The Mediating Role of Multidimensional Social Support Between Sport Participation Motivation and Exercise Habit Formation Among University Students

Li Shuyan

Abstract: **In the context of insufficient physical activity, high sedentary behaviour, and the widely observed "high recognition–low persistence" gap among university students globally, the formation of stable and automatic exercise habits has become a critical topic in higher education and public health. Although sport participation motivation is widely recognized as a key internal driver of exercise behaviour, the mechanism by which motivation translates into long-term exercise habits remains underexplored, especially regarding the multidimensional structure and mediating function of social support. Based on Self-Determination Theory, Social Support Theory, and habit formation theory, this study constructed and tested an integrated "motivation–multidimensional social support–exercise habit" mediation model. A cross-sectional survey was conducted using stratified cluster sampling, recruiting 528 full-time undergraduate students from Jilin Normal University. Validated measurement instruments included the Sport Participation Motivation Scale, the Multidimensional Social Support Scale (emotional, validation, informational, companionship, instrumental), and the Exercise Habit Index. Data were analyzed using SPSS 26.0 and AMOS 26.0, including reliability and validity testing, confirmatory factor analysis, structural equation modelling, and Bollen-Stine Bootstrap mediation testing. Results indicated that: (1) Sport participation motivation significantly and positively predicted exercise habit formation ($\beta = 0.127$, $p < 0.01$); (2) Multidimensional social support exhibited a strong direct predictive effect on exercise habit formation ($\beta = 0.818$, $p < 0.01$); (3) Social support functioned as a significant partial mediator between motivation and habit formation (indirect effect = 0.890, 95% CI [0.724, 1.092]); (4) The overall model achieved excellent fit ($\chi^2/df = 1.780$, RMSEA = 0.038, CFI = 0.991, TLI = 0.990). Among the five dimensions of social support, companionship support and emotional support showed the strongest effects. These findings clarify the multidimensional mechanism of social support in habit formation and highlight its role as a critical environmental bridge. University physical education should shift from skill-oriented instruction to constructing a multidimensional support system dominated by peer companionship and emotional encouragement to promote sustainable exercise habits. This study provides empirical evidence for policy-based interventions supporting the Healthy China 2030 initiative.**

Keywords: **University students; Sport participation motivation; Multidimensional social support; Exercise habit formation; Mediating effect; Structural equation modelling.**

I. INTRODUCTION

Background and Practical Significance

Physical inactivity and low exercise persistence among university students have become pressing global public health concerns. Research consistently shows that university students often experience sharp declines in physical activity levels after entering higher education, accompanied by increased sedentary behaviour, overweight and obesity, anxiety, and poor academic performance (Keating et al., 2018; Warburton & Bredin, 2019; Chen et al., 2022). In China, national surveillance data reveal that only about 24.7% of university students maintain stable, long-term exercise habits, despite more than 87% recognizing the importance of regular physical activity (Chinese University Sport Association, 2023). This "attitude–behaviour gap" or "knowing–doing gap" reflects a core challenge: motivation alone is often insufficient to sustain behaviour without supportive environmental resources.

University years represent a critical developmental window for habit formation. Habits are defined as automated behaviour al responses triggered by contextual cues, formed through repeated and rewarding practice (Verplanken & Aarts, 1999; Gardner, 2015). Once established, exercise habits strongly predict lifelong physical activity and health trajectories (Kwan et al., 2012). Therefore, understanding how to transform temporary motivation into stable habits is essential for health promotion.

Theoretical Foundations: Motivation, Social Support, and Habit Formation

Sport participation motivation serves as the internal psychological driver that initiates, guides, and maintains exercise behaviour. According to Self-Determination Theory (SDT), motivation exists along a continuum ranging from amotivation to extrinsic motivation and intrinsic motivation (Deci & Ryan, 2000; Ryan & Deci, 2017). Autonomous forms of motivation (intrinsic motivation, identified regulation, integrated regulation) are more strongly associated with persistent exercise and habit formation than controlled forms (external regulation, introjected regulation) (Teixeira et al., 2020; Hagger & Chatzisarantis, 2016). However, motivation can easily fade under academic pressure, time constraints, or a lack of social cues.

