

## Article

# Research on the Effect of an Entrepreneurial Environment on College Students' Entrepreneurial Self-Efficacy: The Mediating Effect of Entrepreneurial Competence and Moderating Effect of Entrepreneurial Education

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**Abstract:** Background: entrepreneurial self-efficacy is the level of confidence that entrepreneurs can complete various entrepreneurial tasks. It can significantly predict entrepreneurial effectiveness, entrepreneurial motivation and entrepreneurial ability. This study explores the mechanism of entrepreneurial environment on college students' entrepreneurial self-efficacy and analyzes the role of entrepreneurial competence and entrepreneurial education in the relationship between entrepreneurial competence and entrepreneurial education. Methods: a questionnaire survey was conducted among 1100 college students from 10 colleges and universities in Guangdong Province, and the survey results were statistically analyzed. Results: the results show that: (1) entrepreneurial education and entrepreneurship practice have a significant positive impact on college students' self-efficacy; (2) entrepreneurial environment and entrepreneurial competence have a significant positive predictive effect on entrepreneurial self-efficacy; (3) entrepreneurial competence plays a mediating role in the influence of entrepreneurial environment on entrepreneurial self-efficacy; (4) entrepreneurial education plays a moderating role between entrepreneurial environment and entrepreneurial self-efficacy. Conclusion: present study found that entrepreneurial environment, entrepreneurial competence and entrepreneurial education play a positive role in college students' entrepreneurial self-efficacy. Therefore, this paper suggests the promotion of an entrepreneurial education by creating a good innovative and entrepreneurial environment, establishing a talent training model based on entrepreneurial competence model, and building a high-quality entrepreneurial education system.

**Keywords:** college student; entrepreneurial competence; entrepreneurial self-efficacy; entrepreneurial environment; entrepreneurial education

## 1. Introduction

The Guidance Opinions of the General Office of the State Council in China on Further Supporting College Students' Innovation and Entrepreneurship, published in 2021, points out that college students are the driving force of mass entrepreneurship and innovation, and it is essential to support innovation and entrepreneurship of the raw power. Innovation and entrepreneurship are important paradigms for the cultivation of talent in colleges, and are vital for cultivating innovation ability, entrepreneurial consciousness and social responsibility. In entrepreneurial practice, college students carry out the innovative application of business practice and professional achievements to enhance their entrepreneurial awareness. They can also further understand social needs and development bottlenecks

through entrepreneurial practice and improve their sense of mission. On the other hand, innovation and entrepreneurship help to implement innovation-driven strategy. The essence of innovation drive is talent drive, and college students are an important part of innovative talents [1]. Supporting college students' innovation and entrepreneurship can provide talent guarantees for scientific and technological innovation and economic transformation and upgrading. College students' innovative enterprises can become the driving force for economic and social development, as well as for technological innovation and the development of new industries.

To build an entrepreneurial support system for college students, more attention needs to be paid to the self-efficacy of entrepreneurship in this group. Entrepreneurial self-efficacy is a derivative concept of self-efficacy, which was first proposed by Bandura and refers to an individual's level of confidence in using one's knowledge and skills to complete a task [2]. Hackett and Betz brought the concept of self-efficacy to the field of entrepreneurship and developed the concept of entrepreneurial self-efficacy [3], that is, the level of confidence that entrepreneurs have in their ability to accomplish various entrepreneurial tasks, which is a significant predictor of entrepreneurial effectiveness [4]. Entrepreneurial efficacy increases enthusiasm for learning entrepreneurial skills and empowers entrepreneurs [5]. Entrepreneurial self-efficacy also has a positive predictive effect on entrepreneurial motivation and is an endogenous motivator for entrepreneurs in project operation [6].

Triadic reciprocal determinism asserts that there are interactions between three elements: individual factors, behavioral factors and environmental factors, and that there is a mutual influence and interaction between each two elements [7]. Accordingly, entrepreneurial self-efficacy as an individual factor is governed by individual behavioral ability and environmental factors. Entrepreneurial self-efficacy is often used as a personal factor to understand the entrepreneurial characteristics of individuals [8]. Udayanan explored the entrepreneurial characteristics of graduate students from the perspective of entrepreneurial self-efficacy and found that entrepreneurial self-efficacy can significantly predict entrepreneurial motivation [9]. Neneh and BN proposed that individual entrepreneurial self-efficacy was significantly correlated with entrepreneurial passion and was affected by social support [10]. As for entrepreneurial competence, this refers to the abilities, qualities, knowledge and skills that individuals need to successfully complete entrepreneurial tasks, which is the key indicator of college students' entrepreneurial behavioral competence [11]. Entrepreneurial competence is of great value in evaluating and predicting entrepreneurial behavior [12], and has positive effects on entrepreneurial motivation and entrepreneurial performance [13]. In addition, it also helps to promote the individual's absorption of external knowledge, so as to enhance the entrepreneurial behavior ability [14]. In addition, entrepreneurial environment points to a series of external factors that affect entrepreneurial activities, including political, economic, cultural and other factors [15]. Entrepreneurial environment will directly have a significant impact on college students' entrepreneurial motivation, entrepreneurial cognition and entrepreneurial skills [16]. At the same time, the entrepreneurial environment also affects the development of College Students' entrepreneurial ability by affecting the effectiveness of entrepreneurial training. An active entrepreneurial environment is conducive to improving the effectiveness of entrepreneurial training and then enhancing college students' entrepreneurial ability [17]. Entrepreneurial self-efficacy, entrepreneurial competence and entrepreneurial environment as individual factors, behavioral factors and environmental factors of entrepreneurship, have been studied separately by previous scholars to explore the characteristics and value of relevant variables. However, there are few relevant studies at present. For example, what are the mechanisms of entrepreneurial competence and entrepreneurial environment on entrepreneurial self-efficacy? Also, what is the role of entrepreneurial education implemented in colleges? Answering these questions is of great importance to reveal the specific characteristics of entrepreneurial self-efficacy among college students and to explore the roles of entrepreneurial environment, entrepreneurial competence, and entrepreneurial education. Therefore, it is necessary to further explore the relationship between the three,

so as to reveal the specific mechanism of entrepreneurial competence and entrepreneurial environment, and further understand the specific function of entrepreneurial education in colleges.

