

The Mediating Effects of Hope between Participation in School Physical Education, Academic Stress, Ego-Resilience and Psychological Well-being in High School Students

Kyung Wha Back*

Department of Security and Secretarial Service, Hanseo University, Korea; Khpaek@hanseo.ac.kr

Abstract

The objective of this study is to identify the mediating effects of hope between high school students' participation in school physical education and their physical self-concept to provide basic data for the development of school physical education programs. First, school physical education participation level showed a positive correlation with Ego-resilience and psychological well-being, but a negative correlation with academic stress. Second, the school physical education participation of the students exceeded the median value and academic stress fell a little short of the average, which was the median value of 3 points. Ego-resilience and psychological well-being was higher than the average, which were the median values. Third, the mediating effects of hope were identified in the relationship between school physical education participation and academic stress in the students. Partial mediating effects of hope were identified in the relationships between school physical education participation, Ego-resilience and psychological well-being.

Keywords: Academic Stress, Ego-Resilience, Hope, High School Student, Psychological Wellbeing, School Physical Education

1. Introduction

Physical education is known to enhance desirable learning activities via sound development of mind and body¹. It develops physical strength as well as exercise performance, helps in understanding oneself and society, and nurtures desirable personality and social attributes². The primary goal of physical education is to build a desirable character by experiencing overall physical activities and internalizing their values³. However, students severely lack physical activities due to excessive learning focused on the entrance examination⁴, which may be associated with abnormal development of emotions⁵.

Research concerning the effects of regular physical activities on growing youth is actively conducted in a concerted effort to solve these problems. According to the

research results of Sung and Kang⁶ and Ha, Cho, and So⁷, regular physical activity positively affects not just physical and social health but also mental health in youth. These activities also have a positive effect on class satisfaction⁸. Especially, Lee⁹ asserted that it is important for students to make continuous efforts and to adopt a positive attitude toward sports and exercise by participating in physical education. Students should increase their participation in physical activities by imprinting the value of physical education. Physical education can facilitate physical and mental development as well as changes in human behavior to become more desirable¹. It is also a valuable tool for students to adopt a social norm and role¹⁰.

According to the National Statistical Office¹¹, academic stress has been the highest stress factor for youth in the past several years and appears to be closely related

*Author for correspondence

with aggression in students¹². In studies regarding academic stress, sports activity was found to reduce stress¹³ and was strongly associated with students' levels of satisfaction with physical education¹⁴. Jung¹⁵ also demonstrated that participation in sports activities positively affected academic stress in students. Besides academic stress, students face a variety of environmental stresses that can be overcome by improved individual abilities¹⁶. In this regard, an important psychological factor is ego resiliency.

Ego resiliency refers to tolerance to pressure and impulse control depending on the environment¹⁷ and has been reported to be closely related to mental health¹⁸. In addition, ego resiliency positively affects happiness at school^{3,19} and increases with physical activity^{19,20}. Sports activities at school also increase the ego resiliency of students^{21,22}. It has been reported that students with high ego resiliency maintain smooth relationships with other people, which appeared to be related with their well-roundedness in all areas²³. Psychological wellbeing is the concept of a happy and satisfactory life coupled with

self-realization and interpersonal relations, a factor determining whether a person gets along as an individual or a member of society²⁴. Individuals with high psychological wellbeing have good relationships with other people as well as high self-control abilities²⁶. Sports activity increases psychological wellbeing²⁷ and participation in physical activity also plays an important role in psychological wellbeing²⁸. Especially, Kim²⁹ showed that ego resiliency can positively influence psychological wellbeing while Wang³⁰ demonstrated that a high level of participation in physical activity increases ego resiliency, resulting in better psychological wellbeing. It has been reported that individuals with deep ego resiliency have a warm, satisfactory, and trusting relationship with others, are open to novel experiences while growing up and clearly recognize the purpose and direction of their lives. As shown in previous research results^{31,32} demonstrating that continuous exercise improves ego resiliency and psychological wellbeing, ego resiliency is an antecedent variable to and an important factor for psychological wellbeing.

