

Article

# College Students' Entrepreneurial Intention and Alertness in the Context of the COVID-19 Pandemic

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**Abstract:** This research aims to explore how the COVID-19 pandemic has affected college students' entrepreneurial intention (EI), as well as whether the well-studied link between entrepreneurial alertness (EA) and EI is involved. Data were collected from 612 respondents, and using the stepwise regression method we examined the moderating role of college students' perceived risk of COVID-19 on the connection between EA and EI. The results show that students' perceived risk of COVID-19 reduces their EI. Furthermore, the perceived risk of COVID-19 attenuates the relationship between EA and EI. Specifically, those who perceived a greater risk tended to show lower EI. This article contributes to a better understanding of how the relationship between EA and EI has changed during the pandemic.

**Keywords:** COVID-19 pandemic; entrepreneurial intention; entrepreneurial alertness; perceived risk of COVID-19 pandemic; moderating effect

## 1. Introduction

The COVID-19 pandemic has become one of history's most significant crises [1], highlighting societies' vulnerability and resilience [2]. Governments throughout the world are attempting to use entrepreneurial thinking to combat the pandemic, and different approaches have been used. The facts show that recourse to innovation and entrepreneurship is an important guarantee to ensure the sustainable development of society. The vulnerability of human society in the face of natural disasters such as the COVID-19 pandemic underlines the need and urgency of entrepreneurship [3]. Especially for the younger generation, it is necessary to master entrepreneurship in order to be able to face various potential crises in the future and to better build a common home [4,5].

Entrepreneurial intention is a critical predictor of entrepreneurial actions [6]. The entrepreneurial intention of college students has received a lot of attention. Studies have shown that gender, personality traits, entrepreneurial knowledge, and desire for achievement can be used to predict EI levels, along with family education, entrepreneurial orientation from the government, and regional entrepreneurial atmosphere as external factors [7].

To sum up these characteristic variables and environmental factors, researchers have proposed many theoretical models of entrepreneurship to explain the antecedent variables of entrepreneurial intention and their consequent variables. The most popular theoretical model is the Theory of Planned Behavior (TPB) [8], which argues that attitudes, subjective norms, and perceived behavior control determine entrepreneurial intention. Additionally, these intentions are then translated into actions. In the context of the pandemic, a number of studies have found that college students' EI has decreased [9,10]. However, there are also studies that have found that college students' EI has increased [11]. Despite the conflicting results, these studies do not delve into what causes this. In other words, the impact of the pandemic on college students' EI still requires further study.

In addition to considering the factors influencing EI, it is also worth discussing in depth whether the relationships between EI and other variables have been affected by the pandemic [4,12]. This paper focuses on the link between entrepreneurial alertness (EA) and EI. EA mainly describes a firm's grasp of entrepreneurial opportunities. It is generally believed that people who are alert recognize opportunities that others overlook and seize them at the right time to start a business [13,14]. More recently, a significant portion of the follow-on alertness research has gravitated towards an individual and cognitive construct [14,15]. In particular, Tang et al. articulated alertness as consisting of three dimensions: information scanning and searching, information association and connection, and opportunity evaluation and judgment [16]. Alertness has been found to predict individual and organizational outcomes such as career attitudes [17]. The relationship between entrepreneurial alertness and entrepreneurial intention is very close, and some studies have found entrepreneurial alertness to be a mediating variable between entrepreneurship education and entrepreneurial intention [18]. Some studies have also directly explored the predictive effect of different dimensions of entrepreneurial alertness on entrepreneurial intention [19,20]. It is thus generally accepted that entrepreneurial alertness can predict the entrepreneurial intention of college students. In addition, alertness enables entrepreneurs to assess opportunities more effectively and take more risks [21]. So studying the impact of the pandemic on this relationship is very representative.

In the context of the pandemic, studies have found that alert people are less eager to resume business that has been suspended due to the lockdown, especially when it comes to start-ups [17]. However, whether the pandemic affects the strength of the link between entrepreneurial alertness and entrepreneurial intention has not been explored. Taken together, there is a lack of in-depth research on how the epidemic has affected college students' entrepreneurial intention and how some known links (e.g., that between EA and EI) have been affected by the epidemic.

