

# The Relationship between Locus of Control and Academic Adaptability Among College Students: Mediating Effect of Academic Self-Efficacy

Yongmei Hou and Yuchan Chen

## ABSTRACT

Learning adaptability is a necessary condition for students to complete their learning tasks and achieve good performance. From the connotation of locus of control, academic self-efficacy and learning adaptability, we can see that there is a strong logical connection among the three. The aim of this paper was to explore the characteristics of locus of control, academic self-efficacy and learning adaptability in college students, and analyze the relationship among the above 3 variables. Stratified random sampling was used to select five hundred and nineteen college students from 7 universities in Guangdong Province. They were investigated with Academic Self-Efficacy Scale (ASES), Learning Adaptability Scale for College Students (LAS), and Internality, Powerful Others, and Chance Scale (IPC). The survey results indicated the following three points. First, the total scores of ASES, LAS, IPC were  $(68.90 \pm 10.95)$ ,  $(95.61 \pm 15.46)$ ,  $(27.70 \pm 5.65)$ ,  $(18.06 \pm 7.73)$  and  $(19.65 \pm 6.83)$ , respectively; Second, there was a pairwise correlation among the scores of internality, academic ability self-efficacy and LAS ( $r=0.69, 0.37, 0.61$ , all  $P<0.01$ ), a pairwise correlation among the scores of internality, academic behavior self-efficacy and LAS ( $r=0.67, 0.37, 0.23$ , all  $P<0.01$ ), as well as a pairwise correlation among the scores of internality, academic self-efficacy and LAS ( $r=0.71, 0.37, 0.55$ , all  $P<0.01$ ); Third, the scores of academic ability self-efficacy, academic behavior self-efficacy and academic self-efficacy played a partly mediating effect in the relationship between the score of internality and LAS, with the mediation effect counting for 57.8 %, 27.2 % and 72.9% of the total effect, respectively. It is therefore suggested that internality not only has a direct role on the learning adaptability of college students, but also indirectly affects it through academic self-efficacy.

**Keywords:** academic self-efficacy, college students, learning adaptability, locus of control, mediating effect.

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## I. INTRODUCTION

Locus of control (Rotter & Phares, 1972) is a generalized expectation about the relationship between individual personality and/or behavior and event outcome. The locus of control can be divided into external and internal control. The external controller thinks that the outcome of things is determined by opportunities or others, while the internal controller thinks that the outcome of things is determined by his own ability or personality.

Academic self-efficacy is the performance of self-efficacy in the academic field, also known as academic self-confidence, which refers to the subjective evaluation and judgment of students' ability to complete specific academic problems and the extent to which they engage in corresponding learning activities to achieve learning goals (Schunk, 1989). Academic self-efficacy will directly affect individuals' choice and persistence of learning tasks, degree of effort and behavior (Taghani & Razavi, 2021), and can guide individuals' development by affecting the learning

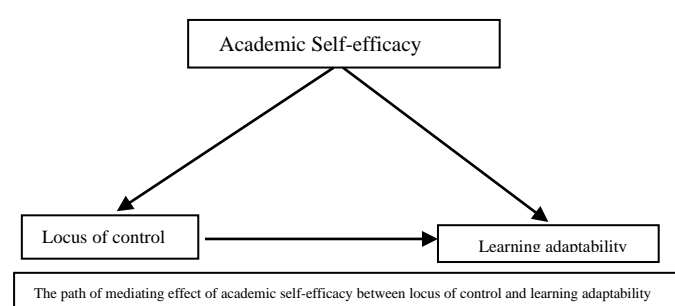
choice process, thinking process, motivation process and expectation of task completion. Specifically, those with higher academic self-efficacy have stronger learning self-confidence, often set higher learning goals for themselves, choose more difficult learning tasks, and are more likely to overcome difficulties and complete learning tasks with a strong will in the face of learning setbacks. Empirical research shows that academic self-efficacy can positively predict professional commitment (Hongxia *et al.*, 2020), academic emotion (Jie & Shanggui, 2013), learning adaptability (Jie & Shanggui, 2013), daily learning flexibility (Qin & Chenyi, 2020), academic performance (Eakman *et al.*, 2019; Xing & Jiandong, 2019), self-esteem (Junjie *et al.*, 2020), life satisfaction (Qin & Chenyi, 2020), subjective well-being (Dai *et al.*, 2012) and mental health level (Yusong, 2014); negatively predict psychological and behavioral problems such as fear of failure (Zhongyong & Xinguo, 2018), academic procrastination (Zhongyong & Xinguo, 2018), learning burnout (Junjie *et al.*, 2020), test anxiety (Warshawski *et al.*, 2019), social anxiety (Dai *et al.*,

