

# How does COVID-19 affect tourism in terms of people's willingness to travel? Empirical evidence from China

Yu Hao, Hanyu Bai and Shiwei Sun

Yu Hao, Hanyu Bai and Shiwei Sun are all based at the School of Management and Economics, Beijing Institute of Technology, Beijing, China

Received 14 September 2020  
Revised 2 December 2020  
10 January 2021  
Accepted 11 January 2021

The authors acknowledge financial support from the National Natural Science Foundation of China (72073010, 71761137001, 71521002), the key research program of the Beijing Social Science Foundation (17JDYJA009), the Beijing Natural Science Foundation (9162013), the National Key Research and Development Program of China (2016YFA0602801, 2016YFA0602603) and the Special Fund for Joint Development Program of the Beijing Municipal Commission of Education. The authors want to especially appreciate the help of Ms Ziwen Lu in preparing the Spanish translation of the abstract. The authors are also very grateful to seven anonymous reviewers and Editor-in-Chief Prof Dr Dimitrios Buhalis for their valuable and insightful comments, which helped to substantially improve the quality of this paper. The usual disclaimer applies.

## Abstract

**Purpose** – *Coronavirus disease 2019 (COVID-19) has resulted in traveling restrictions and decreased the demand among travelers since the end of 2019. Policies and people's behaviors are gradually changing with the increase in the number of new diagnoses of COVID-19. Tourism increases tourists' risk of contracting COVID-19 and will undoubtedly be affected by this disease. Based on this assumption and social cognitive theory, this paper aims to explore the impact of COVID-19 on tourism in terms of people's willingness to travel.*

**Design/methodology/approach** – *Based on social cognitive theory, this study has designed the model and variables. The data of the paper came from a survey conducted in 29 provinces of China and a total of 618 responses were used for data analysis after deleting invalid questionnaires. Drawing on the structural equation modeling method, this paper processes the data collected from questionnaires to test the hypotheses and come to the results.*

**Findings** – *The results indicate that the negative impact of COVID-19 will affect the severity perceptions, personal negative effects and positive effects of tourism during the outbreak, which will ultimately influence people's willingness to travel. During the outbreak of COVID-19, impacted by environmental factors and personal factors, Chinese people's willingness to travel has been significantly reduced.*

**Research limitations/implications** – *This study mainly focuses on people's willingness to travel and the demand side of tourism to analyze the effects of COVID-19 on tourism, which neglects the supply side of tourism for analysis. Subsequent research should take account of the supply side of tourism and expanding the sample size worldwide to determine the impact of COVID-19 on the tourism industry from a broader perspective.*

**Originality/value** – *This study quantitatively analyzes how COVID-19 influenced the tourism industry and precisely determines the possible mechanism of the effect of COVID-19 on tourism by using social cognitive theory to build a model. The insights from the work help to understand how COVID-19 affects people's willingness to travel during the pandemic and how to address this issue.*

**Keywords** *Tourism, Social cognitive theory, COVID-19, People's willingness to travel*

**Paper type** *Research paper*

新冠疫情如何从旅游意愿方面影响旅游业？来自中国的实证研究；

**目的：**新型冠状病毒（COVID-19）自2019年底以来开始被发现，随后逐渐蔓延至全球，给人们的生活带来不小的影响。该病毒的发展使得人们的出行受到了较大的限制，因而减少了人们对于旅游的需求。随着新冠疫情确诊人数的增加，政府政策和人们的行为也处在变化之中。基于这一假设和社会认知理论，本文旨在从人们的旅游意愿角度探究新冠疫情对旅游业的影响。

**设计/方法学/方法：**本文所设计的变量和模型是在社会认知理论的基础之上提出的。本研究的数据来源于面向中国29个省市自治区的问卷调查。在剔除无效问卷后，总共搜集618份有效问卷进行数据分析。本研究采用了结构方程模型，对假设进行检验，并得出最终结论。

**发现：**研究结果表明，新冠疫情带来的负面影响会增加人们对疫情严重性的认知程度、疫情期间旅游给人带来的负面影响增大、正面影响减少，从而最终影响人们的旅游意愿。在新冠疫情之下，受到环境、个人因素的影响，人们的旅游意愿显著降低。

**研究局限/意义：**本研究的数据均来源于中国，所以将本文的结论应用于其他地区时，由于不同地区的自然和社会环境差异，结论可能会产生差异。本研究主要聚焦于人们旅游意愿的变化，即旅游业的需求端，来分析新冠疫情对旅游业的影响，忽视了旅游业的供给端在新冠疫情期间对旅游业的影响分析。后续的研究可

以考虑从旅游业供给端的变化进行分析、以及将样本数量扩大到全球范围,从而可以从更广阔的视角来探究新冠疫情对旅游业的影响。

**创新点/价值 :** 本研究定量分析了新冠疫情如何影响旅游业,并利用社会认知理论建立模型来精确判断这一影响的可能机理。本文的发现有助于了解新冠疫情如何影响人们在疫情行期间旅行的意愿,以及制定相关的应对措施。

**关键词** 居民的旅游意愿,社会认知理论,旅游业,新冠疫情

## **Cómo afecta COVID-19 al turismo a través de la disposición de las personas a viajar? Evidencia empírica de China**

**Propósito :** *El coronavirus (COVID-19) se descubrió desde finales de 2019 y luego se extendió gradualmente a todo el mundo, lo que tuvo un gran impacto en la vida de las personas. La propaganda del coronavirus ha provocado muchas restricciones en los viajes de las personas, por lo tanto, redució la demanda de viaje de las personas. Con el aumento en el número de casos confirmados de COVID-19, las políticas gubernamentales y el comportamiento de las personas también se están cambiando. Basado en esta hipótesis y teoría cognitiva social, este artículo tiene como objetivo explorar el impacto del COVID-19 en el turismo desde la perspectiva de la disposición de las personas a viajar.*

