and 1940 females.

Procedure

This study was supported by university administrators and physical education teachers. Before collecting data, the university physical education teachers or trained research investigators informed the participants about the relevant content and purpose of the study, solicited their consent, and obtained written informed consent. Then the questionnaires were distributed and collected. Participants could withdraw from the study at any time. To protect the privacy of the participants, data collection and analysis were anonymous.

Tools

This study employed three validated assessment tools to measure key constructs:

The University Sports Environment Scale

The University Sports Environment Scale was revised according to Guo Kelei (2019) 's School Physical Education Environment Scale for Middle School Students. In order to make the scale more suitable for university students, the questions were revised, and the words or sentences that were unclear, ambiguous, and incompatible with the university sports environment were revised. The university sports environment scale consisted of three subscales: sports physical environment, sports policy environment, and sports social environment, which included 34 items rated on a 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"). Two rounds of item-objective Congruence (IOC) evaluation were conducted after revision (the IOC value of each item was greater than or equal to 0.8). Therefore, the project is valid (Turner & Carlson, 2003). The subscales of this study had a Cronbach's α ranging from 0.802 to 0.935, and the test-retest reliability ranged from 0.823 to 0.944. These subscales were reported to have decent internal reliability. For each subscale, item scores were averaged to create the composite scores.

The Exercise Motivation Scale

The exercise motivation was measured the physical activity motivation measurement Scale (MPAM-R) and the physical activity extrinsic motivation scale (Chen et al., 2023). The scales have been studied several times among Chinese university students, and had a good reliability (Cronbach's α =0.834-0.955) (Chen, et al., 2006, Chen, et al., 2008, Chen, et al., 2023). The scale consisted of 27 items, including two subscales: intrinsic motivation (15 items, including 5 different dimensions) and extrinsic motivation (12 items, including 4 different dimensions), and rated on a 5-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"). The subscales of this study had a Cronbach's α ranging from 0.810 to 0.839, and the test-retest reliability ranged from 0.818 to 0.920. For each subscale, item scores were averaged to create the composite scores.

The Exercise Behavior Scale

The exercise behavior was measured with the Physical Activity Rating Scale-3 revised by Liang (1994), which had a test-retest reliability of 0.82. The scale contains three questions on exercise intensity, duration and frequency, and used a 5-point Likert scale. The exercise behavior = intensity*(duration-1) * frequency, the highest score is 100 points, and the lowest score is 0 points. Evaluation criteria: the score ≤ 19 points belong to the light exercise behavior; the score between 20-42 points belong to the medium exercise behavior; the score ≥ 43 points belong to the heavy exercise behavior (Shen, 2011; Lu,

2012; Feng, 2015; Dong, 2021; Zhang, et al., 2024). The test-retest reliability of exercise behavior in this study was 0.902.

Statistical Analysis

Descriptive statistics was used to summarize the data characteristics. Pearson correlation analysis was used to investigate the associations among study variables. The software of SPSS27.0 was used for the data management and correlation test. A bootstrapping method was applied to test the mediation effects. AMOS26.0 was used to fit the university sports environment, exercise motivation and exercise behavior models. Structural equation modeling (SEM) was used to examine the hypothesized model.

Ethics

The study was approved by the Ethics Committee for Research of the the Mahasarakham University, Thailand (Approval number: 255-086/2024), in accordance with the ethical standards of the institutional and national research committees and with the 1964 Helsinki Declaration and its later amendments.

Results

Table 1 shows the descriptive statistics and Pearson's correlations for the study. The data of this study met the requirement of normal distribution (Kline, 1998). Sports policy environment ($M=4.24$, $SD=0.54$), Sports social environment ($M=4.15$, $SD=0.57$), and Sports physical environment ($M=3.95$, $SD=0.72$). Intrinsic motivation ($M=4.42$, $SD=0.52$) and Extrinsic motivation ($M=4.03$, $SD=0.61$) showed moderate-to-high level of mean value. Exercise behavior ($M=20.36$, $SD=18.44$) had moderate level. The correlation test showed that the three variables of university sports environment, the two variables of exercise motivation, and exercise behavior were significantly positively correlated ($p<0.01$), which were suitable for SEM analysis.