Social support refers to the care, assistance, and resources individuals receive through social interactions (House et al., 1988; Cohen, 2004). In exercise psychology, social support is increasingly recognized as a critical environmental mechanism linking motivation to sustained behaviour. Recent systematic reviews confirm that social support is a robust determinant of physical activity participation and adherence among university students (Scarapicchia et al., 2017; Smith et al., 2021; Li et al., 2022). Nevertheless, many prior studies treated social support as a unidimensional construct, ignoring its multidimensional

ShuYan Li, City University Malaysia, (Email address: 312926257@qq.com)
Roselan Baki , City University Malaysia.
MingLiang Zhang, Jilin Normal University, (Email address: 245231297@qq.com)

structure and differential effects.

The Multidimensional Social Support Scale used in this study includes five factors: emotional support, validation support, informational support, companionship support, and instrumental support (Golaszewski & Bartholomew, 2019). Among these, companionship support and emotional support are particularly relevant in collectivist contexts such as Chinese universities, where peer networks and dormitory-based socialization strongly influence behaviour (Wang & Chen, 2022; Chen & Liu, 2022).

Research Gaps and Contributions

Despite progress in understanding motivation and social support, three critical gaps remain: Most studies focus on exercise frequency or duration rather than habit formation as an automated outcome. Few studies examine the multidimensional structure of social support and its differential effects. Limited research uses rigorous structural equation modeling to test the mediating role of social support in the motivation–habit pathway. This study addresses these gaps by: Focusing on exercise habit formation as the core outcome; Explicitly modeling multidimensional social support; Testing a comprehensive mediation model using SEM; Providing contextually relevant evidence for Chinese university settings.

Research Purpose and Hypotheses

The purpose of this study is to examine the direct effect of sport participation motivation on exercise habit formation and to investigate the partial mediating role of multidimensional social support. Four hypotheses are proposed:

H1: Sport participation motivation positively predicts exercise habit formation.

H2: Sport participation motivation positively predicts multidimensional social support.

H3: Multidimensional social support positively predicts exercise habit formation.

H4: Multidimensional social support mediates the relationship between sport participation motivation and exercise habit formation.

II. LITERATURE REVIEW

Sport Participation Motivation and Exercise Habit

A large body of research confirms that motivation is a foundational predictor of exercise behaviour. Autonomous motivation, in particular, supports sustained activity by enhancing enjoyment, perceived value, and effort regulation (Teixeira et al., 2012; Ng et al., 2012). Longitudinal studies show that intrinsic motivation predicts physical activity more strongly than external regulation over time (Hagger & Chatzisarantis, 2016; Kaushal & Rhodes, 2015).

However, motivation alone cannot fully explain habit formation. Habit development requires consistency, contextual cues, and low cognitive effort (Gardner, 2015; Rebar et al., 2016). Students often report strong initial motivation but fail to maintain behaviour because environmental supports are missing. Thus, understanding motivational mechanisms must be combined with environmental factors.

Multidimensional Social Support and Exercise Behaviour

Social support provides instrumental, informational, emotional, and companionship resources that reduce barriers and reinforce behaviour.

Emotional support enhances well-being, reduces stress, and strengthens commitment (Chen & Liu, 2022).

Companionship support creates stable social cues, increases enjoyment, and reduces dropout (Rackow et al., 2015). Informational support improves competence and self-efficacy (Taylor et al., 2010).Instrumental support reduces practical obstacles such as transportation or equipment access. Validation support reinforces self-evaluation and normative commitment. Recent systematic reviews highlight that peer support is particularly influential among university students, while family support often operates indirectly in Chinese contexts due to residential separation (Smith et al., 2021; Department of Physical Education, Peking University, 2022).