**Diseño/Metodología/Método :** *Las variables y modelos diseñados en este artículo se proponen sobre la base de la teoría cognitiva social. Los datos para este estudio provienen de las encuestas por cuestionario de 29 provincias, municipios y regiones autónomas de China. Después de excluir los cuestionarios no válidos, se recopilaron un total de 618 cuestionarios válidos para el análisis de datos. En este estudio, se utiliza el modelo de ecuación estructural y la prueba de la hipótesis, al final llegar a la conclusión.*

**Encuentro :** *El resultado de la investigación muestra que el impacto negativo del COVID-19 aumenta la conciencia de las personas sobre la gravedad de la epidemia, y el impacto negativo del turismo durante la epidemia se aumenta y el impacto positivo se disminuye, lo que al final afecta la disposición de las personas a viajar. Bajo el COVID-19, afectada por factores ambientales y personales, la disposición de las personas a viajar se ha reducido significativamente.*

**Limitaciones/Significados de la investigación :** *Los datos de este estudio son todos de China, por lo que cuando las conclusiones de este artículo se aplican a otras regiones, las conclusiones pueden diferir debido a las diferencias en los entornos naturales y sociales de diferentes regiones. Esta investigación se centra principalmente en el cambio del deseo de viajar de las personas, es decir, el lado de la demanda del turismo, para analizar el impacto del COVID-19, por eso ignora el análisis del impacto de la oferta turística en el turismo durante el COVID-19. Los estudios posteriores se pueden considerar desde el aspecto de analizar los cambios en el lado de la oferta del turismo y expandir el número de muestras a una escala global, por lo tanto, se puede explorar el impacto del COVID-19 desde una perspectiva más amplia.*

**Punto/Valor de innovación :** *El encuentro de este artículo ayuda a comprender cómo el COVID-19 afecta la disposición de las personas a viajar durante la epidemia y a formular medidas de respuesta relevantes.*

**Palabras clave:** *Disposición de los residentes a viajar, Teoría cognitiva social, Turismo, COVID-19*

## **1. Introduction**

Coronavirus disease 2019 (COVID-19) has had an enormous impact on the entire world. Regarding the impact of COVID-19 on specific industries, the tourism industry will inevitably change. The previous literature has examined the effect on tourism of various phenomena such as crime, terrorism, political unrest, health problems and natural disasters (Hall, 1996) and community or personal experiences of traveling (Bichler and Peters, 2020; Fakfare and Wattanacharoensil, 2020). Although some articles have considered health crises such as COVID-19 and its impacts (Wen et al., 2020; Zhu and Deng, 2020), research on the impact of infectious diseases on the tourism industry requires continued efforts. In particular, there are an insufficient number of studies that consider the impact of infectious diseases on the tourism industry in terms of people's willingness to travel. This article explores this issue and examines how COVID-19 impacted the tourism industry from the perspective of willingness to travel. This study not only broadens understanding of the path of the impact of COVID-19 on tourism but also advances the scope of research on the influencing factors and purposes of tourism.

Previous literature has provided detailed discussions on the influential factors and purposes of the tourism industry (Mueller and Kaufmann, 2001; Connell, 2006; Wang *et al.*, 2020). Regarding the effects of travel, satisfactory tourism provides people with a sense of well-being (Chen *et al.*, 2013; Kroesen and Handy, 2014; Kwon and Lee, 2020). Structural equation modeling (SEM) has been used in some studies (Nunkoo, 2015; Kawakubo and Oguchi, 2019). Furthermore, the previous literature has extensively discussed people's willingness to travel, which is closely related to their tourism decisions. Studies have indicated that many tours occur for similar purposes such as seeking places to relax, escaping from daily work, finding quiet places and improving physical and mental health (Pesonen and Komppula, 2010; Han, 2019).

COVID-19 has impacted society, business and the economy (World Health Organization, 2019; López *et al.*, 2020; de Bruin *et al.*, 2020). This impact is reflected not only in social and economic fluctuations but also in the implementation of various policies that have changed the way people live and work. The tourism industry is also facing shocks. According to data from the World Tourism Organization, severe acute respiratory syndrome (SARS) led to a 9% reduction in the total number of tourists in Asia (World Tourism Organization, 2004). Based on previous experience with SARS, the tourism industry in the global economy and society will also be affected by COVID-19.

Currently, there are few articles on the impact of infectious diseases on tourism and there are no detailed articles on how infectious diseases affect tourism through step-by-step transmission. Accordingly, this study quantitatively analyzes how COVID-19 influenced the tourism industry and precisely determines the possible mechanism of the effect of COVID-19 on tourism by using social cognitive theory to build a model. The purpose of this study is to explore the influencing path of COVID-19 on tourism from the perspective of changes in people's willingness to travel during the pandemic. It considers how COVID-19 has influenced tourism, what the related factors or variables are and what changes the tourism industry is experiencing. This article uses SEM and a questionnaire to answer these questions and finds that COVID-19 has influenced tourism by changing objective conditions and people's perceptions.

