

Effect of Academic Self-Efficacy on Test Anxiety of Higher Vocational College Students: The Chain Mediating Effect

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Objective: This study aimed to investigate the impact of academic self-efficacy on test anxiety among higher vocational students, as well as the role of sense of life meaning, fear of failure, and gender difference in mediating this relationship.

Methods: A total of 2231 higher vocational students from Shandong Province were surveyed by means of Academic Self-efficacy Questionnaire, Meaning in Life Questionnaire, and Test Anxiety Scale.

Results: There were significant negative correlations among academic self-efficacy, sense of life meaning, and test anxiety. Fear of failure was positively correlated with test anxiety. Sense of life meaning and fear of failure played a mediating role in the relationship between academic self-efficacy and test anxiety. The chain mediating effect was significant only in the female group, not in the male group. In contrast, academic self-efficacy indirectly predicted test anxiety by the independent mediating effect of sense of life meaning or fear of failure in the male group.

Conclusion: Academic self-efficacy may influence test anxiety through the independent mediating effect of sense of life meaning, fear of failure, and the chain mediating effect, and there is a gender difference in these effects.

Keywords: higher vocational students, academic self-efficacy, sense of life meaning, fear of failure, test anxiety

Introduction

As the worst group of Chinese college students in academic performance, students in higher vocational colleges not only present many similarities in their studies, but also are faced with more and more frequent test anxiety. Taking vocational college students as the research object, which is easier to figure out the rule behind this phenomenon, which will promote the academic development and education level of higher vocational colleges. Test anxiety is mainly manifested in confusion, excessive tension, and corresponding physiological arousal of some candidates before or during the test.¹ Severe test anxiety not only affects students' academic performance, but also imposes a negative impact on attention, memory, and other cognitive activities.²

Krispenz et al found that individuals with low academic self-efficacy often show test anxiety when facing tests, and academic self-efficacy can be used to explain test anxiety adequately.³ Chinese professor Yang Qingsong explored the impact of academic self-efficacy on test anxiety of middle-school students, as well as the chain mediating effect of sense of life meaning. It had provided a good idea of investigating the impact of academic self-efficacy on test anxiety.⁴ Academic self-efficacy refers to an individual's judgment and confidence in his ability to complete academic planning, which is a specific form of competence in the study.⁵ Therefore, this study considers academic self-efficacy as an important factor affecting test anxiety. The mechanism model of self-efficacy supports this notion, self-efficacy affects the psychosomatic responses of the subjects through various mediations factors.⁶

Based on the literature review summary, it is concluded that the sense of life meaning and fear of failure are critical mediating variables. Sense of life meaning refers to the subjective experience of an individual feeling that life is valuable and oriented.⁷ A large number of studies have confirmed that sense of life meaning is a crucial psychological capital to reduce personal anxiety and psychological problems.⁷ It has also been found that the sense of life meaning plays a significant role in predicting mental health.

Self-efficacy, as exploratory self-identification of one's ability, is a necessary condition and an important content of the sense of meaning of life.⁸ Relevant empirical studies also confirmed that occupational self-efficacy⁹ and network self-efficacy¹⁰ both could positively predict the sense of life meaning. Based on this, this study concludes that the sense of life meaning plays a mediating role between academic self-efficacy and test anxiety.

Fear of failure is a negative cognition. According to the cognitive-evaluation theory of emotion, Conroy believes that evaluation plays an important role in fear of failure, such as confusion about the future and fear of low self-evaluation.¹¹ In the face of challenging tasks, individuals with a higher degree of fear of failure often tend to hold negative expectations for the results, believing that the consequences of failure are severe and unbearable, which can easily cause harm to personal dignity, such as being despised, laughed at and humiliated by others. Studies have shown that fear of failure can reduce mental resilience, decrease motivation, increase anxiety, and even lead to anorexia, and depression.¹² Studies have found that fear of poor academic performance is a fundamental reason for middle school students' test anxiety,¹³ and fear of failure can indirectly lead to a decline in students' academic performance.¹⁴ Therefore, the fear of failure is likely to be the cause of test anxiety.