Research on the relationship between entrepreneurial environment, entrepreneurial self-efficacy, entrepreneurial competence and entrepreneurial education, has a certain theoretical value. It helps to enrich the research results in the fields of entrepreneurial self-efficacy, entrepreneurial competence and entrepreneurial environment, and deepen people's understanding of relevant concepts. At the same time, by exploring these specific relationships, we can reveal the interaction between individual factors, behavioral factors and environmental factors, so as to reveal the behavioral and psychological characteristics of individual entrepreneurship. In addition, entrepreneurial competence reflects the abilities and characteristics of entrepreneurs [18]. It shows the ability of entrepreneurs to identify and utilize, which has a significant impact on enterprise strategy and project innovation management [19]. Entrepreneurial self-efficacy refers to the individual's cognition and evaluation of their entrepreneurial ability [20]. Entrepreneurial self-efficacy can significantly predict entrepreneurial intention and effectively stimulate individual entrepreneurial enthusiasm [21]. Entrepreneurial self-efficacy fills the role of entrepreneurial environment, and individuals' perception of entrepreneurial behavior will change as the environmental rules change [22]. Entrepreneurial competence and entrepreneurial self-efficacy respectively reflect the ability elements and cognitive elements of entrepreneurship. This study explores the impact of an entrepreneurial environment on entrepreneurial self-efficacy, analyzes the specific role of entrepreneurial competence in this impact, and reveals the action mechanism of ability elements in the impact of the environment on cognitive elements, so as to reveal the specific relationship between the entrepreneurial environment, ability and cognition.

In this study, we will explore these relationships in order to provide theoretical insights for entrepreneurial education in colleges. At present, some students will choose to start their own company rather than seek a job after graduation. Entrepreneurial self-efficacy, entrepreneurial competence, entrepreneurial environment and other variables have a significant impact on college students' entrepreneurial results [2]. Through the study of the relationship between the three, we can understand the interaction between entrepreneurs' individual factors, behavioral factors and environmental factors, take them as the basis for entrepreneurs' counseling, and enhance the accuracy of entrepreneurship counseling. At the same time, colleges can integrate research contributions into entrepreneurial education, better cultivate entrepreneurs' entrepreneurial ability and create a positive entrepreneurial environment, and improve the success rate of entrepreneurial projects.

Based on the literature gap and the objectives of the current study discussed above, this paper puts forward research hypotheses on the relationship between entrepreneurial environment, entrepreneurial self-efficacy, entrepreneurial competence and entrepreneurial education. Around the research hypotheses, the questionnaire survey method is used to collect and analyze the data and verify the research hypothesis. Finally, the suggestions of entrepreneurial education in colleges are provided.

## 2. Literature Review and Hypotheses Development

### 2.1. *Entrepreneurial Environment and Entrepreneurial Competence*

Previous researchers have identified the entrepreneurial environment as an influencing factor of entrepreneurial behavioral competencies [23]. The level of development of entrepreneurial competence as an important entrepreneurial behavioral competence is influenced by the environment in which the entrepreneur is embedded. This is because the educational, social and family environment in which entrepreneurs live is the basis for the development of entrepreneurial competence [24]. Furthermore, the entrepreneurial environment provides an important guarantee for the development of entrepreneurial competencies [25]. Specifically, the entrepreneurial environment can meet the resource elements needed by college students to start a business and provide sufficient support for the develop-

ment of entrepreneurial competencies [26]. Therefore, a good entrepreneurial environment makes entrepreneurial behavior better supported by the government, society and schools, and creates favorable external conditions for entrepreneurial competence training. In addition, the entrepreneurial environment has a positive predictive effect on entrepreneurial intention [27]. A good entrepreneurial environment can enhance entrepreneurial intentions and motivate college students to improve entrepreneurial competence. Put together, the previous arguments suggest the following hypothesis:

**Hypothesis 1 (H1).** *Entrepreneurial environment has a significant positive effect on entrepreneurial competence.*

### 2.2. Entrepreneurial Environment and Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy is the confidence that individuals develop by judging their entrepreneurial behaviors and abilities [28]. A positive entrepreneurial environment can help college students to address resource constraints and to grasp and exploit entrepreneurial opportunities [25], which could help college students obtain positive elements from the entrepreneurial environment to achieve performance and enhance entrepreneurial self-confidence. In addition, the entrepreneurial environment influences entrepreneurial attitudes and creates positive expectations among college students about their entrepreneurial prospects. Such a subjective assessment of the entrepreneurial environment has an important impact on entrepreneurial behavior [29]. Not only can a positive external environment for entrepreneurship reduce anxiety and eliminate the fear of entrepreneurial failure [30], feedback from the entrepreneurial environment can also increase individuals' confidence in their entrepreneurial prospects and enhance entrepreneurial self-efficacy [31]. Therefore, the following hypothesis is proposed.

**Hypothesis 2 (H2).** *Entrepreneurial environment has a significant positive predictive effect on entrepreneurial self-efficacy.*

### 2.3. Entrepreneurial Competence and Entrepreneurial Self-Efficacy

Competence refers to the stable characteristics of knowledge, skills, cognition and behavior that an individual exhibits in order to achieve desired performance [32]. Chandler and Hanks introduced the concept of competence to the field of entrepreneurship research and proposed entrepreneurial competence to reflect the entrepreneurial behavioral competencies of college students [33]. Entrepreneurial competence shows the ability to promote individuals to achieve excellent entrepreneurial performance [18]. Entrepreneurial competence can promote problem solving and business innovation [34]. Entrepreneurial competence is a multidimensional concept of competence, including opportunity competence, relationship competence, conceptual competence, organizational competence, strategic competence, and commitment competence [35], these six abilities will have a certain impact on individual entrepreneurial self-efficacy.