## 2. Theoretical background

The social cognition theory proposed by Bandura (1986, 1997, 2001) emphasizes the key function of the social environment from the perspective of human psychology, including the concepts of motivation, learning and self-regulation. This article begins with the concept of the triadic reciprocity (Bandura and Cervone, 1986) of social cognition theory, explores the impact of COVID-19 on travel intention from the perspective of social cognition and constructs a model for the influence of travel intention during the pandemic.

The triadic reciprocity of social cognitive theory assumes that human functions depend on three sets of interacting factors or influences: behavior, environment and individual (for example, cognition and emotion). Each group of influences on human function affects other aspects and is affected by other aspects. People's thoughts will affect their behavior and environment, the behavior will change their thoughts and the environment and environment will affect individual thoughts and behaviors. The relationship explained by this theory is shown in the following diagram (Bandura, 1986).

In this article, the main focus is the impact of COVID-19 on people's willingness to travel. Therefore, this article uses this model to study the impact of behavioral processes instead of continuing to explore the impact of behavioral processes on the other two aspects or the influence of environmental processes. Therefore, the influencing paths of the dotted lines in Figure 1 will not be discussed in this article.

## 2.1 Environmental processes

Influences in the environment such as socially modeled influences can affect people's motivational processes and outcomes (Schunk, 2012). Tourism involves objective conditions such as transportation, the distance to the traveling destination, the friendliness of the residents in the destination, the destination's living conditions, food quality and diversity and environmental quality, which play an important role in tourism decision-making and ultimately influence people's willingness to travel (Nicolau and Más, 2006; Hsu *et al.*, 2009; Heinen *et al.*, 2015).

During the COVID-19 outbreak, the objective conditions of tourism have been subject to various restrictions. Public and private transportation are controlled, many public places have been closed and people are required to maintain distance from others in public (de Bruin *et al.*, 2020). In addition, during the pandemic, the transportation conditions, service quality, infrastructure and safety and health conditions of the tourism industry have been affected (Wen *et al.*, 2020).

In particular, certain destinations have high infection rates, which may change the images that potential visitors attribute to them. The dimensions of the destination image that may be affected include the perception of health infrastructure, safety and other COVID-19 damage-related associations such as nightlife, large-scale tourism activities and the sense of crowdedness (Zenker and Kock, 2020). As external forces, these objective conditions have a major influence on tourism decisions. During the COVID-19 outbreak, objective conditions affect people's personal processes and ultimately influence people's willingness to travel. In this article, the latent variable **negative impact** of the COVID-19 situation is used to present the environmental processes during COVID-19.

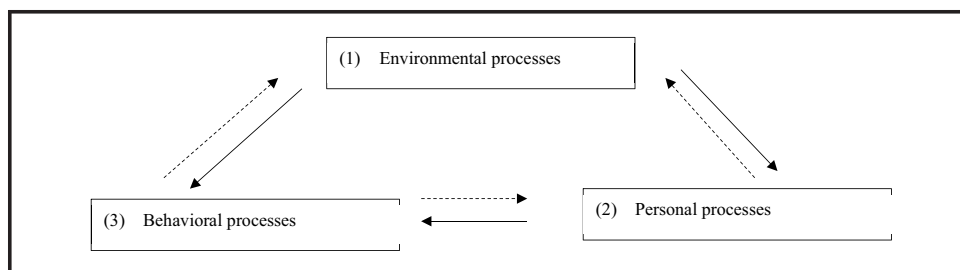
## 2.2 Personal processes

Personal influences include cognitions, beliefs, perceptions and emotions (Schunk and Usher, 2019). Personal influences include processes that help instigate and sustain motivational outcomes (Schunk and DiBenedetto, 2020). This section discusses the personal processes that could be applied to the tourism model.

Regarding the specific factors that influence tourism decision-making, in addition to the objective conditions of tourism, people's tourism decision-making is affected by psychological factors, social factors and subjective cultural factors (FRATU, 2011). For example, some people travel to perform a pilgrimage (Luz, 2020; Chang *et al.*, 2020) and some medical trips are for health purposes. In the following, this article uses outcome expectancies and perception of severity to introduce the latent variables and construct the model.

*2.2.1 Outcome expectancies.* Outcome expectancies refer to the perceived positive and negative consequences of performing a behavior. Self-efficacy and outcome expectancies are the two key determinants of behavior (Schunk and DiBenedetto, 2020). Self-efficacy

**Figure 1** Model of triadic reciprocal interactions



emphasizes the relationship of goal with actions, which is not applicable to this article. Therefore, this article does not use self-efficacy in the model but rather concentrates on outcome expectancies. To apply this issue to tourism, the article divides outcome expectancies into personal negative effects and personal positive effects:

- *Personal negative effects.* A study by [Smallman and Moore \(2010\)](#) on the decision-making process of tourists found that tourists are constrained by monetary budgets, time limits and energy when making decisions ([Smallman and Moore, 2010](#)). In this regard, traveling during the pandemic will undoubtedly increase costs. Tourists will need to spend more money and energy than usual to prevent infection. In addition, tourism itself will increase the risk of infection during the pandemic because it will increase the chance of contact with strangers and the risks of tourism. This point was reflected in a study by Wong and Yeh, who found that in the decision-making process, the feeling that tourism is risky will make tourists hesitate to travel or postpone their travel plans ([Wong and Yeh, 2009](#)). These risks could initiate a mental shift in tourists' travel behavior, resulting in the avoidance of overcrowded mass tourism destinations in favor of more remote, less populated destinations ([Wang and Ackerman, 2019](#)).
- *Personal positive effects.* The main purpose of this latent variable is to explore whether, under the influence of COVID-19, the personal positive effects of tourism can contribute to people's willingness to travel. Previous literature suggests that the personal positive influences of tourism such as enhancing relationships with relatives and friends and enjoying nature, increase people's willingness to travel ([Pesonen and Komppula, 2010](#)). Regarding people's willingness to travel during the COVID-19 outbreak, this article explores whether the personal positive effects of tourism in this particular situation can be offset by other influencing factors in the pandemic, causing people's willingness to travel to continue to increase.

