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## The Impact of COVID-19 Risk Perception on College Students' Positive Psychological Capital: the Role of Psychological Resilience and Social Support

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### ABSTRACT

**Objective:** In order to explore the relationship between COVID-19 risk perception and positive psychological capital in college students, this study investigates the mediating role of psychological resilience and the moderating role of social support. **Methods:** In this study, 586 college students were surveyed by COVID-19 Risk Perception Scale, Positive Psychological Capital Questionnaire, Chinese Version of Resilience Scale and Social Support Scale. **Results:** (1) There is a significant negative correlation between COVID-19 risk perception and positive psychological capital, that is, COVID-19 risk perception can significantly and negatively predict the positive psychological capital of college students. (2) Psychological resilience plays a mediating role between risk perception and positive psychological capital. (3) Social support plays a weakening role in the negative prediction of risk perception on positive psychological capital. **Conclusions:** COVID-19 risk perception not only directly reduces positive psychological capital, but also affects positive psychological capital of college students through psychological resilience; social support can adjust the negative impact of risk perception on positive psychological capital. This study reveals the relationship between COVID-19 risk perception and college students' positive psychological capital and its mechanism, which has positive enlightenment significance for improving college students' mental health status and better promoting self-regulation during major public health events.

**Keywords:** COVID-19; Risk perception; Positive psychological capital; Psychological resilience; Family upbringing; College students.

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## 1. Introduction

Since the outbreak of the COVID-19 pandemic in the world in early 2020, the lifestyle of people around the world has changed greatly. In order to reduce the transmission rate of novel coronavirus and ensure the safety of people's lives and property, the Chinese government has taken measures such as nucleic acid detection for all staff, home isolation and travel restriction. The COVID-19 pneumonia pandemic has lasted for more than three years, and China's pandemic prevention and control policies are also being optimized and adjusted with the new situation. However, no matter how the pandemic prevention policy changed, the three-year pandemic still disrupts people's normal way of work and life. Various problems such as enterprise suspension, student suspension, city closure and health code pop-up affect every group. Some people will accumulate negative emotions due to being confined at home for a long time, and some people will panic due to excessive attention to negative information, resulting in problems with their own immune system. Some people have bad habits such as smoking, drinking, and Internet addiction. What's more, they vent their negative emotions by hurting themselves or others. In addition, many infected people will have physical fatigue, psychological anxiety and other problems after recovery<sup>[1]</sup>. Stress theory believes that negative events in life are the main reason for the negative growth of individuals' physical and mental health, which will lead to mental health problems. The common manifestations are anxiety, depression and even suicidal behavior<sup>[2-3]</sup>. Therefore, the psychological problems of each group caused by the COVID-19 pneumonia pandemic should not be underestimated.

The physical and mental health of college students is an issue that the state attaches great importance to and continues to pay attention to. The mental health problems of college students are deeply affected by the COVID-19 pandemic, especially the psychological problems such as anxiety. The overall level of anxiety is higher than that of the general population<sup>[4]</sup>. The incidence of anxiety is 26.6%, and it is rising<sup>[5-6]</sup>. Specifically, the pandemic has

had varying degrees of impact on the economies of countries around the world. College students in the transition from universities to the labor market lack professional experience and social support. The pandemic will lead them to face a severe employment crisis. With the spread of the pandemic, the problems of college students' difficulty in employment, job hunting and the decline of employment quality have become increasingly prominent. Many students have to give up or readjust their career planning due to the reduction of jobs, layoffs from enterprises, and intensified employment competition. Some students are facing the dilemma of employment and further education. Therefore, when facing the employment problem after the pandemic, many college students have negative emotions such as anxiety and depression. In addition, the sudden pandemic and the implementation of the closure policy broke the original learning and life style of college students. During the COVID-19 pneumonia pandemic, college students received and processed a large amount of pandemic information every day. On the one hand, when browsing the traditional news media, college students will face the explosive flow of a variety of pandemic related information, which will have a psychological impact, and the problem of information anxiety is becoming increasingly serious. On the other hand, college students need to adapt to a comprehensive online teaching state and complete various learning tasks arranged by the school. Under such circumstances, college students will be in a state of tension for a long time. Out of fear of the pandemic, it is easy to form a psychological stress disorder<sup>[7]</sup>.

