

Study on The Implementation Intention of Health Protection Behavior of College Students in Epidemic Situation of Infectious Diseases

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Abstract

From the perspective of social cognitive theory, this paper refines and integrates the theory of protective motivation, the theory of planned behavior and the individual and social environment factors in risk research, a comprehensive analytical framework was built to predict the implementation intention of public health behaviors. Through the investigation of the college students during the epidemic of Covid-19, we found that the willingness of the public to carry out health behaviors was influenced by two kinds of factors: external social environment and individual internal conditions. As far as the external environment is concerned, perceived normative influence of "Significant others" and informational influence from mass media can positively promote the implementation intention of health protection behavior. At the same time, media attention can also indirectly affect the public's willingness to carry out health behaviors through the mediating effects of self-efficacy and coping efficacy, respectively. As far as internal factors are concerned, self-efficacy is the most powerful direct factor to predict individuals' health behaviors. The existence of cognitive deficit and optimism bias results in the failure of the predictive power of the element of threat assessment on the willingness to carry out health behaviors, however, perceived severity can have a negative effect on health behavior intention through the mediation of the "Avoidance" concept. The study also found that the emotional response not only positively affected the intention to carry out healthy behaviors independently of the cognitive assessment process, but also played a positive moderating role between media attention and the intention to carry out healthy behaviors, however, improper risk concept may have a blocking effect on the implementation intention of health behavior.

Keywords: epidemic situation of infectious diseases, protective motivation theory, social cognitive theory, health transmission, emotional transmission

1. Introduction

1.1 Background of Intention of Health Protection Behavior

Behavioral intention is a key proximal determinant of engaging in behavior that is included in a range of theories used to predict health behaviors. Some scholars have pointed out that for highly contagious epidemics, public support and cooperation are also important conditions for overcoming the epidemic, in addition to government-level efforts to organize disease treatment and prevention and control. For the population at large, only a positive response and compliance with national recommendations for prevention can minimize the probability of disease transmission. Based on this understanding, the study of public health protection in the implementation of the impact of factors and mechanisms, not only help the country to mobilize the active participation of the whole population in the management of the epidemic, it also helps public health experts to design health transmission strategies and formulate emergency management programs for infectious diseases.

Since COVID-19, modern people are now realizing that the threat of pandemic may come at any time. The spread of COVID-19 has made experts and national leaders continue discussing and reach an agreement that the habits and behavior in dealing with pandemic becomes one of the key factors during the speed of outbreaks. This awareness turns everyone to realize the importance of being involved for prevention behavior of infectious disease.

Variables associated with changes in the magnitude of the intention–health behavior relationship (i.e., moderators) have been a focus of work on the intention–behavior gap for a number of years. Existing studies have found that the predictive

power of a single theoretical model for human behavior is relatively limited, and the proposed integrated model can not only test the applicability of the variables in a particular situation, existing theories can be further developed and refined. Therefore, the theoretical contribution of this study lies in the effective integration of personal factors and environmental factors in the theory of protective motivation, the theory of planned behavior and the study of risk, according to the logic of social cognitive theory, the influencing factors of the implementation intention of health behavior were investigated. Based on the combination of internal and external factors, the study found the special mechanism of emotional response and risk perception, which were less concerned in the past. On the one hand, the “Emotional parallelism” found in this study not only supports the “Risk as emotion” hypothesis proposed by foreign scholars to a certain extent, but also suggests, it can be manipulated into a two-dimensional structure of “Cognition-emotion” when examining the concept of “Risk perception” in the local context. In the aspect of external factors, many existing health communication studies often directly examine the influence of media exposure on individual behavior. But sometimes the direct effect of media exposure on behavior is relatively weak. In this study, media exposure can also have an indirect effect on health behavior intention through perceived efficacy, which helps to further enhance the effect value of media transmission effect.

1.2 Literature Review

According to the theory of protective motivation, whether people adopt a certain behavior or not is mainly influenced by two parallel cognitive mechanisms: one is “Threat assessment process”, that is, the individual's risk assessment of risk events. It mainly includes two elements: “Perceived susceptibility” and “Perceived severity”(Adriana Jovanov, 2024). The other is the “Coping assessment process”, which refers to the assessment of an individual's ability to cope with a risk event and usually includes two elements: “Self-efficacy” and “Coping efficacy”. According to the theory, the four concepts of perceived susceptibility, perceived severity, coping efficacy and self-efficacy can positively influence people's willingness to perform health-related behaviors. Empirical studies have also shown that the theory of protective motivation is widely used in preventive health behaviors, such as physical exercise, cancer screening, and drug abuse, and shows good predictive power. However, some scholars have pointed out that the theory of protective motivation focuses on the influence of individual factors on health behaviors and lacks the consideration of external environmental factors (Meri Pietilä, 2023).