This article starts by considering the impact of COVID-19 and explores the personal negative and positive effects during the pandemic.

*2.2.2 Perception of risks.* A person's perceived risk is formally regarded as a function of his or her subjective probability estimates and expressed as a set of bets about uncertain results that the decision-maker is willing to accept when trying to make a specific choice ([Cole and Withey, 1981](#)).

From the perspective of modern research ([Vaughan, 2011](#)), perceived risk is a dynamic process and changes in perceived risk affect people's behavior and decision-making. Some previous studies have examined the perceived risk of a pandemic changing the world ([Leppin and Aro, 2009](#); [Ibuka et al., 2010](#); [Zhu and Deng, 2020](#)).

Understanding perceptions of the severity of COVID-19 is very important because these perceptions affect the tourism decision-making behavior of ordinary people. People's cognition of pandemics changes their behavior ([Golden and Earp, 2012](#); [Sheeran et al., 2014](#)). Regarding risk habituation, psychologically and physically, the public gradually adapts to the existence of the pandemic and ignores the risks that it brings. Alternately, people's reactions can take the form of mass panic ([Raude et al., 2019](#)). Regardless of the kind of cognition, the behavior of the individual changes.

Like a virus that has had a great impact on and caused great harm to human health, COVID-19 will increase the risks of tourism. Currently, the virus spreads step by step and the disease condition is changing. If people are becoming increasingly pessimistic this pessimism will also affect their corresponding behaviors and decisions, including decisions about tourism.

### ***2.3 Behavioral processes***

This article examines the changes in people's behavior during COVID-19 based on changes in people's willingness to travel.

During COVID-19, the development of the pandemic situation has had various impacts on people's environment. These impacts are not limited to safety and health but are also reflected at the socioeconomic level. For example, [Zeng et al. \(2005\)](#) found that SARS was an infectious disease that had an impact on business. Therefore, during COVID-19, people's environment is changing. In this changing environment, human-environment interaction will further affect human cognition; in this interaction, people will change their own behavior.

### 3. The hypothesis and final construction of the model

Based on the points above and the triadic reciprocity of social cognitive theory, we suggest that people's behavioral processes will be influenced by environmental processes and personal processes and personal processes will also be affected by environmental processes. In this article, the latent variable of environmental processes is the negative impact of COVID-19 (NI) and it represents environmental processes of social cognitive theory; the latent variables of personal processes are severity perception (SP), personal negative effects (PNE) and personal positive effects (PPE), which three stand for personal processes of social cognitive theory; and the underlying variable of the behavioral process is the willingness to travel during the outbreak of COVID-19 (WT) and it is the representative of the behavioral processes of social cognitive theory. The following assumptions of this article are proposed:

- H1.* The negative impact of COVID-19 will increase people's perception of severity.
- H2.* The negative impact of COVID-19 will increase people's personal negative effects.
- H3.* The negative impact of COVID-19 will decrease people's personal positive effects.
- H4.* The negative impact of COVID-19 will decrease people's willingness to travel during the COVID-19 outbreak.
- H5.* Severity perceptions will decrease people's willingness to travel during the COVID-19 outbreak.
- H6.* Personal negative effects will decrease people's willingness to travel during the COVID-19 outbreak.
- H7.* Personal positive effects will increase people's willingness to travel during the outbreak of COVID-19.

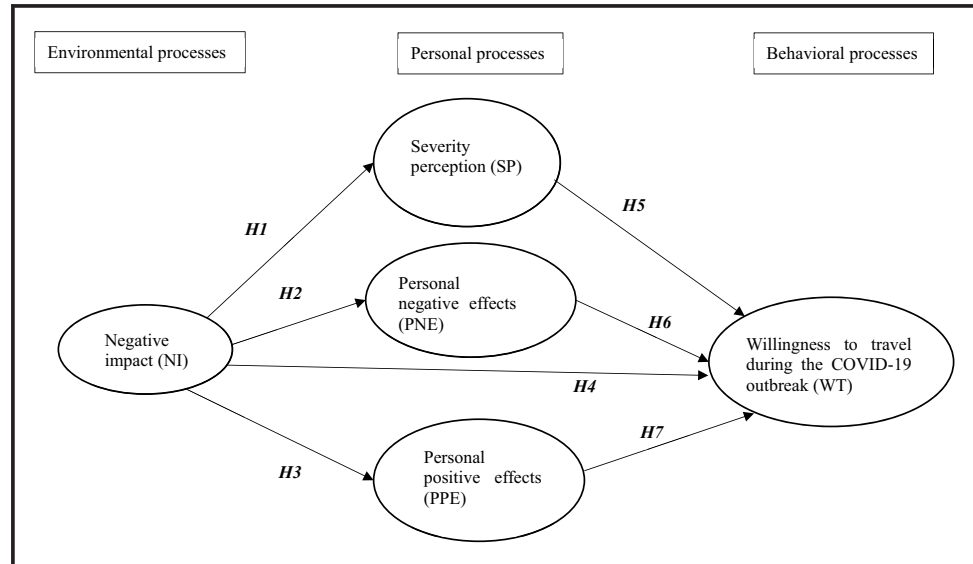
The framework of the model is shown in [Figure 2](#).