Psychological capital is an important part of the theory of positive psychology. Luthans defined psychological capital as a positive psychological state that individuals show in the process of growth and development, including four core components: self-efficacy, optimism, resilience, and hope. It has the characteristics of high self-efficacy, viewing success from a positive attribution perspective, firm goals, and perseverance in the face of difficulties<sup>[8-9]</sup>. Specifically, self-efficacy enables individuals to face

and be competent for challenging tasks with confidence; Optimism makes individuals have a positive attribution style and a positive attitude towards the present and future; Resilience enables individuals to show perseverance when encountering difficulties, and can quickly transform and grow up in setbacks and failures. It is hoped that the individual can maintain the positive motivation state of trying to achieve the predetermined goal through various ways. Generally speaking, the higher the openness and acceptance of people with high psychological capital, the more willing they are to work hard for change, and the psychological qualities such as happiness and humor also have a positive tendency. However, from the perspective of resource conservation, individuals are more sensitive to losses than possible benefits. The sudden pandemic makes the original resources subject to the dual threat of daily life and risk events, which aggravates the loss of individual resources. The higher the awareness of COVID-19 risk perception, the less resources individuals can obtain. Compared with before the pandemic, the positive behavior of most college students will decrease, while the negative behavior will increase.

So, how does COVID-19 risk perception affect college students' positive psychological capital? At present, there is insufficient discussion on the relationship between risk perception and positive psychological capital in China, and there is a lack of research on the impact mechanism of perception level of the COVID-19 on positive psychological capital. In view of this, this paper investigates the changes of college students' psychological capital after the pandemic by sending questionnaires online. To study whether the risk perception of the COVID-19 pneumonia pandemic has an impact on college students' positive psychological capital, what impact it has, and how it has an impact, and answer the above questions, that is, the impact and mechanism of COVID-19 risk perception on college students' positive psychological capital. The in-depth exploration of the factors affecting the psychological capital of college students is of reference significance for promoting the mental health education of college stu-

dents, guiding them to face major crisis events with a positive and optimistic attitude, relieving anxiety and adapting to the changes of the times.

The marginal contributions of this study are as follows: First, it expands the research on the economic consequences of COVID-19 risk perception and the influencing factors of positive psychological capital. The existing research on the economic consequences of COVID-19 risk perception is less, while the research on the influencing factors of positive psychological capital is more abundant. Different from the existing studies, this paper examines the impact of COVID-19 risk perception on college students' positive psychological capital, and deepens and supplements the research on the economic consequences of COVID-19 risk perception and the influencing factors of positive psychological capital. Second, it reveals the mechanism of the effect of COVID-19 risk perception on college students' positive psychological capital. Through the mechanism test, it is found that COVID-19 risk perception has a negative impact on college students' positive psychological capital by reducing their psychological resilience. The mining of the above action path is conducive to a better understanding of the relationship between COVID-19 risk perception and college students' positive psychological capital and its transmission path. Third, this paper has a certain significance of policy optimization, which enlightens educators to strengthen college students' mental health education, pay attention to students' mental health, and pay attention to the cultivation of students' emotional regulation ability.

## **2. Research assumptions**

As the core force of national development, college students play an important role in promoting the rapid development of social economy<sup>[10]</sup>. A healthy mental state is an essential element for the all-round development of college students. In recent years, the state has attached great importance to the mental health of college students. In 2021, the Ministry of Education of China issued the notice on strengthening the management of students' mental health

to carry out targeted psychological intervention on college students and promote the development of college students' physical and mental health. However, with the change of social environment, the academic pressure and employment pressure faced by college students are increasing. The outbreak of the COVID-19 pandemic has forced universities to take measures such as school closure and online teaching. The panic and closed management caused by the spread of the virus have further increased the anxiety and panic of college students. Therefore, how to ensure the mental health development of college students under the COVID-19 pandemic has become an urgent problem to be solved.

