Original Article

Structural Relationships among Self-Management, Self-Resilience, and Adaptability to Chinese and Korean College Life in Physical Education Majors

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Abstract

Background: We aimed to investigate the relationships among self-management, self-resilience, and adaptability to college life in Chinese and Korean students majoring in physical education. In addition, we explored the mediating role of self-resilience in the relationship between self-management and adaptability to college life.

Methods: Random sampling was used to identify participants majoring in physical education at five colleges and universities in Shaanxi (China) and four universities in Kyonggi-do Province (Republic of Korea) in June 2020. We analyzed data for 700 students via exploratory factor analysis, confirmatory factor analysis, correlation analysis, structural equation model analysis, and path analysis.

Results: Self-management had a significant impact on self-resilience ($P<0.001$), while self-resilience had a significant impact on adaptability to college life ($P<0.001$). Among self-management variables, body management had a significant negative impact on adaptability to college life ($P<0.001$). Self-resilience had a mediating effect on the relationship between self-management and adaptability to college life ($P=0.024$).

Conclusion: Our findings highlight the need to develop systems that cultivate students' abilities to integrate into university life, including their abilities to face unsatisfactory studies, manage spare time, make physical adjustments, adapt to new living environments, and maintain interpersonal relationships. Strengthening self-management abilities will lead to improvements in self-resilience, adaptability, and satisfaction with university life among physical education majors.

Keywords: Adaptation to college life; Physical education; Self-management; Self-resilience

Introduction

University life represents a transitional stage in which college students prepare to enter society. During this stage, there is a focus on cultivating specialized talents according to social, economic, political, and cultural development needs and the requirements of various professions and majors.

As such, adaptability to college life significantly affects a student's future development in society (1).

Five major changes occur when students enter university life (2,3). First, students are faced with changes in their living environments and lifestyle,

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making it necessary to adapt to the different personal living habits of students from different regions. Second, they are faced with changes in their academic environment and study habits. Rather than simply learning basic scientific and cultural information using a theoretical approach, students must gain professional knowledge, master professional skills, and develop an understanding of ongoing research in their area of study. Self-study and practical training play a more important role in learning than classroom teaching. Third, students must handle changes in interpersonal relationships. Fourth, the transition to college life is associated with changes in management methods; student-oriented management, with more emphasis on self-management, self-education, and self-discipline, replaces direct management by teachers. Fifth, they are faced with changes in their social activities due to the abundance of student unions and clubs on college campuses. Thus, college students must learn to digest various types of new information and situations in their changing environment. Moreover, as an important group in society, college students should be equipped to manage life, study habits, and various social activities (4-5).

Self-management refers to the ability to manage one's own goals, thoughts, psychological states, and behavior. Self-management strategies focus on the use of an individual's inner strengths to change behavior, with an emphasis on self-discipline (6). In daily life, self-management strategies are utilized to achieve goals, manage time and health, develop physical strength, adjust living habits, exercise patience, and plan future actions (7). After entering college, students exhibit diverse patterns of development in learning motivation and effects. A high degree of self-management ability is associated with a high sense of self-confidence and a positive attitude. Contrarily, individuals with poor self-management ability are likely to experience uneasiness and negative mood (8), severely impacting school life and mental health.

Self-resilience involves flexibility and the use of diverse monitoring strategies to adapt to the demands of a given situation. Individuals with high self-resilience were significantly better at resisting stress than those with low self-resilience (9). Resilience refers to an individual's ability to successfully cope and adapt to difficulties or adversities (10). Individuals with high mental elasticity perceive less psychological distress and exhibit better mental health than individuals with low mental elasticity (11). Individuals with high psychological flexibility experience more positive emotions when facing pressure (12). In another study, individuals with high psychological resilience use various social support resources to improve their coping abilities and reduce stress and psychological pain (13). Increasing the experience of positive emotions and improving mental flexibility could help improve mental health (14). By comparison, self-resilience emphasizes dynamic adjustment in daily life, while resilience emphasizes the process of adaptation in the face of adversity. While both require active regulation and control of the self, self-resilience emphasizes the dynamic process of self-monitoring.