Based on the theory of sense of life meaning, the sense of life meaning is an individual cognition and evaluative understanding of the value of life, and it is the basis of individual existence and the effect of individual psychology and behavior motivation. Once individuals establish a clear perception of having a strong sense of life meaning, they will be prompted to stimulate their strong potential, clarify their life goals and directions, and afford positive responses more easily at risk. This alignment enables them to pursue a life that is in line with the value of life. Relevant empirical studies have also investigated that sense of life meaning has a significant predictive effect on fear of failure.¹⁵ Based on the above inference, it can be further inferred that the sense of life meaning and fear of failure may play a chain mediating role between academic self-efficacy and test anxiety.

The gender difference reflected in self-efficacy and test anxiety is a problem that cannot be ignored for higher vocational students. In the context of Chinese culture, since male students are endowed with more social expectations and responsibilities, they are generally prone to exhibit a stronger sense of efficacy in life and study than female students.¹⁶ Most empirical studies have found that male students are superior to female students in self-efficacy¹⁷ and regulation of negative emotions.¹⁸ Professor Yang Qingsong confirmed in his paper that the emotional arousal threshold of male students is higher than that of female students, and middle school exams are more likely to arouse female students' anxiety.⁴ Notably, gender is an important factor affecting test anxiety. The level of test anxiety of males is significantly lower than that of females.¹⁹ Additionally, fear of failure differs in gender. Male students score significantly higher than female students on the fear of losing others' interest and disappointing significant others.²⁰ In contrast, female students score significantly higher on the fear of lowering their self-evaluation. Due to these gender differences, this study concludes that the mediating effects of self-efficacy on test anxiety through life meaning and fear of failure may be moderated by gender.

To sum up, this study aims to address the following questions. First, what is the impact of academic self-efficacy, sense of life meaning, and fear of failure on test anxiety of higher vocational students? Secondly, how do life meaning and fear of failure mediate the relationship between academic self-efficacy and test anxiety? Third, are there gender differences in the relationship between academic self-efficacy and test anxiety? Through this investigation, this paper will provide theoretical supplement for the influence mechanism and practical guidance for alleviating the test anxiety of higher vocational students.

Object and Method

Object

Higher vocational college students from Jinan City in Shandong Province were selected to take the collective test in class. A total of 2446 questionnaires were distributed by each class teacher two weeks before the test. 2231 valid

questionnaires were collected on-site, with an effective rate of 91.2%. Among them, there were 1222 (54.8%) males and 1009 (45.2%) females, with an average age of 17.6 years (SD=1.02).

Tool

The Academic Self-Efficacy Scale

The academic self-efficacy scale was compiled by Pintrich and revised by Liang Yusong.²¹ There are 22 items in total, including two dimensions of academic ability efficacy and academic behavior efficacy. The five-class classification method was adopted from 1 (completely inconsistent) to 5 (completely consistent). The higher the scale score, the stronger the academic self-efficacy. In this survey, the internal consistency coefficient of the whole scale was 0.901.

The Questionnaire of Life Meaning

The questionnaire on life meaning was compiled by Steger and revised by Wang Mengcheng and Dai Xiaoyang.²² A total of 10 items were evaluated on a scale of 1 (strongly disagree) to 7 (strongly agree), divided into two dimensions of life meaning seeking and life meaning experience. The higher the score, the stronger the sense of life meaning. In this survey, the internal consistency coefficient of the whole scale was 0.861.

The Questionnaire of Failure Performance Evaluation

The questionnaire on failure performance evaluation was compiled and revised by Sun Xiaodong.²³ The scale consists of five subscales, namely fear of shame and embarrassment, fear of low self-evaluation, confusion about the future, fear of diminished social value, and fear of disappointing significant others, with a total of 20 items. This survey used Likert's five-point scale (1 being "not consistent" and 5 being "very consistent"). The higher the score, the stronger fear of failure. In this study, the internal consistency reliability coefficient of the total scale was 0.914, and the internal consistency reliability coefficients of the five subscales were 0.819, 0.680, 0.729, 0.831, and 0.812, respectively.