Positive psychological capital, also known as psychological capital, first appeared in the field of western economics and sociology, and was proposed by Luthans and Youssef in 2004. Psychological capital is the positive psychological state that individuals show in the process of growth and development, and it is also an important indicator to measure the positive psychological quality of teenagers<sup>[11]</sup>. Luthans et al. believe that psychological capital refers to a relatively stable and important positive psychological force that individuals show in the process of growth and development, including four core components: self-efficacy, resilience, hope, and optimism. Previous studies have shown that psychological capital has a significant positive impact on mental health<sup>[12]</sup>. At the same time, a survey found that 39.29% of college students have moderate or high-intensity learning burnout<sup>[13]</sup>. The positive psychological capital of college students can effectively avoid learning burnout psychology and behavior, so as to improve the mental health of college students<sup>[14-15]</sup>. Therefore, exploring the influencing factors of college students' positive psychological capital is very important to help improve college students' positive psychological capital.

Risk perception is a concept used to describe people's attitude and intuitive judgment towards risk, including people's general assessment and response to risk. when applying risk assessment to estimate all kinds of dangerous things, ordinary peo-

ple mainly rely on intuitive risk judgment, that is, risk perception<sup>[16]</sup>. Sitkin and Weingart defined risk perception as the risk of an individual's assessment situation, including the probability estimate of the uncertainty degree of the assessment situation, the controllability of the uncertainty and the confidence in these estimates<sup>[17]</sup>. Specifically, risk perception is people's psychological feeling and understanding of various factors affecting daily life and work, an indicator to measure the public's psychological panic, and the public's understanding and judgment of risk events<sup>[18]</sup>. The COVID-19 pandemic is a risk event, and risk perception is the most direct psychological response to the pandemic. At the same time, the COVID-19 pandemic as a social event will also have an impact on social psychology. People's most direct psychological reaction to a risk event such as the COVID-19 pandemic is affected by the objective risk degree of the event, but it does not completely depend on the objective characteristics of the event<sup>[19]</sup>. Risk perception of pandemic will also be affected by information sources. Most people understand the knowledge and dynamics of the pandemic through various channels, rather than from direct experience. With the development of network technology, pandemic reporting relies on social media such as microblog, wechat and we-media. People's anxiety after obtaining pandemic information through such social media is also easy to spread through social media. High frequency use of social media will bring high panic and other emotions, which will lead to high-risk cognition. If people pay more attention to the number of confirmed cases, the number of deaths and other negative information, while improving the level of risk awareness of the COVID-19 pandemic, it will also overestimate the risk of the pandemic, produce anxiety, panic and other negative emotions, and then affect the positive psychological capital of college students<sup>[20]</sup>. Therefore, the increase of risk perception level of the COVID-19 pandemic may be closely related to the decrease of college students' positive psychological capital. Based on this, this paper puts forward hypothesis 1: there is a significant negative correlation between risk perception and



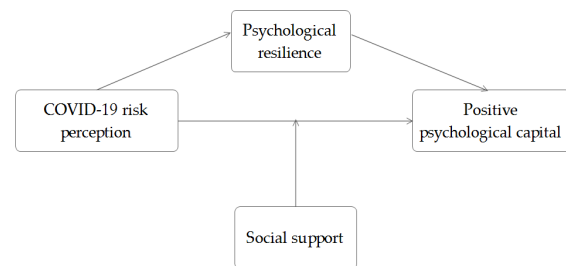
positive psychological capital.

So what mechanism does COVID-19 risk perception affect the positive psychological capital? Existing studies have shown that psychological resilience is the ability to maintain or restore mental health despite adversity. Based on the factor of psychological resilience – process integration model, the reappraisal and optimization of risk cognition will enhance the recovery potential of individual psychological function, while the individual's wrong cognition of risk will reduce the level of psychological resilience<sup>[21]</sup>. Resilience is a sub component of positive psychological capital. Each of the four components of positive psychological capital not only has conceptual independence and empirical based discriminant validity, but also promotes each other and plays a role in a collaborative manner, thus forming a higher-level concept of psychological capital<sup>[12]</sup>. Therefore, in theory, psychological resilience can improve the positive psychological capital of individuals. It can be seen that the improvement of the risk cognition level of the COVID-19 pandemic may cause the individual's false cognition of the risk, reduce the level of psychological resilience, and then reduce the positive psychological capital. Based on this, this study proposes hypothesis 2: psychological resilience plays a mediating role between the risk perception level of the COVID-19 pandemic and positive psychological capital.