The theory of planned behavior originates from the theory of rational behavior. The core point is that the individual's will to act is an important factor in determining the actual behavior. The factors that influence the will to act include both individual and social factors. In terms of individual factor, “Attitude” is an important condition to induce the will to act, while social factor mainly refers to “Subjective norm”, that is, individual perceives the social pressure to perform or not to perform a certain behavior. The inadequacy of the theory of rational behavior lies in its implication of the assumption that man is a perfectly rational animal, capable of controlling his own behavior. Later, the scholar Ajzen quickly recognized this defect and extended the “Planned behavior theory” on the basis of the concept of “Perceptual behavior control”. Since then, the explanatory power of planned behavior theory in predicting individual behavior has been unanimously affirmed, and the theory has been widely applied in many disciplines (Hanung Prasetya, 2024).

The theory of planned behavior (TPB) still widely used to predict various health behaviors. TPB has been assessed that it is capable to explain the level of creation of individual behavior and intention in preventing infectious diseases before the COVID-19. Even during the outbreak of SARS-CoV, TPB was previously used to understand involvement in prevention acts (A. K. Das, 2021). The TPB model seems to be quite good for explaining intention, whereas perceived behavioral control also showed important as attitude, and subjective norm across health-related behavior (Kassem & Lee, 2004; Montanaro et al., 2018).

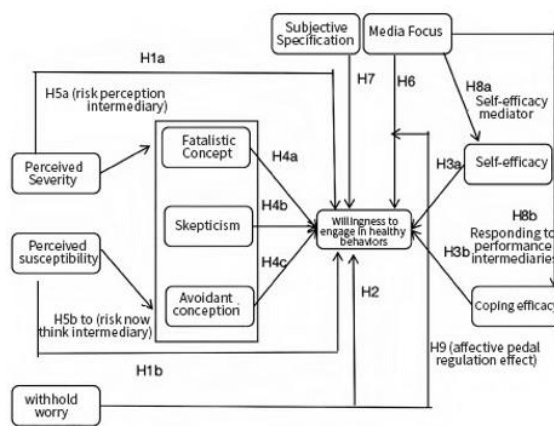


Fig. 1 Overall analysis framework and research assumptions

Risk perception factors and willingness to perform health protection behaviors

According to the logic of protective motivation theory, risk perception factors in threat assessment factors can influence people's adoption of health behaviors. Among them, "Perceived severity" refers to the degree to which an individual feels a certain risk to the physical and mental aspects of the harm. "Perceived susceptibility" refers to the probability that an individual is exposed to a risk without adjusting for existing behavior. 'Perceived severity' and 'perceived susceptibility' are better predictors in promoting people to adopt healthy behaviors, because the novel coronavirus pneumonia is a newly discovered pathogen, the public generally has certain risk perception in the initial stage, so the following research hypothesis is put forward in this study.

H 1: Risk perception has a positive effect on the implementation intention of public health protection behavior.

Because risk perception includes two dimensions: perceived severity and perceived susceptibility, study hypothesis 1 can be further refined into two sub-hypotheses.

H 1a: Perceived severity can positively affect the willingness of the public to perform health protection behaviors.

H 1b: Perceived susceptibility can promote the willingness of the public to take the initiative to protect their health.

Emotional response and willingness to perform health protection behaviors

Some scholars argue that risk perception should include both "Cognitive" and "Emotional" dimensions. In empirical studies using the theory of protective motivation, there have also been scholars who view emotional perception as part of the element of threat assessment that plays a role alongside perceived severity and susceptibility. Research in psychology has also shown that emotional/affective variables can directly induce behavioral changes without mediation by cognitive variables. In this outbreak, whether in the early days of the increasing number of confirmed cases, or the late rebound of the local epidemic, it is easy for the public to have a certain degree of concern. These concerns may prompt people to take precautions, which is why this paper makes the following research hypotheses.

H 2: Anxiety can positively promote an individual's willingness to engage in health-protective behaviors.

Sense of efficacy and willingness to perform health protection behaviors

It was proposed the concept of self-efficacy, a large number of empirical studies have shown that self-efficacy in disease prevention behavior has a good explanatory power. Another concept closely related to self-efficacy is "Coping efficacy," or confidence in the effectiveness of a preventive behavior. The more effective a person thinks a protective measure is, the more willing he or she is to adopt it. Many studies have shown that coping effectiveness not only contributes to the willingness to promote self-protection, but also predicts the motivation to protect others (Igbuhay Joshua D., 2024). On health issues, individuals may adopt risk-averse attitudes if they only perceive risk but do not have the confidence to deal with it. Therefore, the individual has the confidence to overcome the risk, and the risk prevention measures have hope, will take further action. Based on this analysis, this paper proposes the following research hypotheses.