Conceptual competence, commitment competence, and strategic competence, which are covered by entrepreneurial competence, represent the qualities and competencies required for the provision of quality products and service delivery [36]. Entrepreneurial self-efficacy reflects entrepreneurs' subjective cognition and judgment of being able to achieve entrepreneurial goals [4]. Through entrepreneurial competencies, college students are able to create competitive products and services, achieve desirable gains in the market competition. Relying on active entrepreneurial competence, college students can improve their self-confidence in completing entrepreneurial goals in the future by completing the predetermined entrepreneurial goals, so as to enhance their entrepreneurial self-efficacy.

Furthermore, entrepreneurial competence enhances the ability to integrate social resources and provides opportunities for the development of entrepreneurial self-efficacy. Entrepreneurial self-efficacy, as a cognitive judgment of one's own entrepreneurial ability, is affected by the entrepreneurial environment [37]. Entrepreneurs do not accept

the entrepreneurial environment passively but can rely on their entrepreneurial ability to grasp entrepreneurial opportunities and deal with risks. Given that entrepreneurial competence includes relational, opportunity, and organizational competencies, which can access and optimize social resources and support the implementation of entrepreneurial projects [38], social support can satisfy the resource needs required for the development of entrepreneurial projects and help college students break through the resource bottleneck. At the same time, entrepreneurial competence can help entrepreneurs obtain social resources, deal with risks in the entrepreneurial environment, reduce entrepreneurial uncertainty and enhance their entrepreneurial self-efficacy [39]. Summing up, this study proposes a third research hypothesis.

**Hypothesis 3 (H3).** *Entrepreneurial competence has a significant positive effect on entrepreneurial self-efficacy.*

#### *2.4. The Mediating Effects of Entrepreneurial Competence*

Empirical studies have found that entrepreneurial environment that include administrative policies, culture, and social support have significant effects on entrepreneurial competence [40]. The entrepreneurial environment not only has a positive predictive effect on entrepreneurial competence, but also has an impact on entrepreneurial self-efficacy through entrepreneurial competence. Entrepreneurial competence is the key to entrepreneurial success [41].

Firstly, the entrepreneurial environment creates beneficial conditions for the development of entrepreneurial competence, stimulates college students' entrepreneurial enthusiasm, and then promotes the improvement of entrepreneurial self-efficacy. This study found that entrepreneurial enthusiasm has a significant predictive effect on entrepreneurial self-efficacy. With the improvement of entrepreneurial enthusiasm, entrepreneurial self-efficacy is also enhanced [10]. Benefiting from a good entrepreneurial environment, college students' entrepreneurial competence has been developed. The development of this ability will help mobilize college students' entrepreneurial enthusiasm and improve their entrepreneurial self-efficacy [42].

Secondly, the entrepreneurial environment promotes college students' entrepreneurial competence and enhances their self-confidence in entrepreneurial action. Entrepreneurial competence is an important manifestation of individual entrepreneurial ability, and the development of this ability needs to be supported by environmental conditions [25]. Generally speaking, a positive environment will be able to support the development of entrepreneurial competence and meet the requirements of college students' ability development. This improves college students' entrepreneurial ability and can bring positive entrepreneurial results, thus enhancing college students' confidence in completing entrepreneurial tasks [43].

Thirdly, the entrepreneurial environment provides resource support for the development of entrepreneurial competence and drives the improvement of entrepreneurial self-efficacy. The entrepreneurial environment provides support for the development of entrepreneurial competencies and helps college students to obtain social support and provide solid resource conditions for entrepreneurial activities. Comprehensively, the success of entrepreneurship among college students with weak entrepreneurial resources depends not only on themselves, but also on the support of external resources [23]. With entrepreneurial competence, college students can also expand their own social resources and establish the social support system needed to use entrepreneurship [44]. Abundant social resources can trigger positive expectations of entrepreneurial outcomes and enhance entrepreneurial self-efficacy [45]. Thus, the following hypothesis is proposed.

**Hypothesis 4 (H4).** *Entrepreneurial competence has a mediating effect in the relationship between entrepreneurial environment and entrepreneurial self-efficacy.*

### 2.5. The Moderating Effects of Entrepreneurial Education

Firstly, entrepreneurial education helps college students to better utilize the positive parts in the entrepreneurship environment and empower their entrepreneurial strengths, thus further enhancing their entrepreneurial self-efficacy. Entrepreneurial education has a significant impact on entrepreneurial motivation and enhances the internal driving force of entrepreneurs to enhance entrepreneurial skills [46]. Therefore, entrepreneurial education can develop entrepreneurial skills and promote the transformation of entrepreneurial opportunities in the entrepreneurial environment into entrepreneurial advantages. Although the entrepreneurial environment contains entrepreneurial opportunities, how to grasp them is the crucial to achieve entrepreneurial success. Entrepreneurial education, on the other hand, has positive implications for seizing and exploiting business opportunities [47]. Specifically, entrepreneurial education systematically develops entrepreneurial skills in college students through curriculum and training [48]. The skills and strategies acquired through entrepreneurial education can be transferred to entrepreneurial practice to seize business opportunities in the entrepreneurial environment, and then improve entrepreneurial performance, and enhance entrepreneurial self-confidence [49].