The impact of COVID-19 risk perception on college students' positive psychological capital may be affected by objective conditions. Social support is the spiritual and material support that individuals get from the social relationships they have. It usually refers to the spiritual or material help and support given to individuals from all aspects of society, including parents, relatives, friends, etc<sup>[22–23]</sup>. Existing studies have pointed out that under different levels of social support, the emotional status of college students will have great differences. No matter in high or low stress situations, college students with good social support have significantly less depression and anxiety than those with poor social support<sup>[24]</sup>. In addition, studies have pointed out that social support

is positively correlated with positive psychological capital<sup>[25]</sup>. Therefore, good social support may reduce the adverse effect of the cognitive level of the COVID-19 pandemic on positive psychological capital. Based on this, this study proposes hypothesis 3: social support plays a weakening role in the negative prediction of COVID-19 risk perception on positive psychological capital.

To sum up, the level of risk perception can affect college students' positive psychological capital, psychological resilience can improve the individual's positive psychological capital, and social support can positively affect the positive psychological capital. However, the current domestic research on the relationship between risk perception and positive psychological capital is insufficient, and there is a lack of research on the relationship among risk perception, psychological resilience, positive psychological capital and the role of social support in it. At the same time, there is a lack of research on the impact mechanism of the perception level of the COVID-19 pandemic on positive psychological capital. Therefore, based on the above assumptions, the hypothetical model diagram of this study is proposed, as shown in **Figure 1**.



**Figure 1.** Hypothetical model of COVID-19 risk perception, psychological resilience, social support and positive psychological capital.

## 3. Method

### 3.1 Research object

In October–November 2023, this study used the convenient sampling method to test the college students of several undergraduate colleges in Hebei Province

through the network questionnaire platform. A total of 630 questionnaires were distributed, and each subject voluntarily agreed to participate in the questionnaire after being fully informed of the confidentiality and rules of the questionnaire. After sorting out the questionnaire, 586 valid questionnaires (93.02%) were recovered. Among them, 296 were female (50.52%), 290 were male (49.48%), 144 were freshmen (24.57%), 159 were sophomores (27.13%), 149 were sophomores (25.43%), and 134 were sophomores (22.87%). The subjects' ages ranged from 18 to 24 years. This study was approved by the ethics committee of Hebei Agricultural University. Written informed consents were obtained from all the participants for the publication of this study.

### **3.2 Research tools**

#### ***COVID-19 Risk Perception Scale***

Referring to the research of Yan and Wen, this paper uses the COVID-19 Risk Perception Scale to measure the risk perception of college students<sup>[23]</sup>. This scale contains two dimensions of risk perception at the personal level and risk perception at the social level, with a total of 8 questions, such as "the pandemic of COVID-19 pneumonia is closely related to me/the whole country", "I/the ordinary people have the chance to be infected", "I/the ordinary people will be very worried about being infected" and "I/the public feel that the pandemic is very serious". The likert-5 scale is used in this study. The higher the score, the higher the college students' awareness of the risk of COVID-19 pandemic.

#### ***Positive Psychological Capital Questionnaire***

This study uses the Positive Psychological Capital Questionnaire prepared by Zhang et al., which is composed of 26 questions and is divided into four dimensions: self-efficacy (7 items), resilience (7 items), hope (6 items) and optimism (6 items)<sup>[12]</sup>. For example, many people appreciate my talents, I don't like to be angry, I'm working hard to achieve my goals, I always see the good side of things, etc. The scale uses likert-7-point scoring method. The average item score of each dimension is taken as the score of each dimension, and the average of each

dimension is taken as the total questionnaire score. The higher the score, the higher the level of positive psychological capital of each dimension or the overall.

#### ***Chinese Version of Resilience Scale***

This study adopts the chinese version of Connor-Davidso Resilience Scale revised by Xiao and Zhang<sup>[26]</sup>. There are 25 items in this scale, including 3 dimensions, namely, tenacity (13 items), self-improvement (8 items) and optimism (4 items). The likert-5 score is adopted, in which 1 represents never and 5 represents always. The higher the score, the higher the psychological resilience.

