

## **Testing the Mediating Role of Perceived Risk of COVID-19 and the Moderating Role of Age in the Relationship between COVID-19 related Information Sensitivity and Personal Preventive Behaviors**

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### **Abstract**

*The influence of information sensitivity during the COVID-19 pandemic on perceived risk and personal preventive behaviors of consumers in China had been investigated. The participants were Chinese individuals experiencing the pandemic as it happened. Participants voluntarily completed an online questionnaire to provide their COVID-19 information sensitivity, their perceived COVID-19 risk, preventive behavior and their respective age. Our study discovered that COVID-19 information sensitivity positively influence perceived risk and preventive behavior. Moreover, young individuals show higher levels of online information sensitivity, which influenced their personal protective behavior when compared to that of middle-aged and elderly participants. Furthermore, Perceived risk significantly affected preventive behaviors. The results of this study may assist the government and marketers in comprehending information sensitivity which can affect consumers' protective behavior toward reducing COVID-19 infections.*

**Keywords:** *COVID-19 Information Sensitivity, COVID-19 Perceived Risk, Preventive Behavior, Age*

## **1. INTRODUCTION**

The disease has spread rapidly and infected millions of individuals worldwide since the outbreak of COVID-19 in Wuhan, China in December 2019. In April 2022, 510,270,667 individuals out of 6,233,526 infected, have died because of this disease [1]. As the infection is airborne and quite contagious, and as a preventive measure, thousands of schools were closed and evolved their curriculum into virtual classrooms to avoid transmission. Personal preventive behaviors are indispensable in controlling the spread of the pandemic [2].

To control COVID-19 transmissions, government institutions and public services have announced an online educational policy utilizing services such as social network service (SNS). Digital mediums are convenient for

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receiving and providing information around the globe. It is an indispensable and effective way for consumers to obtain or be exposed to information, as needed. Based on previous studies, the Theory of Reasoned Action (TRA) is widely utilized to comprehend consumer attitudes and behavior [3,4]. When utilizing this theory, personal concerns are observed to have a positive impact on a consumer's desire to explore additional related information in a significantly more sensitive manner thereby, influencing their behavior [5]. Depending on this theory, online information sensitivity can positively impact consumer behavior or assist consumers in making the correct decision when presented with a challenge [6,7]. Thus, this study intends to apply TRA theory to illustrate consumer preventive behavior during this time period.

In China, government institutions announced prevention notifications facilitated by SNS, which were quickly seen as useful in limiting the spread of the virus [8]. Alongside the increase in the severity of the pandemic, the risk perception of individuals toward COVID-19 is increasing as well. Higher numbers of individuals have started presenting and utilizing personal protective behaviors to stop the spread of infection, such as utilizing face masks, hand sanitizers, and following government-initiated prevention guidelines. Nevertheless, various consumers exhibit assorted behaviors. For instance, young adults show large amounts of online usage and online information adoption behaviors. On the other hand, middle-aged and elderly individuals show low online information adoption [9]. Following this way, different consumers present different information sensitivity, which then differently affect their perceived risk and preventive behavior. Consequently, it is crucial to devise various information-providing strategies for assorted consumers, based on their respective behavior and responses. This should be carried out in order to effectively reduce the infection rates of COVID-19.

Research from a prior study supports the perspective that the perception of risk is central to an individual's evaluations, choices, and behaviors [10]. Furthermore, humans, in general, tend to avoid dangers rather than confront them. Perceived risk is one of the most powerful factors for assessing consumer behavior [11]. Several studies regard perceived risk as a crucial factor when influencing decisions made by consumers [12]. Previous studies have also investigated how information sensitivity has positively influenced consumer perceived risk [13,14]. Based on these perspectives, there have positive relationship among information sensitivity, perceived risk and preventive behavior. But little studies have identified how information sensitivity influence preventive behavior through perceived risk [15].

Moreover, assorted consumers present assorted types of behavior in an online environment [16]. The difference in age is one of the indisputable factors when illustrating consumer behavior. According to a prior study, age is one of many significantly influential variables, which affect consumer SNS adoption and usage behavior [17-19]. Young individuals present a large amount of usage of digital media when seeking information and social interaction. On the other hand, middle-aged and elderly individuals present low levels of usage of social media. In China, due to early marriage and childbirth, the government has classified consumers aged 30 and above, i.e. born in the 1990s, as middle-aged, which is contrary to other countries. Therefore, consumers born after the 1990s, i.e. belonging to the young generation. However, very few studies have illustrated the influence of online information sensitivity on their perceived risk and preventive behavior following their age.

