중국 대학생의 성장 마인드셋과 학업성취의 관계에서 행복과 희망의 이중매개효과

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Dual mediating effects of happiness and hope between growth mindset and academic achievement of college students in China

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요 약 본 연구는 중국 대학생을 대상으로 행복과 희망이 성장 마인드셋과 학성성취의 관계에서 이중매개하는지를 확인하는데 연구의 목적이 있다. 자료는 중국 Guangdong지역의 한 대학교에서 유의표집한 대학생 337명을 대상으로 설문조사를 통하여 수집하였다. 수집한 자료는 SPSS PC+ Win ver. 25.0과 SPSS PROCESS macro ver. 4.2를 활용하여 분석하였다. 적용된 통계방법은 빈도분석, 신뢰도 분석, 상관분석 및 이중매개효과 분석이었다. 연구의 결론은 다음과 같다. 첫째, 행복, 희망, 성장 마인드셋과 학성성취 모두 정적인 유의미한 상관관계를 보였다. 둘째, 대학생의 행복과 희망은 성장 마인드셋과 학업성취의 관계에서 이중매개하였다. 이러한 결과를 토대로 본 연구는 대학생들의 성장 마인드셋뿐만이 아니라 행복 및 희망을 활용하여 학업성취를 증진할 수 있는 방안을 제언하였다.

주제어 성장 마인드셋, 행복, 희망, 학업성취, 대학생, 이중매개효과

Abstract This study aims to determine whether happiness and hope mediate in the relationship between growth mindset and academic achievement among Chinese college students. Data were collected through a survey targeting 337 college students purposively sampled at a university in Guangdong, China. The collected data was analyzed using SPSS PC+ Win ver. 25.0 and SPSS PROCESS macro ver. 4.2. The statistical methods applied were frequency analysis, reliability analysis, correlation analysis, and dual mediation effect analysis. The conclusion of the study is as follows. First, growth mindset, happiness, hope, and academic achievement all showed significant positive correlations. Second, college students' happiness and hope double mediated the relationship between a growth mindset and academic achievement. Based on these results, this study proposed a plan to utilize not only a growth mindset but also happiness and hope to improve the academic achievement of college students.

Key Words Growth mindset, Happiness, Hope, Academic achievement, College student, Double mediation effect

1. Introduction

The academic achievement of college students is directly related to employment and is an important topic of interest for all college students. In addition, as China enters the 4th Industrial Revolution, competition for employment is becoming increasingly serious due to a partial decrease in jobs. In this situation, academic achievement is an important interest of college students, and research on it needs to continue.

One of the variables that directly affects academic achievement is the growth mindset. A growth mindset has been shown in many studies to have a positive effect on academic achievement regardless of school level [1,2]. Research on the relationship between growth mindset and academic achievement among Chinese college students needs to be conducted more actively.

Meanwhile, in the relationship between growth mindset and academic achievement, for which a certain amount of research has been accumulated, research on ways to further improve academic achievement is necessary. Therefore, in this study, it is necessary to explore and confirm variables that play a mediating role in the relationship between growth mindset and academic achievement. First of all, this study attempted to apply happiness as the first mediating variable. Previous studies have reported that a growth mindset affects happiness [3,4] and that happiness affects academic achievement [5]. Therefore, there is a need to verify this relationship among Chinese college students.

Next, this study attempted to apply hope as the next mediating variable. It has been reported that a growth mindset influences hope [6,7]. It has been reported that hope affects academic achievement [8]. Therefore, it is necessary to determine whether hope mediates in the relationship between growth mindset and academic achievement among Chinese college students. Furthermore, it is necessary to use two mediating variables to confirm whether happiness and hope play a dual mediating role in the relationship between growth mindset and academic achievement. Therefore, this study aims to verify the dual mediating effects of happiness and hope between a growth mindset and academic achievement of college students in China. The research questions to achieve these research objectives are: First, what is the correlation between major variables? Second, do happiness and hope dually mediate the relationship between a growth mindset and academic achievement?

2. Theoretical background

2.1 Relationship between growth mindset and academic achievement

Implicit theories are divided into entity theory and incremental theory [9]. Entity theory refers to the belief that intelligence is an innate and fixed ability that does not change regardless of effort, while incremental theory refers to the belief that intelligence is a variable attribute and can be improved at any time. Dweck [10] renamed the entity theory as a fixed mindset and the incremental theory as a growth mindset. Therefore, a growth mindset is the belief that one's skills and talents can be changed. People with a growth mindset believe that intelligence and skills can be improved through work and dedicated effort [11], and students with a growth mindset tend to think of academic life in terms of learning, growth, and development [12].