#### ***Social Support Scale***

Social support can be divided into two categories in nature. One is objective, visible or actual support; The other is subjective and experienced emotional support. This study uses the social support rating scale compiled by Xiao and Yang in 1993. The scale contains three dimensions: objective support, subjective support and support utilization, with a total of 10 items, including objective support (3 items), subjective support (4 items) and social support utilization (3 items)<sup>[27]</sup>. As the research object is college students, this scale has made some changes, such as changing the work unit into a school. The higher the score, the higher the individual's social support level.

### **3.3 Statistical processing**

In this paper, SPSS and Stata software are used for data statistical analysis. SPSS was used to analyze the risk perception, psychological resilience and positive psychological capital of the COVID-19 pandemic. Stata was used to analyze whether COVID-19 risk perception will affect the positive psychological capital of college students. Then the mediating role of psychological resilience was analyzed by regression. Finally, the moderating effect of social support on COVID-19 risk perception on the positive psychological capital of college students was analyzed by regression.

## 4. Results

### 4.1 Common method deviation inspection

In this study, Harman single factor test is used to conduct a common method bias test for all items in the questionnaire. The results show that, among the 7 items, a total of 3 common factors with eigenvalues greater than 1 are extracted, and the first common factor explains 19.85% of the total variance, which is less than the standard 40% critical value. Therefore, there is no significant common methodological bias in the data in this study.

### 4.2 Descriptive statistics and correlation analysis among variables

Columns (1) and (2) in **Table 1** are descriptive statistical results of variables. The average of COVID-19 risk perception is 23.84, and the standard deviation is 3.99. This shows that college students have a higher awareness of the risk of the COVID-19 pneumonia pandemic. The average value of positive psychological capital is 102.96, and the standard

deviation is 10.64. This shows that there are great differences in the positive psychological capital of different college students.

Column (6) examines the relationship between COVID-19 risk perception and positive psychological capital and psychological resilience. The correlation coefficient between risk perception and positive psychological capital is -0.42, which is significant at 1% significance level. This shows that there is a significant negative correlation between COVID-19 risk perception and positive psychological capital, and hypothesis 1 is verified. The correlation coefficient between risk perception and psychological resilience is -0.23, which is significant at 1% significance level. This shows that there is a significant negative correlation between risk perception and psychological resilience. Column (7) examines the correlation coefficient between psychological resilience and positive psychological capital. The correlation coefficient between psychological resilience and positive psychological capital is 0.27, which is significant at 1% significance level. This shows that there is a significant positive correlation between psychological resilience and positive psychological capital.

**Table 1.** Descriptive statistics and correlation analysis of variables.

	(1) M	(2) SD	(3) 1	(4) 2	(5) 3	(6) 4	(7) 5	(8) 6	(9) 7
1 Gender	--	--	--						
2 Age	21.03	2.01	0.01	--					
3 Grade	2.47	1.20	-0.02	0.01	--				
4 COVID-19 risk perception	23.84	3.99	-0.09	0.05	0.05	--			
5 Positive psychological capital	102.96	10.64	0.05	-0.09**	0.01	-0.42***	--		
6 Psychological resilience	74.72	5.82	0.12***	-0.00	-0.05	-0.23***	0.27***	--	
7 Social support	38.66	6.58	0.02	0.02	0.02	0.04	0.02	-0.02	--

Note: gender is a dummy variable (1=male, 0=female). \* at 0.01 level (two tailed), the correlation was significant. \*\* at 0.05 level (two tailed), the correlation was significant. \*\*\* at 0.1 level (two tailed), the correlation was significant.