Adaptation refers to the process of assimilation and behavior change (15). For college students, adaptability directly affects their study habits, life, and future employment (16). Adaptation refers to "behavior and ability to cope with environmental pressure," (17), while adaptation represents "a harmonious relationship between individual psychological needs and environmental maintenance" (18). In contrast, Lakoff (19) defines adaptation as "the interaction between the individual and the environment." Adaptation to school life is a process in which students actively participate in school curricula, interact with others based on harmonious and satisfactory relationships with teachers and friends, and abide by school regulations.

After entering college, students are away from their parents, and may not know how to manage their spare time, budget for living expenses, adjust their physical activity levels, and handle new interpersonal relationships. Furthermore, low levels of stress resistance may affect university life in students not experienced setbacks and tribulations. Physical education students are also affected by various personal/internal, external,

and environmental factors during competitions. For example, self-management ability can directly or indirectly affect sleep quality, in turn affecting competition outcomes. Therefore, strict self-management is necessary for athletes to achieve satisfactory results (20). Indeed, student athletes at universities, with good self-management skills are more satisfied with sports or life and are likely to achieve better performance during training or competition (21).

To date, few studies have focused on self-management, self-resilience, and adaptability among college students majoring in physical education. Therefore, the present study aimed to investigate the relationship among self-management, self-resilience, and adaptability to college life in Chinese and Korean students majoring in physical education. Additionally, we explored the mediating role of self-resilience in the relationship between self-management and adaptability to college life.

Our hypotheses were as follows (Fig. 1): H1: Self-management ability exerts a significant impact on self-resilience; H2: Self-resilience exerts a significant impact on adaptability to college life; H3: Self-management exerts a significant impact on adaptability to college life; H4: Self-resilience exerts a mediating effect on the relationship between self-management and adaptability to college life.
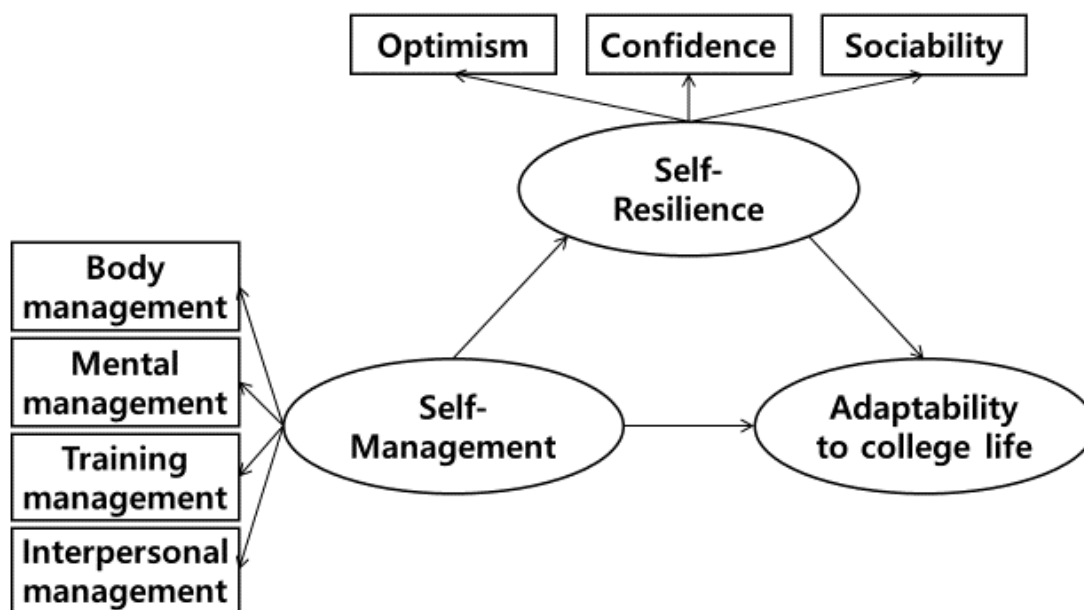