From a cognitive perspective, the pandemic can be seen as a large stressor that affects everyone to a greater or lesser extent. Everyone has a certain emotional response. Prospect theory tells us that people are finitely rational [22]. Affect heuristic theory further tells us that emotions may influence cognitive judgment, especially when faced with a crisis [23]. Along this theoretical line, this study introduces the perceived risk of the COVID-19 pandemic to explore the impact of the pandemic on college students' entrepreneurial intention and how existing connections have changed during the pandemic.

In conclusion, the present study examines the resilience of the relationship between entrepreneurship alertness and entrepreneurship intention during the COVID-19 pandemic. Remarkably, this study proposes that people's perception of the risk of contracting COVID-19 can influence the translation of entrepreneurial alertness to intention. Specifically, the present study extends the current literature by demonstrating that individuals' perception of the risk of COVID-19 moderates the relationship between entrepreneurial alertness and intention.

## 2. Literature Review

### 2.1. Entrepreneurial Alertness and Entrepreneurial Intention

Entrepreneurial intention is “a self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future” [24]. Individuals with high entrepreneurial intentions are continuously preparing for an entrepreneurial career. Even if they are not presently participating in entrepreneurial activities, they ultimately will [25]. In other words, entrepreneurial intention plays a crucial role in the formation of an individual’s entrepreneurial behaviors [26], as “the stronger a person’s intention to engage in a specific behavior, the more likely it is that the actual behavior will be performed” [8]. Perhaps the most popular theory among entrepreneurship researchers is the theory of planned behavior [8], which provides a framework for predicting how attitudes and perceptions of normative and control beliefs shape entrepreneurial intentions and behavior. However, another theoretical perspective is also available, the cognitive framework, which highlights the effects of related cognitive factors in the process of entrepreneurship. For instance, people tend to suffer from a robust optimistic bias—an inflated tendency to expect things to turn out well [27]. Entrepreneurs are more prone to such bias than other persons; for example, they are more confident and believe they have a higher probability of success or overcoming difficulties. In conclusion, such bias can lead them to expect more favorable outcomes to a greater extent than is reasonable.

Entrepreneurial intention is a critical component of successful business operations [28,29]. Thus, numerous studies have been conducted to explain the formation of entrepreneurial intentions, which develop a variety of intention-based models [30]. Such research has looked into aspects that could speed up the entrepreneurial process and provide critical support for both theory and practice. Among these, how entrepreneurial opportunities are identified and nurtured is an important aspect of entrepreneurial activity [31]. As a result, the concept of entrepreneurial alertness (EA) has gained much attention in the entrepreneurship literature since it describes how people perceive and act on entrepreneurial opportunities [32,33]. Nevertheless, it should be noted that being able to identify entrepreneurial opportunities does not necessarily mean that the person will commit to entrepreneurship, which may be influenced by other factors [25]. The research found that natural disasters, such as earthquakes, could moderate individuals’ entrepreneurial intentions; specifically, the effects of attitudes and perceived behavioral control on entrepreneurial intention was strengthened while the relationship between subjective norms and entrepreneurial intention was weakened [34]. Thus, we should ask the question: How does the COVID-19 shape the drivers of entrepreneurial intentions, such as entrepreneurial alertness?

From the perspective of the cognitive framework, the key to the entrepreneurial process is recognizing entrepreneurial opportunities [35]. There are many factors that influence one’s recognition of entrepreneurial opportunity, including entrepreneurial alertness [36]. More specifically, entrepreneurial alertness is described as: “a motivated propensity of man to formulate an image of the future” [31]. Recently, individual and cognitive orientations have become more popular; for example, Baron has argued that entrepreneurial alertness means that individuals “identify new solutions to market and customer needs in existing information, and to imagine new products and services that do not currently exist” [13]. It has been confirmed that alertness is a crucial antecedent factor in forming entrepreneurial intentions; alert individuals are more likely to identify new business opportunities, which accelerates the formation of entrepreneurial intention. In other words, entrepreneurial alertness has a positive effect on entrepreneurial intention. The relationship between entrepreneurial alertness and entrepreneurial intention has been well studied. For example, McMullen and Shepherd emphasize that entrepreneurial alertness helps individuals identify good opportunities and improve their judgment ability, further accelerating the formation of entrepreneurial intention and driving people to engage in business in the future [9]. Additionally, there are many researchers studying the moderating or mediating role of alertness between intention and other factors, such as entrepreneurial education [37,38], and proactive personality [25].