### 4.3 Mediation effect test

Previous studies have confirmed that COVID-19 risk perception can negatively predict the positive psychological capital of college students. However, it is not clear through which transmission channel the impact is realized. Combined with the previous

analysis, COVID-19 risk perception may negatively predict psychological resilience, and then negatively predict positive psychological capital. Based on this, under the control of gender, age and grade, this paper further investigates whether COVID-19 risk perception affects college students' positive psychological capital through the negative impact of psychological

resilience. After adding control variables such as gender, age and grade, the regression coefficient of COVID-19 risk perception on positive psychological capital is  $-0.42$ , which is significant at the 1% significance level, indicating that COVID-19 risk perception significantly negatively predicts positive psychological capital, which is consistent with the previous research conclusion. The regression coefficient of COVID-19 pandemic on psychological resilience is  $-0.23$ , which is significant at the 1% statistical level, indicating that COVID-19 risk perception significantly negatively predicts psychological resilience. When both risk perception and resilience predict positive psychological capital, the regression coefficient of resilience to positive psychological capital is  $0.24$ , which is significant at the 1% statistical level. The regression coefficient of COVID-19 risk perception to positive psychological capital is  $-0.36$ , which is significant at 1% statistical level. The negative predictive effect of risk perception on positive psychological capital is still significant. This shows that psychological resilience is the interme-

diary path of COVID-19 risk perception to positive psychological capital. The mediating effect value is  $0.07$ , and the mediating effect accounts for 14.5% of the total effect 66%. Hypothesis 2 is supported.

#### 4.4 Regulation effect test

The moderating effect of social support is tested under the control of gender, age and grade. Results as shown in **Table 3**, the correlation coefficient between COVID-19 risk perception and positive psychological capital is  $-2.22$ , which is significant at the 1% significance level. The correlation coefficient of social support on positive psychological capital is  $-1.04$ , which is significant at 1% significance level. The correlation coefficient of COVID-19 risk perception \* social support on positive psychological capital is  $0.05$ , which is significant at 1% significance level. This shows that the predictive effect of COVID-19 risk perception on positive psychological capital is regulated by social support, that is, social support can regulate the negative impact of COVID-19 risk perception on positive psychological capital.

**Table 2.** Regression analysis of mediating effect of resilience.

Regression equation		Overall fitting coefficient			Significance of regression coefficient			
Result variable	Predictive variable	R	R <sup>2</sup>	F	$\beta$	CI lower limit	CI upper limit	T
Positive psychological capital	Gender	0.18	0.03	6.01	0.99	-0.70	2.69	1.15
	Age				-0.42	-0.84	0.00	-1.95*
	Grade				0.23	-0.55	1.01	0.58
	COVID-19 risk perception				-0.42	-0.67	-0.24	-3.77***
Psychological resilience	Gender	0.20	0.04	7.29	1.30	0.38	2.23	2.77***
	Age				0.02	-0.21	0.25	0.20
	Grade				-0.19	-0.61	0.23	-0.87
	COVID-19 risk perception				-0.23	-0.38	-0.14	-3.84***
Positive psychological capital	Gender	0.22	0.05	7.28	0.66	-1.03	2.35	0.79
	Age				-0.42	-0.84	-0.01	-2.00
	Grade				0.28	-0.49	1.05	0.71
	COVID-19 risk perception				-0.36	-0.61	-0.17	-3.26***
	Psychological resilience				0.24	0.11	0.41	3.12***

Note: all variables in the regression model have been standardized. The lower limit of CI and the upper limit of CI refer to the lower limit and the upper limit of 95% confidence interval respectively.



**Table 3.** Regression analysis of the regulating effect of social support.

Regression equation		Overall fit index			Significance of regression coefficient			
Result variable	Predictive variable	R	R <sup>2</sup>	F	<b>B</b>	CI lower limit	CI upper limit	T
Positive mind Management capital	Gender	0.19	0.04	4.81	1.02	-0.67	2.72	1.19
	Age				-0.42	-0.84	0.00	-1.96**
	Grade				0.17	-0.61	0.95	0.43
	COVID-19 risk perception				-2.22	-2.70	-0.51	-3.79***
	Social support				-1.04	-1.39	0.00	-2.77***
	COVID-19 risk perception * social support					0.05	0.00	0.06

## 5. Discussion

College students are a special group in society, and their social mentality is generally positive, confident and optimistic. The social and psychological problems of college students caused by the COVID-19 pneumonia should not be ignored [1]. As an important factor affecting the positive psychological capital, COVID-19 risk perception will have many negative effects on the development of college students. This study focuses on the relationship between risk perception and positive psychological capital, and the mediating and moderating roles of psychological resilience and social support in this relationship. The results show that COVID-19 risk perception is negatively correlated with college students' positive psychological capital, that is, COVID-19 risk perception can negatively predict college students' positive psychological capital. COVID-19 risk perception negatively affects college students' positive psychological capital by reducing their psychological resilience. The direct effect of risk perception on college students' positive psychological capital is regulated by social support. That is, social support can weaken the negative impact of COVID-19 risk perception on college students' positive psychological capital. The results of this study have certain reference significance for reducing the occurrence of college students' anxiety in the face of major emergencies, promoting the development of college students' mental health, and improving the attention of families and society to college students.