H 2: Sense of efficacy can positively promote the willingness of the public to carry out health protection behaviors.

Since self-efficacy is divided into self-efficacy and coping efficacy, the research hypothesis can be further subdivided into two sub-hypotheses.

H 3a: Self-efficacy can positively predict the willingness of the public to carry out health protection behaviors.

H 3b: Coping efficacy can positively predict the willingness of the public to carry out health protection behaviors.

The direct influence and mediating effect of risk concept on health protection intention

Psychologists who study the way people respond to stressful events have found that some people adopt "Problem-oriented coping styles," which include rational action and asking for help, others adopt an "Emotion-oriented coping style," in which they try to alleviate their negative emotions with immature ideas, the most typical are the ideas that give rise to "Skepticism," "Avoidance," and "Fatalism". The "Avoidant view" tries to deny the existence of the threat and avoid talking about the risk, while the "Skeptical view" means the unwillingness to accept the status quo of the risk and underestimate the severity of the risk "Fatalism" holds that the real situation cannot be changed, people can do nothing but passively accept. Several studies on the topic of infectious diseases have shown that all three misconceptions about risk can discourage people from adopting healthy behaviors. Therefore, on the basis of introducing the risk concept, this paper proposes the following research hypotheses.

H 4: The concept of risk can negatively inhibit the generation of the will to protect health.

This research mainly discusses the influence of the three risk concepts of "Fatalism", "Skepticism" and "Avoidance" on the implementation intention of health protection behavior, so the hypothesis can be divided into three sub-hypotheses.

H 4a: The concept of fatalism will negatively inhibit the generation of the will to protect health.

H 4b: The concept of “Skepticism” will negatively inhibit the generation of the will of health protection behavior.

H 4c: The “Avoidant” concept will negatively inhibit the generation of the will of health protection behavior.

Following Rogers's “Protective motivation theory,” subsequent research on tobacco control found that the threat assessment factor accounted for only 19 percent of smoking cessation behaviors, the remaining 81% of maladaptive behavior is poorly explained. He and his colleagues argue that, in addition to examining the facilitative factors that influence protective motivation, it is necessary to look at “Maladaptive beliefs” that hinder protective motivation. To this end, they introduced five kinds of improper coping concepts, namely, “Religious belief”, “Avoidance concept”, “Fatalism”, “Helplessness” and “Naivete Idea”, as cognitive mediating variables, in the case of breast cancer, only the “Avoidant” concept has a significant mediating effect between risk assessment factors and behavioral intentions. Another survey on alcohol consumption among college students showed that among the perceptions of inappropriate coping, two factors, namely avoidance and religious beliefs, can directly affect the intention to reduce alcohol consumption, but only the avoidant concept mediates between perceived seriousness and behavioral intention. The former scholars put forward the concept of ‘Improper response’ and this paper put forward the three concepts of risk have high similarities. Therefore, it is reasonable to speculate that the three risk concepts in this study may play a mediating role between risk perception and health behavior. The following research hypothesis is proposed.

H 5: The concept of risk plays a mediating role between risk perception and health behavior intention.

Given that risk perception includes two dimensions, “Perceived severity” and “Perceived susceptibility,” this research hypothesis can also be refined into two sub-hypotheses.

H 5a: Risk perception plays a mediating role between perceived severity and willingness to perform healthy behaviors.

H 5b: Risk perception plays a mediating role between perceived susceptibility and willingness to perform healthy behaviors.

Media concern and willingness to implement health protection behaviors

According to the social cognitive theory of social environmental factors, this paper will be media concern and subjective norms of two factors into the scope of investigation. Research in the health communication community has shown that the media play an important role in changing public health beliefs and promoting health aspirations. In view of this influence, this paper proposes the following research hypothesis.

H 6: The public's attention to Covid-19 vector information can positively predict the implementation intention of its health protection behavior.

Subjective norms and willingness to implement health protection behaviors

Some scholars point out that some people in real life are willing to take protective measures even though they perceive low risk, which is mainly due to the effect of “Normative influence”. Because Covid-19 is highly contagious, the mutual supervision of the public should not be ignored. The subjective norm in the theory of planned behavior can explain this phenomenon. “Subjective norm” refers to the attitude that an individual feels from “Important others”, such as family members and friends, to support or oppose a certain behavior, and tends to conform to normative beliefs emphasized by “Significant Others. Subjective norms are good predictors of people's adoption, maintenance of preventive health-care behaviors, or rejection of wrong behaviors. Based on this analysis, this paper proposes the following research hypotheses.

H 7: Subjective norms can positively promote the willingness of individuals to carry out health protection behaviors.

