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중국 대학생의 학업소진이 학업적 자기효능감에 미치는 영향에서 교사지지의 매개효과와 성장 마인드셋의 조절효과

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The mediating effect of teacher support and the moderating effect of growth mindset in the impact of academic burnout on academic self-efficacy in Chinese college students

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요 약 본 연구는 학업적 소진이 학업적 자기효능감에 미치는 영향에서 교사지지의 매개효과와 성장 마인드셋의 조절효과를 파악하여 학업적 자기효능감 향상을 위한 기초자료를 제공하는데 연구의 목적이 있다. 조사 대상은 중국 광동성의 한 대학에서 의도적으로 표본을 추출한 광저우 의과대학 구강학과 및 구강과학 기술을 전공하는 대학생 300명이다. 자료는 설문지를 활용하여 수집하였다. 자료분석은 SPSS PC+ Win Ver. 25.0 and SPSS PROCESS macro ver. 4.2를 활용하여 분석하였다. 적용된 통계기법은 빈도분석, 신뢰도분석, 상관분석, 그리고 간접효과 및 조건부 직접효과분석 이었다. 연구결과는 다음과 같다. 첫째, 학업소진은 교사지지, 성장 마인드셋 및 학업적 자기효능감과 유의미한 부적인 상관관계를 보였다. 교사지지는 성장 마인드셋 및 학업적 자기효능감과 정적인 유의미한 상관관계를 보였다. 둘째, 학업소진과 학업적 자기효능감의 관계에서 교사지는 매개역할을, 그리고 성장 마인드셋은 조절역할을 하였다. 학업적 자기효능감 향상을 위하여 학업소진이 학업적 자기효능감에 미치는 영향을 상쇄시키는 교사지지와 완충시키는 성장 마인드셋의 활용 방안을 제언하였다.

주제어 : 학업소진, 교사지지, 성장 마인드셋, 학업적 자기효능감, 매개효과, 중국대학생

Abstract This study aims to provide basic data for improving academic self-efficacy by identifying the mediating effect of teacher support and the moderating effect of growth mindset in the impact of academic burnout on academic self-efficacy. The subjects of the survey were 300 college students majoring in stomatology and stomatology technology in Guangzhou Medical College who were intentionally sampled from a university in Guangdong, China. Data was collected using an online questionnaire. Data analysis was performed using SPSS PC+ Win. ver. 25.0 and SPSS PROCESS macro ver. 4.2. The statistical techniques used were descriptive statistics, reliability analysis, correlation analysis, and indirect effect and conditional direct effect analysis. The research results are as follows. First, academic burnout showed a significant negative correlation with teacher support, growth mindset, and academic self-efficacy. Teacher support showed a significant positive correlation with growth mindset and academic self-efficacy. Second, in the relationship between academic burnout and academic self-efficacy, teacher support played a mediating role, and growth mindset played a moderating role. To improve academic self-efficacy, this study proposed ways to utilize teacher support to offset and growth mindset to buffer the impact of academic burnout on academic self-efficacy.

Key Words: academic burnout, teacher support, growth mindset, academic self-efficacy, mediating effect, moderating effect, Chinese college student

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1. Introduction

Academic self-efficacy is the foundation for high academic achievement. It is reported that if academic self-efficacy is high, students prefer challenging tasks, perform tasks successfully, and have high academic achievement [1,2]. On the other hand, academic burnout shows a negative relationship with academic self-efficacy. It has a negative impact on academic achievement, so academic attention is needed on the relationship between academic burnout and academic self-efficacy.

So far, little research has been done on the impact of academic burnout on academic self-efficacy. While interested in academic self-efficacy, academic burnout was dealt with incidentally [3], but there was a lack of research on the relationship between academic burnout and academic self-efficacy. Therefore, this study sought to deal in depth with the impact of academic burnout on academic self-efficacy. For this purpose, teacher support and a growth mindset were introduced as mediating and moderating variables.