2012), boredom (Xiaofang & Xiaoxian, 2017) and online game addiction (Mei *et al.*, 2021), etc.

Learning adaptability refers to the ability of students to adjust their body and mind according to the changes in learning conditions such as learning attitude, methods, and environment, mainly in the aspects of learning motivation and behavior, in order to achieve a favorable state of balance between internal and external learning environments (Martin, 2001). Generally speaking, when individuals face the breaking of the original balance, they will generate new learning needs, and then, through the role of learning incentives and active self-regulation, achieve learning adaptability (Chartrand, 1990). It can be seen that learning adaptability is a necessary condition for students to complete their learning tasks and achieve good performance. In addition, learning adaptability runs through the whole learning stage. However, previous studies were relatively in-depth on the learning adaptability of primary and secondary school students or focused on the learning adaptability of college freshmen. There were few studies on the learning adaptability of the entire college student group.

From the connotation of locus of control, academic self-efficacy and learning adaptability, we can see that there is a strong logical connection among the three: internal and external controller have different evaluations on the role of academic self-efficacy (i.e., the subjective evaluation of learning ability) in learning outcomes. Internal controllers believe that academic self-efficacy determines learning outcomes, while external controllers believe that learning outcomes are determined by learning opportunities or environments. Therefore, when learning conditions change or learning difficulties are encountered, internal controllers can actively find their own shortcomings, actively change learning strategies and motivation, and adjust their effort, so that they are more likely to overcome difficulties and adapt to the new needs of learning. Meanwhile, external controllers passively wait for the change of learning conditions.

On the other hand, empirical research found that there was a significant pairwise correlation between locus of control, academic self-efficacy and learning adaptability (Martin, 2001; Mohammed *et al.*, 2020; Rixia, 2020; Li *et al.*, 2008). Learning adaptability is a series of explicit behaviors and emotional reactions, which belongs to the result variable; Locus of control is an internal personality trait, which belongs to a remote variable. Academic self-efficacy is a judgment of one's own learning ability and behavior control ability, which belongs to a proximal variable. Locus of control should be mediated by academic self-efficacy. Therefore, we can assume that academic self-efficacy plays a mediating role between locus of control and learning adaptability, and the influence path is shown in Fig. 1:



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## II. OBJECTS AND METHODS

### A. Objects

#### 1) Sample size estimation

The minimum sample size is calculated by  $G * \text{power}^3$  (Franz *et al.*, 2007). Previous studies have shown that the test effect value of domestic research on the learning adaptability of college students is at the medium level, that is, the  $d$  value is 0.50-0.80 (Martin *et al.*, 2001; Chartrand, 1990; Mohammed *et al.*, 2020; Li *et al.*, 2008). In this study, we set the effect value  $d=0.70$ , and the statistical test power of  $1-\beta=0.80$ , the type I error probability  $\alpha=0.05$ . Since there are 10 independent variables, the minimum sample size required for the survey is calculated as 150. Due to a 20% of possible follow-up loss rate, the minimum sample size is determined as 188.

#### 2) Sampling

By stratified random sampling, 600 questionnaires were distributed to college students from 7 universities, including Sun Yat sen University, South China University of Technology, Zhongkai Agricultural College, Guangdong Pharmaceutical University, Guangzhou Academy of Fine Arts, Guangzhou Institute of Physical Education, and Guangzhou Institute of Finance. Five hundred and nineteen valid questionnaires were collected, with an effective rate of 86.5%. The age is 18–25 years ( $20.45 \pm 2.26$  years on average), There were 257 boys and 262 girls: 124 freshmen, 111 sophomores, 106 juniors, 96 seniors and 82 fifth-year students.