### 5.1 The relationship between COVID-19 risk perception and college students' positive psychological capital

This study found that there was a significant negative correlation between COVID-19 risk perception and college students' positive psychological capital. As long as people perceived the risk of the pandemic, they would have panic more or less. During the period of pandemic control, college students mainly relied on social media to access external information. Due to information asymmetry, many online rumors began to spread on social media. Some ordinary people did not know about the COVID-19 pneumonia pandemic, blindly followed the crowd and listened to online rumors, which made the negative emotions of social groups continue to increase. Social media is full of information such as fear of virus transmission, unease about the lack of medical supplies, and anxiety about the sealed life. These emotions are also affecting the emotional changes of college students. Moderate emotional arousal is positive, while excessive panic will lead to high depression, high anxiety and other negative consequences, which will have a negative impact on college students' positive psychological capital [28]. Therefore, it is of guiding significance to help college students correctly assess the risk of the COVID-19 pandemic to help them improve their positive psychological capital.

### 5.2 Mediating role of psychological resilience

The mediating effect analysis showed that psy-

chological resilience played a mediating role between COVID-19 risk perception and college students' positive psychological capital, which indicated that the decrease of psychological resilience during the COVID-19 pandemic was the direct reason for the decrease of college students' positive psychological capital. First of all, due to the unpredictability of the outbreak of the new type of coronary pneumonia, at the initial stage of the outbreak, all sectors of society had insufficient understanding of the pandemic. When faced with unknown public events with strong infection and mortality rate, individuals with high risk perception were more likely to search for information related to the pandemic repeatedly. While improving the level of risk perception of the new type of coronary pneumonia, they would also overestimate the risk of the pandemic. The individual's wrong perception of risk will reduce their psychological resilience [21]. Therefore, COVID-19 risk perception negatively predicts college students' psychological resilience. Secondly, this study also found that psychological resilience positively predicted college students' positive psychological capital. Individuals with high psychological resilience have optimistic, yearning and enthusiastic attitudes towards life, and often have highly positive emotions to help them resist the negative effects of negative experiences, which will have a positive impact on college students' positive psychological capital [29]. This intermediary model suggests that college students should face the COVID-19 pandemic with a positive and optimistic attitude, improve the level of psychological resilience, and improve their positive psychological capital.

### **5.3 Regulating role of social support**

The moderating effect analysis of this study showed that the effect of COVID-19 risk perception on positive psychological capital would be moderated by social support. That is, compared with college students with good social support, the negative predictive effect of COVID-19 risk perception on positive psychological capital is more significant for college students with poor social support. Existing

studies have pointed out that the COVID-19 pandemic, as a negative event, will lead to psychological problems such as anxiety and stress among college students [30]. Social support has been regarded as a protective factor, which can reduce the adverse effects of negative life events such as fear and stress on psychology and physiology [31-33]. Lack of social support may aggravate the symptoms of depression, other mental diseases or common symptoms after pandemics [34]. Understanding social support can help individuals in a stressful environment, reduce the negative psychological impact of stressful events on individuals, and reduce the psychological trauma caused by negative events. Understanding of social support can negatively predict the negative emotions of individuals. Specifically, the higher the level of social support perceived by college students, the less they are affected by negative emotions, and the more they can alleviate the anxiety during the closure of the pandemic. The feeling of social support will reduce college students' sense of pressure, and then improve college students' positive psychological capital [35]. This study further shows that social support can buffer the negative impact of COVID-19 risk perception on college students' positive psychological capital, and enlightens families and society to pay more attention to college students, so as to provide help for college students' study, life and employment. Improving social support may be an effective way to help college students with high awareness of the risk of the COVID-19 pandemic to improve their positive psychological capital.