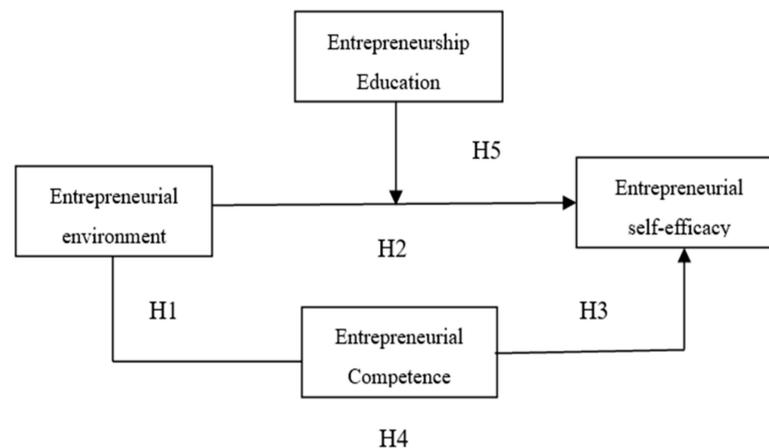
Secondly, entrepreneurial education also helps to obtain resource support from the entrepreneurial environment. Entrepreneurial education is a key factor affecting individual entrepreneurship attitudes [50]. Based on planned entrepreneurial education, individuals form a positive entrepreneurial attitude [17]. Through entrepreneurial education, individuals can grasp the opportunities and challenges in the environment with a positive attitude and enhance their entrepreneurial self-efficacy. In particular, entrepreneurial education components such as interpersonal communication and team building are beneficial in establishing social network channels to access the market, capital and technological resources needed for entrepreneurship [51]. By obtaining resource support in the entrepreneurial environment, college students build core strengths for their projects, enhance their entrepreneurial performance, and increase their sense of self-efficacy in entrepreneurship.

Thirdly, entrepreneurial education enhances risk management skills and facilitates risk prevention. Risk management strategies are acquired through entrepreneurial education and relevant methods are transferred to the entrepreneurial project operations [52]. This can effectively identify and control the risk elements of the entrepreneurial environment and prevent entrepreneurial self-efficacy from being negatively affected by entrepreneurial failure.

Accordingly, according to the impact of entrepreneurial education on entrepreneurial environment and entrepreneurial self-efficacy, this study puts forward the hypothesis of the role of entrepreneurial education on the relationship between entrepreneurial environment and entrepreneurial self-efficacy. the following hypothesis is proposed.

**Hypothesis 5 (H5).** *Entrepreneurial education has a moderating effect in the relationship between entrepreneurial environment and entrepreneurial self-efficacy.*

According to the research hypothesis, the paper puts forward the variable model of entrepreneurial environment, entrepreneurial competence, entrepreneurial self-efficacy and entrepreneurial education. Entrepreneurial environment has a significant effect on entrepreneurial self-efficacy, entrepreneurial competence mediates the effect of entrepreneurial environment on entrepreneurial self-efficacy, and entrepreneurial education has a significant moderating effect between entrepreneurial environment and entrepreneurial self-efficacy. The research model is shown in Figure 1:



**Figure 1.** Research model.

### 3. Methods and Data

#### 3.1. Methods

This study adopts the method of questionnaire to collect research data. Questionnaire survey is an important method to collect research data. This method formulates a rigorous and standardized questionnaire, requires the research object to answer, and collects data accordingly. The basic information of the subjects, entrepreneurial competence level, current situation of entrepreneurial environment, entrepreneurial self-efficacy and water equality were included in the questionnaire.

Firstly, the basic information of the research object. The questionnaire collects data on demographic variables such as gender, household registration, grade level, and school type. At the same time, the questionnaire also investigates whether the subjects participate in entrepreneurial education and entrepreneurship practice, so as to understand the specific situation of their participation in entrepreneurship activities.

Secondly, the level of entrepreneurial competence. The Entrepreneurial Competence Scale, revised by Meng-Ying Wei based on the original Thomas Six Dimensions of Entrepreneurial Competence Scale [53]. The scale consists of 24 items, using the Likert 5-point scale, and includes six dimensions, including opportunity competence, relationship competence, conceptual competence, organizational competence, strategic competence, and commitment competence, and the internal consistency coefficients of the corresponding dimensions are 0.728, 0.746, 0.808, 0.712, 0.764, and 0.827, respectively, and the overall coefficient of the questionnaire is 0.811.

Thirdly, the current situation of entrepreneurial environment. The Perceived Entrepreneurial Environment Measurement Scale, developed by Chang-Hwan Yook, was implemented. The scale contains nine items and uses the Likert 5-point scale with an internal consistency coefficient of the questionnaire of 0.811 [54].

Fourthly, the level of entrepreneurial self-efficacy. The Entrepreneurial Self-Efficacy Scale, developed by Lucas and Cooper, as developed by Lucas and Cooper, was selected. The scale contains 19 items and uses a Likert 5-point scale with an internal consistency coefficient of 0.861 [55].

#### 3.2. Data Collection

A questionnaire survey was conducted on 1100 college students in 10 colleges and universities in Guangdong, including 3 involved in “Double First-Class” university project and 7 that are not. For colleges and universities in the eastern part of Guangdong, the survey was conducted by paper questionnaires. For non-Eastern Guangdong colleges and universities, the subjects were surveyed by distributing electronic questionnaires through the researchers’ social network.

Finally, 979 valid questionnaires (effective rate 89%) were obtained, of which 583 (59.6%) were completed by men and 396 (40.4%) were accomplished by women. Of the participants, 411 (41.98%) were from urban and 568 (58.02%) were from rural, while 282 (26.66%) were freshmen, 281 (28.09%) were sophomores, 215 (23.60%) were juniors, and 201 (21.65%) were seniors.

After excluding invalid questionnaires, the data of valid questionnaires were statistically analyzed by using SPSS 21.0.