Little previous research has investigated whether teacher support plays a mediating role in the relationship between academic burnout and academic efficacy. However, studies to show that academic burnout is related to teacher support [4,5], and teacher support is related to academic self-efficacy [6,7] were partially carried out. Therefore, based on this, it was predicted that teacher support would mediate in the relationship between academic burnout and academic efficacy, and this study sought to confirm this.

In addition, a growth mindset is called the psychology of success [8], and self-efficacy is predicted to differ depending on whether the growth mindset is high or low. It was confirmed that students with a high growth mindset have a high sense of efficacy regarding their learning abilities [9]. In addition, many studies have reported that a growth mindset plays a moderating role [10]. Although no direct prior research shows that a growth mindset moderates the relationship between academic burnout and academic self-efficacy, based on the results of previous research, it is predicted that a growth mindset will play a moderating role in the relationship between academic burnout and academic self-efficacy. This study tried to confirm it.

Therefore, this study aims to provide basic data for improving academic self-efficacy by identifying the mediating effect of teacher support and the moderating effect of a growth mindset on the impact of academic burnout on academic self-efficacy. The research questions to achieve this goal are: First, what is the correlation between major variables? Second, does teacher support play a mediating role, and growth mindset play a moderating role in the impact of academic burnout on academic self-efficacy?

2. Theoretical background

2.1 Relationship between academic burnout and academic self-efficacy

Students' academic burnout is referred to as a feeling of exhaustion due to academic demands, a cynical and distant attitude toward studying, and a feeling of incompetence as a student [11]. Academic burnout is defined as the burnout pattern of tired students, who lack confidence and show skepticism toward academic activities, as well as antipathy and anxiety [12].

On the other hand, academic self-efficacy refers to the learner's belief or confidence in his or her ability to organize and execute the actions required for appropriate performance of academic tasks in specific situations related to academic performance [13]. Learners with high academic self-efficacy choose challenging tasks, put in a lot of effort to

successfully perform the task, and try to perform the task responsibly and persistently even when difficulties arise. In addition, the higher the academic self-efficacy, the lower the level of anxiety, and excellent self-regulation skills, such as effective time management skills and the use of study strategies [2]. On the other hand, learners with low academic self-efficacy tend to believe that the tasks given to them are more difficult than they are, and as a result, they tend to avoid difficult tasks and lack persistence or effort to achieve their goals [14].

Meanwhile, according to previous research, academic burnout was reported to be a cause of lowering academic efficacy. In a study that analyzed the mediating effect of self-efficacy in the relationship between adolescents' academic burnout and school adaptation, it was reported that academic burnout had a negative effect on self-efficacy [15]. In a study that examined the mediating effect of self-efficacy in the relationship between the personality characteristics of counseling undergraduate students, academic burnout, and career stress, academic burnout had a negative effect on self-efficacy [16]. As a result of reviewing previous research, it was found that academic burnout had a negative effect on academic self-efficacy. However, there have been few studies that set academic burnout as an independent variable and academic self-efficacy as a dependent variable and examined the relationship between these two variables in depth. Therefore, this study sought to understand in depth the impact of academic burnout on academic efficacy.

2.2 Mediating role of teacher support

Teacher support is defined as one-sided emotional and informational support provided by a teacher to a student or a two-way exchange between a teacher and a student [17]. Teacher support is divided into emotional support, evaluative support, informational support, and practical support perceived as received from meaningful interactions with teachers [18]. The reason why teacher support is important is because, unlike adults who are active in various networks, students receive support in limited environments such as home and school.

For teacher support to play a mediating role in the relationship between academic burnout and academic self-efficacy, academic burnout must have a significant effect on teacher support, and teacher support must have a significant effect on academic self-efficacy. Therefore, previous research was reviewed.

In a study that analyzed the mediating effect of social support in the relationship between academic burnout and class flow in high school students, it was reported that academic burnout had a negative effect on social support [4]. A study targeting college students showed that academic burnout and self-efficacy had a very high correlation [5].

Meanwhile, teacher support has been reported in many studies to have a significant impact on academic self-efficacy. Teacher social support was positively correlated with self-regulatory efficacy and self-confidence, which are sub-variables of academic self-efficacy [6], and research results showing that when the higher the social support, the higher the self-efficacy and school life adaptation of middle and high school students, they are good at it, was reported [7].