The purpose of this study was to identify the effect of COVID-19-related consumer information sensitivity on perceived risk and personal protective behavior after the outbreak of COVID-19 in China. The specific research statements are as follows. Initially, this study intended to investigate the effect of COVID-19 information sensitivity on consumer perceived risk and preventive behavior. Then, we intent to identify the information sensitivity influence consumer preventive behavior through perceived risk. Subsequently, this study aims to identify the moderation effect of age differences. The results will enhance the general

comprehension of the key motivator of consumers' personal preventive behavior by clarifying the influence of information sensitivity, perceived risk, and age difference. Moreover, this study will assist in creating effective strategies that can be utilized by public service institutions in the reduction of COVID-19 transmission.

## **2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT**

### **2.1 Theoretical Background**

#### **2.1.1 Theory of reasoned action (TRA)**

Information disclosure behavior is voluntary or unintentional in the online environment. Consumers intentionally or unintentionally explore information. TRA is an appropriate way to explain the consumer behavior intention [6]. It is used to predict consumer behavior. This theory was widely used for determining the relationship between online information and consumer behavior. TRA is a well-developed and validated intention model that has proven successful in predicting and explaining consumer behavior across domains [20]. Following the previous studies, TRA was used to illustrate personal behavior intention determined by the attitude of the individual toward the behavior, such as positive or negative evaluation about the behavior and subjective norms, that is, the social pressure to perform the behavior.

Depending on the previous studies, information sensitivity is one of the critical factors that influence consumer attitudes and behaviors [6, 7]. These studies investigated that consumers information sensitivity change consumer attitude and behavior. This logic can also be found in health information management. As Davidson, Yantis, Norwood, and Montano (1985) argued that when considering taking influenza vaccination, the higher the sensitivity, the stronger the consistency of their attitude and associated behavior [21]. A recent study also illustrated the association between exposure to health information and behavior intention. The results explained that information sensitivity positively leads to preventive intention [22]. In this way, this study intended to use TRA to explore consumers' personal preventive behavior following their COVID-19 information sensitivity.

### **2.2 Hypotheses Development**

#### **2.2.1 Perceived online COVID-19 related information sensitivity and perceived risk, preventive behavior**

Perceived online COVID-19 related information sensitivity could be defined as the level of privacy concerns an individual feels for COVID-19 related information in the online environment. According to previous studies, consumer information sensitivity impacts consumer attitude and behavior. Online information positively influences consumer attitude and behavioral intention [5]. Sato et al., (2019) study argued that health information sensitivity positively increase consumer preventive behavior intention [22]. In the Middle East respiratory syndrome (MERS) epidemic research [14], it was found that expressing MERS-related information sensitivity positively impacted consumer perceived risk and handwashing behavioral intention. During the severe acute respiratory syndrome epidemic also, Chinese people heavily utilized the internet and regarded online tools as one of the important sources of information [18], consumer with information sensitivity presented higher perceived risk and preventive behavior. We therefore formulate the following hypotheses:

Hypothesis 1: Perceived online COVID-19 related information sensitivity positively impacts perceived risk

Hypothesis 2: Perceived online COVID-19 related information sensitivity positively impacts personal preventive behavior

### **2.2.2 Perceived risk and preventive behavior**

In this study, perceived risk is the feeling about the infectious disease [3]. Perceived risk plays a significant role in the consumer decision making process. Following the previous study, consumer tend to avoid dangers rather than confront them. Perceived risk is one of the most powerful factors for assessing consumer preventive behavior [11]. Wise et al., (2020) study found that perception of the risk was significantly related to preventive behavior such as engagement in social distancing and handwashing behavior [3]. Other studies also identified that consumer or public's risk reception positively influence their preventive behavior [15]. From this theory, we formulate the following hypothesis:

Hypothesis 3: Perceived risk positively impacts personal preventive behavior

### **2.2.3 Perceived risk mediation effect**

Following the previous studies, online information sensitivity is very effective in changing or reinforcing consumers' attitude and then influence their behavior intention in a crisis [23]. Mou & Lin's (2014) study illustrated that the Chinese government used social media to help create public awareness of the risks involved, then affect their preventive behavior intention [23]. In this way, online COVID-19 related information sensitivity impacted consumers' perceived risk and then helped people present preventive behavior to avoid them. Some other studies have argued that social media is recognized as a useful communication tool to raise risk awareness, and then influence their preventive behavior [15]. From these studies, we formulate the following hypothesis:

Hypothesis 4: Perceived online COVID-19 related information sensitivity positively impacts personal preventive behavior through perceived risk