Table 1. General characteristics of subjects

Classification		Frequency	%
Gender	Male	307	39.9
	Female	462	60.1
	Total	780	100.0
Age (mean = 16.23)	14	2	0.3
	15	106	13.9
	16	398	52.1
	17	231	30.2
	18	27	3.5
	Total	764	100.0
Grade	1	188	24.4
	2	578	75.2
	3	3	0.4
	Total	769	100.0
Level of academic records	Low	182	23.7
	Medium	461	60.0
	High	125	16.3
	Total	768	100.0

Recently, many researchers have begun directing their attentions to hope, a positive psychological factor. Hope is conceptualized as a “cognitive construct which reflects people's motivations and capacity to strive toward personally-relevant goals”³³ and increases positive emotions and wellbeing³⁴. The components of hope are: 1) goals: approaching life in a goal-oriented manner; 2) pathway: finding workable routes to reach the goal; 3) agency: belief in initiating and sustaining movement along pathways toward desired goals³³.

Hopeful thinking improves students' abilities to find a variety of ways to achieve desirable academic goals and to focus on achieving their goals. An athlete under stress with high hopes performs better than one with less hope. In addition, it was reported that hope controls psychological distress caused by stress at a low level and alleviates physical symptoms from individual stress³⁵. According to Kim³⁶, hope has a positive relationship with psychological wellbeing in high school and undergraduate students. The research results also demonstrated that students with a high level of hope have a more positive perception of their private experiences and social support, and select an active mechanism for coping rather than an avoidance mechanism.

As described above, participation in physical education at school may have a positive effect on academic stress, ego resiliency and psychological wellbeing, and the mediating effect of hope in the relationship between these factors may help to foster the emotions of young students.

2. Method

2.1 Study Subjects and Data Collection Methods

C-Do was selected as the data collection area for the sake of convenience and 3 high schools that provide kendo as physical education were chosen. A total of 780 students, including 370 students at S high school, 296 students at Y1 high school and 114 students at Y2 high school, were randomly selected and used for the final study.

General characteristics of the study subjects are shown in Table 1. The gender distribution was 39.9% male and 60.1% female, the subjects were 14 to 18 years old, with an average age of 16.23 years old. Second grade students comprised 75.2% and first grade students comprised 24.4%. A high percentage of students (60.0%) reported

their grades as fair, 23.7% reported their grades as poor and 16.3% reported their grades as good.

2.2 Instruments

2.2.1 Attitudes toward School Physical Education

Evaluation of school physical education was measured using a Likert 5 scale with 1 point corresponding to “strongly disagree” and 5 points to “strongly agree”. Higher scores indicated better attitudes.

2.2.2 Academic Stress

For academic stress, scales that were amended and complemented with academic stress questionnaires developed by Oh³⁸ were used. A total of 31 questions with subcategories related to reasons for academic stress were composed of 7 questions about grades, 7 questions about career path, 7 questions about relationships with teachers and 10 questions about relationships with friends. Scores were measured with 5 point Likert scales, with 5 points for “strongly disagree” and 1 point for “strongly agree”. Reliability of the academic stress questionnaire was Cronbach's $\alpha = 0.901$.

2.2.3 Ego-Resilience

The Ego-Resilience Scale (ERS) developed by Block and Kremen³⁹, adapted by Park¹⁶ and subsequently reorganized by Kim⁴⁰ was used. The ego-resilience scale is composed of 15 total questions including 3 questions on interpersonal relations, 5 questions on vitality, 4 questions on curiosity, and 4 questions on optimism. The Likert scale uses 1 point for “strongly disagree” and 5 points for “strongly agree”. Higher points indicate higher Ego-resilience.

2.2.4 Psychological Well-Being

The scale for psychological well-being developed by Ryff²⁵, adapted into a Korean version by Kim et al.⁴¹ then subsequently amended and complemented by Kim⁴² was used. The scale for psychological well-being is composed of 28 total questions including 6 questions on self-demand, 5 questions on positive interpersonal relations, 4 questions on control of environment, 4 questions on autonomy, 5 questions on life purpose, and 4 questions on personal growth. The Likert scale uses 1 point for “strongly disagree” and 5 points for “strongly agree”.

Reliability of psychological well-being was Cronbach's $\alpha = 0.863$.

2.2.5 Hope

To measure hope in high school students, the dispositional hope scale invented by Snyder³⁷ and adapted by Choi et al.²¹ was used in this study. The K-DHS is a 12-item Likert-type scale, with four items assessing agency thinking, four items assessing pathways thinking, and four distracters. It uses a 4-point Likert scale; 1 = definitely false to 4 = definitely true and a higher score indicates a higher level of hope.