Perceived efficacy mediates the relationship between media attention and willingness to engage in healthy behaviors

Bandura points out that self-efficacy comes from mature experience, vicarious experience, social persuasion and psychological traits. In the above sources, both “Substitute experience” and “Social persuasion” emphasize the indirect influence of external factors on self-efficacy. However, existing studies have shown that the media is a major influence mechanism among various external influence sources. Similar to self-efficacy, the effectiveness of coping effectiveness refers to a protective behavior, which also depends on the individual's direct experience of implementation and indirect experience of substitution. It is therefore reasonable to speculate that media is also an external source of response effectiveness. Self-efficacy and coping efficacy may also promote the willingness of individuals to carry out healthy behaviors. Based on these analyses, this study hypothesizes that efficacy plays a mediating role between media attention and willingness to engage in healthy behaviors, and it is divided into two sub-hypotheses.

H 8a: Self-efficacy plays a mediating role between media attention and health behavior intention.

H 8b: Coping efficacy plays a mediating role between media attention and willingness to engage in healthy behaviors.

The moderating effect of emotional response on media attention and intention of health behavior implementation

Research on risk transmission suggests that emotion plays an important role in risk perception. Studies from the Covid-19 pandemic have also shown that vectors can elicit emotional responses. Combined with related research, anxiety and other emotions can promote the willingness of the public to adopt preventive behavior. It is reasonable to speculate that emotional responses play a moderating role between media exposure and the willingness of the public to engage in health-protective behaviors. For this reason, this paper proposes the following research hypothesis (Diana Zhao, 2024).

H 9: Worry plays a moderating role between media attention and willingness to engage in healthy behaviors (for individuals with high anxiety, the more frequently they engage in media contact, the more likely they are to engage in healthy behaviors).

2. Method

2.1 Sample Selection

According to the data published by the China degree and Graduate Education Information Network, this paper takes 34 universities in Sichuan province as the sampling frame. Among them, one was randomly selected from two "Double-first-class universities" and two were randomly selected from six "Double-first-class discipline" universities, seven out of the other 28 general undergraduate institutions were randomly selected. Since colleges and universities had not resumed classes offline during the epidemic, they took the online survey method and commissioned the teaching staff of each college to distribute questionnaires through the network link by using convenient sampling method. The formal survey was conducted from February 25 to February 29,2020. A total of 1500 questionnaires were distributed in two five-day surveys, and 835 valid questionnaires were finally received, the response rate was 55.6%. The invalid questionnaires could not be considered, which had been answered seriously by students.

The distribution of different characteristics of sample was shown in Table 1.

Table 1. Characteristics of the sample distribution

Characteristics of the sample distribution			
Gender	The percentages of boys 60.6% (506 persons)		The percentages of girls 39.4% (329 persons)
Education	Undergraduate 74.7% (624 persons)	Postgraduate 21% (175 persons)	Doctoral students 4.4% (36 persons)
Discipline	Humanities, social sciences and science, 48.6% (406 persons)		Engineering, agriculture and medicine 51.4% (429 persons)

2.2 Research Design

Variable measurement

In this study, each variable was measured with reference to the more mature research results of predecessors, and each variable was manipulated into a concept containing at least 3 items. Each item was scored with the Likert 5-point scale. Specifically, in the dependent variable health protection behavior choice, we chose the "Frequent hand-washing" this health behavior. Influenza protective behavior was used in the measurement questions, specifically, "During Covid-19, I would like to wash my hands immediately after going out and coming home/I would like to wash my hands before eating/I would like to wash my hands immediately after sneezing", Cronbach' A = 0.792 (Ying-Chih Chuang, 2015).

The "Perceived severity" was measured, which included three items: "Infection with a novel coronavirus will cause a greater impact on the human body," with a reliability coefficient of Cronbach's $\alpha= 0.743$. The "Perceived susceptibility" measure draws on and adapts from research, which included three questions: "If I have a cold, I suspect I am infected with a novel coronavirus." Cronbach's $\alpha= 0.741$. (Adriana Jovanov, 2024), three questions, including "During the Covid-19 epidemic, I am confident that I will remember to wash my hands immediately after coming home each time" and "During the Covid-19 epidemic, I believe that I will wash my hands immediately after every sneeze", cronbach's $\alpha= 0.839$. Measurements of "Coping Effectiveness", which included three items such as "Washing hands with hand sanitizer or soap is effective in avoiding bacterial and viral infections", cronbach's $\alpha= 0.812$. The "Subjective norm" was measured, which included three items such as "During Covid-19, your family thinks you should wash your hands frequently", cronbach's $\alpha= 0.839$. In the aspect of media attention, the questionnaire asked the respondents how much they paid attention to the information about Covid-19 on microblog, wechat, news client, short video and ordinary video website. Options are assigned 5-1 points from "Very concerned" to "Not concerned at all.". Cronbach's $\alpha= 0.735$.