## 2.2. COVID-19 and Entrepreneurial Intention

The COVID-19 pandemic is unquestionably a crisis, and it has four essential characteristics: first, it is serious (as in, it might have catastrophic implications); second, no one is immune to the virus; third, it is fast-spreading; and last, it is long-lasting (we still do not know when the pandemic will stop). Due to these qualities, the pandemic has had a significant influence on the global community. At the macro-level, the rapid spread of the pandemic has led to a shortage of medical and health supplies in major countries in different parts of the world, even leading to competition for profit rather than strengthening international solidarity. It has also led to a shortage of basic necessities in different countries, increasing the demand for some primary industrial goods and even revitalizing some industries (e.g., shipping). Of course, the pandemic has also led to a significant acceleration of the global digitization process [39,40]. This is also evident at the micro-level. Most companies had to adopt a work-from-home strategy for their employees, and the number of users of online meeting applications soared. Individuals have had to adapt to these changes.

On the plus side, a changing society offers new opportunities for entrepreneurs, and the COVID-19 pandemic may represent a once-in-a-lifetime opportunity for entrepreneurs to modify established processes [41]. However, this is not always a good thing for prospective entrepreneurs. There has not been any research into how college students' entrepreneurial intention (as representatives of prospective future entrepreneurs) has altered during the pandemic. How did students adjust to this new manner of teaching after being forced to take lessons remotely due to the pandemic? What was their risk profile during the outbreak, and how did that influence their decision-making? All of these questions have yet to be answered.

Entrepreneurial activities are characterized by high risk. Researchers have long been interested in why some people choose to engage in such high-risk activities and have tried to answer these questions from a cognitive perspective. Scholars have suggested that the Prospect Theory explains this phenomenon well, which showed that people rely on heuristics such as availability or representativeness to make judgments or decisions [42]. More recently, Slovic and colleagues proposed another heuristic, the affect heuristic, which people might rely on when judging the risk and benefit of specific hazards [43]. According to the affect heuristic, hazards may evoke images and associations tagged with positive or negative feelings, which in turn influence judgments of these hazards [43,44]. This framework further distinguished two models of thinking, the experiential system and the analytical system. Probabilities, or evidence, are the information the analytical system relies upon. Images, metaphors, or narratives are the information the experiential system relies upon. This latter system is important for laypeople's risk perception. Results of past studies suggest that the affect heuristic may be important for lay people's risk perception and may result in biased risk estimates [23,43].

From a cognitive perspective and the affect heuristic theory, risk perceptions are the subjective perceptions and judgments people make about the risks they face, or the attitudes and perceptions people hold towards risk. Risk perceptions differ individually and fluctuate with the development of changes in external factors, and such differences influence their mental activities and behavioral decisions. When making entrepreneurial decisions, individuals take risky actions because they perceive less risk. That is, individuals with a high propensity for risk perceive less risk in a given situation than individuals with a low propensity for risk. Similarly, then, in the context of the current pandemic, individuals may be more willing to engage in risky entrepreneurial activities if they perceive less risk [45]. Conversely, if an individual's perceived risk is higher, then his willingness will be weaker. Based on this, we propose the following theoretical hypothesis.

**H1.** *Risk perception has a diminishing effect on entrepreneurial intentions, and the higher the degree of perceived risk, the weaker the intention.*

### 2.3. Perceived Risk Moderates the Relationship between EI and EA

Generally speaking, EA has a positive effect on EI. However, the existing findings show that the association is not particularly solid or unchanging; it weakens and even becomes non-significant under some circumstances. [18,46]. More specifically, Obschonka et al. showed that a proactive personality moderates this association [25]. This implies that we need to search for other factors that moderate this association.