## 4. Methodology

### 4.1 Procedure

Based on a review of tourism research, the relevant literature on tourism forecasting with Internet-generated data (such as social media) were identified and collected from large databases, including Web of Science, Science Direct, EBSCOHost and Google Scholar ([Li et al., 2021](#)). Some studies have used social media to collect online questionnaires or have verified the quality and reliability of WeChat-based questionnaires ([Hao, Guo and Shao, 2019](#); [Sun et al., 2016](#); [Yang et al., 2016](#)). By June 2020, the number of Chinese netizens had reached 940 million and mobile users accounted for 99.2% of netizens ([China Internet Network Information Center, 2020](#)). Therefore, it was reasonable to use WeChat and QQ to administer our online questionnaire. The questionnaires used in this article for data collection were distributed via WeChat and QQ groups. A total of 621 questionnaires were collected. To diversify the respondents, we used accidental sampling and snowball sampling to expand the number of people who answered the questionnaire. Their geographic distribution is shown in [Table 1](#). The population of the survey was all people in the provinces shown below.

**Figure 2** Research framework



#### 4.2 Participants

A sample of 621 Chinese participants took part in the survey. The quality of the questionnaire was strictly controlled. After checking the data, online questionnaires that were completed too quickly were removed. Thus, 3 questionnaires were removed and 618 valid questionnaires were collected.

Among the 618 respondents who participated in this survey, there were slightly more women than men and young and middle-aged people constituted the majority. In terms of occupation, most of the respondents were (full-time) students or were already employed. Most of the respondents were urban residents. The respondents' educational level was relatively high, with more than half holding an undergraduate degree or above. The number of trips per year was evenly distributed; most respondents typically traveled three times per year or less. Some people typically did not travel every year. We investigated the changes in people's willingness to travel; therefore, we also considered people who did not travel in our survey to identify the overall perspective on people's changes in willingness to travel. Regarding monthly income in the past six months, most respondents had a monthly income of 10,000 yuan or less. In China, under the circumstance of COVID-19, some factories or plants closed or workers were laid off. It is reasonable that some respondents' income was zero. Additionally, some students filled out the questionnaire, which could account for some of the zero-income respondents. The respondents worked in various industries, with the majority being full-time students or working in wholesale and retail. These demographic characteristics are shown in Table 1 (Table 2).

#### 4.3 Measures

The questionnaires of every latent variable were designed as follows to study the influence path of COVID-19 (Table 1). Every respondent was required to answer every question according to his or her personal perception; 1 represents the most disagreement or the lightest degree and 5 represents the most agreement or the heaviest degree. The degree increases progressively from 1 to 5.

The design of questionnaire items was based on the model construction and was combined with the characteristics of tourism. Among the negative impact items, our question was

**Table 1** Geographic distribution of 621 respondents

Province	No.	(%)
Anhui	91	14.65
Guangdong	49	7.89
Shandong	48	7.73
Beijing	42	6.76
Sichuan	38	6.12
Jiangsu	34	5.48
Henan	29	4.67
Hebei	22	3.54
Liaoning	20	3.22
Hunan	19	3.06
Fujian	19	3.06
Shanxi	19	3.06
Zhejiang	18	2.90
Xinjiang	17	2.74
Heilongjiang	17	2.74
Hubei	16	2.58
Hunnan	16	2.58
Shaanxi	15	2.42
Neimenggu	14	2.25
Guizhou	14	2.25
Chongqing	12	1.93
Jilin	10	1.61
Shanghai	9	1.45
Tianjin	9	1.45
Taiwan	6	0.97
Jiangxi	5	0.81
Hainan	5	0.81
Gansu	5	0.81
Hongkong	3	0.48

developed with reference to previous surveys (Park *et al.*, 2020; Gao and Mattila, 2014; Siu *et al.*, 2014; Zhu *et al.*, 2020). Regarding severity perceptions, we adapted the introduction to the questions and the measurement of people's degree of severity perception from Yang and Ma (2020) and Rosselló *et al.* (2020). In terms of personal negative and positive effects, we referred to surveys in previous studies to define our questions (Su and Swanson, 2017; Yang and Ma, 2020; Kwon and Lee, 2020; Wang *et al.*, 2020). For people's willingness to travel, we studied Cahyanto, Wiblishauser, Pennington-Gray and Schroeder's article about dynamics in travel avoidance and then developed our own questions (Table 3).

## 5. Data analysis and outcomes

### 5.1 Reliability and validity

*5.1.1 Sample common method bias test.* To test for potential common method bias, this study uses principal component analysis to perform factor analysis on all items. Based on the results of using SPSS 24.0, the average variance explained (AVE) of the first factor when unrotated is 34.087%, which is less than 50%, indicating that there is no serious common method bias in the sample (Ullman and Bentler, 2003) (Table 4).

*5.1.2 Reliability and validity.* To ensure the study is reliable and valid, this study uses Mplus software to test the reliability and validity of the scale.