As a result of considering previous research, it can be inferred that academic burnout affects teacher support, and teacher support affects academic self-efficacy. Therefore, this study aimed to determine whether teacher support plays a mediating role in the relationship between academic burnout and academic self-efficacy among Chinese college students.

2.3 Moderating effect of growth mindset

Dweck [8] defines mindset as a frame or lens of mind that interprets and selectively organizes information, and then the growth mindset is the belief that human intelligence (IQ) can be changed through learning and effort [19], and it is closely related to a successful life. On the other hand, people with a fixed mindset believe that abilities are innate or completely fixed in early life stages and that they cannot change their abilities.

Dweck [8] found that students with a fixed mindset that intelligence is immutable tend not to even try or make active efforts to solve a difficult task when faced with it, which can lead to a decrease in self-efficacy. On the other hand, students with a growth mindset, which is the belief that intelligence can be improved, were confirmed to have a high sense of efficacy regarding their learning abilities [9].

For a growth mindset to play a moderating role, the impact of academic burnout on academic self-efficacy should vary depending on whether a growth mindset is high or low. This was reviewed in previous research.

A growth mindset was reported to play a moderating role in perceived discrimination and behavior problems among Chinese migrant children [10] and was also reported to play a moderating role in strengths and subjective well-being in adolescence [20]. Based on these results, it was predicted that a growth mindset would moderate the impact of academic burnout on academic self-efficacy when teacher support plays a mediating role, and this study sought to confirm this among Chinese college students.

3. Methods

3.1 Research model

To determine whether a growth mindset moderates the impact of academic burnout on academic self-efficacy when teacher support plays a mediating role, model 5 of the SPSS PROCESS macro proposed by Hayes [21] was applied, and the research model is shown in Figure. 1. It was attempted to control college students' gender, grade, residence, which affect the mediating and dependent variables.

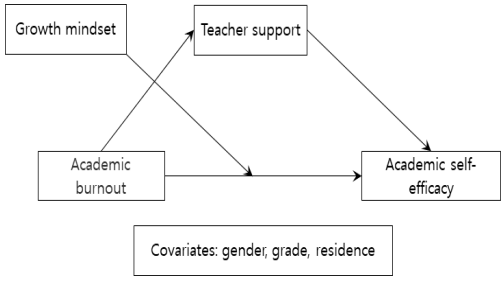

Fig. 1 Research model

3.2 Participants

Guangdong province, China was conveniently selected as the study area, and the study subjects were college students. The convenient sampling method was applied to the sampling of the survey subjects. Data was gathered through an online survey. Excluding insincere responses, the total number of subjects used in the final analysis was 300 college students majoring in stomatology and stomatology technology in Guangzhou Medical College in Guangdong, China.

The general characteristics of the survey target are as follows. Those surveyed were 15.7% male and 84.3% female. By grade, 23.7% were first graders, 41.3% were second graders, and 35.0% were third graders. The place of residence was 23.3% in large cities, 34.3% in small and medium-sized cities, and 42.3% in rural areas. The major was stomatology at 46.7% and oral medicine technology specialty at 53.3%. Family income below 30,000 was the highest at 54.0%, followed by 30,000 to 80,000 at 28.7%.

3.3 Research tools

3.3.1 Academic burnout

The academic burnout scale compiled by Wu and Dai [22] was in this study. This scale is designed to measure academic burnout such as "I can devote myself to study energetically." and "Recently I feels a very empty heart, do not know what to do," and consists of a total of 16 questions. The scoring was done on a 5-point Likert scale, with higher scores indicating higher academic burnout. In this study, the reliability of this scale, Cronbach's α, was suitable at .851.

3.3.2 Growth mindset

The growth mindset scale developed by Dweck[8] and adapted by Lee, Park and Hwang[23] was used in this current study. This scale is designed to measure the beliefs about changes in intelligence and in personality such as "intelligence (IQ) is innate and cannot be changed (inverted items)" and "People have different personalities, but everyone can change their personality", and consists of a total of 8 questions. The scale was measured 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 .754.