Research on the relationship between growth mindset and academic achievement has been conducted by many scholars. A growth mindset had a positive effect on students' math achievement [13]. Yeager and Dweck [2] found that students with a growth mindset had greater faith in their future academic achievement and had higher expectations and efforts for better academic achievement. As a result of examining the relationship between mindset and academic achievement over time, early mindset

influenced students′ academic achievement [14]. Compared to students and teachers with a fixed mindset, students and teachers with a growth mindset not only have higher academic achievement, but also challenge new learning topics, choose more difficult topics, and put in significantly more effort [13]. In this way, it can be seen that a growth mindset has a positive effect on academic achievement.

2.2 Mediating effect of happiness between growth mindset and academic achievement

Happiness is a cognitive and emotional evaluation of one′s life, which is a relatively continuous feeling of well-being rather than a momentary emotion or mood, and is defined as the degree to which an individual positively judges the quality of his or her life [15]. A happy person is likely to be satisfied with all options, even for minor and ego-threatening decisions [16]. Happy people drew optimistic inferences from life events and evaluated the gap between achievements and aspirations more positively [17]. Happy people experience more positive affect and less negative affect than unhappy people [18].

For happiness to play a mediating role in the relationship between a growth mindset and academic achievement, a growth mindset must have a significant effect on happiness, and happiness must have a significant effect on academic achievement. Therefore, previous studies were reviewed. A growth mindset is said to promote happiness and school satisfaction [3], and is moderately correlated with overall well-being [4].

On the other hand, adolescents who were happy during their second year of middle school had higher academic performance four years later when they reached their third year of high school. Happiness in the second year of middle school still predicted high school grades, albeit slightly, even when controlling

for the second grade, the time and cost of private education, and the socioeconomic status of parents [5]. As a result of exploring the direction of the direct causal relationship between subjective well-being and academic achievement in elementary school students, children′s happiness positively predicted academic performance one year later even after controlling for IQ, age, and previous academic performance [19]. As a result of previous research, a growth mindset has a significant effect on happiness, and happiness has a significant positive effect on academic achievement, so happiness is predicted to mediate in the relationship between a growth mindset and academic achievement. Therefore, this study attempted to determine whether happiness mediates targeting Chinese college students.

2.3 Mediating effect of hope between growth mindset and academic achievement

Hope began to be systematically studied by Snyder et al. [20] defined the concept of hope in relation to the human goal pursuit process and proposed agency and pathways as subelements of hope. And he developed a hope scale whose reliability and validity were confirmed to measure an individual′s level of hope. Snyder [21] referred to hope as an individual′s trait or disposition that has motivational energy for a desired goal and achieves that goal through specific paths. Hope is composed of subfactors of agency thinking (willpower) and pathways thinking (way power), and these two factors are a cognitive set that pursues a goal while interacting.

Previous research was examined to determine whether hope plays a mediating role in the relationship between growth mindset and academic achievement. It was reported that the higher the growth mindset, the higher the hope [6]. A study conducted on mothers with young children showed a positive correlation between growth mindset and hope [7].

Looking at the relationship between hope and academic achievement, high hope can lead to excellent academic performance, which is possible through the ability to find various ways to reach a goal and to try these various ways [8]. A short-term longitudinal study on hope and academic achievement revealed that hope is a stable factor that continuously influences academic achievement over time [22]. As considered in previous research, hope was predicted to play a mediating role in the relationship between growth mindset and academic achievement, and this study sought to confirm this.