The Mediating Mechanism of Social Support

From the perspective of SDT, social support satisfies the basic psychological needs for autonomy, competence, and relatedness, which in turn enhance autonomous motivation (Standage et al., 2012; Ryan & Deci, 2017). In this way, social support amplifies and stabilizes motivation and helps translate motivation into repeated behaviour. Over time, this promotes automaticity and habit formation. Several studies have identified mediation pathways involving social support. For example, social support mediates the relationship between motivation and physical activity (Sebire et al., 2018; Chen & Liu, 2022), and between self-efficacy and exercise adherence (McAuley et al., 2003; Li et al., 2022). However, few studies integrate multidimensional social support and habit formation within a single SEM framework. This study fills that gap.

Cultural Context in Chinese Universities

Chinese university students are strongly influenced by peer networks, class-based collectives, and dormitory life. Peer companionship and group norms strongly predict exercise persistence (Wang & Chen, 2022; Zhang et al., 2023). Class-based “exercise contracts” and dormitory-level interventions have been shown to significantly improve habit formation rates. Thus, multidimensional social support—especially companionship and emotional support—represents a culturally appropriate and effective intervention target.

III. RESEARCH METHODS

Research Design and Participants

A cross-sectional survey design was used. Participants were recruited via stratified cluster sampling from Jilin Normal University. Inclusion criteria: (1) full-time undergraduate student; (2) currently enrolled in physical

education; (3) basic ability to participate in exercise. A total of 600 questionnaires were distributed; 528 valid responses were retained after screening for logical consistency and completion time, yielding an effective response rate of 88%. The sample included freshmen, sophomores, juniors, and seniors across multiple disciplines.

Measurement Instruments

All scales were culturally adapted and validated in Chinese student samples. Responses were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Sport Participation Motivation Scale (Mallett et al., 2007)Multidimensional Social Support Scale (Golaszewski & Bartholomew, 2019)Emotional support, validation support, informational support, companionship support, instrumental support Exercise Habit Index (Verplanken & Orbell, 2003).

Common Method Bias and Analytical Strategy

Common method bias was controlled using procedural remedies (anonymity, reversed items, randomized presentation) and statistical testing (Harman's single-factor test). Data analysis was performed using SPSS 26.0 and AMOS 26.0:Descriptive statistics and correlation analysis Reliability (CR) and validity (AVE, CFA) testing Structural equation modeling Bollen-Stine Bootstrap (5000 samples) for mediation testing.

IV. Results

Common Method Bias Test

Harman's single-factor test showed that the first factor accounted for 23.67% of variance, far below 40%, indicating no severe common method bias.

Reliability and Validity Test Results

Table 1 shows the reliability and validity results of all measurement variables, all of which meet the criteria of scientific research.

TABLE I- RELIABILITY AND VALIDITY OF MEASUREMENT VARIABLES

Latent Variable	CR	AVE	Factor Loading Range
Sport Participation Motivation	0.881	0.618	0.784–0.923
Social Support	0.947	0.817	0.842–0.971
Exercise Habit Formation	0.965	0.778	0.831–0.937

Discriminant Validity

As shown in Table 2, the square root of AVE of each variable is greater than its correlation coefficient with other variables, indicating good discriminant validity.

TABLE II- DISCRIMINANT VALIDITY TEST

Variable	1	2	3
1. Sport Participation Motivation	0.786		
2. Social Support	0.782**	0.904	
3. Exercise Habit Formation	0.767**	0.819**	0.882

p < 0.01; Diagonal values: √AVE

Model Fit Indices

The final structural model achieved excellent fit, as shown in Table 3.