3.3.3 Teacher support

The teacher support scale revised and compiled by Ouyang [24] was used in this study. This scale is designed to measure Students' Perceived Teacher Support Behavior such as "In my study and life, my teachers are very strict with me", and "The teacher often puts me in charge of things in the class" and consists of a total of 19 questions. The scale was measured on a 5-point Likert scale, with higher scores indicating higher teacher support. In this study, the reliability of this scale, Cronbach's α was high at .896.

3.3.4 Academic self-efficacy

The Academic Self-Efficacy Questionnaire revised and compiled by Liang [25] was used. This scale is designed to measure academic self-efficacy such as "I think I can solve the problems in my study", and "I think I can grasp what the teacher teaches in class in time," and consists of a total of 18 questions. The scale was measured on a 5-point Likert scale, with higher scores indicating higher academic self-efficacy. In this study, the reliability of this scale, Cronbach's α was suitable at .889.

3.3.5 General information and control variables

The demographic characteristics of the survey subjects include gender (male, female), grade (Freshman, Sophomore, Junior), major (Stomatology, Oral medicine technology specialty), residence (Municipality, small city, rural area), and household income level (Below 30,000, 30,000 to 80,000, 80,000 to 150,000, and more than 150,000) were investigated. Gender, grade and residence were controlled as they were predicted to have an impact on the mediating and dependent variables when analyzing the moderated mediating effect.

3.4 Data analysis

For data analysis, SPSS PC+ Win. ver. 25.0 and PROCESS macro ver. 4.2 were utilized, and the following statistical techniques were applied.

Frequency analysis was performed for basic analysis, and Cronbach's α, the internal consistency coefficient, was calculated to determine reliability. Pearson bivariate correlation analysis was conducted to determine the correlation between each variable. To verify the moderated mediating effect, SPSS PROCESS macro model 5 was applied. Bootstrapping method was used to test the moderated mediating effect. At this time, the number of samples was set

to 5,000 and the confidence level was set to 95%. When analyzing the moderated mediating effect, an independent variable and moderating variable were mean-centered. The conditions for testing the conditional effect and conditional indirect effect were M-SD, M, and M+SD.

4. Results

4.1 Correlation between variables

Bivariate correlation analysis was conducted. Academic burnout showed a significant negative correlation to teacher support (r=-.478, p<.01), growth mindset (r=-.198, p<.01), and academic self-efficacy (r=-.532, p<.01). Teacher support showed a significant positive correlation with a growth mindset (r=.209, p<.01) and academic self-efficacy (r=.609, p<.01). On the other hand, there was no significant correlation between growth mindset and academic self-efficacy (r=.098, p>.05). Overall, the correlation coefficient value was lower than .7, so there was no problem with multicollinearity.

As a result of descriptive statistics, academic burnout, teacher support, growth mindset, and academic self-efficacy were all higher than the median, and teacher support was the highest at M=3.1719.

〈Table 1〉 Correlation analysis pf main variables

	1	2	3	4
1. Academic burnout	1			
2. Teacher support	-.478**	1		
3. Growth mindset	-.198**	.209**	1	.098
4. Academic self-efficacy	-.532**	.609**	.098	1
M	3.0865	3.1719	3.0592	3.0939
SD	.4746	.42395	.47087	.39063

*p<.05, **p<.01

4.2 Mediating effect of teacher support and moderating effect of growth mindset

When teacher support mediates in the relationship between academic burnout and academic self-efficacy, the PROCESS proposed by Hayes [21] was used to analyze whether a growth mindset moderates the relationship between academic burnout and academic self-efficacy, that is, to analyze the conditional direct effect of the growth mindset. Analysis was conducted by applying macro's Model No. 5. Bootstrap was used for verification during analysis, the confidence interval was set at 95%, the number of samples was set at 5,000, and the independent and moderating variables were mean-centered. The analysis results are presented in Fig. 2, <Table 1>, and <Table 2>.