Fig. 1: Research Model

Methods

Participants

We adopted a random sampling method to identify participants majoring in physical education at five colleges and universities in Shaanxi (China) and four universities in Kyonggi-do Province (Republic of Korea) in Jun 2020. Overall, 700 students were assessed for eligibility, and data for 620 eligible students were stratified according to gender, grade, participation in sports, frequency of participation, and exercise duration (Table 1).

All study participants provided informed consent, and the study design was approved by Kyonggi University, Kyonggi-do, Republic of Korea.

Table 1: General participant characteristics

Variables		n	%
Nationality	China	352	56.8
	Korea	268	43.2
Gender	Male	442	71.3
	Female	178	28.7
Grade	Freshman	58	9.4
	Sophomore	234	37.7
	Junior	168	27.1
	Senior	160	25.8
Participation	Yes	584	94.2
	No	36	5.8
Exercise frequency (weekly)	0 times	36	5.8
	1-2 times	104	16.8
	3-4 times	255	41.1
	5 times	225	36.3
Exercise duration	None	36	5.8
	<1 hour	62	10.0
	1-2 h	327	52.7
	2-3 h	161	26.0
	>3 h	34	5.5
Total		620	100

Assessment tools

All responses were rated using a 5-point Likert scale, with 1–5 representing "strongly disagree" to "strongly agree," respectively. Reliability and validity were tested using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The aggregate validity index of the average variance extracted (AVE) and construct reliability (CR) were assessed based on the criteria (AVE >0.50, CR >0.70) (22-23). Reliability was determined using Cronbach's α (Table 2) which was above 0.70 for each variable in the questionnaire, indicating that the internal factors of the latent variable had high consistency and good reliability. In addition, the model's AVE and CR were both higher than 0.50 and 0.80, respectively, indicating good aggregation validity.

Self-management

We used a modified version of the Athletes' Self-Management Questionnaire developed by Huh (24), which includes 13 questions across four are-

as related to self-management. Cronbach's α for the following questions was as follows: 0.797 for body management (n=3); 0.877 for mental management (n=4); 0.855 for training management (n=3); and 0.785 for interpersonal relationship management (n=3).

Self-Resilience

Self-resilience was measured using an improved version of the Self-resilience questionnaire developed (25). Three aspects of self-resilience were assessed using nine questions (three each). Cronbach's α values for optimism, confidence, and sociality were 0.846, 0.860, and 0.806, respectively.

Adaptation to college life

The College Life Adaptability Measurement Questionnaire is based on the modified Student Adaptation to College Questionnaire (SACQ) (26). The SACQ consists of nine questions, with a Cronbach's α of 0.899.

Table 2: Reliability and validity test results

Variable		Item	Estimate	Squared multiple correlation	Standardized residuals	Construct reliability	Average variance extracted	Cronbach's α
Self-management	Body management	1	0.650	0.423	0.577	0.803	0.579	0.797
		2	0.790	0.624	0.376			
		3	0.830	0.689	0.311			
	Mental management	5	0.750	0.560	0.440	0.880	0.647	0.877
		6	0.810	0.659	0.341			
		7	0.830	0.689	0.311			
		8	0.820	0.679	0.321			
	Training management	9	0.704	0.496	0.504	0.795	0.565	0.785
		10	0.801	0.642	0.358			
		11	0.747	0.558	0.442			
	Interpersonal management	13	0.832	0.692	0.308	0.854	0.662	0.855
		14	0.776	0.602	0.398			
		15	0.832	0.692	0.308			
Self-resilience	Optimism	1	0.822	0.676	0.324	0.850	0.655	0.846
		2	0.757	0.573	0.427			
		3	0.846	0.716	0.284			
	Confidence	4	0.800	0.640	0.360	0.866	0.683	0.860
		5	0.883	0.780	0.220			
		6	0.793	0.629	0.371			
	Sociability	7	0.681	0.464	0.536	0.813	0.594	0.806
		8	0.779	0.607	0.393			
		9	0.843	0.711	0.289			
Adaptability to college life		2	0.735	0.540	0.460	0.900	0.502	0.899
		4	0.563	0.317	0.683			
		5	0.733	0.537	0.463			
		6	0.711	0.506	0.494			
		8	0.653	0.426	0.574			
		10	0.689	0.475	0.525			
		11	0.760	0.578	0.422			
		12	0.807	0.651	0.349			
		14	0.701	0.491	0.509			