The Test Anxiety Scale

The test anxiety scale was compiled by Sarason and translated by Wang Caikang.²⁴ It has 37 items in total on a scale of 1 to 2. The higher the total score on the scale, the higher the level of test anxiety. In this survey, the internal consistency coefficient of the scale was 0.855.

Statistical Analysis and Common Method Bias Test

Descriptive and correlation analyses were performed using SPSS22.0, while structural equation and multi-group analyses were conducted using AMOS23.0. Harman single factor test was utilized to check this study's degree of common method bias. The results showed that there were 15 factors with characteristic roots more significant than 1, and the variance explained by the first factor was 18.236%, which did not exceed the critical standard of 40%. Therefore, it can be considered that there is no common method bias in the variables involved in this study.

Results

Descriptive Analysis and Correlation Analysis of Each Variable

The study results found that academic self-efficacy, sense of life meaning, and test anxiety were significantly negatively correlated; Fear of failure was positively correlated with test anxiety. Gender was negatively correlated with academic self-efficacy. See Table 1 for details.

Testing of Mediating Effects

The structural equation was employed to test the mediation effect. The scale items were randomly packaged, Academic self-efficacy was packaged into 2 indicators, meaning of life into 2 indicators, fear of failure into 5 indicators, and test anxiety into 4 indicators.²⁵

First, the overall effect of academic self-efficacy on the prediction of test anxiety was examined. The model fitting indexes were $\chi^2/df=3.472$, CFI (comparative fit index)=0.964, TLI (Tucker-Lewis index)=0.914, GFI (goodness-of-fit index)=0.975, RMSEA (root mean square error of approximation)=0.05, SRMR (standardized root mean residual)=0.03.

Table 1 Descriptive Analysis and Correlation Analysis of Each Variable (n=2231)

Variable Name	M±SD	1	2	3	4
1. Academic self-efficacy	3.25±0.70				
2. Sense of life meaning	5.01±0.89	0.578**			
3. Fear of failure	5.61±0.91	-0.411**	-0.401**		
4. Text anxiety	0.57±0.24	-0.421**	-0.471**	0.391**	
5. Gender	1.63±0.5	-0.109**	-0.311**	-0.041	0.234**

Note: ** $P < 0.01$. Gender: male (1), female (2).
Abbreviations: M, mean; SD, standard deviation.

Academic self-efficacy negatively predicted test anxiety ($\gamma = -0.298, P < 0.01$). Secondly, a chain mediation model was established by adding mediating variables such as the sense of life meaning and fear of failure, as shown in Figure 1. The results revealed that the model fitting indexes were $\chi^2/df = 3.564$, CFI=0.944, TLI=0.945, GFI=0.964, RMSEA=0.054, SRMR=0.038, and the model fit was good.

The direct effect of academic self-efficacy on test anxiety was not significant ($\gamma = -0.055, P < 0.01$); Academic self-efficacy positively predicted the sense of life meaning ($\gamma = 0.518, P < 0.01$), and negatively predicted fear of failure ($\gamma = -0.568, P < 0.01$). Meaning of life negatively predicted test anxiety ($\gamma = -0.248, P < 0.01$); The sense of life meaning negatively predicted fear of failure ($\gamma = -0.312, P < 0.01$); Fear of failure positively predicted test anxiety ($\gamma = 0.348, P < 0.01$).

The results indicated that academic self-efficacy affects test anxiety not only through the sense of life meaning and fear of failure, but also through the chain mediation effect of sense of life meaning and fear of failure. In addition, in order to measure the significance of the mediating effects above, the non-parametric percentile Bootstrap method was employed to sample 5000 times and estimate the 95% confidence interval. If the confidence interval did not contain 0, it indicated that the mediating effect was significant. The results showed that sense of life meaning (95% CI: -0.187, -0.022) and fear of failure (95% CI: -0.278, -0.038) were independent mediators between academic self-efficacy and test anxiety. Besides, sense of life meaning and fear of failure (95% CI: -0.211, -0.018) played a chain mediating role, and the corresponding mediating effect values were -0.125, -0.148, and -0.067, respectively.