### **2.2.4 Age moderation effect**

Demographic differences among individuals are associated with their different behavioral intention [23]. Age categories are defined as young adult (17~29 years), middle adulthood (30~49 years), and older adult (50~71 years) [24]. Previous studies have determined that age is one of the most influential variables, which affects consumer SNS adoption and usage behavior [17]. A study examined the moderating effect of age difference and the results indicated that the effect of personalization on trust and behavior intention is stronger for young consumer than the middle and old aged [9]. Thus, online environment impacts more young consumers' behavior than that of middle-aged. This research proposes the following hypothesis:

Hypothesis 5: Age has moderation effect on the path

## **3. METHOD**

### **3.1 Measurement Development**

A self-administered questionnaire was developed for the survey, which included items on COVID-19 related information sensitivity, perceived risk of COVID-19, personal preventive behaviors, and demographic information. All the measurement items are listed in Table 2. COVID-19 related information sensitivity means the level of an individual's feelings toward COVID-19 related information in the online environment. COVID-19 related information sensitivity was measured with three items adopted from [26]. Perceived risk of COVID-19 was defined as consumer perceived risk about the COVID-19 and was measured with three items adopted from [27,28]. Preventive behavior was defined as the intention of the consumer to use self-protective equipment to reduce the risk of COVID-19 infection. Preventive behavior consisted of four items adopted from

[15]. All measurements were first developed in English and then translated into Chinese by this study researcher who is fluent in both Chinese and English. The Chinese version of the survey was translated back into English by an English professor who is a native speaker of Chinese, to ensure questionnaire translation equivalence. To verify the questionnaire validity and fitness, the pre-test was conducted from 5 May to 10 May 2020. The results of pre-test verified that there was no problem in the questionnaire validity. All items were measured on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

### 3.2 Data Collection and Sample Characteristics

This study collected data through an online survey. Since COVID-19 is a contagious disease, most of the activities were processed without any physical interactions. Additionally, we considered the stabilization of respondents and concluded that online questionnaire survey was more suitable than offline. This questionnaire link was made by the researcher on the Wenjuan Xing platform. It is the largest online system that helps scholars collect data. Many Chinese researchers are conducted through this system. Therefore, this study also chose this system to create the survey link. All the participants voluntarily took this survey. The survey did not include any questions that could have violated the human rights of the participants. The survey completion time was restricted to 20 minutes. The main survey was conducted from 20 May to 02 June 2020. Invalid data were excluded and 253 respondents' data were used to conduct the statistical analysis. The profiles of respondents are following. Males: 114 and females: 139; young generation (below 30 years): 131 and middle-aged generation: 122

## 4. RESULTS

### 4.1 Measurement Model

Before analyzing the data, exploratory factor analysis was conducted using principal component analysis (varimax rotation). The survey instruments and item loadings are given in Table 1. a total of 10 items were analyzed for three factors. As shown in Table 1, the Keiser–Meyer–Olkin value was 0.817 ( $p < 0.001$ ) and the factor loadings for measurement items on the intended constructs were at least 0.650. Further, Cronbach's alpha was greater than 0.8, which indicated that the scale had good internal consistency.

**Table 1. Exploratory factor analysis**

Constructs	Items	Factor Loadings	Eigen Value	% Variance	Cronbach's $\alpha$
IS	I don't mind spending a lot of time to search COVID-19 information on SNS	.867	2.706	33.784	.937
	In general, the COVID-19 information on SNS is important for me	.928			
	I am sensitive about the state of COVID-19 at present on SNS	.915			
PB	I have worn a mask to reduce the risk of COVID-19 infection	.838	3.378	27.064	.949
	I have tried not to go to public places, such as restaurants or departmental stores	.881			
	I plan to purchase personal protective equipment to prevent the risk of COVID-19 infection	.895			
	I have tried to wash my hands or used hand sanitizer more often to prevent the risk of COVID-19 infection	.875			
	COVID-19 is a serious risk that threatens the survival of humans	.895	2.674	26.742	.923

PCR	I have a high possibility of contracting COVID-19	.876
	Compared to others, I am highly likely to contract COVID-19	.866

Note<sup>1</sup>: IS = COVID-19 Information Sensitivity; PB = Personal Preventive Behavior; PCR = Perceived Risk Toward COVID-19

## 4.2 Structural Model

This research used structural equation modeling to test the hypothesis. We tested the relationship among COVID-19 related information sensitivity, perceived risk of COVID-19, and personal preventive behaviors. As shown in figure 1, the results proved that COVID-19 related information sensitivity significantly influenced perceived risk of the disease ( $\beta = .399, p < .001$ ) and personal preventive behavior ( $\beta = .304, p < .001$ ). Perceived risk of COVID-19 significantly influenced personal preventive behaviors ( $\beta = .457, p < .001$ ). Therefore, the hypothesis was supported. Further, the mediation effect of perceived risk of COVID-19 was assessed. The results showed that perceived risk toward COVID-19 had significant indirect influence on consumers' preventive behaviors.