The reliability test uses Cronbach's alpha coefficient and composite reliability (CR). As shown in Table 3, Cronbach's alpha coefficient is 0.838–0.908, which is higher than the standard of 0.70 (Ullman and Bentler, 2003). Additionally, the CR of the variables is



**Table 2** Demographic characteristics of 618 respondents

<i>Demographic characteristics</i>	<i>Classification</i>	<i>No.</i>	<i>(%)</i>
Sex	Male	281	45.5
	Female	337	54.5
Age	20 and under	91	14.7
	20–40 years old	477	77.2
	Over 40 years old	50	8.1
Working situation	Full-time student	209	33.8
	Employed	358	57.9
	Independent entrepreneurship	20	3.2
	Freelance	22	3.6
	Retired	2	0.3
	Other	7	1.1
Urban-rural attributes of the place of residence	Urban area	401	64.9
	Rural area	159	25.7
	Urban-rural junction area	57	9.2
	Not sure	1	0.2
Educational level	Uneducated	1	0.2
	Primary school	6	1.0
	Junior high school	57	9.2
	Vocational school	96	15.5
	High school	88	14.2
	Bachelor's degree	323	52.3
	Master's degree	34	5.5
	Doctoral degree	13	2.1
Typical number of trips per year	0	102	16.5
	1 time	138	22.3
	2 times	139	22.5
	3 times	138	22.3
	4 times	58	9.4
	5 times or more	43	7.0
Average monthly income in the last six months	0	44	7.1
	1–2,000	122	19.7
	2,001–10,000	400	64.7
	10,001–16,000	33	5.3
	16,001 and above	19	3.1

0.839–0.956, which is higher than the standard of 0.60. Therefore, the reliability of the scale is good (Table 5).

The validity test verifies the convergent validity and discriminant validity of the model. Convergent validity concerns whether measurement indicators with the same potential characteristics will load onto the same common factor, while discriminant validity concerns whether measurement indicators with different potential characteristics will load onto different common factors.

Table 4 presents the model fitness results. Here,  $\chi^2/df$  is 2.521, the comparative fit index (CFI) is 0.962, the Tucker-Lewis index (TLI) is 0.956, the root mean square error of approximation (RMSEA) is 0.050 and the standardized root mean square residual (SRMR) is 0.077, showing that the model has a good fit. The loadings of each factor of the model are 0.704–0.984 (Table 3) and the AVE values of the model are 0.566–0.846 (Table 3), exceeding the accepted standard of 0.360 (Anderson and Gerbing, 1988). These results show superior convergent validity among the variables (Table 6).

Table 7 shows the correlation coefficient matrix of the latent variables. The values along the diagonal in the table are the square roots of the AVE of each latent variable, which are all greater than 0.60. The comparison shows that the value of the square root of the AVE of each variable is higher than the correlation coefficient of the variable and the other variables, showing that each variable has good discriminant validity (Table 7).

**Table 3** The design of the questionnaire

Factors	Item
Negative impact (Park <i>et al.</i> , 2020; Gao and Mattila, 2014; Siu <i>et al.</i> , 2014; Zhu <i>et al.</i> , 2020)	Q1 During the pandemic, it is difficult for tourism to have good service quality
	Q2 During the pandemic, it is difficult to have complete supporting facilities for tourism
	Q3 During the pandemic, it is difficult for tourism to have convenient transportation and travel conditions
	Q4 During the pandemic, it is difficult for tourism to have safe and hygienic conditions
	Q5 How contagious do you think COVID-19 is?
	Q6 What harm do you think COVID-19 does to the human body?
	Q7 What do you think the impact of COVID-19 on society is?
	Q8 How long do you think the impact of COVID-19 on society will last?
Severity perception (Yang and Ma, 2020; Rosselló <i>et al.</i> , 2020)	Q9 Traveling during the pandemic will increase my risk of contracting the virus
	Q10 Traveling during the pandemic will make me be condemned by others
	Q11 Traveling during the pandemic will cause me to worry about others
	Q12 Traveling during the pandemic will make me spend extra energy
Personal negative effects (Yang and Ma, 2020)	Q13 Traveling during the pandemic can improve my relationship with relatives and friends
	Q14 Traveling during the pandemic can add fun to my life
	Q15 Traveling during the pandemic can allow me to enjoy natural resources and cultural products
	Q16 Traveling during the pandemic can increase my knowledge and broaden my horizons
	Q17 Traveling during the pandemic can provide me with abundant tourism resources and products
Personal positive effects (Kwon and Lee, 2020; Su and Swanson, 2017; Wang <i>et al.</i> , 2020)	Q18 If the policy does not prohibit it, I am willing to travel during the outbreak
	Q19 If the policy does not prohibit it, I will support the people around me to travel during the pandemic
	Q20 If the policy does not prohibit it, I am willing to pay attention to travel strategies during the pandemic
	Q21 If the policy does not prohibit it, I am willing to pay for tourism during the pandemic
	Q22 If the policy does not prohibit it, I am willing to pay for tourism during the pandemic
Willingness to travel during the COVID-19 outbreak (Cahyanto <i>et al.</i> , 2016)	

**Table 4** Total variance explained

Factor	Initial eigenvalue variance %	Cumulative %
Factor 1	34.087	34.087
Factor 2	12.371	46.457
Factor 3	9.211	55.668
Factor 4	9.149	64.818
Factor 5	7.233	72.051

In summary, the goodness of fit, reliability and validity of the model adopted by this research is good and the model is suitable for hypothesis testing.

