

# Dual Mediating Effects of Academic Self-Efficacy and Hope in the Link Between Conscientiousness and Academic Performance in College Students

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**Abstract:** As the higher education scale is continuously growing, academic competition among students is fierce and how to improve their academic performance efficiently is a heated problem. This study intended to solve this problem and aimed to uncover factors that influenced the academic performance of college students. Through dual mediating analysis, whether academic self-efficacy and hope double mediate the path via conscientiousness and academic performance will be tested. The study subjects were sampled using a purposive approach from two colleges in Guangzhou city of China, and data were collected with a questionnaire survey. The questionnaire was designed to collect data regarding conscientiousness, academic self-efficacy, hope, and academic performance and 400 results were collected. For research tools, SPSS ver.25 and PROCESS macro ver.4.2 were used. And frequency analysis, reliability analysis, correlation analysis, and dual mediation effect analysis were applied for analyzing data. Model number 6 of SPSS PROCESS macro was utilized to figure out the dual mediating effect. As the result of current study, firstly, there were positive correlations between conscientiousness, academic self-efficacy, hope, and academic performance. Secondly, the dual mediating effect analysis indicated that academic self-efficacy and hope double mediated the path via conscientiousness and academic performance, which showed a full mediation effect. It was assured that conscientiousness positively affected academic performance through academic self-efficacy and hope. This result was vital as it not only confirmed the dual mediation effect of academic self-efficacy and hope in the link between conscientiousness and academic performance, but also implied that it was significant to improve academic performance by designing effective intervention programs. These programs should make well use the findings that academic self-efficacy and hope combined contributed to better academic performance.

**Keywords:** Academic Performance, Academic Self-Efficacy, Conscientiousness, Dual Mediating Effect, Hope

## 1. Introduction

As the higher education scale is continuous to grow, the number of college student is also climbing. Consequently, academic competition among students are increasingly fierce and how to improve academic performance(AP) becomes vital. Besides, numerous educational programs designed to assist students' leaning results are costly and most of them are ineffective in a long run. What are the

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contributors of students' academic performance and how to improve the efficiency and effectiveness of these programs is an urgent problem to solve. Therefore, with finding out the main contributors of AP, this study will play a positive effect on optimizing educational programs and therefore improves the AP of college students.

Academic performance, one of the most crucial indicators for college learning, tells students' academic result and continues to affect student's work outcome[1]. To some extent, higher GPA in college seems to be the key for a brighter future for youngsters in many countries. As a result, the discussion of this topic is heated and deeper research is required to uncover the essential contributing factors of AP.

Numerous studies performed in the past decades announced that conscientiousness influences AP, and the research outcomes are also reported to be solid[2-5]. While vast of studies focus on the positive effectiveness of conscientiousness on learning performance, it is also significant to work on the variables that can mediate the path through conscientiousness and academic performance. This study began with interests towards these potential mediating variables.

As for potential mediating variables, academic self-efficacy(ASE)'s close relationship with both conscientiousness[6] and AP[7] has reassured its viability. To be more specific, when ASE increases, AP also improves. In this situation, ASE has a mediating effect in the connection through conscientiousness and AP. Studies concerning this area are in actual demands as the potential mediator is essential in alleviating AP.

Hope is considered to be a powerful force in human's life. Under academic context, it is also an positive power to overcome all sorts of difficulties. Further, students of higher hope are also higher in conscientiousness[8], and more importantly, hope will affect AP[9]. Therefore, hope also potentially mediates the connection via conscientiousness and AP. More importantly, whether this hypothesis is possible in actual cases is vital. If the potential mediators are verified, as a result, potential intervention practices can also be designed to enhance AP.

Therefore, the current study focuses on uncovering factors that will improve AP. Also, through dual mediating analysis, the study intend to verify whether ASE and hope are double mediating the path through conscientiousness and AP will be tested. The following research questions were as follows. Firstly, what is the correlation between ASE and hope in the link between conscientiousness and AP? Secondly, do ASE and hope contribute to a dual-mediating effect in the path via conscientiousness and AP?