### B. Tools

#### 1) Internality, powerful others, and chance scale, IPC

It is compiled by Levenson (1981), revised by Xin Yu into Chinese version (Xiangdong, 1999). IPC has 24 items, divided into 3 subscales of internality (I), powerful others (P) and Chance (C), with 8 items for each subscale. The Likert 6-point scoring method is used to score from (-3) to (+3) points corresponding to “completely disagreed” to “completely agreed.” When calculating the total score of the subscale, 24 points are added to offset the negative score, so the total score of each subscale ranges from 0–48. The higher the score of a certain item or subscale, the more obvious the tendency of the item or subscale. In this study, Cronbach'  $\alpha$  Coefficient of the total scale is 0.754, and Cronbach'  $\alpha$  coefficients of 3 subscales of I, P and C are 0.683, 0.820 and 0.769, respectively.

#### 2) Academic self-efficacy scale, ASES

It is compiled by Yusong Liang (2000) based on the Academic Self-Efficacy Questionnaire (Pinrich & DeGroot, 1990). ASES has a total of 22 questions, which are divided into two dimensions: academic ability self-efficacy and academic behavior self-efficacy. There are 11 questions for each dimension. The Likert 5-point scoring method is used to score from 1 to 5 points corresponding to “completely disagreed” to “completely agreed.” The higher the total score, the higher the academic self-efficacy. In this study, Cronbach'  $\alpha$  coefficient of the total scale is 0.858, and Cronbach'  $\alpha$  Coefficients of academic ability self-efficacy and academic behavior self-efficacy are 0.813 and 0.737, respectively.

### 3) Learning adaptability scale for college students, LAS

It is compiled by Tingyong Feng *et al.* (2006), with 29 items which are divided into five dimensions: learning motivation, teaching mode, learning ability, learning attitude and environmental factors. The Likert 5-point scoring method is used to score from 1 to 5 points corresponding to “completely non-compliant” to “completely compliant.” The higher the score of the total scale, the better the learning adaptation. In this study, Cronbach’  $\alpha$  coefficient of the total scale is 0.842, and Cronbach’ $\alpha$  coefficients of each dimension is 0.680-0.889.

#### C. Data Processing

SPSS 20.0 is used for statistical analysis. Descriptive statistics are used to calculate the mean scores and standard deviations; Pearson product difference correlation is used to explore the correlation among variables; Linear regression analysis is used to analyze the mediating role of academic self-efficacy between locus of control and learning adaptability.

## III. RESULTS

### A. Common Method Deviation Test

Since the data of this study are all from the questionnaire (self-report of the subjects), there may be common bias. After data collection, Harman single factor test (Hao & Lirong, 2004) is used to test the common method deviation. The results showed that there are 17 factors with eigenvalues greater than 1, and the first factor explains 24.34% of the total variation, which is less than the critical criterion of 40%. Therefore, the influence of common method bias on the results of this study can be excluded.

### B. The Status Quo of College Students’ Academic Self-Efficacy, Learning Adaptability and Locus of Control

Table I shows that the students in this group have low internality (Levenson, 1981; Xiangdong, 1999), and the score of powerful others (Levenson, 1981; Xiangdong, 1999), chance (Levenson, 1981; Xiangdong, 1999), the total score of ASES and two dimensions (Pintrich *et al.*, 1993; Yusong, 2000), as well as the total score of LAS and five dimensions (Levenson, 1981; Xiangdong, 1999) are at the middle level.

### C. Correlation Analysis Between the Scores of Each Scale

It can be seen from Table II that the total scores of internalities, self-efficacy of academic ability and LAS are correlated in twos ( $r=0.69, 0.37, 0.61$ , all  $P<0.01$ ); The total scores of internalities, academic behavior self-efficacy, LAS are correlated in twos ( $r=0.67, 0.37, 0.23$ , all  $P<0.01$ ); The total scores of internalities, ASES and LAS are correlated in twos ( $r=0.71, 0.37, 0.55$ , all  $P<0.01$ ).