Root mean square error of approximation=0.052, Tucker–Lewis index=0.926, Comparative fit index=0.936, χ^2=1089.259 (P<0.001), df=406, χ^2/df=2.683

Statistical analysis

We used SPSS and Amos Version 25.0 (IBM Corp., Armonk, NY, USA) for data processing and statistical analysis. Data analysis methods included EFA and CFA, correlation analysis, structural equation model (SEM) analysis, and path analysis. Analyses were performed after verifying the fit of the hypothesis model to the structural relationship of each variable. Statistical significance was set at P<0.05.

Results

Correlations among self-management, self-resilience, and adaptability to college life

The results of the correlation analysis among self-management, self-resilience, and adaptability to college life are shown in Table 3. Self-

management and self-resilience were significantly positively correlated (r=0.295–0.629, *P*<0.001), suggesting that students with better self-management ability are likely to be more optimistic, confident, and social during college life. Except for body management, all self-management variables exhibited a significant positive correlation with adaptability to college life (r=0.198–0.281, *P*<0.001). Self-resilience was also positively correlated with adaptability to college life (r=0.146–0.681, *P*<0.001), suggesting that higher levels of confidence and optimism are associated with better adaptability. All correlations were less than 0.85, meeting the criteria reported by Kline (27).

Table 3: Correlations among self-management, self-resilience, and adaptability to college life

Variable	Body manage-ment	Mental manage-ment	Training manage-ment	Interper-sonal manage-ment	Opti-mism	Confi-dence	Socia-bility	Adapta-bility to college life
Body management	1.000							
Mental management	0.468**	1.000						
Training management	0.295**	0.521**	1.000					
Interpersonal management	0.582**	0.484**	0.311**	1.000				
Optimism	0.459**	0.629**	0.488**	0.479**	1.000			
Confidence	0.484**	0.610**	0.494**	0.533**	0.681**	1.000		
Sociability	0.404**	0.527**	0.430**	0.398**	0.504**	0.525**	1.000	
Adaptability to college life	0.057	0.281**	0.261**	0.198**	0.331**	0.267**	0.146	1.000

**P<0.01; tested via correlation analysis

Suitability of the research model

We established an SEM to explore the relationships among self-management, self-resilience, and adaptability to college life. The results indicated a good fit: χ^2=185.085, goodness-of-fit index (GFI)=0.939, normed fit index (NFI)=0.943, Tucker–Lewis index (TLI)=0.913, comparative fit index (CFI)=0.913, root mean square residual (RMR)=0.032, root mean square error of approximation (RMSEA)=0.068 (Table 4). Each fitting index was within a reasonable range and met the appropriate test standard. These results reflect a high degree of fitting between the theoretical model and survey data.