## **2. Literature Review**

### **2.1 Conscientiousness and Academic Performance**

To begin with, most researchers are familiar with conscientiousness, as it is included in Big Five theory[10]. Conscientiousness is normally understood as "the tendency to be organized, responsible, and hardworking"[11] as well as "the propensity to follow socially prescribed norms for impulse control, to be goal directed, to plan, and to be able to delay gratification and to follow norms and rules"[12]. Moreover, four popular domains of conscientiousness are consists of orderliness, industriousness, self-control as well as responsibility[13]. Additionally, as indicated from recent study, punctuality seems to be a possible facets of conscientiousness[14].

More importantly, AP, a vital predictor of outcomes at various levels of education and job consequences[1], is well explained by social-cognitive theory of motivation, which is that students' behaviour is a function of desires to achieve particular goals[15]. Additionally, college students' AP is usually expressed as GPA[16].

Further, conscientiousness and AP are closely interrelated. For instance, within Big Five theory,

conscientiousness is testified as the primary element that associated consistently with academic achievement[2][3]. And plenty of research results support the view that students with higher conscientiousness achieve higher academic success, both in high school[4] and in university[5]. However, the needs to explore the mediators between these two variables are not thorough and therefore vastly demanding.

## 2.2 Mediating Effect of Academic Self-Efficacy and Hope

In this study, most of the current attention is paid to whether ASE and hope mediate the link through conscientiousness and AP.

Within academic situations, self-efficacy is normally named as ASE, which means learners' judgments on one's ability to successfully achieve educational goals[17]. Also, it describes the beliefs by which students complete a task or achieve a goal[18].

Further, ASE is testified to be interacted with both conscientiousness[6] and AP[7]. Moreover, several studies' result had assured conscientiousness' positive contributing effect on ASE[19],and that ASE positively affected AP[20]. As a result, the mediation effectiveness of ASE through conscientiousness and AP seems viable. Also, existing evidence suggests the mediation effectiveness of ASE in the learning context[21].

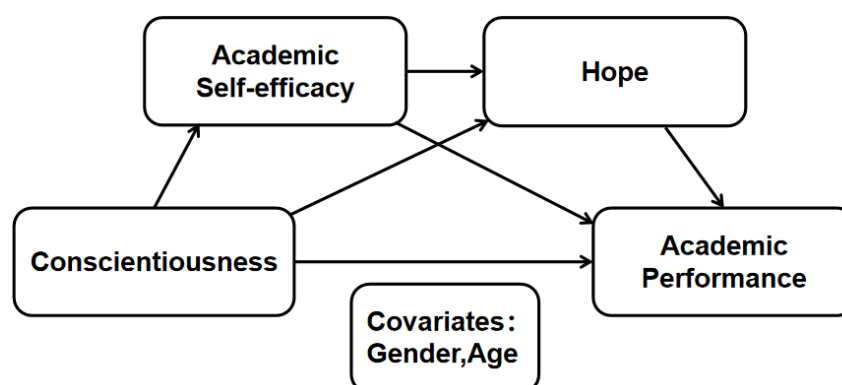
In terms of hope, it is defined as expectation that individuals can facilitate positive outcomes through their own planning and initiative, which consists of pathways and agency[22].

More importantly, research has indicated a positive correlation between hope and conscientiousness[8].Also, the positive connection of hope and AP is solid. Base on recent study results, conscientiousness exerts positively on hope[23] and individuals of higher hope tend to perform better academically than the lower ones[9]. Therefore, hope's mediating effect between conscientiousness and AP is possible. In addition, the mediating effect of hope is traceable from several studies[24][25]. However, study relating to the mediation effectiveness of hope is still lacking. To summarize, the simple mediation role of ASE and hope was theoretically confirmed.

Last but not least, as discussed earlier that conscientiousness predicts ASE[19], ASE affects hope positively[26] and hope influences AP in a positive way[9], this study attempts to confirm whether these two mediators have a dual mediation effect in the series. That is, the purpose here aims to confirm whether ASE and hope mediate the connection via conscientiousness and AP.