## 5.2 Hypothesis testing

This article uses Mplus to construct a structural equation model to verify the path relationships of the model. Regarding the validity of the model, the results show that  $\chi^2(182) = 458.743$ ,  $\chi^2/df = 2.521$ , CFI = 0.962, TLI = 0.956, RSMEA = 0.050 and SRMR = 0.077, indicating that the model fits well. According to the results in Figure 2, the perception of the severity of COVID-19 has a negative effect on tourism during the COVID-19 outbreak. Additionally, the negative impact of tourism caused by COVID-19 significantly affects the personal positive effects and the personal negative effects of tourism during the COVID-19 outbreak. The negative impact of COVID-19 on tourism significantly changes people's willingness to travel. All hypotheses pass the test (Table 6) (Figure 3, Table 8).

The SEM analysis results are shown in Table 6. Based on the fit data above, all hypotheses pass the test, showing that the negative impact that COVID-19 brings to tourism does cause people to change their perception of severity and views of the personal positive and negative effects of tourism and these changes ultimately lead to changes in people's willingness to travel during the pandemic.

**Table 5** Factor loadings and validity testing

Latent variable	Factor loading	Mean	Variance	Skewness	Kurtosis	Cronbach's alpha coefficient	CR	AVE
Negative impact (NI)	0.844***	3.673	1.291	-0.726	-0.169	0.908	0.909	0.714
	0.874***	3.595	1.354	-0.49	-0.735			
	0.866***	3.775	1.148	-0.743	0.023			
	0.794***	4.019	1.268	-0.963	0.002			
Severity perception (SP)	0.785***	4.11	0.868	-1.024	0.809	0.838	0.839	0.566
	0.708***	4.076	0.779	-0.798	0.124			
	0.807***	4.147	1.061	-1.443	1.753			
	0.704***	3.934	0.897	-0.713	0.015			
Personal negative effects (PNE)	0.749***	4.184	0.769	-0.9	0.262	0.861	0.864	0.614
	0.833***	3.785	1.221	-0.756	-0.14			
	0.800***	4.154	0.823	-0.932	0.201			
	0.749***	3.99	1.045	-0.853	0.163			
Personal positive effects (PPE)	0.648***	2	0.948	0.904	0.646	0.872	0.873	0.582
	0.759***	2.209	1.408	0.783	-0.292			
	0.854***	2.273	1.286	0.741	-0.122			
	0.831***	2.309	1.414	0.634	-0.537			
Willingness to travel during the COVID-19 outbreak (WT)	0.704***	1.917	1.302	1.109	0.271	0.898	0.956	0.846
	0.907***	1.966	1.24	0.974	0.055			
	0.900***	1.825	1.112	1.156	0.52			
	0.984***	2.034	1.382	0.896	-0.22			
	0.884***	1.94	1.17	0.971	0.113			

Notes: \*\*\* $p < 0.001$ . CR is composite reliability; AVE is average variance extracted

**Table 6** The fit analysis of the model

Fitness index	Critical value (suggested value) (Anderson and Gerbing, 1988)	The index of the model	Whether it meets the standard
Chi-square ( $X^2$ )	The smaller, the better	458.743	-
Degrees of freedom (df)	The larger, the better	182	-
$X^2/df$	$1 < X^2/df < 3$	2.521	Yes
CFI	$>0.90$	0.962	Yes
TLI	$>0.90$	0.956	Yes
RMSEA	$<0.08$	0.050	Yes
SRMR	$<0.08$	0.077	Yes

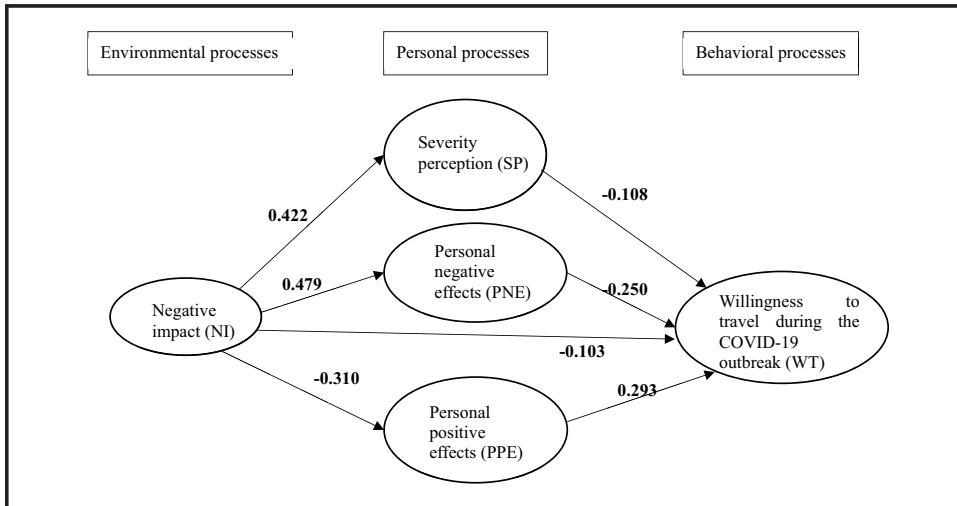
**Table 7** Correlation coefficient matrix of the latent variables