Table 4: Suitability of the research model

	χ^2	df	GFI	NFI	TLI	CFI	RMR	RMSEA
Model fit	185.085	48	0.939	0.943	0.913	0.942	0.032	0.068

GFI, goodness-of-fit-index; NFI, normed fit index; TLI, Tucker–Lewis index; CFI, comparative fit index; RMR, root mean square residual; RMSEA, root mean square error of approximation
Model fit cutoff values: RMSEA <0.100, TLI ≥0.900, CFI ≥0.900

Hypothesis verification
We analyzed path relationships among self-management, self-resilience, and adaptability to college life (Table 5). The mental, training and interpersonal relationship components of self-management exerted positive effects on both the optimism (β=0.443, 0.254, and 0.177, respectively) and confidence (β=0.359, 0.256, and 0.254, re-spectively) components of self-resilience. Body, mental, and training management (β=0.132. 0.367 and 0.224, respectively) positively affected self-resilience in terms of sociability. Optimism (β=0.307) and sociability (β=0.173) positively influenced adaptability to college life. Body man-agement (β=0.279) also negatively affected adaptability to college life.

Table 5: Path relationships among self-management, self-resilience, and adaptability to college life

Hypothe-ses	Path			β	Standard error	Critical ratio	Assessment
1-1-1	Body management	→	Optimism	0.073	0.040	1.255	Reject
1-1-2	Mental management	→	Optimism	0.443	0.053	7.991***	Accept
1-1-3	Training management	→	Optimism	0.254	0.071	5.175***	Accept
1-1-4	Interpersonal management	→	Optimism	0.177	0.047	3.055**	Accept
1-2-1	Body management	→	Confidence	0.109	0.040	1.952	Reject
1-2-2	Mental management	→	Confidence	0.359	0.052	6.787***	Accept
1-2-3	Training management	→	Confidence	0.256	0.071	5.387***	Accept
1-2-4	Interpersonal management	→	Confidence	0.254	0.047	4.494***	Accept
1-3-1	Body management	→	Sociability	0.132	0.059	2.013*	Accept
1-3-2	Mental management	→	Sociability	0.367	0.075	6.005***	Accept
1-3-3	Training management	→	Sociability	0.224	0.102	4.091***	Accept
1-3-4	Interpersonal management	→	Sociability	0.109	0.068	1.662	Reject
2-1	Optimism	→	ACL	0.307	0.080	3.569***	Accept
2-2	Confidence	→	ACL	0.013	0.074	0.162	Reject
2-3	Sociability	→	ACL	0.173	0.049	2.517*	Accept
3-1	Body management	→	ACL	-0.279	0.052	-3.484***	Accept
3-2	Mental management	→	ACL	0.157	0.081	1.708	Reject
3-3	Training management	→	ACL	-0.058	0.099	-0.782	Reject
3-4	Interpersonal management	→	ACL	0.118	0.061	1.444	Reject

ACL, Adaptability to college life
***$P<0.001$, **$P<0.01$, *$P<0.05$; tested via path analysis

Mediating effect of self-resilience on the rela-tionship between self-management and adaptability to college life
We examined the mediating effect of self-resilience on the relationship between self-management and adaptability to college life using a bootstrapping method with a confidence inter-val of 95% (Table 6). The lower and upper limits of the confidence interval for the indirect effects of self-management on adaptability to college life

did not include zero, indicating a significant mediating effect. This finding suggests that self-management not only directly affects adaptability but also indirectly affects it by influencing self-resilience.

Table 6: Direct, indirect, and total effects

Path of influence	Direct effect	Indirect effect	Total effect
Self-management → Self-resilience	0.968**	-	0.968
Self-resilience → Adaptability to college life	0.427**	-	0.427
Self-management → Adaptability to college life	-0.307	0.413	0.106
		Lower Upper	
		-1.207 7.426	

**P<0.01; tested by Bootstrap method

Discussion

This study aimed to clarify the relationships among self-management, self-resilience, and adaptability to college life, and to verify the mediating effect of self-resilience on the relationship between self-management and adaptability. The mental, training and interpersonal relationship aspects of self-management had significant positive effects on optimism and confidence, suggesting that students with stronger self-management abilities are more confident and optimistic. These results are consistent with those of previous studies reporting a positive effect of self-management on confidence and satisfaction in various sports (21,28-33). Stronger self-management ability (especially mental management ability) was associated with better concentration in athletes, which can increase self-confidence and improve athletic ability and life satisfaction (29).