3. Methods

3.1 Research model

To confirm whether happiness and hope double mediate in the relationship between growth mindset and academic achievement, model number 6 of the SPSS PROCESS macro proposed by Hayes [23] was applied, and the research model was set up as shown in Figure 1. This study attempted to control college students' gender, age, and major, which affect the mediating and dependent variables.
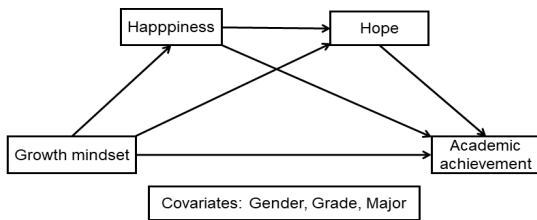
[Fig. 1] Research model

3.2 Participants

The Guangdong region in China was purposively selected as the study area, and the subjects of the study were college students. The purposive sampling method was applied to sample college students. Data was collected through an online survey from May to June, 2023. Excluding insincere responses, the total

number of subjects used in the final analysis was 337 students. The general characteristics of the survey subjects were 38.3% male and 61.7% female. By grade, 26.7% were first graders, 20.8% were second graders, 38.3% were third graders, and 14.24% were fourth graders. By major, 22.3% were preschool education, 34.7% were business management, 7.7% were computer applications, and 35.3% were other.

3.3 Research tools

3.3.1 Growth mindset

The growth mindset scale in this study used the scale developed by Dweck [10]. This scale is designed to measure growth mindset such as "People's IQ is congenital and cannot be changed", and " People can always change their personality", and consists of a total of 8 questions. The measurement was done on a 5-point Likert scale, with higher scores indicating a higher growth mindset. In this study, the reliability of this scale, Cronbach's α, was suitable at .706.

3.3.2 Happiness

The happiness scale in this study used the scale developed by Chen [24]. This scale is designed to measure college students' happiness such as "Most aspects of my life coincide with my ideals", and "I have my values, and it gives me meaning in my life", and consists of a total of 30 questions. The measurement was done on a 5-point Likert scale, with higher scores indicating higher happiness. In this study, the reliability of this scale, Cronbach's α, was high at .970.

3.3.3 Hope

The hope scale in this study used the scale developed by Snyder et al. [20]. This scale is designed to measure agency and pathways thinking such as "I think I am doing pretty well", and " I can think of many ways to get the things in life that are most important to me", and consists of a total of 8

questions. The measurement was done on a 5-point Likert scale, with higher scores indicating higher hope. In this study, the reliability of this scale, Cronbach's α, was high at .912.

3.3.4 Academic achievement

Academic achievement was measured by having respondents record their level of academic achievement in three subjects last semester, including major, liberal arts, and other subjects, on a 5-point scale.

3.4 Data analysis

The data was analyzed using SPSS PC+ Win. Ver. 25.0 and SPSS PROCESS macro Ver. 4.2. For basic analysis, frequency analysis was performed, and Cronbach's α was calculated to determine reliability. Pearson's bivariate correlation analysis was conducted to identify the correlation between major variables, and model 6 of the SPSS PROCESS macro was performed to analyze the dual mediating effect.

4. Results

4.1 Correlation of main variables

As a result of correlation analysis between major variables, a growth mindset was positively correlated with happiness (r=.343, p<.01), hope (r=.451, p<.01), and academic achievement (r=.221, p<.01). Happiness showed a significant positive correlation with hope (r=.778, p<.01) and academic achievement (r=.296, p<.01). And hope showed a positive correlation with academic achievement (r=.318, p<.01). The correlation coefficient between happiness and hope was .7, so when this checked the Dubbin-Watson value through regression analysis, the value was within the normal range, so there was no problem with multicollinearity.

As a result of descriptive statistical analysis, the average values of all four major variables exceeded the median value of 3 points, and among them, academic achievement was the highest.

〈Table 1〉 Results of correlation analysis of main variables

	1	2	3	4
1.Growth mindset	1			
2.Happiness	.343**	1		
3.Hope	.451**	.778**	1	
4.Academic achievement	.221**	.296**	.318**	1
M	3.1424	3.6035	3.566	3.6657
SD	0.54171	0.59274	0.66494	0.72215

**p<.01

4.2 Dual mediating effects of happiness and hope between growth mindset and academic achievement

To verify the serial dual mediating effect of happiness and hope in the relationship between growth mindset and academic achievement, an analysis was conducted using PROCESS macro model 6 proposed by Hayes (2017), and the results are presented in Figure 2 and Table 2.
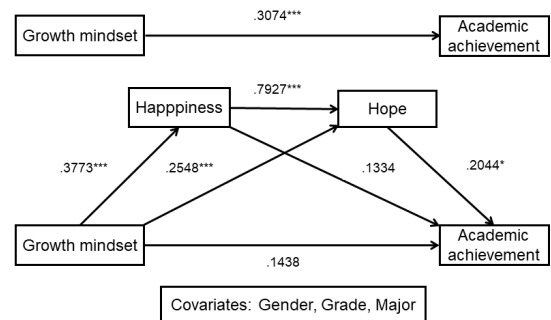
[Fig. 2] Statistical model of dual mediating effects of happiness and hope