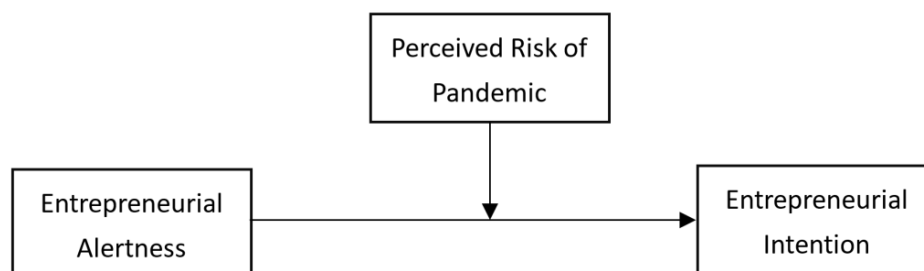
Entrepreneurial alertness research has focused on how individuals think innovatively to achieve the opportunity–cognition–behavior connection [17]. In particular, entrepreneurial alertness describes how potential entrepreneurs “attribute meaning to environmental changes” by adding their schemas to society [47]. It enhances individuals’ innovation ability when replying to external environmental changes or shifts, such as identifying new opportunities, objects, events, and behavioral patterns [48]. Thus, the link between the alertness and entrepreneurial intentions of university students will be influenced by the general environment of the pandemic. This is because the disruption caused by the pandemic brings with it unique and unprecedented changes and opportunities [32].

Looking deeper, the core of entrepreneurial alertness is the collection and cognitive processing of information [15,16]. Crises bring many further changes, which leads to every individual being confronted with a variety of new information every day. Additionally, since the pandemic is quite dangerous, the individual’s perception of the level of danger of the pandemic also influences their judgment and processing of information [44]. From another point of view, individuals who perceive a high risk will develop a certain level of anxiety and fear [49]. As suggested by the affect heuristic theory, decision makers’ emotions affect their ability to process risk information, prompting the prospective entrepreneurs to make irrational information evaluations and thus influencing their decisions.

In a fearful situation, the individual’s cognitive judgment is significantly affected [50], as emotion may be generalized to a certain extent [51]. For instance, more conservative decisions are made in such a situation. It is reasonable that fear may be generalized to the extent that it may lead to a new assessment of the previously appreciated career plan of entrepreneurship. Especially for alert individuals, the more information they collect, then the more attentive they will be to the pandemic, and the more negatively impacted they will be by the pandemic based on the theoretical analysis. In turn, it is possible to reduce the corresponding entrepreneurial intention. This means that individuals who perceive a higher level of risk will decrease their willingness to start a business, even though their entrepreneurial alertness is maintained at a higher level. In other words, the perceived risk of the epidemic weakens the positive association between entrepreneurial alertness and entrepreneurial intentions. Therefore, the following hypothesis is proposed in this study.

**H2.** *Risk perception moderates the relationship between entrepreneurial alertness and entrepreneurial intention, and the higher the degree of perceived risk, the weaker the link.*

Above all, based on previous research [18,19,21], the Prospect Theory and Affect Heuristic Theory, this study argues for the model shown in Figure 1.



**Figure 1.** The conceptual model of the current study.



### 3. Materials and Methods

#### 3.1. Participants

Data were collected from undergraduate students from several universities located in the central and southern parts of China who volunteered to participate in this survey. The anonymous and self-completed questionnaires were distributed to the students through an online crowdsourcing platform (<https://www.wjx.cn/>, accessed on 23 May 2022), which consisted of the Entrepreneurial Intention scale, Entrepreneurial Alertness scale, Perceived Risk of COVID-19 Pandemic scale, and demographic variables. The study was implemented in May 2021, and a total of 612 responses were collected, and all were valid. The sample composed 310 males (50.7%) and 302 females (49.3%); 291 students (47.5%) who had student-leader experience; and 158 students (25.8%) from families who run a self-employed business (“getihu” in Chinese). This study was approved by the Ethics Review Committee of South China Normal University, and the ethics application number is SCNU-PSY-2021-020.

#### 3.2. Measures

##### 3.2.1. Entrepreneurial Intention (EI)

EI was measured using a five-question scale adopted from a commonly used entrepreneurial intention scale [52,53], which has been modified to suit the Chinese cultural context in previous studies [54]. The representative item is “I intend to start my own business in the near future.” The Cronbach’s  $\alpha$  of the entrepreneurial intention scale was 0.915. In addition, a CFA was conducted to verify the construct validation, with the results showing a good data-construct fit, composite reliability (CR) = 0.812 ( $\geq 0.7$ ), RMSEA (Root Mean Square Error of Approximation) = 0.036 ( $< 0.08$ ), 95% CI = [0.000, 0.073], SRMR (Standardized Root Mean-Square) = 0.011 ( $\leq 0.10$ ), CFI (Comparative Fit Index) = 0.998 ( $\geq 0.90$ ), and TLI (Tucker–Lewis Index) = 0.997 [55].