In the factor analysis of six items, two factors were obtained by orthogonal rotation of the maximum variance method, which could explain 65.997% of the total variance (KMO = 0.765, P & Lt; 0.001). The first factor consisted of three questions, “I am worried about my family members/relatives/neighbors being infected by coronavirus,” and was named “Others worry” (Cronbach's α = 0.823). The second factor was named “Self-worry” (Cronbach's α = 0.790) and consisted of three items: “If I am diagnosed with Covid-19, my academic/interpersonal relationship will be affected”.

The “Fatalism” measure consisted of three questions (Cronbach's α = 0.745) : “If it is decided that I will be infected by coronavirus, then I cannot change my fate”; The measurement of “Skepticism” included three items such as “The severity of Covid-19 was exaggerated”(Cronbach's α = 0.856) ; “Avoidant beliefs” included three items such as “I don't think too much about Covid-19”(Cronbach's α = 0.805) .

3. Results

In this study, “Health behavior implementation will” as a dependent variable, using hierarchical regression model, the explanatory power of the model was investigated by including the factors of belief perception in the theory of protective motivation, social influence in the theory of planned behavior and emotion and idea in the study of risk. At the same time, using Bootstrap method to test the mediating effect of three risk concepts between two risk assessment factors and health protection behavior intention, and the mediating effect of two kinds of self-efficacy between media attention and health protection behavior intention.

3.1 Statistics and Data Analysis

Analysis of the influencing factors on the implementation intention of health protection behavior

Table 2. A linear regression model of health protection behavior implementation intention

Name of Variables		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Population characteristics	<i>Gender</i>	-0.121	-0.125	-0.026	-0.028	0.002	0.000
	<i>Cohort</i>	0.119	0.125	0.040	0.044	0.051	0.050
	<i>Annual income of family</i>	-0.023	-0.021	-0.024	-0.025	-0.021	-0.022
Risk perception factors	<i>Perceived seriousness</i>		0.100	0.002	0.004	0.017	0.014
	<i>Perceived susceptibility</i>		0.100	0.022	0.024	0.034	0.034
	<i>Family worries</i>		0.043	0.036	0.035	0.020	0.023
	<i>Self-worries</i>		0.171	0.064	0.062	0.046	0.045
Performance-related factors	<i>Self-efficacy</i>			0.745	0.736	0.572	0.569
	<i>Coping effectiveness</i>			0.087	0.088	0.024	0.024
	<i>The idea of skepticism</i>				-0.023	-0.043	-0.040
Risk perception factors	<i>The concept of avoidance</i>				-0.030	-0.006	-0.007
	<i>Fatalism</i>				0.000	0.018	0.019
Social environmental factors	<i>Media attention</i>					0.075	0.079
	<i>Subjective norms</i>					0.357	0.358
	<i>Media & Self-anxiety</i>						0.039
Interaction items	<i>Media & family concerns</i>						0.009
	<i>Susceptibility & self-efficacy</i>						
	<i>Severity & self-efficacy</i>						
<i>F value</i>		9.21	9.637	158.537	119.147	143.639	126.296
<i>R²</i>		0.029	0.068	0.63	0.63	0.705	0.706

Notes: #p<0.1, * p<0.05, **p<0.01, ***p<0.001

In terms of Multicollinearity tests on general linear regression models, the variance inflation factor (VIF) for all models ranged from 1 to 2, well below the threshold of less than 10, which means there's no Multicollinearity in the regression model. The baseline model introduced demographics indicators, in which gender and grade had a significant impact on

respondents' willingness to implement healthy behaviors. Among them, women are more motivated than men to adopt healthy behaviors, perhaps because women perceive risks more strongly than men. The higher the grade, the more willing the students are to carry out healthy behaviors. This may be because the higher the students' knowledge level is higher than the lower students', and they have more health awareness. Model 2 introduced two dimensions of risk perception: "Cognition" and "Emotion". Table 1 shows that the two factors of threat assessment have a significant positive impact on the implementation of public health behavior. In the emotional dimension of risk perception, only self-concern can positively affect the public's willingness to carry out healthy behaviors. Worries about family members, on the other hand, did not produce significant predictive power. This may be explained by a one-to-one correspondence between emotions and behavioral intentions. In Model 3, self-efficacy and coping efficacy were used to predict people's willingness to engage in healthy behaviors. At the same time, "Perceived severity" and "Perceived vulnerability" lost their influence, but the influence of self-concern on health behavior remained as shown in Table 2.