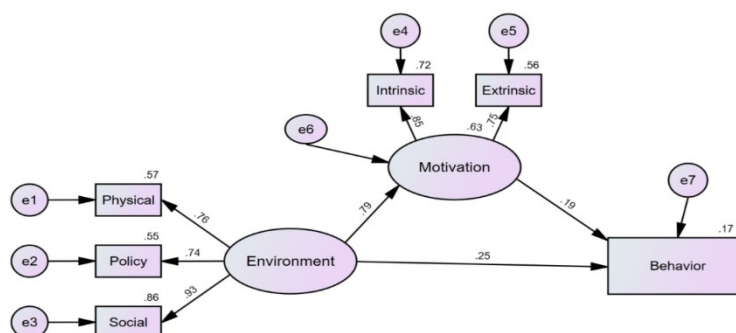
Table 1. Descriptive Statistics and Correlation Matrix

Variables	Physical	Policy	Social	Intrinsic	Extrinsic	EB
Physical	1					
Policy	.623**	1				
Social	.703**	.699**	1			
Intrinsic	.493**	.540**	.658**	1		
Extrinsic	.439**	.457**	.551**	.641**	1	
EB	.340**	.322**	.381**	.331**	.326**	1
M	3.95	4.24	4.15	4.42	4.03	20.36
SD	0.72	0.54	0.57	0.52	0.61	18.44
Skew	-0.54	-0.77	-0.54	-0.93	-0.22	1.49
Kurt	-0.29	0.57	-0.39	0.35	-0.57	2.46

Note: Physical=Sports physical environment; Policy=Sports policy environment; Social=Sports social environment; Intrinsic=Intrinsic Motivation; Extrinsic=Extrinsic Motivation; EB=Exercise Behavior; M =Mean,SD=Standard Deviation, Skew=Skewness; Kurt=Kurtosis.

** $P<0.01$.

Figure 1. SEM of university sports environment, exercise motivation and exercise behavior



The SEM parameter estimates are shown in Figure 1. The proposed model showed the structural model illustrated an acceptable model fit, CFI=0.966, GFI=0.989, AGFI=0.967, NFI=0.987, IFI=0.988, RMR=0.008, and RMSEA=0.068. The path coefficients were significant and in the right direction for the university environment –Exercise motivation ($\beta=0.792$, $p<0.001$), the university environment – Exercise behavior ($\beta=0.25$, $p<0.001$), Exercise motivation–Exercise behavior ($\beta=0.19$, $p<0.001$). The SEM model explained 63% of the variance in exercise motivation and 17% of the variance in exercise behavior. The results suggested that the model is appropriate for predicting university students' exercise behavior.

Table 2. Bootstrap mediation effect test results

Path	Parameter	Estimate	Lower	Upper	P	Effect ratio
Environment ↓ Motivation ↓ Behavior	Indirect effect	0.198	0.135	0.266	<0.001***	37.36%
	Direct effect	0.331	0.252	0.413	<0.001***	62.45%
	Total effect	0.53	0.487	0.571	<0.001***	

Note: Environment=University Sports Environment, Motivation=Exercise Motivation, Behavior=Exercise Behavior.

*** $p<0.001$

As shown in the Table 2, the mediating effect of the path of university sports environment → exercise motivation → exercise behavior was significant ($P<0.001$), and the 95% confidence interval (CI) was 0.135-0.266, excluding 0; at the same time, the direct effect was significant ($P<0.05$). It proved that this was a partial mediation effect, and exercise motivation played a partial mediating role in the impact of university sports environment on exercise behavior. The indirect effect accounted for 37.36%.