## **6. Conclusion**

In this paper, the impact of COVID-19 risk perception on college students' positive psychological capital was investigated by using the network questionnaire platform to test the college students in several undergraduate colleges in Hebei province, China. The study found that: COVID-19 risk perception is significantly negatively correlated with positive psychological capital, that is, COVID-19 risk perception can significantly and negatively predict college students' positive psychological capital.

The mechanism analysis shows that COVID-19 risk perception mainly reduces the positive psychological capital of college students by reducing their psychological resilience. The moderating effect shows that social support plays a weakening role in the negative prediction of COVID-19 risk perception on positive psychological capital, that is, social support can regulate the negative impact of COVID-19 risk perception on positive psychological capital. The research conclusion reveals the impact path and scenario of COVID-19 risk perception on college students' positive psychological capital, and expands the research on the economic consequences of COVID-19 risk perception and the influencing factors of positive psychological capital.

The conclusion of this study has some policy implications: for college students, we should establish a positive attitude towards life, reasonably arrange the intensity of attention to the pandemic report, and if we continue to pay attention to the pandemic news information, the sense of survival threat will continue to increase. We should shift our attention from the fear of pandemic development to learning and life, improve our immunity and keep ourselves in a positive state. For school education, we should make full use of modern science and technology such as big data, we-media and artificial intelligence, organically connect "offline" and "online" education channels, innovate quality education methods, and ensure teaching quality. In addition, schools should expand the connotation of quality education and integrate physical and mental health education, scientific knowledge popularization, public safety education and ideal and belief education into traditional education. Enhance the scientific knowledge and protection ability of college students, and alleviate the emotional anxiety caused by the awareness of pandemic risk. The employment center in universities should give full play to its service function and actively provide students with training in various work skills, interview and communication skills on campus. When conditions permit, guide graduates to explore the talent market in other places. At the same time, sufficient resources should be provided

for graduates to help them solve the employment problem under the pandemic situation in reality. For the society, it is necessary to strengthen the assistance for college students' employment, and employment is the biggest livelihood. Expand employment channels for graduates, such as by launching online recruitment activities, strengthening employment guidance and assistance for students with difficulties, alleviating students' employment anxiety under the pandemic, and reducing students' burden, improving college students' positive psychological capital. Establishing digital technology platforms and enhancing guiding education related to green transformation can help improve cognitive performance.

This study has the following limitations: first, through the online questionnaire platform, we conducted a questionnaire survey on college students from several undergraduate colleges in China's Hebei province. This study did not involve samples from all schools, and the results may be affected when extrapolated. In addition, due to the limitations of objective conditions, this study did not carry out face-to-face field investigation, which will inevitably have a partial impact on the results. Second, this study evaluated college students' risk perception and positive psychological capital of the COVID-19 pandemic by questionnaire, which may lead to deviation in the score of risk perception and positive psychological capital of the COVID-19 pandemic due to various external factors, subjective factors, professional cognition and other reasons, and there may be reporting bias. Third, this study is a cross-sectional survey, which can not fully include the individual's perception of pandemic risk and the change of psychological capital in different stages of pandemic development. This study also needs more sample sizes to verify. The sampling survey data of universities in China's Hebei province is far from enough. In the future, we can continue to demonstrate and improve the impact of risk perception of the COVID-19 pandemic on positive psychological capital by increasing the number of students from other universities and majors inside and outside the province, so as to provide the basis for formulating strategies and

measures to deal with public health emergencies in the future.

## Author Contributions

Conceptualization, Jinhui Ning; methodology, Xiaoyang Zhang and Jinhui Ning; software, Xiaoyang Zhang; validation, Shi Yin and Jinhui Ning; formal analysis, Shi Yin; investigation, Jinhui Ning; resources, Xiaoyang Zhang; data curation, Xiaoyang Zhang; writing—original draft preparation, Jinhui Ning; writing—review and editing, Jinhui Ning and Xiaoyang Zhang; supervision, Jinhui Ning; funding acquisition, Shi Yin. All authors have read and agreed to the published version of the manuscript.

## Conflict of Interest

There is no conflict of interest.

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