## 3. Research Methods

### 3.1 Research Model



[Fig. 1] Research Model

To testify the double mediating effectiveness of ASE and hope in the path through conscientiousness and AP in college learners, this research model was set up as shown in [Fig. 1] by the analyzing process of model No.6 of SPSS PROCESS macro.

### **3.2 Participants and Data Collection**

This study conducted purposive sampling on university students in two colleges located in Guangzhou of China. One college is a public school with liberal arts while the other one is a private school with science. Before the survey was conducted, enough introduction about the purpose of this study was provided and students were fully understood. The questionnaires were anonymous and students agreed to informed consent. 403 university students were recruited voluntarily and then among them, 3 students' responded inappropriately were excluded. Finally, a total of 400 questionnaire results were used. To be more specific, 103 students' data were collected from one college and 297 students' data were from another one from June 2023 to July 2023.

The general characteristics indicating the participants are as follows. Males took up 34.8% while females represented 65.2%. By age, 18.8% of students were less than 20 years old, 17.2% were 20 years old, 14.2% were 21 years old, 29% were 22 years old and 20.8% were over 22 years old.

### **3.3 Research Tools**

#### **3.3.1 Conscientiousness**

To measure conscientiousness, the sub-scale of NEO-FFI developed by Costa and McCrae[27] and validated by Zhang et al.[28] was utilized. The researcher had modified some of the questions for the better understanding of Chinese students. This sub-scale of conscientiousness consists of 12 items. It's a 5-point Likert scale ranging from "Strongly disagree" to "strongly agree". Higher point indicates stronger conscientiousness. Current study's reliability of the conscientiousness-scale had a Cronbach's  $\alpha$  value of .626.

#### **3.3.2 Academic self-efficacy**

To measure ASE, scale developed by Liang[29] for Chinese situation was utilized. This Chinese scale originates from Pintrich's self-regulatory learning strategies scale[30]. This Chinese scale has a total of 22 items. It's a 5-point Likert scale ranging from "Strongly disagree" to "strongly agree". Increasing score suggests higher ASE. Current study's reliability of ASE-scale showed that Cronbach's  $\alpha$  value was .859.

#### **3.3.3 Hope**

Originated from the scale designed by Snyder et al.[31], the Hope Scale(K-DHS) modified by Choi et al.[32] and translated into Chinese by expert was applied in this study. This scale is of 8 items totally. It's a 5-point Likert scale ranging from "Strongly disagree" to "strongly agree". Increasing score represents stronger hope. In this study, This research's reliability of hope scale's Cronbach  $\alpha$  value was .894.

#### **3.3.4 Academic performance**

With the recognition of the scale's validity by expert, the scale modified by the researcher was used to measure the AP of college learners. The scale consists of 4 items. It's a 5-point Likert scale ranging from "Strongly disagree" to "strongly agree". Increasing score means better AP. The current study's Cronbach's  $\alpha$  of AP scale showed .934.

### 3.3.5 Covariates

Among the personal characteristics that affect mediating variables and dependent variables, gender, and age were controlled during the analysis.

### 3.4 Data Analysis

During current research, SPSS Ver. 25 and SPSS PROCESS macro Ver. 4.2 were utilized to analyze data. With frequency analysis, the characteristics of participants and general trends of variables were identified. Moreover, Cronbach's  $\alpha$  was produced to test the reliability. To figure out the first research question, the connection among variables, the researcher used Pearson's bivariate correlation analyzing method. Besides, to solve the second research question, model number 6 of SPSS PROCESS macro was utilized to figure out the dual mediating effect. To analyze mediating effectiveness, confidence level was leveled at 95%, and bootstrap samples' figure was 5,000.

## 4. Results

### 4.1 Correlation Between Main Variables

Utilizing Pearson's correlation method, the outcomes of association within variables are shown inside [Table 1]. Conscientiousness was positively associated with ASE ( $r=.477, p<.01$ ), hope ( $r=.289, p<.01$ ) and AP ( $r=.430, p<.01$ ). ASE was positively connected with hope ( $r=.668, p<.01$ ) as well as AP ( $r=.730, p<.01$ ). And hope was positively correlated with AP ( $r=.640, p<.01$ ). Meanwhile, the correlation coefficient between hope and AP was higher than .7, suggesting multicollinearity issue. As a result, a regression analysis with AP as dependent variable, conscientiousness, academic self-efficiency, and hope as independent variables, VIF and tolerance for diagnosing multicollinearity were calculated. Results indicate that the tolerance was less than 1 and larger than 0.4 for all independent variables, and the value of VIF was less than 3, so it was judged that there was no problem of multicollinearity [33].