2.3 Data Analysis

Data were analyzed using the SPSS PC+ Win. 21.0 program. For basic analysis, descriptive statistics analysis and correlation analysis were performed; Hierarchical regression analysis was conducted using Baron and Kenny's methods for determining mediating effects. Sobel's Test was used for the significance test on indirect effects to dependent variables, with mediating variables as the independent variables.

3. Results

In order to identify the correlation between school physical education participation level, academic stress, ego-resilience and psychological well-being of the students, Pearson correlation analysis was conducted. The results are presented in Table 2. School physical education participation level showed a positive correlation with

ego-resilience and psychological well-being, but a negative correlation with academic stress.

Descriptive statistic results showed that participation in school physical education by the students averaged 3.4 points, which exceeded the median value of 3. Academic stress averaged 2.426 points, which was a little below the median point of 3. Ego-resilience, psychological well-being and hope had higher than average points, with 3.483 points, 3.236 points, and 3.4048 points, respectively, which were close to the median value.

To identify the mediating effects of the students' hopes on school physical education participation and academic stress, hierarchical regression analysis and Sobel's Test were conducted. At the first stage, participation significantly predicted hope ($F = 25.11$, $p < 0.001$), while participation significantly predicted academic stress ($F = 9.683$, $p < 0.01$) at the second stage. At the third stage, which combined participation and hope, participation could not significantly predict academic stress, but hope did ($F = 48.932$, $p < 0.001$). The standardized coefficient (β) of participation decreased from -0.112 at the second stage to -0.055 at the third stage.

Therefore, after identifying mediating effects in the relationship between school physical education participation and academic stress in students and identifying the significance of the indirect effects of independent variables to dependent variables through mediating variables (Sobel's Test: $Z = -4.518$, $p < 0.001$), the mediating effects were tested.

To identify the mediating effects of hope on school physical education participation and ego-resilience of student, hierarchical regression analysis and Sobel's Test

Table 2. Correlation analysis and descriptive statistics

	1	2	3	4	5
1. Participation in school physical education	1				
2. Academic stress	-0.112**	1			
3. Ego-resilience	0.303**	-0.346**	1		
4. Psychological wellbeing	0.234**	-0.450**	0.620**	1	
5. Hope	0.178**	-0.332**	0.570**	0.625**	1
M	3.400	2.426	3.483	3.236	3.4048
SD	1.066	0.506	0.526	0.432	0.57724

* $p < 0.05$, ** $p < 0.01$

were conducted. In stage 1, participation significantly predicted hope ($F = 25.11$, $p < 0.001$), whereas in stage 2, participation significantly predicted ego-resilience ($F = 77.465$, $p < 0.001$).

When input participation and hope were combined in stage 3, the two variables significantly predicted ego-resilience ($F = 219.578$, $p < 0.001$) and the standardized coefficient (β) value decreased to -0.112 from -0.055 in stage 2.

Therefore, partial mediating effects were identified in the relationship between participation in school physical education and Ego-resilience in students. Significance test results (Sobel's Test: $Z = 4.934$, $p < 0.001$) on the indirect effects of independent variables to dependent variables through mediating variables were also identified to be significant and mediating effects were tested.

To identify the mediating effects between school physical education participation and psychological well-being,

Table 3. Analysis for the mediating effects of hope

IV	DV	B	SE	β	R ²	F	Sobel's test
Participation	Hope	0.097	0.019	0.178***	0.032	25.110***	-4.518***
Participation	Stress	-0.053	0.017	-0.112**	0.012	9.683**	
Participation Hope	Stress	-0.026 -0.283	0.016 0.30	-0.055 -0.323***	0.114	48.932***	
Participation	Hope	0.097	0.019	0.178***	0.032	25.110***	4.934***
Participation	Resilience	0.149	0.017	0.303***	0.092	77.465***	
Participation Hope	Resilience	0.101 0.483	0.014 0.027	0.206*** 0.532***	0.365	219.578***	
Participation	Hope	0.097	0.019	0.178***	0.032	25.110***	4.975***
Participation	Wellbeing	0.094	0.014	0.234***	0.055	44.456***	
Participation Hope	Wellbeing	0.051 0.446	0.011 0.021	0.126*** 0.602***	0.406	261.070***	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