#### 4. Data Analysis and Results

##### 4.1. Analysis of Differences in Demographic Variables

Independent sample *t*-test is used to test the difference of two consecutive independent variables. Gender, registered residence, entrepreneurship education and entrepreneurial practice all consist of 2 consecutive independent variables. Therefore, independent samples *t*-test was used to understand the differences in entrepreneurial self-efficacy of college students on demographic variables. The statistical results are shown in Table 1. Statistical results show that college students who had participated in entrepreneurial education had significantly higher levels of entrepreneurial self-efficacy than college students who had not participated in entrepreneurial education ( $t = 4.750, p < 0.001$ ), and college students who had participated in entrepreneurship practice also had significantly higher levels of entrepreneurial self-efficacy than college students who had not participated in entrepreneurship practice ( $t = 5.874, p < 0.001$ ). However, there was no significant difference in the level of entrepreneurial self-efficacy between male and female college students ( $t = 0.388, p > 0.05$ ), nor between urban and rural college students ( $t = 0.101, p > 0.05$ ). There was also no significant difference in entrepreneurial self-efficacy among college students in terms of grade level ( $F = 0.458, p > 0.05$ ).

**Table 1.** Differences in college students' entrepreneurial self-efficacy on demographic variables.

Demographic Variables		Entrepreneurial Self-Efficacy	
		M ± SD	t/F
Gender	Male	3.554 ± 0.592	0.388
	Female	3.541 ± 0.431	
Household Registration	Urban	3.551 ± 0.547	0.101
	Rural	3.547 ± 0.526	
Grade	Freshman	3.546 ± 0.498	0.458
	Sophomore	3.527 ± 0.515	
	Junior	3.537 ± 0.543	
	Senior	3.599 ± 0.388	
Entrepreneurial education	With	3.669 ± 0.529	4.750 ***
	Without	3.495 ± 0.526	
Entrepreneurial Practice	With	3.702 ± 0.491	5.874 ***
	Without	3.490 ± 0.537	

Note: \*\*\*  $p < 0.001$ .

At the same time, this study used one-way ANOVA to explore the differences of entrepreneurial self-efficacy among college students of different grades. One way ANOVA is used to test the difference between multiple averages, so as to determine whether the factors have a significant impact on the test results. Grade variables include four levels. This study uses one-way ANOVA to test the differences of entrepreneurial self-efficacy among college students of different grades. Statistics show that there was no significant difference in entrepreneurial self-efficacy among college students in terms of grade level ( $F = 0.458, p > 0.05$ ).

#### 4.2. Correlation Analysis

Pearson correlation is used to measure whether two data sets are on a line. It is used to measure the linear relationship between distance variables. Pearson correlation analysis was used in this study to explore the relationship between entrepreneurial environment, entrepreneurial competence and entrepreneurial self-efficacy. The statistical results are shown in Table 2. The statistical results show that entrepreneurial environment had a significant positive correlation with entrepreneurial self-efficacy ( $r = 0.787, p < 0.001$ ). There was a significant positive correlation between the overall level of entrepreneurial competence and entrepreneurial self-efficacy ( $r = 0.841, p < 0.001$ ). Opportunity competence ( $r = 0.652, p < 0.001$ ), relationship competence ( $r = 0.711, p < 0.001$ ), organizational competence ( $r = 0.790, p < 0.001$ ), conceptual competence ( $r = 0.800, p < 0.001$ ), strategic competence ( $r = 0.814, p < 0.001$ ), and commitment competence ( $r = 0.777, p < 0.001$ ) were also significantly and positively correlated with entrepreneurial self-efficacy.

**Table 2.** Correlation coefficients of entrepreneurial environment, entrepreneurial competence and entrepreneurial self-efficacy.

Variables	EE	EC	OpC	RC	OrC	ConC	SC	ComC
ES	0.787 ***	0.841 ***	0.652 ***	0.711 ***	0.790 ***	0.800 ***	0.814 ***	0.777 ***

Note: ES = Entrepreneurial self-efficacy; EE = entrepreneurial environment; EC = entrepreneurial competence; OpC = opportunity competence; RC = relationship competence; OrC = organizational competence; ConC = conceptual competence; SC = strategic competence; ComC = commitment competence. \*\*\*  $p < 0.001$ .

#### 4.3. Hypothesis Testing

##### 4.3.1. Regression Analysis of Entrepreneurial Environment and Entrepreneurial Competence on Entrepreneurial Self-Efficacy

Regression analysis is a statistical analysis method to determine the quantitative relationship between two or more variables. Regression analysis was used in this study to explore the effect of entrepreneurial environment and entrepreneurial competence on entrepreneurial self-efficacy using gender, household registration, grade level, and school type as control variables. Model 2 in Table 3 shows that entrepreneurial environment is a significant predictor of entrepreneurial self-efficacy ( $\beta = 0.677, p < 0.001$ ) and Hypothesis 1 is supported. Analyzing the effect of entrepreneurial competence on entrepreneurial self-efficacy, the statistical results are shown in Table 3 Model 4, entrepreneurial competence positively predicts entrepreneurial self-efficacy ( $\beta = 0.729, p < 0.001$ ) and Hypothesis 3 is supported.

**Table 3.** Regression analysis of mediating effects of entrepreneurial competence.

Variable	Entrepreneurial Competence			Entrepreneurial Self-Efficacy		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender	−0.043	0.003	−0.015	0.017	0.028	0.027
Household Registration	0.040	0.030	0.016	−0.013	0.006	−0.008
Grade	−0.029	−0.009	−0.026	−0.012	−0.017	−0.012
School type	−0.001	−0.041	0.007	0.008	−0.029	−0.009
entrepreneurial education	−0.198 ***	−0.085 ***	−0.108 ***	0.036	−0.003	0.040 *
entrepreneurial practice	−0.184 ***	−0.029	−0.189 ***	−0.055	−0.045	−0.030
Entrepreneurial environment		0.664 ***			0.616 ***	0.285 ***
Entrepreneurial competence				0.727 ***		0.499 ***
F	11.104	204.442 ***	8.647	397.288 ***	265.765 ***	640.678 ***
R <sup>2</sup>	0.232	0.558	0.043	0.710	0.621	0.768
Adjusted R <sup>2</sup>	0.049	0.555	0.038	0.709	0.619	0.766

\*  $p < 0.05$ , \*\*\*  $p < 0.001$ .