As for frequency analysis, the values of all variables were higher than the median value of 3. Hope had the highest average of 3.78, conscientiousness average of 3.58, ASE average of 3.54, and hope average of 3.48.

[Table 1] Correlation and Descriptive Statistics Analysis Results

	1	2	3	4
1. Conscientiousness	1			
2. Academic self-efficiency	.477**	1		
3. Hope	.289**	.668**	1	
4. AP	.430**	.730**	.640**	1
M	3.5835	3.5423	3.4831	3.7781
SD	.39655	.44263	.82747	.60993

\*\* $p<.01$

### 4.2 Dual Mediating Effect

To determine the double mediating effectiveness of ASE and hope towards the link of conscientiousness and AP, model number 6 of SPSS PROCESS macro was performed. During analyzing, bootstrap confidence interval was 95% and samples were set at 5000. Gender and age were

controlled. Results are shown in [Table 2] and [Fig. 2].

Conscientiousness positively influenced ASE (.5374,  $p < .001$ ), and hope (.1689,  $p < .01$ ). ASE positively influenced hope (.9328,  $p < .001$ ) and AP (.8528,  $p < .001$ ). Hope also significantly affected AP (.4541,  $p < .001$ ).

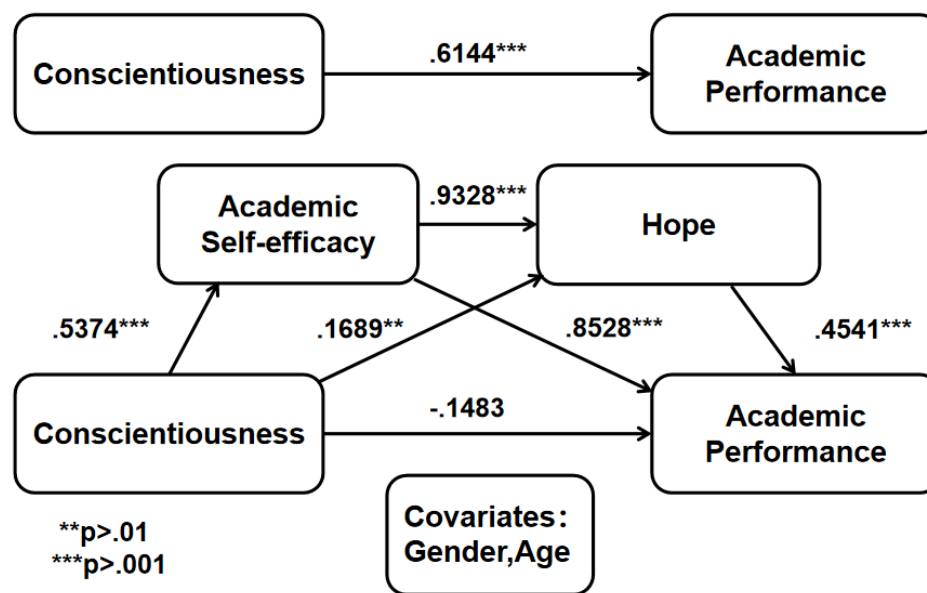
The total effect showed .6144 (.4148 ~ .8109), the direct effect was -.1438 (-.3162 ~ .0197), and the total indirect effect was .7626 (.6052 ~ .9344). The total effect and total indirect effect were significant as there was no zero indicated from upper to lower bootstrap values.

Indirect effects were verified through the bootstrap method. The indirect effect of ASE was .4583 (.3084 ~ .6321), the indirect effect of hope was .0767 (.0144 ~ .1475), and the dual mediating effect of ASE and hope was .2277 (.1381 ~ .3327), which was also significant as the bootstrap values showed.