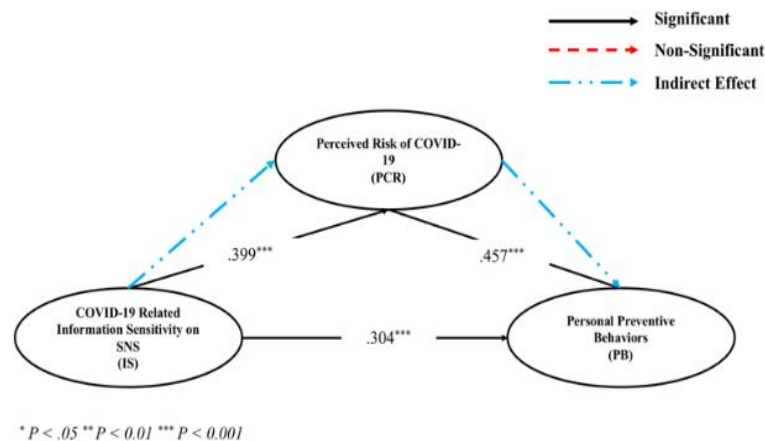


Figure. 1 Results of path analysis

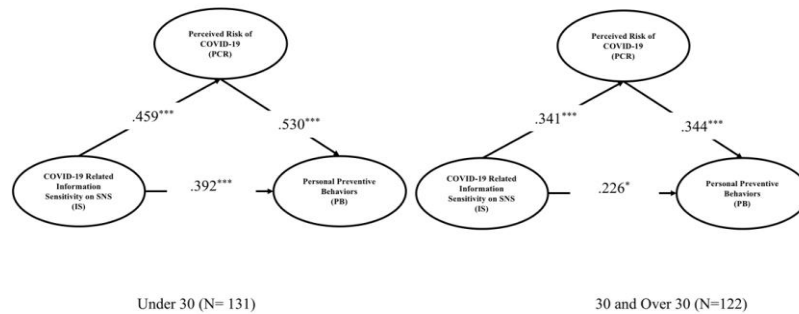
## 4.3 Moderation Analysis

To evaluate the moderating influence of young and middle age consumers, moderation analysis was conducted. The 253 participants were divided into young age (N=131) and middle and old age (N=122). As shown in Table. 4 and Figure. 2. Young participants were more influenced from the online environment than the middle and old aged.

Table 4. Results of moderation effect

Path	Young Age (N=131)	P	Middle and Old Age (N=122)	P
IS → PRC	.459	***	.341	***
IS → PB	.392	***	.226	*
PRC → PB	.530	***	.344	***

Note1: IS = COVID-19 Information Sensitivity; PB = Personal Preventive Behavior; PCR = Perceived Risk Toward COVID-19



**Figure. 2 Results of moderation effect**

## 5. DISCUSSION

In study, we investigated the path relationship among COVID-19 related information sensitivity on SNS, perceived risk toward COVID-19, and personal preventive behavior. The moderation of age difference was also conducted. The results of this study indicated that COVID-19 related information sensitivity on SNS positively impacted consumer perceived risk toward COVID-19, consistent with previous study [14,18]. Perceived risk toward COVID-19 also significantly influenced consumer preventive behavior. A previous study has also argued the same results [3]. We also investigated the mediation effect of perceived risk toward COVID-19. The results indicated that perceived risk had significantly indirect effect on COVID-19 related information sensitivity on SNS and personal preventive behavior, which the same with previous studies [15]. In addition, this study tested the moderation effect of age. The results revealed that young age group was more influenced by the digital media than the middle and old aged.

## 6. CONCLUSION

This study illustrated that the effect of information sensitivity on perceived risk and behavior intention. Based on the results of this study, this study could provide several theoretical implication and managerial implication. First, the results of this study are consistent with some of the previous studies. In addition, this study revealed the mediation effect of perceived risk toward COVID-19 on consumer self-preventive behavior. Third, the study added the moderator age to illustrate difference. Different age groups represented different behaviors in adopting online information; young, middle, and old age consumers exhibited different online behaviors. From a practical standpoint, when the outbreak of the infection occurred, the transmission of information related to COVID guidelines could only be offered by the government. Due to advancement in information technology, online transmission has become an effective channel to communicate information to the public. Therefore, information related to infection and disease outbreaks and self-preventive guidelines in the online environment is more effective for them. On the other hand, middle and old consumers represent low adoption of information through digital media. This group of consumers present low trust toward online information. Therefore, during an outbreak of an infection disease, government needs to pay attention to both conventional mass media and digital media. Through both the channels, consumer awareness of the disease could be increased and they could learn how to prevent themselves from the infectious disease; eventually, reducing the spread of the infection.

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