The ability to connect with others and make friends is necessary for college students to establish a wide range of relationships. According to Hypotheses 1-3, the body, mental and training management aspects of self-management had positive effects on sociability. We also observed that the optimism and sociability aspects of self-resilience had a significant positive impact on adaptability to college life. This result is consistent with previous claims that students with an optimistic attitude will actively face college life and courses, get along well with classmates and

teachers, and abide by the college's rules (34). Our findings are also consistent with those of Kim (35), who reported that higher levels of optimism were associated with greater adaptability to academic life, fewer psychological difficulties, and higher satisfaction with employment and school life. There was a stable positive relationship between psychological resilience and school adaptation, indicating that students with better psychological resilience exhibited better adaptability (1).

In the present study, mental, training, and interpersonal relationship management had no significant impact on adaptability (H3). This result is partially inconsistent with the results of other studies. Self-management had a positive impact on adaptability to college life among South Korean students (36). Training and mental management exert a significant impact on satisfaction with university life among athletes (37), while only training management influenced life satisfaction (38). There is a causal relationship between the personality characteristics of college students, self-management, and adaptation to university life (39). That is, differences in personality characteristics and self-management exert a great influence on an individual's adaptability. More easy-going students are likely to exhibit better adaptability. Our results may be explained by the inexperience with body management strategies among college students, their diverse personality characteristics, and the fact that professional athletes often expe-

rience accidental injuries that can hinder their lives. These findings highlight the need to develop systems that emphasize physical, training, and mental management abilities to improve self-management capabilities among university students (40).

In this study, self-resilience had a mediating effect on the relationship between self-management and adaptability to college life. Han (29) argued: "If self-confidence is affected by self-management, it will indirectly affect the satisfaction they get from sports." These results are partially consistent with the results of the present study. High self-resilience can help students cope with and relieve learning pressure, actively seek solutions to problems, and aid them in formulating effective learning goals (41). The protective effect of good psychological flexibility was highlighted against the development of an inferiority complex, which can influence adaptability to college life (1).

This study has some limitations. It was conducted exclusively in Chinese and Korean. We did not consider cultural differences and characteristics between countries. Furthermore, various psychological counterpart effects were not verified because the study was conducted using only three variables: self-management, self-resilience, and adaptability. Therefore, caution is required in interpreting and utilizing research results. Moreover, since the participants were recruited in only one province in China and Korea, respectively, they did not accurately represent the entire population in China and Korea. Therefore, in future, well-designed studies are necessary. Nevertheless, this study investigated the relationships among self-management, self-resilience, and adaptability between Chinese and Korean students.

Conclusion

Our findings demonstrated the significant impact of self-management on self-resilience among college students majoring in physical education in China and Korea. The mental, training, and interpersonal relationship management aspects of self-management were positively associated with

the optimism and confidence aspects of self-resilience. Additionally, body management had a significant positive effect on sociability. Self-resilience (optimism, sociability) and body management had a significant positive and negative influence on adaptability to university life, respectively. Lastly, we observed a mediating effect of self-resilience on the relationship between self-management and adaptability to college life.

College students majoring in physical education must face the combined pressure of studying sports theory, completing multiple practical/technical courses, and preparing for future employment. In addition, college students majoring in physical education are affected by various internal and external factors during competitions. Ultimately, these pressures highlight the need to promote actively integration into university life by cultivating the ability to face unsatisfactory studies, manage spare time, make physical adjustments, adapt to new living environments, and maintain interpersonal relationships among students. Strategies designed to strengthen self-management ability will help improve self-resilience (optimism, confidence) among college students, thereby improving their ability to adapt to and enjoy college life.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interest.

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