Discussion

The relationship of university sports environment and exercise motivation

The results showed that three subscales of the university sports environment: sports physical environment, sports policy environment, sports social environment and exercise motivation of the two subscales intrinsic motivation and extrinsic motivation also showed significant positive correlation (r values between 0.439** to 0.658**), The correlation coefficient between sports social environment and intrinsic motivation is the highest. A good sports social environment plays an irreplaceable role in promoting university students' exercise motivation. The path results showed that university sports environment had a significant positive impact on exercise motivation.

The extrinsic environment can stimulate students' exercise motivation. In a sports environment with perfect policy, suitable atmosphere and material guarantee, students' exercise motivation will be stimulated (Zuo, 2023). A good sports environment can help stimulate the motivation of young people to exercise, thereby increasing the amount of physical activity (Yang, 2017), and appropriate sports activity resources (venues, facilities, layout) can improve accessibility and operability (Dong, 2021). These potential external resources can internalize intrinsic motivation and promote individual exercise practice (Dai et al., 2018; Chen & Zhu, 2022). The sports policy environment can effectively promote university students' exercise motivation. In order to pass physical education courses or physical fitness tests, some students meet extrinsic requirements through physical exercise (Dong et al., 2014). The university's physical education credit policy and graduation physical education requirements encourage university students to have extrinsic motivation and then participate in physical exercise. The sports social environment affects the exercise motivation of university students. The social supportive environment is that students feel the support of teachers, friends/peers (Liang, 2020), and then produce exercise motivation. At the same time, teaching practices within school settings represent a powerful influence on students' motivation (Eccles & Roeser, 2011; Taylor, et al., 2014). University students have different

interests and needs, so it is very important to provide them with a variety of sports, venues, social support, etc. This can not only meet the individual needs of university students, but also allow them to find sports that they are interested in, so that it is easier to generate exercise motivation (Hou, 2023).

The relationship of university sports environment and exercise behavior

The results showed that three subscales of the university sports environment: sports physical environment, sports policy environment and sports social environment were significantly positively correlated with exercise behavior (r values ranged from 0.322** to 0.381**). The correlation coefficient between sports social environment and exercise behavior is the highest. A good sports social environment plays an irreplaceable role in promoting university students' exercise behavior. The path results showed that university sports environment had a significant positive impact on exercise behavior. The university sports environment constitutes an important component of higher education environment and one of the factors influencing the generation and maintenance of university students' exercise behaviors. The convenient conditions provided by universities in terms of time and space can help university students do physical exercise better. A good university sports environment can imperceptibly had a positive impact on the generation and maintenance of university students' exercise behavior, and can significantly affect students' physical activity levels (Wang, 2023; Robertson-Wilson et al., 2007).

The sports physical environment is the basis of students' exercise behavior, and behavior is the process of the subject forming a certain reaction and taking an activity to meet a certain need under Environmental stimulation (Dong & Mao, 2021). The occurrence of exercise behavior is easily directly affected by the surrounding environment (Humpel et al., 2002; Hong & Li, 2022). Factors such as the number, layout and convenience of exercise venues can affect individual exercise behavior (Pan et al., 2010; Ran, 2011; Hong & Li, 2022). Complete school stadiums, facilities, equipment and other natural environments can provide opportunities and conditions for young people to exercise, which is beneficial to improving the operability and accessibility of behaviors, reducing the difficulty of execution, and making it possible for exercise behaviors to occur (Dong & Mao, 2021; Shen, 2023). The sports policy environment is a favorable guarantee for students' exercise behavior, and sports policy plays an important role in promoting students' exercise behavior (Su et al., 2017; Guo, 2019; Gong et al., 2021; Hong, 2022). The physical education policies help schools create healthy, equitable environments (Burson et al., 2021). University sports credit policy, physical health standard policy, and graduation sports requirement policy, among others, have improved students' awareness of physical exercise and promoted university students' physical exercise behavior. Reasonable sports venues, sports equipment and sports policies stimulate university students' enthusiasm and motivation for physical exercise, and also provide a platform for the establishment of university students' interpersonal relationships and improvement of social adaptation (Shen, 2023). The correlation between behavior and environment can not only explain and predict behavior, but also influence people's behavior by designing, changing and controlling the environment. The university sports environment, which is composed of physical environment, policy environment and social environment, is an important factor to promote exercise behavior and strengthen exercise consciousness of university students. Individual exercise behavior, closely related to sports environment and the perception of surrounding environment, can directly affect the beginning and persistence, suspension and withdrawal of university students' exercise behavior (Hong & Li, 2022).