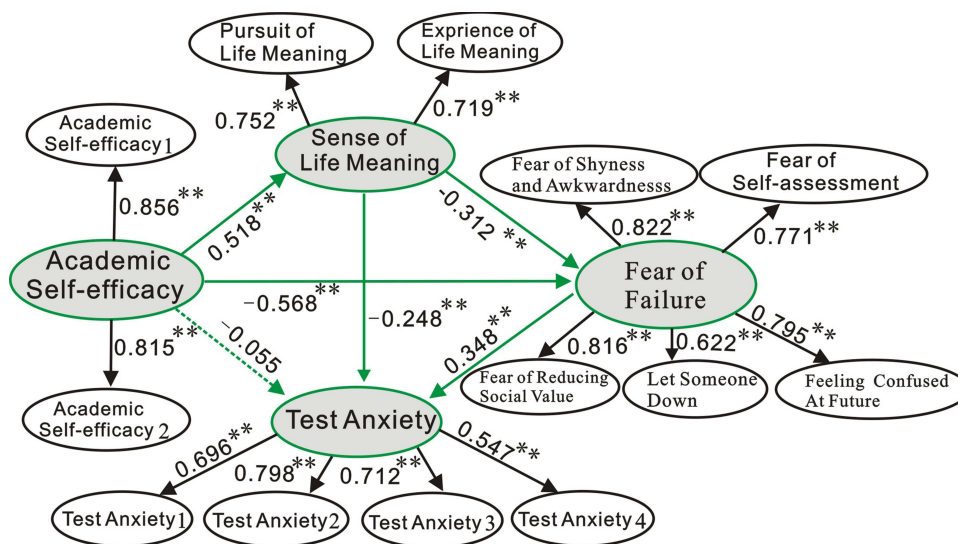


Figure 1 The mediating effect of life meaning and fear of failure on academic self-efficacy and test anxiety (all).
Note: ** $P < 0.01$.

Gender Differences in Mediating Roles

There were significant differences between male and female students in self-efficacy ($M_{\text{male}} > M_{\text{female}}$, $t=5.328$, $P<0.01$) and test anxiety ($M_{\text{male}} < M_{\text{female}}$, $t=-4.871$, $P<0.01$). Based on this, this study examined whether the mediating effects of the sense of meaning in life and fear of failure are consistent across groups. First, the mediating effect models of males and females were tested separately. The results showed that the fitting indexes of the male model were $\chi^2/df=3.241$, CFI=0.955, TLI=0.959, GFI=0.948, RMSEA=0.089, and SRMR=0.061. The fitting indexes of the female model were $\chi^2/df=2.781$, CFI=0.945, TLI=0.959, GFI=0.957, RMSEA=0.042, SRMR=0.061. In general, all indicators of the mediating effect of female and male models are within the acceptable range, which can be compared with multiple groups. Secondly, the unqualified model is set. M_1 and the qualified path coefficient are equal to model M_2 . By comparing the fitting results of the two models, $\Delta\chi^2(13)=37.254$, $P<0.01$, a significant difference can be observed between the two models, as shown in Table 2. The unqualified estimation models for males and females are presented in Figures 2 and 3.

Non-parametric percentile Bootstrap method was used to further examine gender differences in mediating effects. The results indicated that for male students, the sense of life meaning and fear of failure played an independent mediating role between academic self-efficacy and test anxiety, while the chain mediating role of sense of life meaning and fear of failure was not significant. On the other hand, for female students, fear of failure played an independent mediating role between academic self-efficacy and test anxiety, and sense of life meaning and fear of failure played a chain mediating role. In addition, the independent mediating role of life meaning was not significant, as summarized in Table 2 for details.

There was a significant gender difference between the sense of meaning of life and fear of failure ($\gamma_{\text{male}} = 0.189$, $\gamma_{\text{female}} = 0.378$, $c.r.= 3.842$, $P < 0.01$), between fear of failure and test anxiety ($\gamma_{\text{male}} = 0.175$, $\gamma_{\text{female}} = 0.399$, $c.r.=4.189$, $P<0.01$), while there was no gender difference in other path coefficients ($c.r.=0.055-1.655$, $P_s>0.05$).