In Model 4, three risk concepts were introduced, and the statistical results showed that the predictive power of the three risk concepts on health protection behavior was not obvious, but the influence of two feelings of efficacy and worry on the willingness to carry out healthy behaviors remained stable. The explanatory power of model 5 increased to 70.5% after the introduction of media attention and subjective norms. The model shows that both subjective norms and media attention, self-efficacy and anxiety can positively predict people's willingness to engage in healthy behaviors, however, the risk concept of "Skepticism" can inhibit the implementation of health protection behavior. Model 6 examined the interaction between media attention and intention to implement health protection behaviors. The results showed that self-anxiety had a positive moderating effect between media attention and health behavior intention (see Figure 2). This shows that for individuals with high self-concern, the higher their media attention, the stronger their willingness to adopt protective behavior. In summary, H1 is not supported, H6 and H7 are fully supported, and H2, H3, H4, and H9 are partially supported.

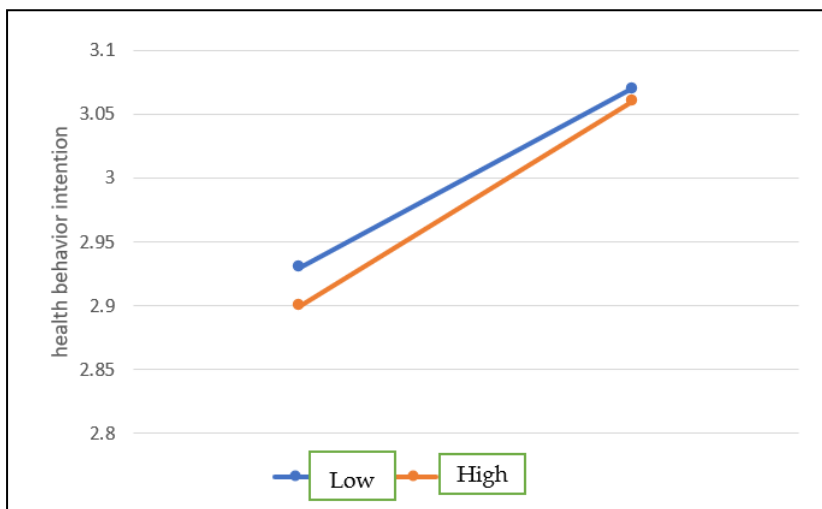


Fig. 2. The moderating effect of self-concern on media attention and health behavior intention

Analysis and test of intermediary effect

In the test of mediating effect, perceived severity and perceived susceptibility were used as independent variables, and the intention to protect behavior was used as dependent variables, three risk concepts were used as mediating variables to test the multiple mediating effects. Then, the mediating effects of self-efficacy and coping efficacy were tested by using media attention as the explanatory variable and the intention to protect behavior as the dependent variable. The software sets the confidence interval to 95%, carries on 5,000 times the repeated sampling, finally presents the standardized regression coefficient. It is found that among the three risk concepts, perceived severity can only have an indirect effect on the intention to protect through the "Avoidance" concept. Combined with the conclusion that the perceived severity of H1 has no significant effect on the implementation intention of health protection behavior, the concept of avoidance played a completely mediating role between perceived severity and willingness to perform health protection behaviors. The mediating effect of the three risk concepts was not significant in the mediating effect test with perceived susceptibility as independent variable (all of the three variables had 0 in the confidence interval of the indirect effect). It can be seen that H5 is only partially supported as shown in Table 3.

Table 3. The mediating effect of three risk concepts on risk factors and health behavior intention

Mode	Indirect effects	Boot SE	LLCI	ULCI
Perceived severity-Skepticism-willingness to engage in healthy behaviors	0.0007	0.0047	-0.0088	-0.0104
Perceived severity- Avoidant -willingness to engage in healthy behaviors	-0.0238	0.0089	0.0078	0.0423
Perceived severity- Fatalism-willingness to engage in healthy behaviors	-0.0039	0.0049	-0.0148	0.0049
Perceived susceptibility -Skepticism -willingness to engage in healthy behaviors	-0.0015	0.0030	-0.0105	0.0028
Perceived susceptibility - Avoidant -willingness to engage in healthy behaviors	-0.0084	0.0101	-0.0111	0.0288
Perceived susceptibility - Fatalism -willingness to engage in healthy behaviors	-0.0050	0.0109	-0.0272	0.0157

Table 4 shows that media attention can positively predict individual self-efficacy and coping efficacy, respectively. At the same time, media attention had a positive indirect effect on health behavior implementation intention through self-efficacy (indirect effect was 0.2245, CI = [0.1723,0.2860] excluding 0), according to the conclusion that media attention has a direct effect on health behavior intention, self-efficacy plays a part of mediating role between media attention and behavior intention. At the same time, media attention also had a positive indirect effect (indirect effect = 0.2062, CI = [0.0078,0.0483] not including 0) on the willingness to implement healthy behaviors through coping effectiveness, according to the conclusion that media attention has a direct positive effect on health behavior intention, coping efficacy also plays a part of mediating role between media attention and health behavior intention. Hence the support for H 8.