The relationship of exercise motivation and exercise behavior

The research results show that two subscales of exercise motivation: Intrinsic motivation and extrinsic motivation had a significant positive correlation with exercise behavior (r values were 0.326** to 0.331**). The correlation coefficient between intrinsic motivation and exercise behavior was the highest, and intrinsic motivation was more favorable to promote the production of exercise behavior. The path results showed that exercise motivation had a significant positive impact on exercise behavior.

Motivation is the root of behavior, and can drive individual exercise participation and predict exercise behavior (Zeng, 2023). The motivational-behavioral nexus operates through a dynamic process wherein psychological drives translate into concrete actions, which are subsequently reinforced through continued motivational input, creating a positive feedback loop that sustains long-term exercise adherence. In the physical activity domain, exercise motivation constitutes the primary driving force that initiates and sustains students' participation in regular physical exercise, thereby significantly influencing their be-

havioral patterns. Exercise motivation affects and dominates exercise behavior, so that "exercise duration", "exercise intensity" and "exercise frequency" are strengthened and sustained (Zhu & Zhang, 2016; Wang, 2023; Hou, 2023).

The relationship of university sports environment and exercise motivation on exercise behavior

The results showed that exercise motivation played an important role in the influence of university sports environment on exercise behavior, and university sports environment further promoted students' exercise behavior by improving their exercise motivation.

Individual exercise behavior is determined by the interaction of environment, individual psychology and behavior (Xie et al., 2009; Hong & Li, 2022; Assavanopakun et al., 2022). The maintenance, change and development of individual exercise behavior are affected by two major factors: internal and external factors (Dong, 2017; Zhang et al., 2002). Internal factors mainly refer to individual psychological factors, while external factors mainly refer to environmental factors (Hong & Li, 2022; Zuo, 2023). The sports environment can stimulate individual motivation and thus produce sports behavior (Zeng, 2023). Motivation is a key point to achieve successful learning (Ryan & Deci, 2017; Sotos-Martinez et al., 2023). The occurrence of exercise behavior is easily influenced directly by the surrounding environment, the behavior of individuals participating in physical exercise is closely related to the surrounding environment, and people's perception of the surrounding environment can directly affect their exercise behavior and the persistence of exercise behavior (Humpel et al., 2002; Hong & Li, 2022). University students' exercise motivation and behavior are often based on the university sports environment, the environmental information perceived by the subject can stimulate or change the behavioral motivation and decision-making, thus forming the corresponding behavior (Peng, 2015; Chen & Zhu, 2022). The sports physical environment, sports policy environment and sports social environment in the university can continuously strengthen the perception and cognition of students in the process of participating in physical exercise, prompting them to generate intrinsic and extrinsic motivation for exercise behavior, and then internalize it in their mind and externalized in the practice, and form correct exercise habits. Strengthening the construction and management of university sports environment can provide better physical exercise environment and conditions for university students, thus enhancing their exercise motivation and promoting them to develop good exercise behavior (Hou, 2023).

Conclusions

The structural equation model demonstrated good fit in examining the relationships among university sports environment, exercise motivation, and physical activity behavior. Path analysis revealed significant positive direct effects, with the sports environment substantially predicting both exercise motivation and exercise behavior, while exercise motivation similarly showed a strong direct effect on exercise behavior. Mediation analysis confirmed exercise motivation's partial mediating role in the environment-behavior relationship. These results collectively establish that while the university sports environment directly facilitates exercise, it also operates through motivational mechanisms, providing a robust theoretical foundation for developing multi-level interventions that simultaneously enhance universities sports infrastructure and foster student exercise motivation to effectively promote sustainable exercise behaviors.