Discussion

The research findings can be discussed and summarized based on the aforementioned survey results. Academic self-efficacy indirectly affects test anxiety through the mediating effect of sense of meaning in life, which is consistent with previous research evidence that self-efficacy promotes the sense of life meaning and reduces test anxiety.²⁶ Academic self-efficacy is an individual's subjective evaluation of his own ability. Higher individual evaluation of his own ability will be more helpful for improving personal self-worth, such as the sense of life meaning and self-esteem, thus enhancing self-confidence in the face of exams and the perseverance to play his own potential, so as to diminish test anxiety.

Apart from that, academic self-efficacy can significantly negatively predict fear of failure, and fear of failure significantly increases test anxiety. Fear of failure plays an intermediary role between academic self-efficacy and test anxiety.

Furthermore, the sense of life meaning and fear of failure play a chain mediating role between academic self-efficacy and test anxiety. In this study, the direct effect of academic self-efficacy on test anxiety is insignificant, but the indirect effect is played through mediating variables.

Additionally, compared with females, males' academic self-efficacy imposes a more significant indirect prediction effect on test anxiety through the sense of life meaning. The main reason is that females' sense of life meaning could not

Table 2 Effect Size and Sex Difference of Mediating Effect

Direct Effect	Male		Female	
	Effect Size	95% CI	Effect Size	95% CI
Ind 1	-0.159**	(-0.268, -0.057)	-0.025	(-0.127, -0.069)
Ind 2	-0.198**	(-0.317, -0.078)	-0.228**	(-0.278, -0.146)
Ind 3	-0.015	(-0.068, 0.051)	-0.127**	(-0.174, -0.047)

Notes: Ind 1: academic Self-efficacy→ sense of life meaning→ test anxiety; Ind 2: academic Self-efficacy→ Fear of failure→ test anxiety; Ind 3: academic Self-efficacy→ sense of life meaning→ Fear of failure→ test anxiety. ** $P<0.01$.

Abbreviation: CI, confidence interval.

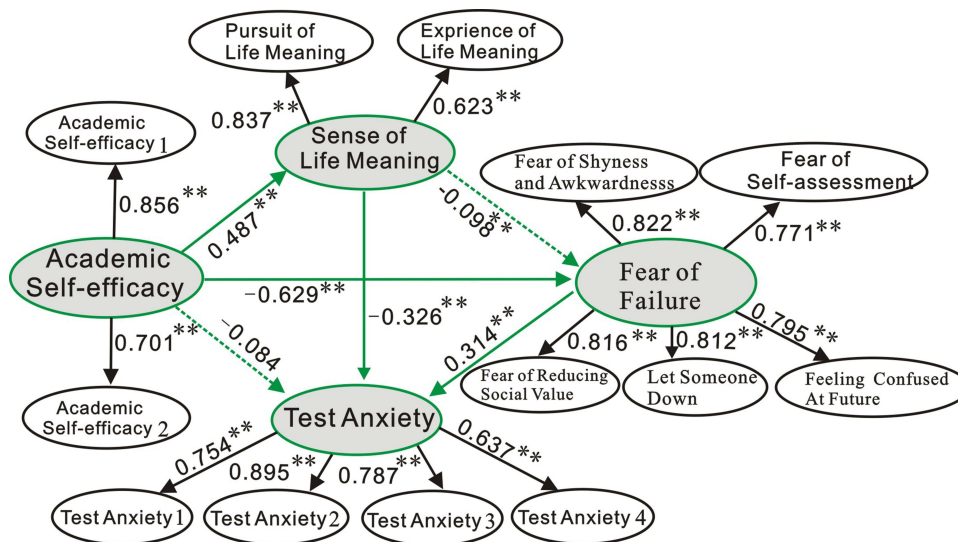


Figure 2 The mediating effect of life meaning and fear of failure on academic self-efficacy and test anxiety (male). **Note:** ** $p < 0.01$.