### D. The Mediating Effect Test of Scores of ASES between Locus of Control and Learning Adaptability

According to the mediation effect test method proposed by Zhonglin Wen *et al.* (2005), the score of internalities is used as independent variable, the total score of LAS is used as dependent variable, and the total score of ASES and the

scores of the two subscales are used as the intermediate variables. The results are shown in Tables III to V.

TABLE I: DESCRIPTIVE STATISTICS OF SCORES OF EACH SCALE (N=519)

Variable	Min	Max	M	SD
Ability self-efficacy	14.00	52.00	35.66	6.77
Behavioral self-efficacy	20.00	48.00	33.24	5.36
Academic self-efficacy	36.00	96.00	68.90	10.95
Learning motivation	9.00	37.00	26.03	5.41
Teaching model	11.00	33.00	23.39	4.42
Learning ability	6.00	29.00	20.22	3.90
Learning attitude	4.00	20.00	14.41	3.06
Environmental factor	5.00	20.00	11.86	3.16
Total score of LAS	44.00	129.00	95.61	15.46
Internality	21.00	54.00	27.70	5.65
Powerful others	0.00	41.00	18.06	7.73
Chance	3.00	39.00	19.65	6.83

#### 1) The mediating effect test of ability self-efficacy between locus of control and learning adaptability

Table III shows that ability self-efficacy has a partial mediating effect between internality and the total score LAS. The ratio of the mediating effect to the total effect is:

$$\text{effect } m = a \times b / c \times 100\% = (0.691) \times (0.313) / 0.374 \times 100\% = 57.83\% \quad (1)$$

#### 2) The mediating effect test of behavioral self-efficacy between locus of control and learning adaptability

Table IV shows that behavioral self-efficacy has a partial mediating effect between internality and the total score LAS. The ratio of the mediating effect to the total effect is:

$$\text{effect } m = a \times b / c \times 100\% = (0.670) \times (0.153) / 0.374 \times 100\% = 27.41\% \quad (2)$$

#### 3) The mediating effect test of academic self-efficacy between locus of control and learning adaptability

It can be seen from Table V that academic self-efficacy has a partial mediating effect between internality and the total score LAS. The ratio of the mediating effect to the total effect is:

$$\text{effect } m = a \times b / c \times 100\% = (0.709) \times (0.383) / 0.374 \times 100\% = 72.61\% \quad (3)$$

## IV. DISCUSSION

The students in this group have low internal control, and the scores of powerful others, chance, the total score of ASES and scores of both dimensions, the total score of LAS and the scores of five dimensions are at the middle level, which is consistent with the results of previous studies (Schunk, 1989; Eakman *et al.*, 2019; Mohammed *et al.*, 2019; Rixia *et al.*, 2020; Li *et al.*, 2008). It is suggested that college students as a whole are not confident enough to successfully complete their studies and achieve good results, and their learning adaptability also needs to be improved.

TABLE II: ANALYSIS OF CORRELATION BETWEEN SCORES OF EACH SCALE (N=519)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Ability self-efficacy												
2. Behavioral self-efficacy	0.54**											
3. Academic self-efficacy	0.92**	0.83**										
4. Learning motivation	0.56**	0.28**	0.54**									
5. Teaching model	0.29**	-0.02	0.20**	0.36**								
6. Learning ability	0.71**	0.37**	0.65**	0.46**	0.24**							
7. Learning attitude	0.33**	0.06	0.27**	0.33**	0.49**	0.27**						
8. Environmental factor	0.16*	-0.18*	-0.06	0.15**	0.32**	0.04	0.35**					
9. Total score of LAS	0.61**	0.23**	0.55**	0.74**	0.77**	0.68**	0.70**	0.49**				
10. Internality	0.69**	0.67**	0.71**	0.53**	0.01	0.30**	0.45**	0.02	0.37**			
11. Powerful others	-0.30**	-0.34**	-0.32**	-0.07	0.01	-0.11*	-0.23**	0.21**	-0.07	-0.17*		
12. Chance	-0.46**	-0.48**	-0.50**	0.01	0.14*	-0.03	-0.12*	0.02	0.03	-0.27**	0.72**	