#### 4.3.2. Mediating Effect Test

Mediating analysis is often used to reveal how the influence of explanatory variable  $x$  on variable  $y$  is transmitted through variable  $m$  [56]. If variable  $x$  affects variable  $y$  through variable  $m$ , variable  $m$  is the intermediary variable between variable  $x$  and variable  $y$  [31]. Causal step approach is a common method for mediating effect analysis. It is the most used mediating effect test method so far [57]. In the causal step approach, the first step is to carry out the regression of variable  $x$  to variable  $y$  to test the significance of regression coefficient  $c$ ; the second step is to carry out the regression of variable  $x$  to variable  $m$  to test the significance of regression coefficient  $a$ ; and the third step is to carry out the regression of variable  $x$  and variable  $m$  to variable  $y$  to test the regression coefficients  $c'$  and  $b$ . If the coefficients  $c$ ,  $a$  and  $b$  are significant, it means that there is an intermediary effect. In this case, if  $c'$  is not significant, and the regression coefficient  $c'$  is significant, but  $c' < c$ , it shows that there is a partial mediation [58]. The study uses the causal step approach to test the mediating effect of entrepreneurial competence on the impact of entrepreneurial environment on entrepreneurial self-efficacy.

Mediating effect refers to how independent variables affect dependent variables through mediating variables. Hierarchical expression is an important statistical method to test the mediating effect. Hierarchical regression analysis was used to test the mediating effect of entrepreneurial competence in the influence of entrepreneurial environment on entrepreneurial self-efficacy.

Statistical analysis was first conducted with gender, household registration, grade, school type, entrepreneurial education, entrepreneurship practice as control variables, entrepreneurial environment as the independent variable, and entrepreneurial self-efficacy as the dependent variable. The statistical results are shown in Table 3. The data show that entrepreneurial environment positively predicted entrepreneurial self-efficacy ( $\beta = 0.616$ ,  $p < 0.001$ ) and H2 was supported. The regression analysis of entrepreneurial competence to entrepreneurial self-efficacy shows that entrepreneurial competence has a significant predictive effect on entrepreneurial self-efficacy ( $\beta = 0.727$ ,  $p < 0.001$ ). Finally, the regression analysis of entrepreneurial environment and entrepreneurial competence on entrepreneurial self-efficacy was carried out. Model 6 shows that both of these have a significant predictive effect on entrepreneurial self-efficacy ( $\beta = 0.285$ ,  $p < 0.001$ ,  $\beta = 0.499$ ,  $p < 0.001$ ). According to model 5 and Model 6, when entrepreneurial competence is introduced into the regression equation, the regression coefficient of entrepreneurial environment on entrepreneurial self-efficacy decreases from 0.616 to 0.285. Therefore, entrepreneurial competence plays a partially mediating effect in the effect of entrepreneurial environment on entrepreneurial self-efficacy and H4 is supported.

#### 4.3.3. Test of the Moderating Effect of Entrepreneurial Education

The multiple regression analysis found that entrepreneurial education and entrepreneurial environment have a significant predictive effect on entrepreneurial self-efficacy, and that entrepreneurship education plays a role in the process of entrepreneurial environment affecting entrepreneurial cognition [17]. Moderating effect refers to how the causal relationship between two variables changes with the value of moderating variables. It shows the cross-term  $B$  of variables under the influence of main effect variable  $B$  on variable  $A \times$  effect of  $C$  on variable  $A$  [59]. According to the role of entrepreneurship education on the impact of entrepreneurial environment on entrepreneurial cognition, this study assumes that entrepreneurship education has a moderating effect and tests the moderating effect.

The commonly used statistical method of moderating effect is multiple regression analysis. Hierarchical expression analysis can judge whether there is a moderating effect through the  $p$  value of the interaction item between the independent variable and the moderating variable, that is, whether the interaction between the moderating variable and the independent variable has an effect on the dependent variable. In the statistical process, the "independent variable  $\times$  moderating variable" product term is incorporated

into the regression equation. The coefficient of this term being significant indicates that the moderating effect is significant [60].

Hierarchical expression analysis can judge whether there is a moderating effect through the  $p$  value of the interaction item between the independent variable and the moderating variable, that is, whether the interaction between the moderating variable and the independent variable has an effect on the dependent variable. Hierarchical regression analysis for testing the moderating effect of entrepreneurial education in entrepreneurial environment on entrepreneurial self-efficacy was carried out for this study. Before conducting the test, the entrepreneurial environment variable was centralized and entrepreneurial education as a categorical variable was not [61].