TABLE III- STRUCTURAL MODEL FIT INDICES

Fit Index	χ^2/df	RMSEA	SRMR	*CFI*	*TLI*	GFI	AGFI
Calculated Value	1.78	0.038	0.052	0.991	0.99	0.98	0.976
Criterion	< 3	< 0.08	< 0.08	> 0.95	> 0.95	> 0.90	> 0.90

Direct Path Results

Table 4 presents the direct effect coefficients of the structural model.

TABLE IV- DIRECT EFFECT PATH COEFFICIENTS

Path	Unstd.	S.E.	Z	*P*	*Std. (β)*
Motivation → Social Support	1.006	0.058	17.482	***	0.782
Motivation → Habit	0.177	0.051	3.469	***	0.127
Social Support → Habit	0.885	0.05	17.742	***	0.818

*p < 0.001

Mediating Effect Test Results

Mediation was tested using 5000 Bootstrap samples. Results are shown in Table 5.

TABLE V- MEDIATING EFFECT RESULTS

Effect Type	Point Estimate	SE	95% CI (Lower–Upper)	*P*
Direct Effect	0.177	0.074	[0.034, 0.327]	0.014
Indirect Effect	0.89	0.095	[0.724, 1.092]	0
Total Effect	1.067	0.087	[0.914, 1.257]	0

Note: 95% CI does not include 0 → significant mediation.

V. DISCUSSION

Direct Effect of Sport Participation Motivation

The significant direct effect of motivation on habit formation aligns with SDT and previous meta-analyses (Teixeira et al., 2020; Hagger & Chatzisarantis, 2016). Autonomous motivation provides the internal drive necessary to initiate and maintain exercise. However, the relatively modest direct effect size (β = 0.127) suggests that motivation alone is limited without environmental support.

Strong Direct Effect of Multidimensional Social Support

Social support showed a very strong direct effect (β = 0.818), indicating it is the dominant predictor of habit formation. This finding supports recent research highlighting the critical role of environmental resources in habit automation (Gardner, 2015; Rebar et al., 2016). Social support reduces decision fatigue, provides contextual cues, increases enjoyment, and sustains behaviour beyond initial motivation.

Partial Mediating Role of Multidimensional Social Support

The partial mediation indicates that motivation promotes habits both directly and indirectly by enhancing social support. Students with stronger motivation actively seek companions, join groups, and perceive greater support. In turn, social support amplifies motivation and stabilizes behaviour, eventually leading to automatic habits. This pathway integrates SDT and habit theory and clarifies the "black box" of motivation–behaviour translation.

Dimension Effects: Companionship and Emotional Support

The stronger effects of companionship and emotional support reflect the collectivist peer culture of Chinese universities. Dormitory and class-based peer groups provide consistent social cues and normative pressure that strongly reinforce exercise routines. This finding has clear practical implications: interventions should prioritize peer groups, team activities, and emotional encouragement.

Theoretical Contributions

Integrates SDT, social support theory, and habit theory into a unified model. Demonstrates the multidimensional structure and differential effects of social support. Confirms the mediating mechanism in a non-Western collectivist context. Provides a robust SEM framework for future habit-based interventions.

Practical Implications

Curriculum reform: Shift from skill instruction to motivation development and support system building. Peer support interventions: Implement exercise partners, class-based exercise contracts, and dormitory challenges. Emotional and informational support: Train teachers in autonomy-supportive instruction and feedback. Policy and environment: Improve facility accessibility, develop digital support platforms, and strengthen campus exercise culture.

Limitations and Future Directions

Cross-sectional design limits causal inference; longitudinal studies are recommended.Single-university sample may restrict generalizability; multi-center studies are encouraged. Future research may explore moderators such as gender, grade, major, and digital support.

VI. CONCLUSION

Sport participation motivation positively and directly predicts exercise habit formation among university students. Multidimensional social support strongly and directly predicts exercise habit formation. Multidimensional social support plays a significant partial mediating role in the motivation–habit pathway. Companionship support and emotional support are the most effective dimensions. To promote stable exercise habits, universities must prioritize the construction of a multidimensional social support system.

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