##### 3.2.2. Entrepreneurial Alertness (EA)

EA is measured using a four-question scale adopted from Tang et al.’s [16] scale, which was modified to suit the Chinese cultural context by Guo and Zhou [56]. The representative items are “I have frequent interactions with others to acquire new information,” and “I often see connections between previously unconnected domains of information.” The Cronbach’s  $\alpha$  was 0.879. Additionally, the CFA results showed good construct validation, with CR = 0.834 ( $\geq 0.7$ ), RMSEA = 0.062 (95%CI, [0.014, 0.116]), SRMR = 0.009 ( $\leq 0.10$ ), CFI = 0.997 ( $\geq 0.90$ ), and TLI = 0.992 ( $\geq 0.90$ ).

##### 3.2.3. Perceived Risk of COVID-19 Pandemic (PRCP)

PRCP is measured by the Perceived risk of COVID-19 pandemic scale (PRCPS) [57], which describes an individual’s intuitive feelings about being infected with COVID-19, their cognitive judgments about their susceptibility to infection, and their mental representations of the unusual severity of COVID-19. Specifically, the PRCP consists of three dimensions: emotional feelings (three items, such as “I am worried about catching coronavirus,” five-point Likert scale), cognitive judgment (three items, such as “no matter how small the chances are, there is a chance that I could get the new coronavirus,” six-point Likert scale), and unusual severity representation (three items, such as “I never/rarely/sometimes/often think about getting the novel coronavirus,” four-point Likert scale). The Cronbach’s  $\alpha$  was 0.891. The CFA showed good construct validation as well, with CR = 0.812 ( $\geq 0.7$ ), RMSEA = 0.041 (95%CI, [0.025, 0.057]), SRMR = 0.022 ( $\leq 0.10$ ), CFI = 0.988 ( $\geq 0.90$ ), and TLI = 0.984 ( $\geq 0.90$ ).

##### 3.2.4. Control Variables

We controlled for the students’ gender, experience as a student leader, and entrepreneurial role models (whether a parent is self-employed), as we knew that male students’ en-

trepreneurial intention is higher than that of female students, and that demographic factors appear to significantly affect entrepreneurial intentions [58].

### 3.3. Data Analysis

First, the reliability and validation of the scales used in this study are analyzed to ensure that our further analysis was built on a solid foundation, and the common method bias has been settled. Second, descriptive statistics are carried out to describe the basic situation of variables, such as the means, standard deviations, and correlations between variables. Third, the hypotheses were tested by comparing the fitness of several nested models step by step under the structural equation-modelling framework.

The software used was Mplus 8.0 [59]. A good fit is indicated by  $RMSEA < 0.08$ ,  $SRMR \leq 0.10$ ,  $CFI \geq 0.90$ , and  $TLI \geq 0.90$  [55].

## 4. Results

### 4.1. Reliability and Validity

The reliabilities of the scales are good. As mentioned in Section 3.2, the Cronbach's  $\alpha$  was greater than 0.70, and the CR was greater than 0.60 for all scales.

The Exploratory Structure Equation Model (ESEM) was used to test the scales' construct validity [60,61]. One to three factor models were conducted sequentially, and the model fit indexes are shown in Table 1. As we can see, the three-factor model is the best-fitted model, so the scales have good construct validation. In addition, the questionnaires used have been implemented in prior studies, so the content validation is also good. Moreover, the scales are adopted from tested and proven scales [54–56], and have been modified to suit the Chinese cultural context, so they exhibit good content validity [61].

**Table 1.** Summary of the model fit of the ESEM.

Model	$\chi^2$	df	CFI	TLI	RMSEA[CI]	SRMR
1-factor	2992.812	135	0.578	0.522	0.186 [0.180, 0.192]	0.172
2-factor	1064.902	118	0.860	0.819	0.115 [0.108, 0.121]	0.054
3-factor	141.425	102	0.994	0.991	0.025 [0.014, 0.035]	0.016

In addition, the common method bias is further verified using the Harman single factor test [62]. The results showed that three factors with eigenvalue greater than one were extracted among the 18 items, the cumulative variance contribution rate is 64.40%, the first eigenvalue is 4.805, the variance contribution rate is 26.697%, and the proportion is less than 40% of the total explanatory variables.