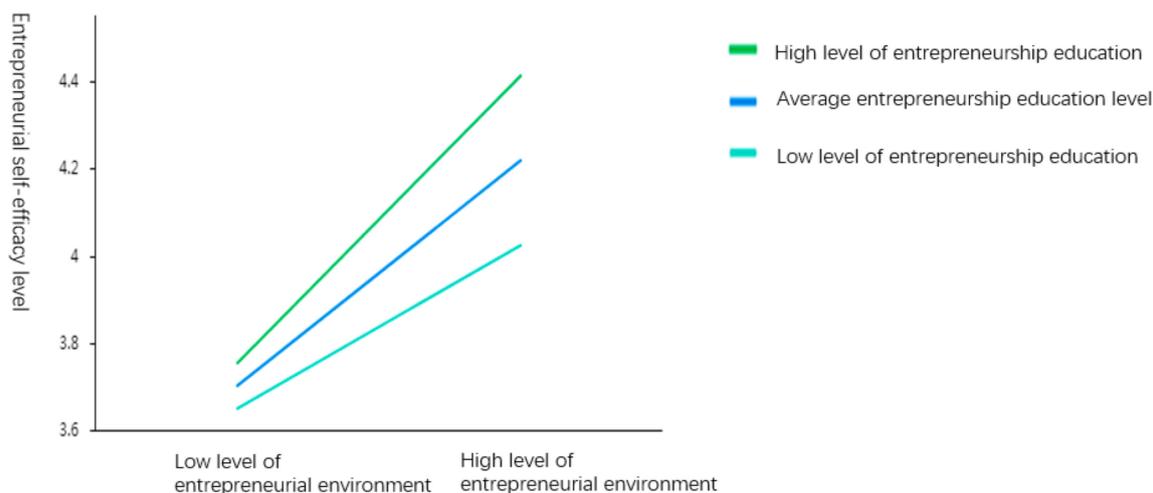
In the regression analysis process, control variables such as gender, household registration, grade level, school type, and entrepreneurial practice were added first, then the main variables such as entrepreneurial environment and entrepreneurial education, and finally the product terms of entrepreneurship education and entrepreneurship environment were included in the regression equation for statistics, with the results shown in Table 4. The statistical results show that the product term of entrepreneurship education and entrepreneurship environment enters the regression equation ( $\beta = 0.106$ ,  $t = 3.043$ ,  $p < 0.001$ ), which shows that environmental education has a significant moderating effect on the influence of environmental environment on environmental self-efficacy, and H5 is supported.

**Table 4.** Regression analysis of the moderating effect of entrepreneurial education.

Explanatory Variable	Entrepreneurial Self-Efficacy			
	Model 1	Model 2	Model 3	Model 4
Gender	−0.015	−0.015	0.028	0.030
Household Registration	0.013	0.016	0.006	0.004
Grade	−0.027	−0.026	−0.017	−0.016
School type	0.007	−0.017	−0.029	−0.028
Entrepreneurial practice	0.234 ***	0.189 ***	0.045	0.039
Entrepreneurial education		0.108 ***	0.003	0.016
Entrepreneurial environment			0.616 ***	0.481 ***
Entrepreneurial environment × entrepreneurial education				0.106 ***
F	8.912 ***	8.647 ***	265.765 ***	231.011 ***
R2	0.035	0.043	0.621	0.625
Adjusted R2	0.031	0.038	0.619	0.622

\*\*\*  $p < 0.001$ .

On the basis of verifying the regulatory effect of entrepreneurship education, this paper makes a simple effect analysis. The statistical results are shown in Figure 2. The simple slope test showed that, for college students who had participated in entrepreneurial education, as the level of entrepreneurial environment increased, the group's entrepreneurial self-efficacy showed a significant upward trend ( $\beta = 0.699$ ,  $t = 26.781$ ,  $p < 0.001$ ). For college students without entrepreneurial education, the entrepreneurial self-efficacy of this group also showed a significant upward trend as the level of entrepreneurial environment increased ( $\beta = 0.588$ ,  $t = 30.107$ ,  $p < 0.001$ ). However, the impact of entrepreneurial environment on entrepreneurial self-efficacy was more pronounced among college students with entrepreneurial education compared with those who had not. This indicates that the impact of entrepreneurial environment on entrepreneurial self-efficacy is further enhanced by college students' participation in entrepreneurial education.



**Figure 2.** Moderating effect of entrepreneurial education.

## 5. Discussion of Results

### 5.1. Demographic Differences in Entrepreneurial Self-Efficacy

The study revealed that college students who participated in entrepreneurial education had significantly higher levels of entrepreneurial self-efficacy than those who were not involved. This indicates that entrepreneurial education has a positive predictive effect on entrepreneurial self-efficacy. Entrepreneurship training, entrepreneurship courses, and other forms of entrepreneurial education have contributed positively to the enhancement of entrepreneurial self-efficacy among college students [2]. Relying on entrepreneurial education, students can better construct entrepreneurial theories and skill systems and show higher confidence levels in completing entrepreneurial tasks. As well, it was found that entrepreneurial practices also have a positive predictive effect on entrepreneurial self-efficacy. Entrepreneurial practice helps college students identify and grasp entrepreneurial opportunities and access market resources. Entrepreneurial practice also enhances college students' ability to plan, deploy, and control the technical and human resources of their businesses [12]. Thus, entrepreneurial practice enhances entrepreneurial ability, increases the likelihood of entrepreneurial success, and thus enhances entrepreneurial self-efficacy among college students.

### 5.2. The Effect of Entrepreneurial Environment and Entrepreneurial Competence on Entrepreneurial Self-Efficacy

Research shows that entrepreneurial environment and entrepreneurial competence have a positive predictive effect on entrepreneurial self-efficacy. The entrepreneurial environment is the basis for the entrepreneurial project execution and can provide sufficient external conditions for the entrepreneurial activity implementation. A positive entrepreneurial environment can provide rich resources to support entrepreneurial activities and meet the elemental conditions required for the development of entrepreneurial projects. This can make college students have positive expectations about the outcome of entrepreneurship and enhance their entrepreneurial self-efficacy.

Entrepreneurial competencies reflect the abilities, qualities, knowledge and skills that ensure that individuals can successfully complete entrepreneurial tasks and have a significant impact on entrepreneurial self-efficacy. With entrepreneurial competencies, college students can achieve desirable entrepreneurial performance and increase their self-efficacy in entrepreneurial activities. In addition, entrepreneurial competence positively influences entrepreneurial intentions and entrepreneurial attitudes [62]. This is beneficial to the enhancement of motivation to cope with difficulties and challenges and to prevent the negative effects of entrepreneurial failures.