As a result of the analysis, the independent variable, growth mindset, had a significant positive effect on happiness (B=.3773, p<.001), a significant positive effect on hope (B=.2548, p<.001), and no significant effect on dependent variable, academic achievement (B=.1438, p>.05). Happiness had a significant positive effect on hope (B=.7927, p<.001) and had no significant

⟨Table 2⟩ Dual mediating effects of job stress and psychological commitment

Variables		Mediating variable model 1 (DV: Happiness)			Mediating variable model 2 (DV: Hope)			Dependent variable model (DV: Academic achievement)		
		Coeffect	SE	t value	Coeffect	SE	t value	Coeffect	SE	t value
Constant		2.4124	.2447	9.8607***	−.0034	.1990	−.0169	1.5311	.3313	4.6217***
ID	Growth mindset	.3773	.0563	6.7000***	.2548	.0429	5.9361***	.1438	.0752	1.9129
M1	Happiness				.7927	.0393	20.1860***	.1334	.0976	1.3660
M2	Hope							.2044	.0915	2.2347*
Model summary	R^2	.1227			.6442			.1669		
	F	11.6133***			119.8657***			11.0159***		

Effects		Effect	SE	Confidence interval	
				LLCI	ULCI
Direct effect		.1438	.0752	−.0041	.2916
Total indirect effect		.1636	.0470	.0820	.2651
Indirect effect	Growth mindset→Happiness→Academic achievement	.0503	.0418	−.0236	.1412
	Growth mindset→Hope→Academic achievement	.0521	.0317	.0034	.1265
	Growth mindset→Happiness→Hope→Academic achievement	.0611	.0309	.0048	.1268

***p<.001, ID: Independent variable, DV: Dependent variable, M: Mediating variable

effect on academic achievement (B=.1334, p>.05). Hope had a significant positive effect on academic achievement (B=.2044, p<.01).

Meanwhile, the total effect between growth mindset and academic achievement was B=.3074(p<.001), but with the input of the mediating variables happiness and hope, the direct effect of the path between growth mindset and academic achievement reduced to B=.1438(p>.05).

The fact that a growth mindset has a significant effect on happiness, happiness has a significant effect on hope, and hope has a significant effect on academic achievement means that there is an indirect effect of happiness and hope between a growth mindset and academic achievement. Therefore, verification of the indirect effect was tried using bootstrapping.

As a result of verifying the indirect effects of happiness and hope using bootstrap, there was no '0' in the upper and lower limits of bootstrap, so all three indirect effects were significant. In other words, happiness mediated in the relationship between a growth mindset and academic achievement, and hope mediated in the relationship between a growth mindset

and academic achievement. Happiness and hope doubly mediated in the relationship between a growth mindset and academic achievement.

5. Discussion and conclusion

The discussion focusing on the results of the study is as follows.

First, happiness, hope, growth mindset, and academic achievement all showed a positive significant correlation. These results were consistent with research results showing that a growth mindset and academic achievement have a positive effect [1], that a growth mindset has a significant effect on happiness [3], and that happiness has a significant effect on academic achievement [19]. This study shows that academic achievement is related to various variables, and in particular, it showed the highest correlation coefficient with hope, suggesting that the improvement of hope is necessary to improve academic achievement.

Second, college students' happiness and hope double mediated in the relationship between a growth

mindset and academic achievement. In other words, it means that academic achievement can be promoted through the path of a growth mindset → happiness → hope. Therefore, to improve the academic achievement of college students, it is suggested that it is appropriate to utilize the path of growth mindset→happiness→hope rather than using only growth mindset.

The limitations of the study and suggestions for further research are as follows. First, when selecting universities for this study, one university was intentionally sampled. Since this may result in sampling error, it is necessary to reduce sampling error by randomly sampling at least three universities.

Second, countless psychological factors affect academic achievement. In follow-up research, it is necessary to further explore variables that affect academic achievement by applying other positive psychological variables such as self-efficacy and grit.

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