### 4.2. Description of Results

Table 2 presents the means, standard deviations and correlation coefficients among the variables. The intention is high, with the mean being slightly above the midpoint. The alertness is lower than the intention. For the perceived risk of COVID-19, the mean is lower than the midpoint (2.5/3/3.5 for the 4/5/6-point scales, respectively), and the standard deviation is smallest among the three scales, which means that most people had some (but not severe) concerns regarding infection.

Additionally, EI, EA, and PRCPS are significantly correlated with each other; EI and EA are positively correlated but PRCPS is negatively correlated with the other two. Gender and student-leader experience are significantly correlated with EI, EA, and PRCPS, but whether their parents are self-employed is not correlated with these variables.

**Table 2.** Means, standard deviations, and correlations among study variables. ( $n = 612$ ).

Variables	1	2	3	4	5	6
1.gender <sup>a</sup>	-					
2.student-leader experience <sup>b</sup>	−0.349 ***	-				
3.Parents self-employed <sup>b</sup>	0.276 ***	−0.008	-			
4.EA	−0.351 ***	0.337 ***	0.047	(0.879) #		
5.EI	−0.586 ***	0.628 ***	0.008	0.638 ***	(0.915) #	
6.PRCP	0.213 ***	−0.186 ***	0.017	−0.285 ***	−0.338 ***	(0.891) #
Mean	-	-	-	2.22	2.84	2.34
SD	-	-	-	0.788	0.945	0.536

<sup>a</sup> female = 1, male = 0; <sup>b</sup> yes = 1, no = 0; # Cronbach's  $\alpha$ , \*\*\*  $p < 0.001$ .

#### 4.3. The Moderation Model

The moderation effect is examined via a stepwise regression analysis. Model 1 presents the baseline model with the control variables only. The independent variable, entrepreneurship alertness, is included in Model 2. The two-way interactions of entrepreneurship alertness  $\times$  perceived risk of COVID-19 is entered into Model 3. All models are statistically significant and explain between 56.6% and 70.0% of the variance in entrepreneurial intentions.

As shown in Table 3, the perceived risk of COVID-19 has a significant negative effect on entrepreneurial intentions ( $b = -0.095$ ,  $p < 0.001$ ), which provide support for hypothesis 1. Additionally, the entrepreneurial alertness showed a significant positive effect on entrepreneurial intentions, which is consistent with prior research. However, this association is moderated by the perceived risk of COVID-19, as is shown by the fact that the interaction of entrepreneurship alertness  $\times$  perceived risk of COVID-19 is significant in Model 3. In other words, hypothesis 2 is also established.

**Table 3.** Stepwise regression results of the moderation model (dependent variable: EI).

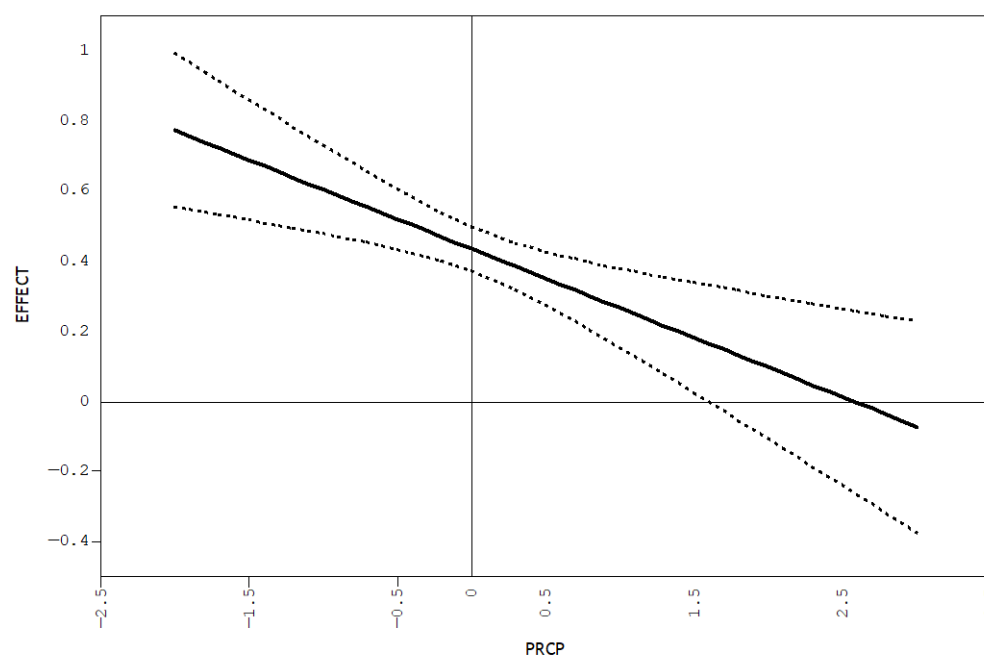
	Model 1		Model 2		Model 3	
	b	t	b	t	b	t
Gender	−0.461 ***	−15.726	−0.333 ***	−11.941	−0.33 ***	−11.929
Leader experience	0.468 ***	17.446	0.373 ***	15.029	0.365 ***	14.839
Self-employ	0.140 ***	4.850	0.088 ***	3.592	0.090 ***	3.672
EA			0.365 ***	13.641	0.363 ***	13.68
PRCP			−0.095 ***	−4.056	−0.109 ***	−4.677
EA $\times$ PRCP					−0.078 **	−3.295
$R^2$	0.566		0.694		0.700	
$f$	20.775 ***		35.163 ***		35.173 ***	