References

- Assavanopakun, P., Sirikul, W., Promkutkao, T., Promkutkeo, S., & Panumasvivat, J. (2022). Focus on high school: factors associated with creating harmony between the educational transition and adolescents' well-being. *International Journal of Environmental Research and Public Health*, 19(15), 9261.
- Bai, Y. (2022). Effects of loneliness, cell phone addiction, and sleep disorders on university students' physical activity: a moderated chain-mediated model. *Journal of Tianjin Sports Institute* (04), 467-474.



- Biddle, S. J., & Asare, M. (2011). Physical activity and mental health in children and adolescents: a review of reviews. *British journal of sports medicine*, 45(11), 886-895.
- Birnbaum, A. S., Evenson, K. R., Motl, R. W., Dishman, R. K., Voorhees, C. C., Sallis, J. F., ... & Dowda, M. (2005). Scale development for perceived school climate for girls' physical activity. *American journal of health behavior*, 29(3), 250-257.
- Burson, S. L., Mulhearn, S. C., Castelli, D. M., & van der Mars, H. (2021). Essential components of physical education: Policy and environment. *Research Quarterly for Exercise and Sport*, 92(2), 209-221.
- Chan, Y. Y., Lim, K. K., Lim, K. H., Teh, C. H., Kee, C. C., Cheong, S. M., ... & Ahmad, N. A. (2017). Physical activity and overweight/obesity among Malaysian adults: findings from the 2015 National Health and morbidity survey (NHMS). *BMC Public Health*, 17(1), 1-12.
- Chen, L. (2022). A study on the relationship between extracurricular physical activity, exercise motivation and subjective well-being of university students in Chongqing Master's Dissertation, South-west University.
- Chen, S.P., Li, S. Z., & Yan, Z., (2006). A study of university students' exercise adherence mechanism based on the perspective of exercise commitment. *Sports Science* (12), 48-55.
- Chen, X., & Zhu, C.Q., (2022). The influence of community sport environment on adolescents' leisure-time physical activity: multiple mediating effects of neighbourhood relationship and intrinsic motivation. *Chinese Sports Science and Technology* (12), 57-64.
- Chen, S.P., Li, X.S., & Rong, J.Z. (2008). Intrinsic and extrinsic motivation of university students' physical exercise. *China Sports Science and Technology* (04), 135-138+143.
- Chen, S.P., Song, D., Xie, L.J., Zhang, Z.J., & Liu, L.P. (2023). Cluster analysis of physical exercise motivation and sports behavior characteristics of Chinese university students. *Journal of Capital University of Physical Education* (01), 57-67.
- D'Aurea, C. V. R., Frange, C., Poyares, D., Souza, A. A. L. D., & Lenza, M. (2022). Physical exercise as a therapeutic approach for adults with insomnia: systematic review and meta-analysis. *Einstein (Sao Paulo)*, 20, eA08058.
- Dai, J. & Chen, H.. (2018). A study on the influencing factors of adolescents' out-of-school physical activity behaviors from the perspective of social ecology. *Journal of Capital Institute of Physical Education* (04), 371-377.
- Dong, B.L. (2021). Study on the interaction of individual, family and school factors on Adolescents' physical exercise behavior. Doctoral Dissertation, Shanghai University of Sport.
- Dong, B.L., & Mao, L.J. (2021). The relationship between school physical environment, interpersonal environment and physical activity among adolescents. *Journal of Physical Education* (02), 111-117.
- Dong, B.L., Zhang, H., Chen, C., Zhu, L.Q., Song, L.L., Nie, L.F., & Jin, Y.F. (2014). A study on the relationship between extracurricular exercise motivation and behavior of female university students. *Sports Culture Guide* (04), 141-144.
- Dong, B.L., (2017). Investigation and analysis of the effects of health beliefs and social support on physical activity among adolescents. *Journal of Physical Education* (03), 115-122.
- Eccles, J.S., & Roeser, R.W. (2011). Schools as developmental contexts during adolescence. *Journal of Research on Adolescence*, 21, 225-241.
- Fang, L. M. (2020). The effect of physical exercise on adolescents' cognitive ability and academic performance. *Science of Sports* (04), 35-41.
- Feng, Y.J. (2015). The Effect of Triple Efficacy in PE on Collegiate Students' Leisure-Time Physical Activity Behavior. Doctoral Dissertation, Beijing Sport University.
- Gong, Q. B. (2021). Research on university Students' Sports Participation from the Perspective of Social Ecology. Doctoral Dissertation, Shanghai University of Sport.
- Gong, Q.B., Geng, J.X., Cheng, X.M., Xu, L.J., & Wu, Y. (2021). An empirical study on the relationship among college students' perception of sports environment, sports participation, and sports gain. *Journal of Xi'an Physical Education Institute* (02), 226-235.
- Guo, K.L. (2019). Research on the relationship between school sports environment, exercise intention and physical activity of Junior Middle School students. Doctoral Dissertation, Shanghai University of Sport.
- Hong, J.J. (2022) The Relationship between Sports Environment and Physical Exercise Behavior of Junior High School Students in Shanghai. Master's Dissertation, Shanghai sports University.
- Hong, J.J., & Li, S.H., (2022). Effects of sport environment on children and adolescents' exercise behavior: the mediating role of exercise commitment. *Chinese Sports Science and Technology* (10), 40-46.