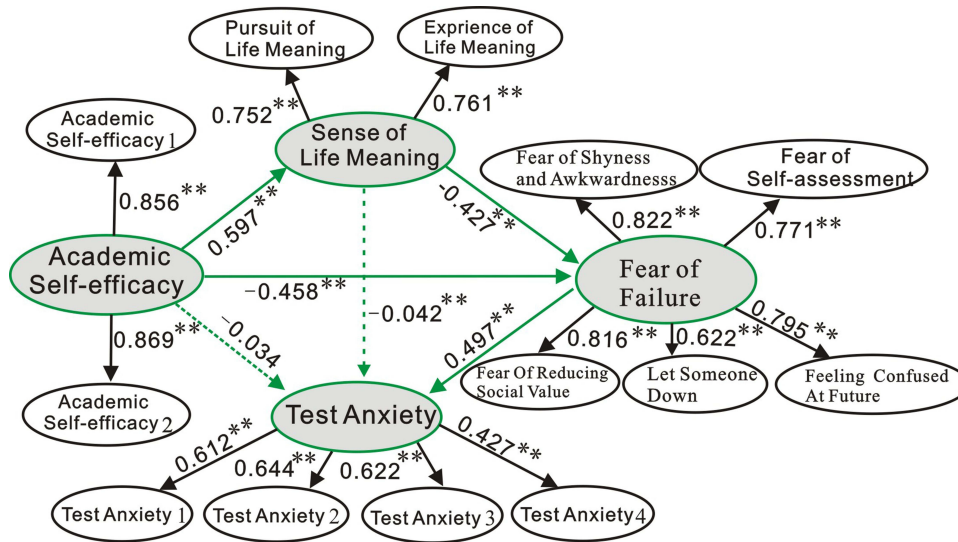


Figure 3 The mediating effect of life meaning and fear of failure on academic self-efficacy and test anxiety (female). **Note:** ** $p < 0.01$.

predict test anxiety.²⁷ Female students' academic self-efficacy can predict test anxiety through the chain mediating effect between the sense of life meaning and test fear. However, the chain mediating effect of male students is not remarkable, which may be due to the generally higher level of test anxiety among females,²⁸ resulting in the ceiling effect, which inhibits the influence of the sense of meaning in life.²⁹

Based on the preceding discussion, several measures can be implemented to alleviate the test anxiety of higher vocational students. Firstly, higher vocational education should focus on cultivating students' ability to excavate their strengths and weaknesses, establishing a positive mechanism for comparing students' academic performance to improve the self-efficacy of vocational college students. Second, higher vocational schools should strive to foster a more serene and pleasant campus environment. This can encourage students to appreciate the beauty of life and discover the value of life, ultimately boosting their sense of meaning of life. Thirdly, emotional management training for students is necessary, which can strengthen their emotional regulation ability and help reduce their fear of failure. Fourthly, differentiated

approaches should be taken for males and females, which is more conducive to reducing students' test anxiety among vocational college students.

There are also some limitations in this study, which need to be improved in future studies: some factors (grade, place of residence, class committee member, etc) may affect the specific outcomes of academic self-efficacy, which suggests that the role of potential factors should be comprehensively considered and appropriately controlled when studying the impact of academic self-efficacy in the future.

Conclusion

Firstly, there were significant negative correlations among academic self-efficacy, sense of life meaning, and test anxiety, Fear of failure was positively correlated with test anxiety; Secondly, sense of life meaning and fear of failure played a mediating role in the relationship between academic self-efficacy and test anxiety. Thirdly, the chain mediating effect was significant only in the female group, not in the male group.

Ethics Statement

The study proposals were reviewed and approved by the Academic Committee of Shandong shengli vocational college, and that it was conducted in accordance with the Declaration of Helsinki. Moreover, before collecting data, the vital information about the study has been introduced to participants and we have obtained the participants' written consent who take part in the research prior to the commencement of the study.

Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial/non-financial relationships that could be construed as a potential conflict of interest.

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