In the mediating variable model, academic burnout had a significant negative effect on teacher support (B=-.4285, p<.001). In the dependent variable model, teacher support had a positive significant effect on academic self-efficacy (B=.3748, p<.001), and academic burnout had a negative significant effect on academic self-efficacy (B=-.2482, p<.001), but growth mindset did not have a significant effect on academic self-efficacy (B=.0146, p>.05). Academic burnout had a significant effect on teacher support, and teacher support had a significant effect on academic self-efficacy, so teacher support mediated in the relationship between academic burnout and academic self-efficacy.

The interaction term between academic burnout and growth mindset had a statistically significant effect on academic self-efficacy (B=.1584, p<.001). The change in R^2 (highest order test) resulting from the addition of the interaction term was also significant (.0336, p<.001). Therefore, a growth mindset moderated the effect of academic burnout on academic self-efficacy.

Because the moderating effect was significant, this study analyzed the conditional effect of academic

burnout according to the three conditions of growth mindset (M, M±SD). As a result of the analysis, the conditional effect was significant in all three conditions of growth mindset, and as growth mindset increased from M-SD to M+SD, the conditional effect decreased. In other words, as a growth mindset increased, the negative impact of academic burnout on academic self-efficacy decreased. As a result of checking the Johnson-Neyman conditional effect significance level area, the conditional effect was significant in the area where growth mindset was lower than .8986, and 96% of the total survey subjects were included in this area.

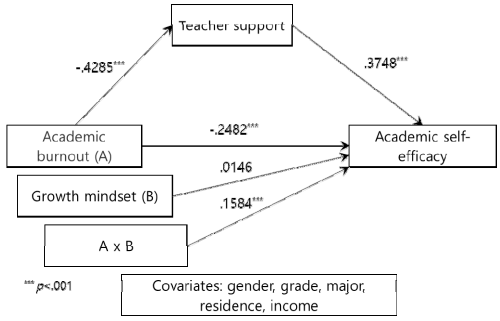

Fig. 2 Statistical model of mediating effect of teacher support and moderating effect of growth mindset

〈Table 2〉 Analysis of mediating and moderating effect

Classification		Mediating variable model (DV: Teacher support)			Dependent variable model (DV: Academic self-efficacy)		
		Coeffect	SE	t value	Coeffect	SE	t value
Constant		3.1570	.1407	22.4310**	1.8987	.1817	10.4467***
IV	teacher support	-.4285	.0462	-9.2753**	-.2482	.0401	-6.1837***
Mediator	teacher support				.3748	.0463	8.0915***
Mderator	growth mindset				.0146	.0389	.3746
Interaction item	teacher support × growth mindset				.1584	.0362	4.3705***
Highest order test	R^2 change				.0336		
	F				19.1017***		
Covariates	Gender	.0203	.0600	.3374	-.0170	.0457	-.713
	Grade	-.0101	.0286	-.3529	.0033	.0216	.1518
	Residence	-.0005	.0276	-0181	.0173	.0209	.8265
Model summary	R^2	.2294			.4868		
	F	21.9534***			39.5712***		

onditional effects of the focal predictor at values of the moderator

growth mindset	Effect	se	t value	LLCI*	ULCI**
-.4709 (M-SD)	-.3228	.0423	-7.6377***	-.4060	-.2396
.0000(M)	-.2482	.0401	-6.1837***	-.3272	-.1692
.4709 (M+SD)	-.1736	.0449	-3.8645***	-.2621	-.0852

Moderator value(s) defining Johnson-Neyman significance region

Value	% below	% above
.8986	96.0000	4.0000

Conditional effect of focal predictor at values of the moderator

growth mindset	Effect	se	t value	LLCI*	ULCI**
-2.0592	-.5744	.0817	-7.0317***	-.7351	-.4136
.7408	-.1309	.0501	-2.6095**	-.2296	-.0322
.8986	**-.1059**	**.0538**	**-1.9681**	**-.2117**	**.0000**
.9408	-.0992	.0548	-1.8090	-.2071	.0087
1.9408	0592	.0839	.7058	-.1059	.2243

*p<.05, **p<.01, ***p<.001
*LLCI=bootstrap lower bound within 95% confidence interval
**ULCI=bootstrap upper limit within 95% confidence interval

Fig. 3 shows the moderating effect of growth mindset on the impact of academic burnout on academic self-efficacy. When the growth mindset was M+SD, the slope decreased more gently than when the growth mindset was M-SD.