- Hou, S.J. (2023). Psychological Exploration of the Influence of Exercise Motivation on university Students' Sports Participation Motivation. *Contemporary Sports Science and Technology* (20), 151-154+160.
- Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults' participation in physical activity: a review. *American journal of preventive medicine*, 22(3), 188-199.
- Johnston, L. D., Delva, J., & O'Malley, P. M. (2007). Sports participation and physical education in American secondary schools: current levels and racial/ethnic and socioeconomic disparities. *American journal of preventive medicine*, 33(4), S195-S208.
- Karabulut, U. S., Romero, Z., Conatser, P., & Karabulut, M. (2018). Assessing overweight/obesity, dietary habits, and physical activity in Hispanic university students. *Exercise Medicine*, 2.
- Karthikeyan, S. K., Ashwini, D. L., Priyanka, M., Nayak, A., & Biswas, S. (2022). Physical activity, time spent outdoors, and near work in relation to myopia prevalence, incidence, and progression: An overview of systematic reviews and meta-analyses. *Indian journal of ophthalmology*, 70(3), 728.
- Kim, Y., Park, J. Y., Kim, S. B., Jung, I. K., Lim, Y. S., & Kim, J. H. (2010). The effects of Internet addiction on the lifestyle and dietary behavior of Korean adolescents. *Nutrition research and practice*, 4(1), 51-57.
- Ku, P. W., Steptoe, A., Liao, Y., Hsueh, M. C., & Chen, L. J. (2018). A cut-off of daily sedentary time and all-cause mortality in adults: a meta-regression analysis involving more than 1 million participants. *BMC medicine*, 16(1), 1-9.
- Lei, Y.H., Li,W.f., Rong,S., Li, T.T., & Tan, T. (2020). Analysis of the current situation and influencing factors of takeaway food consumption among university students in Wuhan. *Chinese School Health* (04), 524-527.
- Li, C.L., & Zhu, H.J. (2020). A study on the relationship between university students' motivation, commitment, behavior and positive emotions in physical exercise. *Journal of Hubei Normal University (Philosophy and Social Science Edition)* (04), 94-97.
- Li, L, Xu, J.F., Lu, Y.L., & Feng, L.S. (2019). Research progress of outdoor activities and physical exercise in preventing and controlling myopia in children and adolescents. *China Sports Science and Technology* (04), 3-13.
- Li, L.S., & Ji L. (2016). Research Progress on the Effect of Physical Activity on Students' Academic Achievement. *Journal of Beijing Sport University* (09), 82-90.
- Lian, M.M.,& Li, R.Q. (2019). Research on Analyzing Causes and Countermeasures of Decline in Physical Fitness of university Students in China. *Contemporary Sports Science and Technology* (32), 116-117.
- Liang,D.Q. (1994). Stress level of college students and its relationship with physical exercise. *Chinese Journal of Mental Health*, 8(1), 5-6.
- Liang,P.A. (2020). An empirical study on the influence of social support on adolescent self-directed physical exercise motivation and exercise. *Journal of Guangzhou Institute of Physical Education* (03),33-37.
- Liu, M., Wu, L., & Yao, S. (2016). Dose-response association of screen time-based sedentary behavior in children and adolescents and depression: a meta-analysis of observational studies. *British journal of sports medicine*, 50(20), 1252-1258.
- Liu, T., Hao, L.L., & Liu, J. (2023). Mobile phone usage of university students and its impact on health. *Contemporary Sports Technology* (14), 177-181+186.
- Liu,Y.M.,Sun, Q.Z., & Sun,Y.X. (2001). A survey study on sports attitude and sports behavior of university students in China. *China Sports Science and Technology* (01).
- Lu, W.(2012). The formation of college students' exercise motivation and its influence on exercise behavior: prediction and intervention based on SDT. Doctoral Dissertation, Beijing Sport University.
- Lu, X.L., & Wang, K. (2019). Effects of extracurricular physical exercise on psychological capital mental health and social adaptability of university students. *Chinese School Health* (03), 392-395.
- McKenzie, T. L., & Kahan, D. (2008). Physical activity, public health, and elementary schools. *The Elementary School Journal*, 108(3), 171-180.
- Ollerenshaw, J. A., & Creswell, J. W. (2002). Narrative research: A comparison of two restorying data analysis approaches. *Qualitative inquiry*, 8(3), 329-347.