Notes: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

TABLE III: TEST OF MEDIATING EFFECT OF ABILITY SELF-EFFICACY ON INTERNALITY AND LAS TOTAL SCORE

Step	Dependent variable	Independent variable	$\beta$	t	R <sup>2</sup>
Step 1 (c)	LAS total score	Internality	0.374	6.305**	0.137
Step 2 (a)	Ability self-efficacy	Internality	0.691	2.394*	0.476
Step 3 (c')	LAS total score	Internality	0.252	3.836**	0.159
(b)		Competence self-efficacy	0.313	5.309**	

TABLE IV: TEST OF MEDIATION EFFECT OF BEHAVIORAL SELF-EFFICACY ON INTERNALITY AND LAS TOTAL SCORE

Step	Dependent variable	Independent variable	$\beta$	t	R <sup>2</sup>
Step 1 (c)	LAS total score	Internality	0.374	6.305**	0.137
Step 2 (a)	Behavioral self-efficacy	Internality	0.670	5.112*	0.349
Step 3 (c')	LAS total score	Internality	0.191	3.836**	0.184
(b)		Behavioral self-efficacy	0.153	7.228**	

TABLE V: TEST OF MEDIATION EFFECT OF ACADEMIC SELF-EFFICACY ON INTERNALITY AND LAS TOTAL SCORE

Step	Dependent variable	Independent variable	$\beta$	T	R <sup>2</sup>
Step 1 (c)	LAS total score	Internality	0.374	4.523**	0.137
Step 2 (a)	Academic self-efficacy	Internality	0.709	7.677*	0.449
Step 3 (c')	LAS total score	Internality	0.222	5.008**	0.199
(b)		Behavioral self-efficacy	0.383	3.996**	

Although they can initially realize the roles of external and internal factors on academic performance, they pay more attention to the roles of external factors such as chance or others and fail to fully realize the roles of internal factors such as abilities and personality. This study finds that there are significant direct and indirect effects between college students' internality and learning adaptability.

First, there is a significant positive correlation between college students' internality and their learning adaptability, indicating the direct effects which is consistent with the results of previous studies (Chartrand, 1990; Mohammed *et al.*, 2020; Li, 2008). In other words, the higher the internality, the stronger the learning adaptability of college students. This is because the locus of control is a stable attribution tendency, which can guide a series of personal follow-up behaviors. Students with high internality believe that internal factors determine the success or failure of learning. So, they are willing to find reasons from themselves, can actively find learning resources, and adjust their learning attitude and methods to make their learning progress consistent with the requirements, thus showing good learning adaptability. On the contrary, students with low internality believe that external factors determine the success or failure of learning. So, they are inclined to

attribute learning setbacks to others or environment and other external factors, and passively wait for others to make changes or the environment to change. This practice tends to lead to two major consequences: the direct result is that negative waiting wastes time, and more seriously, learning difficulties have individual differences, and their occurrence both development and solution depend on learners' own ability and efforts. Changes in others or the environment cannot meet the ever-changing individual differences, which will not improve learning adaptability.

Second, there are significant indirect effects between internality and learning adaptability. The specific path is as follows: internality-academic self-efficacy-learning adaptability, that is, academic self-efficacy plays a partial intermediary role between internality and learning adaptability. High internalities tend to have a higher sense of academic self-efficacy, their academic expectations are higher, and they can overcome increasing learning difficulties with higher self-confidence and stronger willpower, complete more and more heavy learning tasks, and their learning adaptability will also be strengthened.



## V. CONCLUSION

This study preliminarily explored the relationship among college students' internality, academic self-efficacy and learning adaptability, and proved the following theoretical hypothesis: academic self-efficacy plays a partial intermediary role between internality and learning adaptability. On one hand, there is a significant positive correlation between internality and learning adaptability, which is a direct effect between the two; On the other hand, there is an indirect effect between internality and learning adaptability. The specific action path is as follows: internality-academic self-efficacy - learning adaptability.

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