Table 4. The mediating effect of self-efficacy and coping efficacy between media attention and health behavior intention

Mode	Direct effects	Indirect effects	Total effects	LLCT	ULCI
Media attention-Skepticism-willingness to engage in healthy behaviors					
Media attention-Avoidant -willingness to engage in healthy behaviors	0.295				
Perceived severity- Fatalism-willingness to engage in healthy behaviors	0.762				
Media attention -Skepticism -willingness to engage in healthy behaviors	0.083	0.2245	0.3073	0.1723	0.2860
Media attention - Avoidant -willingness to engage in healthy behaviors					
Perceived susceptibility - Fatalism -willingness to engage in healthy behaviors	0.0936				
	0.2803				
Media attention -willingness to engage in healthy behaviors	0.2811	0.2062	0.3073	0.0078	0.0483

4. Discussion

Cognitive deficit, "Optimism bias" and the failure of threat assessment factors

This study found that the perceived vulnerability and perceived severity, two risk factors, did not explain the public's willingness to engage in health protection behaviors. A review of the literature reveals three explanations for this. One is that the actual incidence of certain diseases is low, and therefore the public is not strongly aware of risk. Second, the respondents were not aware of certain health risks. For example, a 2017 study of college students in Wada showed that perceived severity and susceptibility did not predict health-related behaviors. Therefore, the author's explanation is that college students lack of scientific understanding of the transmission routes and epidemic trends of diseases. Third, there was an "Optimism bias" in the respondents' assessment of health risks. That is, when people judge the probability of risk, they tend to think that they are less likely to encounter risk than others. As far as this research topic is concerned, since more than 70,000 confirmed cases have been reported during the survey period in February 2020, the public's risk perception is strong, so the first reason can be excluded. Next, we will combine the data to demonstrate the "Understatement of knowledge" and "Optimism bias".

In the study, 8 questions were set to measure the general knowledge of Covid-19 from the angles of clinical symptoms, transmission routes, etc., answer wrong or do not know 0 points, the total score in the 0-8 range. The average score of the 835 respondents was found to be 5.7. That is to say, to this epidemic, interviewees student really has certain cognition insufficiency. In addition, the survey designed "You think yourself/classmates/the general public by the new coronavirus infection probability" three questions to measure the "Optimism bias", options range from "Very high" to "Very low" on a scale of 5 to 1. Statistics showed that the average probability of the respondents to assess their own infection was 3.40, the average probability of students infected was 3.61, the average probability of the general public was 3.90. The paired sample t-test showed that there was a significant difference in the probability of self-infection between the respondents and the students ($T = -0.7329$, $P < 0.001$) There was also a significant difference in the probability of self-infection between the respondents and the general population ($T = -15.230$, $P < 0.001$). This suggests that there is indeed an "Optimism bias" in the perception of risk among young students in this Covid-19 epidemic.

Self-efficacy: the main internal motive force of the will to carry out health protection behavior

In terms of the elements of the coping assessment process, the study found that self-efficacy is the most important variable to predict the public's health behavior. Research in psychology has shown that self-efficacy can be cultivated through acquired influences, as opposed to innate factors such as intelligence. Therefore, the findings suggest that in health communication practice, if public health experts give positive cues to public confidence and expectations, it will help the general public develop a healthy lifestyle.

The present study found that coping effectiveness has no direct effect on an individual's willingness to adopt healthy behaviors, which may be related to the "Stress vulnerability hypothesis". According to this hypothesis, when the risk level is low, the individuals with high coping effectiveness have higher resilience than those with low coping effectiveness. But when the level of risk is high, people's ability to cope with risk decreases regardless of their level of coping effectiveness (Vanderbilt-Adriance & Shaw, 2008). Covid-19 is one of the most important infectious diseases in the world, and there is no vaccine available in the market at the time of this study.

"Normative influence" and "Informational influence": the external influencing factors of health behavior implementation intention.

According to Deutsch and Gerard's dual-process theory, there are two factors that influence people's decision-making. One is "Normative influence", which makes an individual's actions conform to the expectations of others The other is "Informational influence", which refers to receiving information from others about social realities. This study found that "Subjective norms" and "Information attention" can have a positive impact on people's willingness to carry out healthy behaviors, further supporting the "Dual-processing theory".

It was found that the influence of subjective norms on people's behavior intention mainly comes from two paths. One is that subjective norms exert moral pressure on the conduct of individuals. The second is that people tend to believe that the "Significant others" are right, and so refer to and imitate them. In this study, subjective norms may affect people's behavior intention in two ways at the same time. On the one hand, Covid-19 is a highly contagious disease, everyone's protective measures are in place will directly affect the health of others. So, people warn each other and monitor each other. On the other hand, many experts and scholars are advocating good personal protection, so the general public also naturally agree with these "Important others" practice the recommendations.