- Pan,X.G.,Chen, S.P.,Zhang,Z.J., & Cheng,C.F. (2010). Research on the exercise behavior of college students in sports organizations and its influencing factors. *Journal of Xi 'an Physical Education Institute* (03),_375-378.
- Peng, Y.C. (2015). Analysis of the influence of urban residents' environmental cognition on environmental behavior. *Journal of Central South University (Social Science Edition)*(03),_168-174.
- Ran, Q.H. (2011). An empirical study on the development of youth sports in Shanghai. *Journal of Tianjin Institute of Physical Education* (02),_122-127.
- Rezende, L. F. M. D., Azeredo, C. M., Silva, K. S., Claro, R. M., França-Junior, I., Peres, M. F. T., ... & Eluf-Neto, J. (2015). The role of school environment in physical activity among Brazilian adolescents. *PloS one*, 10(6), e0131342.
- Robertson-Wilson, J., Lévesque, L., & Holden, R. R. (2007). Development of a questionnaire assessing school physical activity environment. *Measurement in Physical Education and Exercise Science*, 11(2), 93-107.
- Ryan, R.M. & Deci, E.L. (2017). *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*; Guilford Press.
- Shen, M Y. (2011). *Intervention Strategies of Chinese Adults' Exercise Behavior: The Integration of the TPB with the HAPA*. Doctoral Dissertation,Beijing Sport University.
- Shen, X. (2023) *Analysis of college students' exercise behavior and its influencing factors under the cognitive decision theory of sports behavior*.Master's Dissertation, Xi 'an Institute of Physical Education.
- Singh, A., Uijtdewilligen, L., Twisk, J. W., Van Mechelen, W., & Chinapaw, M. J. (2012). Physical activity and performance at school: a systematic review of the literature including a methodological quality assessment. *Archives of pediatrics & adolescent medicine*, 166(1), 49-55.
- Sotos-Martinez, V. J., Tortosa-Martínez, J., Baena-Morales, S., & Ferriz-Valero, A. (2023). Boosting student's motivation through gamification in physical education. *Behavioral sciences*, 13(2), 165.
- Stanczykiewicz, B., Banik, A., Knoll, N., Keller, J., Hohl, D. H., Rosińczuk, J., & Luszczynska, A. (2019). Sedentary behaviors and anxiety among children, adolescents and adults: a systematic review and meta-analysis. *BMC Public Health*, 19(1), 1-22.
- Su, X.H., Li,B.G., & Tian, Y. (2017). Correlation factors of adolescent physical exercise behavior based on social ecological model. *Journal of Shenyang Institute of Physical Education* (04),_70-76.
- Taylor, I. M., Spray, C. M., & Pearson, N. (2014). The influence of the physical education environment on children's well-being and physical activity across the transition from primary to secondary school. *Journal of sport and exercise psychology*, 36(6), 574-583.
- Turner, R. C., & Carlson, L. (2003). Indexes of item-objective congruence for multidimensional items. *International journal of testing*, 3(2), 163-171.
- Wang, Y.R, (2023). Research on the influence of university sports environment on university students' sports behavior. *Sports Science and Technology* (02),_35-36+42.
- Wechsler, H., Devereaux, R. S., Davis, M., & Collins, J. (2000). Using the school environment to promote physical activity and healthy eating. *Preventive medicine*, 31(2), S121-S137.
- Wen, X.(2015). The impact of physical exercise on adolescents' cognitive ability and academic performance: the history, present and future of research. *Science in Sports and Sports* (03),_73-82.
- WHO. (2020). *WHO guidelines on physical activity and sedentary behavior*.
- Wu,M.L.(2010).*Questionnaire statistical analysis practice: operation and application of SPSS*. Chongqing University Press.
- Xiao, Q. (2015). Research on the influence of university sports environment on students' sports learning. *Journal of Chifeng university (Natural Science Edition)*(13),_197-198.
- Xie,L., Zhao,D.P., & Yan,J.H. (2009). A study on the relationship between attitudes and behaviors of physical exercise in adolescents. *Journal of Tianjin Institute of Physical Education* (01),_72-74.
- Yan J., Li Q., Zhang Z.K., Wang B.Y., & Zhu F.S. (2019). Effects of campus extracurricular physical activity on physical self-esteem and self-confidence of upper elementary school students. *Sports and Science* (02), 100-104.
- Yang, J.P. (2017). *Research on the relationship between family sports environment, exercise motivation and adolescent physical activity*. Doctoral Dissertation, Shanghai Institute of Sport.
- Yuan, F., Gong, W., Ding, C., Li, H., Feng, G., Ma, Y., ... & Liu, A. (2021). Association of physical activity and sitting time with overweight/obesity in Chinese occupational populations. *Obesity Facts*, 14(1), 141-147.