### 5.3. *The Mediating Effects of Entrepreneurial Competence*

It was found that entrepreneurial competence has a partially mediating effect on the relationship between entrepreneurial environment and entrepreneurial self-efficacy. The entrepreneurial environment not only has a significant effect on entrepreneurial competence, but also, by this effect, works on entrepreneurial self-efficacy. In practice, a positive entrepreneurial environment establishes conditions conducive to the development of entrepreneurial competencies and enhances entrepreneurial competencies among college students. This provides competence for entrepreneurial practice, reinforces positive expectations of entrepreneurial outcomes, and helps to increase the level of entrepreneurial self-efficacy among college students.

### 5.4. *The Moderating Effects of Entrepreneurial Education*

Studies have shown that entrepreneurial education significantly moderates the effect of entrepreneurial environment on entrepreneurial self-efficacy, and that the effect of entrepreneurial environment on entrepreneurial self-efficacy is more pronounced among college students who have participated in entrepreneurial education compared to those without entrepreneurial education. Entrepreneurial education enhances the ability of individuals to identify and integrate social resources, and the higher the level of participation in entrepreneurial education, the greater the ability to access resources [49]. College students who have participated in entrepreneurial education, mastered strategies for acquiring social resources, and transferred the relevant strategies to entrepreneurial practice, were better able to obtain social support in the entrepreneurial environment and enhanced entrepreneurial self-efficacy.

## 6. Implications

### 6.1. *Create a Good Environment for Innovation and Entrepreneurship*

The entrepreneurial environment has a positive predictive effect on entrepreneurial self-efficacy. Therefore, it is necessary to create a positive entrepreneurial environment to create beneficial external conditions for college students' entrepreneurial development. On the one hand, the government should provide entrepreneurial support policies to help college students obtain entrepreneurial funding, access to market resources, and carry out technology development. On the other hand, industry enterprises can strengthen entrepreneurial cooperation with college students, jointly develop technologies and expand market resources, and give investment support to entrepreneurial projects with market potential. Besides, universities should establish a systematic entrepreneurial service system, cultivate a culture of innovation and entrepreneurship, promote the construction of entrepreneurial incubation carriers such as co-working space and science and technology parks, and provide not only soft but also hard support for college students' entrepreneurship.

### 6.2. *Establish a Talent Training Model Based on Entrepreneurial Competence Model*

Entrepreneurial competence not only significantly predicts entrepreneurial self-efficacy, but also plays a part in mediating the effect of an entrepreneurial environment on entrepreneurial self-efficacy. Hence, the establishment of talent cultivation model from the perspective of entrepreneurial competence can enhance college students' entrepreneurial competence and improve their entrepreneurial self-efficacy. Universities should promote school–enterprise cooperation, organize market research, hold lectures on industry development, and invite famous entrepreneurs to provide project counseling to enhance college students' opportunity competence and relationship competence. At the same time, colleges and universities can encourage and guide college students to practice entrepreneurial projects by relying on college students' innovation and entrepreneurship training program and "Youth Red Dream Building Journey" activities, and guide college students to improve organizational competence, conceptual competence and strategic competence in practice. In addition, universities should set up entrepreneurial role models, create a

strong entrepreneurial atmosphere, strengthen students' entrepreneurial motivation, and continuously improve their commitment competence.

### 6.3. Build a High-Quality Entrepreneurial Education System

Entrepreneurial education has moderating effects on the contribution of the entrepreneurial environment to entrepreneurial self-efficacy. College students with entrepreneurial education can better obtain support from the entrepreneurial environment and enhance entrepreneurial self-efficacy. Therefore, colleges and universities should build a high-quality entrepreneurial education system to enhance college students' entrepreneurship theory and skill levels. Colleges and universities should improve the quality of entrepreneurship courses, promote the integration of specialization and innovation, and develop students' entrepreneurial ability training based on the curriculum system. Colleges and universities should carry out various forms of entrepreneurial practice to enhance entrepreneurial skills of college students. The internalization of entrepreneurship skills can be promoted through innovation and entrepreneurship competition, innovation and entrepreneurship service practice activities, enterprise visit and research, etc. Besides, colleges and universities should strengthen cooperation with government and enterprises, realize the deep integration of government, industry, academia, research and application, establish cooperative entrepreneurial education system inside and outside the university, and improve the effectiveness of entrepreneurial education.

## 7. Conclusions, Shortcomings, Further Research Directions

### 7.1. Conclusions

This study discussed the impact of entrepreneurial environment on College Students' self-efficacy and analyzed the mediating effect of entrepreneurial competence and moderating role of entrepreneurial education. This can help understand the relationship among them and enrich the theory of the ternary interactive decision model in the context of entrepreneurial education. In addition, combined with the survey and research results, the paper put forward specific suggestions to strengthen entrepreneurial education in colleges. These can provide theoretical reference for colleges to implement entrepreneurial education, improve the training quality of entrepreneurship talents and improve college students' entrepreneurial ability.

### 7.2. Shortcomings and Further Research Directions

This study took college students in Guangdong Province as the research object. The promotion of research results needed to be carried out in areas with similar characteristics, which has certain limitations. In addition, in terms of personal information, the survey simply asked whether the subjects participated in entrepreneurship education and entrepreneurship practice. In the future, we need to deeply understand the specific forms of students' participation in entrepreneurship education and entrepreneurship practice, as well as the value of relevant methods. The research work needs to expand the scope of the subject and expand the popularization and application of the research results. At the same time, we should increase the information collection on the specific ways for college students to participate in entrepreneurship education and entrepreneurship practice and analyze the impact of different ways of participation.

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