The impact of mass media on people's health behaviors has long been recognized by the academic community. As far as Covid-19 is concerned, the media not only release knowledge on disease prevention, but also play the role of

supervision by public opinion, by condemning non-masks and going out without permission, people are guided to take scientific precautions. In addition, this study found that media exposure could have an indirect effect on health behavior intention through self-efficacy and coping efficacy, respectively. This finding supports Bandura's theory of the formation mechanism of self-efficacy. As Bandura points out, positive feedback from observing other people's experiences or through external information is an important source of self-efficacy.

The “Emotional response” can affect the behavior intention independently of the “Cognitive assessment” process

There are two views on the mechanism of the effects of emotional response and cognitive assessment on behavioral intention. The first can be called the "Emotion-induced theory": that is, the emotional response as a risk assessment outcome variable, that first perceived risk, then produce emotional response. The second is called "Emotional parallelism", that is, emotional response can act on individual's behavioral intention independently of cognitive process. Representative theories such as the "Risk as emotion" hypothesis proposed. This study found that self-concern could positively predict people's willingness to engage in healthy behaviors, while perceived severity and perceived vulnerability could not. This initially supports the “Emotional parallel theory.” We then took perceived severity and perceived susceptibility as explanatory variables, health behavior implementation intention as explanatory variables, and worry as a mediator variable, respectively, and repeated the Bootstrap Method 5, 000 times for inspection. The results in Table 5 show that the mediating effect of worry on perceived severity, perceived susceptibility and willingness to perform healthy behaviors is not significant. It can be concluded that, at least in this study, the “Emotion-induced theory” is not supported.

Table 5. The mediating effect of worry between risk assessment and health behavior intention was examined

	Indirect effects	Boot SE	LLCT	ULCI
Perceived susceptibility – worry emotion -willingness to engage in healthy behaviors	-0.023	0.0178	-0.0371	0.0328
Perceived seriousness – worry emotion -willingness to engage in healthy behaviors	0.0233	0.0137	-0.0027	0.0508

The direct blocking effect and indirect mediating effect of risk concept on health protection behavior

Among the three risk perceptions, only skepticism has an effect on health behavior intention. This is in line with established theoretical expectations, since “Skepticism” refers to habitually questioning other people's advice, guidance. And fatalism has no predictive power on people's willingness to engage in healthy behaviors. Perhaps because of public confidence in the country's strong governance in response to the outbreak. At the same time, the avoidant concept cannot predict people's willingness to carry out health protection behavior. This may support the psychological view that people with avoidant beliefs have lower self-efficacy. In this study, self-efficacy was the strongest predictor of implementation intention of health behaviors, so higher self-efficacy of respondents would weaken their avoidance beliefs.

In addition to the direct effect, this study also found that the “Avoidant concept” plays a negative mediating effect between perceived severity and willingness to carry out healthy behaviors. The findings also suggest that there may be two pathways of action between threat assessment factors and health protection behaviors. One is the direct influence path, that is, risk perception will directly promote the individual's motivation of prevention and protection. The other is the indirect influence path, that is, risk perception can indirectly influence people's motivation of protective behavior through the mediation of risk concept. The implication of this finding for health communication is that for people who do not take health problems seriously, health educators can indirectly promote the adoption of health behaviors by designing some communication materials that influence the public's risk perception.

5. Limitation of Research

It should be pointed out that there are still some deficiencies in this paper: due to time and resource constraints, the survey is limited to college students in Sichuan, and the use of non-probability sampling method. Lack of care for residents of other areas and occupations. In addition, the study used a cross-sectional survey, the lack of different time periods of public awareness and behavior research. Therefore, the author looks forward to the emergence of more empirical surveys from other regions, other time periods, to further complement and verify the conclusions of this study.

6. Conclusion

This study found that the implementation intention of health behavior is mainly influenced by the external social environment and internal characteristics of their own dual impact. In terms of external conditions, both the subjective norms from “Important others” and the social influence path of mass media can directly promote the implementation intention of health behaviors, self-efficacy is the most powerful factor to predict individual health protection behavior. Anxiety can positively affect the implementation intention of health protection behavior independent of the cognitive assessment process. However, some improper risk perception not only has a blocking effect on health behavior intention, but also acts as a mediator between perceived severity and health behavior intention. Detailed research conclusions and theoretical explanations include the following five aspects.

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Authors contributions

Dr. He Ye and Prof. Mastura Mahamed were responsible for study design and revising. Dr. He Ye was responsible for data collection. Prof. Sharil Nizam Sha'ri drafted the manuscript and Prof. Mastura Mahamed revised it. All authors read and approved the final manuscript. In this paragraph, also explain any special agreements concerning authorship, such as if authors contributed equally to the study.

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