\*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Figure 2 shows the moderating effect of the perceived risk of COVID-19 on the association of EA and EI through the Johnson–Neyman technique [63]. As we can see from this figure, the path from EA to EI is no longer significant when the perceived risk is more than one and a half SD.

Finally, regarding the control variables' results, gender, student-leader experience, and parents' entrepreneurial experience are all significant across all models, which is in line with prior findings in entrepreneurship research [64,65].





**Figure 2.** The interaction effect of  $PRCP \times EA$  on EI. The solid line indicates regression coefficients of  $PRCP \times EA$  on EI at different PRCP levels, and the dashed line shows the 95% confidence interval of these coefficients.

## 5. Discussion and Conclusions

### 5.1. Research Values and Contributions

This study offers empirical data for the continuing discussion on the effects of COVID-19 on entrepreneurship. First, we found that an individual's perceived risk lowers their EI. We found that the link between EA and EI has become weaker during the pandemic. Along with previous studies [17,66], such as those on entrepreneurial self-efficacy and EI [67], the results give us a deeper understanding of the crisis' influence on entrepreneurship, especially with regard to college students' EI.

The study found that perceived risk significantly reduces college students' EI. From an affect heuristic perspective, the pandemic brings negative emotions. In the framework of negative emotion heuristics, individuals are more risk averse and tend to be more conservative when making decisions. The measure of risk in our study is subjective; that is, it involves subjective reports of the perceived risk of COVID-19. The objective level of risk may be relatively small, yet it may still be magnified by some individuals. In this process, other cognitive biases, such as fractional bias, may also exist. The pandemic has resulted in many deaths. Although the number of deaths is not very large, it can cause great fear in some people. Due to this fear, people may choose to avoid risky start-ups when evaluating entrepreneurship and as a result may show a lower willingness to start a business.

It may also be that the specific cultural background of this study led to such results, as the respondents were all Chinese. China was the first country to bear the brunt of the pandemic, entrepreneurial finance investments in China slumped dramatically in the immediate aftermath of COVID-19, especially early-stage seed investments, which had the steepest fall [68]. So this harsh reality may also affect college students' willingness to start a business. Ruiz-Rosa et al. [6] found that Spanish university students' social entrepreneurial intention decreased during COVID-19 [9], and similar results were found among Latin American students [10]. However, Botezat and colleagues found that Romanian college students' EI increased during the pandemic, but this study did not distinguish the impact of the entrepreneurship education program from the impact of the pandemic [11]. Future research should compare different countries' results because different countries have different cultural backgrounds [53] and different entrepreneurial environments [69].