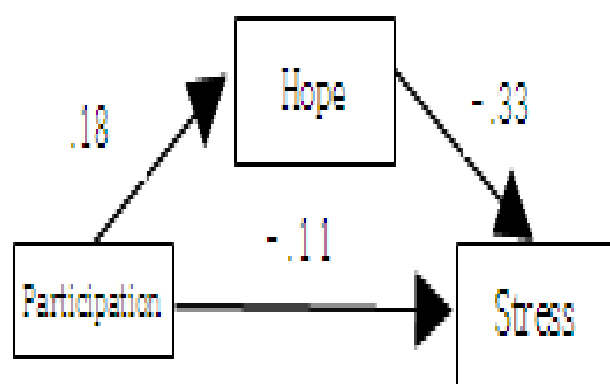


Figure 1. The relationship among participation in school physical education, hope, and academic stress.

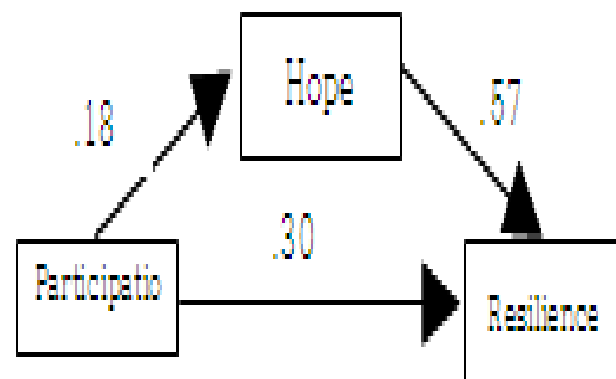


Figure 2. The relationship among participation, hope, and ego-resilience.

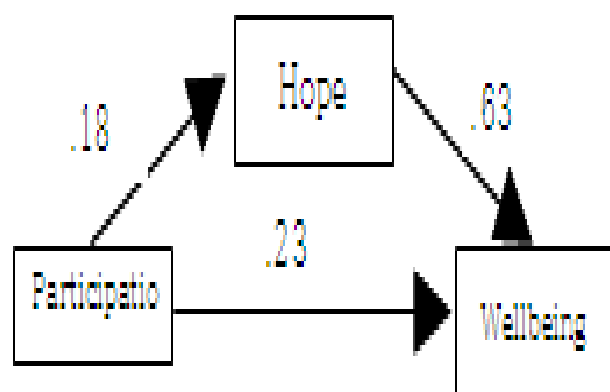


Figure 3. The relationship among participation, hope, and psychological wellbeing.

hierarchical regression analysis and Sobel's Test were executed. Participation significantly predicted hope in stage 1 ($F = 25.11$, $p < 0.001$) and also significantly predicted psychological well-being in stage 2 ($F = 44.456$, $p < 0.001$).

When participation and hope were combined in stage 3, the two variables significantly predicted psychological well-being ($F = 261.070$, $p < 0.001$). The standardized coefficient (β) value decreased to 0.126 from 0.234 in stage 2.

Therefore, in the relationship between participation in school physical education and psychological well-being, significance test results (Sobel's Test: $Z = 4.975$, $p < 0.001$) on the indirect effects of independent variables to dependent variables through mediating variables were identified to be significant and mediating effects were tested.

4. Discussion and Conclusion

First, school physical education participation level showed a positive correlation between Ego-resilience and psychological well-being, but a negative correlation with academic stress.

Second, school physical education participation level of students exceeded the median value of 3 and academic stress fell a little short of the average, which was also the median value of 3 points. Ego-resilience and psychological well-being were higher than the average, which was also the median value.

Third, the mediating effects of hope were identified in the relationship between school physical education participation and academic stress in students. Partial mediating effects of hope were additionally identified in the relation between school physical education par-

ticipation, ego-resilience and psychological well-being. Based on the above results, it can be concluded that hope plays an important role in reducing academic stress and increasing ego-resilience as well as the psychological well-being of high school students, through a relationship with participation in school physical education. Therefore, there should be multiple educational options to guarantee participation in school physical activities.

5. References

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