- Zeng, L.R. (2023). Motivation, Environment, and Needs: A study on the formation mechanism of College students' sports behavior in the environment of campus running APP. (eds.) Abstracts of the 13th National Sports Science Congress.
- Zhang, C.H., Zhang, J.C., Jin, Y.H., & Li, N.H. (2002). Research progress of exercise persistence in foreign countries. *Journal of Shanghai Institute of Physical Education* (04), 48-51+56.
- Zhang, L., & Li, J.Y. (2022). Analysis of Influencing Factors on Physical Activity Behavior of university Students. *Journal of Fujian Technical Teachers university* (05), 585-591.
- Zhang, W.J., Xu, M.L., Feng, Y.J., Mao, Z.X., & Yan, Z.Y. (2024). The effect of procrastination on physical exercise among college students—the chain effect of exercise commitment and action control. *International Journal of Mental Health Promotion*, 26(8), 611–622.
- Zhu, F.S., & Zhang, Z.K. (2016). The relationship between exercise motivation and exercise behavior characteristics of college students. *Chinese School Health* (06), 863-866.
- Zuo, M. (2023). A study on the impact of school physical education environment on youth sports participation. Master's dissertation, Southwest University.

Authors' and translators' details:

Zengyin Yan
Wannaporn Sumranpat Brady
Zengyin Yan

zyzy_sport@163.com
Wannaporn.su@msu.ac.th
zyzy_sport@163.com

Author
Author
Translator