Relatively little attention has actually been paid to the relationship between entrepreneurial alertness and entrepreneurial intention by previous authors. This is because the relationship between alertness and intention is quite close. In business, even mature companies have to be alert to develop new business. However, in the case of university students, there are studies on the relationship between these two. Thus, this basic link is a good way to examine the impact of the pandemic. We found a moderating effect of the pandemic in our study. This result can be understood in two ways. First, the risk of the pandemic decreased college students' EI. At the same time, the pandemic's impact on their level of entrepreneurial alertness was limited and this measure was largely stable, making the link between EI and EA weaker. In other words, cognitive heuristics may not weaken the entrepreneurial alertness but the EI is lower. Therefore, this leads to a weaker connection.

### 5.2. Theoretical Implications

Our study extended the ongoing research flow of COVID-19's effect on entrepreneurship and made several theoretical contributions. First of all, this paper extended the concept of entrepreneurial risk from business scope to individual perceived health-related risks by adopting a cognitive perspective. Previous research has focused risk perception on uncertainty and crisis factors in the business creation process [70,71]. Our study argues that the perception risk of the pandemic also plays a role in the process of entrepreneurship. Entrepreneurs are only found to be unique in their lower degree of loss aversion, and not in their risk or ambiguity aversion [72]. However, the pandemic brings too many uncertainties. Our study introduced prospect theory and affect heuristic into the context of entrepreneurship research and may further inspire a group of studies. Furthermore, we discovered that, in addition to the well-known positive cognitive bias [73], there is a negative cognitive bias for entrepreneurial ambitions. At last, we found that the perceived risk of environmental context elements could attenuate the link between EA and EI, allowing us to acquire a better understanding of the association's resilience.

### 5.3. Practical Implications

The COVID-19 pandemic has had significant impacts on higher education learning and teaching practices [3,74]. In many countries around the world, campuses are closed and teaching has moved online [75]. Internationalization has slowed down considerably. The sector has been shaken, with significant discussions of assurance of learning [76,77], well-being [78], and leadership [4,5] emerging in the literature. The causes for this are manifold, and there have been studies that have constructed new theoretical models from institutional origins [79], but the pandemic is not over, so our knowledge also needs to continue to deepen. Despite these challenges, higher education institutes have reacted positively, implementing new solutions to continue providing teaching, research, and service to society. Our study can provide some valuable implications regarding entrepreneurial education.

Entrepreneurship education programs should undergo targeted modifications. The COVID-19 pandemic had a higher impact on educational affairs than other crises, including preceding health-related pandemics. When creating a new program during a pandemic, it is important to think about ways to lessen students' risk aversion. Studies show that people are more concerned about the negative consequences of human hazards compared with natural hazards [44]. So it might be helpful to emphasize the natural attributes of the pandemic. The government must make vital pandemic information and disease-related science as widely available as possible to the public in a timely and accurate manner. Additionally, students should take the initiative to learn about epidemic principles and other scientific information, try to objectively evaluate the epidemic's progression, and strive to mitigate the epidemic's influence on themselves. Moreover, it is suggested that affirmation of personal values can buffer psychological stress response during the COVID-19 pandemic [80]. So, such self-affirmation exercises can be considered for inclusion in entrepreneurship education programs.

From another perspective, the study results inspired us to focus more on increasing the level of entrepreneurial alertness among college students. Although the link between EA and EI has become weaker during the pandemic, the EI is likely to fluctuate. Thus, when a pandemic occurs, it may be lower; after the pandemic, it may return to its previous level. However, alertness is a constant search process. Therefore, more attention should be paid to the development of alertness.

#### 5.4. Limitations and Future Studies

The main limitation is that the variables studied in this study were examined using a questionnaire, which has inherent limitations. The measurement of risk, in particular, is subjective, and future research might examine whether the findings of this study hold up in the face of major objective variations in risk profiles across time or geographic locations. Moreover, the sampling technique used in this study was convenient sampling, which can also be a limitation. Whether our results can be generalised to the Chinese population should be dealt with care.

Furthermore, all of the participants in this study were mainland Chinese college students, and no cross-cultural data were collected. Future studies should continue along the current direction, for example, by exploring the co-variation of college students' academic performance and EI during the pandemic [81,82]. Furthermore, cross-cultural comparison is an intriguing aspect that may be investigated further in future research [83]. There is a greater focus on collectivism, coordinated and synchronized acts, and the significance of powerful government actions in the Chinese cultural setting. As a consequence, the current results were obtained. Although the Western cultural setting places a greater focus on individual initiative [84], it is worth looking at whether the same outcomes would be found in Western countries.

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