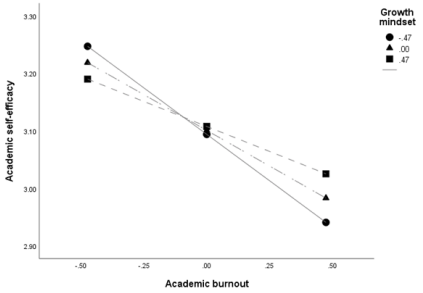

Fig. 3 growth mindset의 moderating effect

The indirect effect of teacher support and the conditional direct effect of a growth mindset are presented in <Table 3>. In the three conditions of growth mindset, the conditional direct effect of academic burnout on academic self-efficacy was all significant, and it can be seen that it has the same value as the conditional effect. As the growth mindset increased from M-SD to M+SD, the impact of academic burnout on academic self-efficacy decreased. Additionally, the indirect effect of teacher support was significant at B=-.1606, as there was no zero between the lower and upper bounds of the bootstrap (-.2457 to -.0843). These results suggest that the impact of academic burnout on academic self-efficacy can be offset by intervening with a growth mindset and teacher support.

〈Table 3〉 Analysis of direct and indirect effects of academic burnout on academic self-efficacy

Conditional direct effect(academic burnout → academic self-efficacy)				
growth mindset	Effect(B)	se	LLCI*	ULCI**
-.4709(M-SD)	-.3228	.0423	-.4060	-.2396
.0000(M)	-.2482	.0401	-.3272	-.1692
.4709M+SD)	-.1736	.0449	-.2621	-.0852
indirect effect				
teacher support	Effect(B)	BootSE	BootLLCI	BootULCI
	-.1606	.0413	-.2457	-.0843

*LLCI=bootstrap lower bound within 95% confidence interval
**ULCI=bootstrap upper limit within 95% confidence interval

5. Discussion and conclusion

The conclusions are as follows while discussing the results of the study.

First, academic burnout showed a significant negative correlation with teacher support, growth mindset, and academic self-efficacy. Teacher support showed a significant positive correlation with a growth mindset and academic self-efficacy. On the other hand, there was no significant correlation between growth mindset and academic self-efficacy. These research results showed that academic burnout had a negative effect on self-efficacy [16] and that academic burnout and self-efficacy are positively correlated [5], and were consistent with the research results [7] that the higher the social support, the higher the self-efficacy. This suggests that to promote academic self-efficacy, academic burnout must be reduced, while teacher support must be increased.

Second, a growth mindset moderated the effect of academic burnout on academic self-efficacy. In particular, as the growth mindset increased, the influence of academic burnout on academic self-efficacy further decreased. This meant that the growth mindset played a buffering role. Additionally, teacher support played a mediating role in the relationship between academic burnout and academic self-efficacy. This is in line with the research results that academic burnout has a negative effect on social support [4] and the research results that the higher the social support, the higher the self-efficacy [7]. did. In particular, teacher support played a role in offsetting the negative effect of academic burnout on academic self-efficacy. Therefore, it was suggested that the negative impact of academic burnout on academic self-efficacy could be reduced by using a growth mindset and teacher journals. Therefore, it is necessary for universities to run programs to promote a growth mindset and teacher support for

students whose academic self-efficacy is decreasing due to academic burnout.

A limitation of the study is that the subjects of this study were recruited from one university. Because there are various types of universities, future research must select students from various universities and identify general trends in academic burnout and academic self-efficacy. Second, many variables affect academic self-efficacy. This study was limited to academic burnout, teacher support, and growth mindset, but future research needs to continue to study the impact of other variables in addition to these variables on academic self-efficacy.

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