[Table 2] Results of Analysis of Dual Mediating Effect of Ase and Hope

Variables		Mediating variable model 1 (DV: ASE)			Mediating variable model 2 (DV: Hope)			Dependent variable model (DV: Academic performance)		
		Coeffect	SE	t-value	Coeffect	SE	t-value	Coeffect	SE	t-value
Constant		1.6820	.1915	8.7849***	-.0328	.2224	-.1476	-.4946	.3148	-1.5710
ID	Conscientiousness	.5374	.0493	10.8994***	.1689	.0594	2.8271**	-.1483	.0854	-1.7359
M1	ASE				.9328	.0534	17.4728***	.8528	.1007	8.4729***
M2	Hope							.4541	.0712	6.3742***
Covariates	Gender	-.0522	.0410	-1.2724*	-.0579	.0437	-1.3253	-.0810	.0620	-1.3068
	Age	.0066	.0137	.4774	-.0009	.0146	-.0603	-.0296	.0207	-1.4330
Model Summary	R2		.2312			.5442			.5048	
	F		39.7060***			117.8910***			80.3138***	
Effects				Effect	SE	Confidence interval				
						LLCI	ULCI			
Total effect				.6144	.1000	.4148	.8109			
Direct effect				-.1483	.0854	-.3162	.0197			
Total indirect effect				.7626	.0823	.6052	.9344			
Indirect effect	Conscientiousness → ASE → AP			.4583	.0840	.3084	.6321			
	Conscientiousness → Hope → AP			.0767	.0334	.0144	.1475			
	Conscientiousness → ASE → Hope → AP			.2277	.0503	.1381	.3327			

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , ID: Independent variable, DV: Dependent variable, M: Mediating variable



[Fig. 2] Dual Mediating Effect of Ase and Hope

## 5. Discussion

The current study concentrates on the influence of conscientiousness, ASE, hope and AP on colleges learners. Discussion based on the research findings are introduced below:

Firstly, the correlation analysis of the main variables represents a positive correlation among conscientiousness, ASE, hope and AP. The research results in current study are in line with previous ones, namely that conscientiousness positively connected with AP, that conscientiousness positively affected ASE, that conscientiousness revealed a positive relationship with hope, and that ASE and hope indicate positive relationships with AP respectively. As a result, to enhance the AP of college learners, it is a necessity to enhance not only students' conscientiousness status but also to operate effective and viable programs that can bring stronger ASE to students in needs. Also, strategies to alleviate hope status of students through activities and presentations would be desirable and necessary.

Secondly, as the result of the dual mediation effect analysis indicates, the ASE and hope's double mediation effect in the connection through conscientiousness and AP is verified and supported. To be more specific, while the path coefficient through conscientiousness and AP was significant, it was not significant when ASE and hope were added as mediators. Therefore, it shows a full mediation effect.

Lastly, ASE and hope simply mediated the path via conscientiousness and AP, respectively. Despite the previous study in this particular area is limited and those related ones were of different independent variables[34]. The current results were consistent with most previous studies that indicating ASE and hope were affected by conscientiousness and had influence on AP. The result of this study recommends that it is significant to improve AP by designing economical intervention programs that contributes to better ASE and hope status for college students. Also, the inter-relations of student's self-efficacy and hope should not be neglected by educators.

## 6. Conclusion

To sum up, this study confirmed the dual mediating effects of ASE and hope in the link between conscientiousness and AP in college students, which means that AP can be lifted by conscientiousness.

More importantly, ASE and hope also contribute to the connection from conscientiousness to AP.

The limitations for current study include the followings. The data were gathered at the end of the term and students might be under more pressure than usual and rush to complete the questionnaires. Moreover, the sample was limited to Chinese college students in Guangdong province.

Despite these above limitations, this study is of significance as it identified a complete dual mediating effects of ASE and hope in the path via conscientiousness and AP among college learners. For future directions, studies on the moderating variable that could enhance students' ASE and hope are promising. Besides, intervention programs could be designed based on the current study results and further applied to educational scenarios.

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