Latent variable	AVE	NI	SP	PNE	PPE	WT
NI	0.714	0.845				
SP	0.566	0.298***	0.752			
PNE	0.614	0.307***	0.099***	0.784		
PPE	0.582	-0.189***	-0.061***	-0.063***	0.763	
WT	0.846	-0.308***	-0.157***	-0.217***	0.213***	0.920

Notes: \*\*\* $p < 0.001$ . NI is Negative Impact; SP is Severity Perception; PNE is Personal Negative Effects; PPE is Personal Positive Effects; WT is Willingness to Travel during the COVID-19 outbreak

The negative impact of COVID-19 on tourism will lead people to perceive greater risks and increase the perception of severity, as the coefficient of 0.422 shows. Additionally, the negative impact of COVID-19 makes people believe that the personal negative effects of tourism during the pandemic have significantly increased, as shown by the path coefficient

**Figure 3** Schematic diagram of the path relationships of the model



**Table 8** Hypothesis test

Hypothesis	Paths	Path coefficients	t-statistic	p-value	Result
H1	NI→SP	0.422	10.863	0.000	Yes
H2	NI→PNE	0.479	13.181	0.000	Yes
H3	NI→PPE	-0.310	-7.580	0.000	Yes
H4	NI→WT	-0.103	-2.117	0.034	Yes
H5	SP→WT	-0.108	-2.201	0.028	Yes
H6	PNE→WT	-0.250	-4.972	0.000	Yes
H7	PPE→WT	0.293	6.868	0.000	Yes

of 0.479. Additionally, the negative impact of COVID-19 on tourism leads people to believe that the personal positive effects of tourism during the pandemic have significantly decreased, as shown by the path coefficient of  $-0.310$ . The negative impact of COVID-19 directly influences people's traveling willingness. It is important to recognize the impact of this variable.

The perception of severity and personal negative effects of tourism during the COVID-19 outbreak will decrease people's willingness to travel during the pandemic, with path coefficients of  $-0.108$  and  $-0.250$ . In addition, the personal positive effects of tourism during the COVID-19 outbreak will increase people's willingness to travel during the pandemic, with a path coefficient of  $0.293$ . These results show the changes in people's willingness to travel during the COVID-19 outbreak under various factors. Based on the absolute value of the path coefficient, the personal positive and negative effects of tourism during the pandemic period have similar effects on people's willingness to travel, with the perception of severity effects being slightly greater than the personal positive effects.

Our exploration of the changes in people's willingness to travel shows that the personal positive effects of tourism are slightly greater than the personal negative effects and the negative impact of COVID-19, with a path coefficient of  $0.293$  and an absolute value higher than the other two ( $0.108$  and  $0.250$ , respectively). These results show that when people discuss tourism, they pay more attention to its personal positive effects. However, the perception of severity, personal negative effects of tourism during the COVID-19 outbreak and the negative impact of COVID-19 significantly reduce people's willingness to travel

during the COVID-19 outbreak. Overall, people's willingness to travel during the COVID-19 pandemic is declining.

## 6. Results

The negative impact of COVID-19 on tourism changes people's willingness to travel directly and indirectly by changing people's personal processes. Some articles have discussed the negative impact of COVID-19 and its influence on tourism (Gössling *et al.*, 2020; Farzanegan *et al.*, 2020) and other studies have examined the behavioral and psychological process of changes in tourism during COVID-19 (Kock *et al.*, 2020). In this article, we combined the two processes and studied how NI influenced tourism and its influencing paths. We found that NI reduced people's willingness to travel. It also influenced people's views about the risks and effects of traveling during COVID-19, indirectly causing changes in people's willingness to travel.

Risk perceptions of COVID-19 have a very significant impact on the tourism industry, reducing people's willingness to travel. In studies related to COVID-19, some research has demonstrated the influence of risk perceptions of COVID-19 on tourism (Zhu and Deng, 2020; Qiu *et al.*, 2020). Some also found that there are significant differences between various generational cohorts concerning perceived travel risk during COVID-19 (Abraham *et al.*, 2020). In this article, we used social cognitive theory to make risk perception one part of personal processes and obtained similar results indicating that risk perceptions of COVID-19 reduce people's willingness to travel in personal processes.

Negative and positive personal effects also have effects on people's willingness to travel. In previous studies (Smallman and Moore, 2010; Pesonen and Komppula, 2010; Wang and Ackerman, 2019), there have been many discussions of the effects of traveling. This article also studied the relationship between personal effects and WT and found that because of the changes produced by COVID-19, personal negative and positive effects are changing, which influences WT.

These results show that under the threat of harm to physical health, people's demand for leisure and entertainment can only temporarily give way to their demand for health, which is in line with Maslow's hierarchy of human needs (Huitt, 2007).

## 7. Discussion and conclusion

Currently, most of the tourism literature focuses on the influencing factors of tourism (Nicolau and Más, 2006; Wong and Yeh, 2009; Heinen *et al.*, 2015) and most of it discusses the influencing factors of general tourism decision-making (Smallman and Moore, 2010; Wang *et al.*, 2020; Wen *et al.*, 2020). These analyzes are based on individual needs, convenience and the benefits that destinations can provide. In contrast, this article focuses on the incidence of COVID-19 and studies the changes in tourism that will result. Specifically, this study focuses on the path of how COVID-19 impacted the tourism industry and presents findings of how people's willingness to travel has changed during COVID-19.

The outbreak of COVID-19 has had a far-reaching impact on society and the economy of various countries around the world. For example, based on the data of China's National Bureau of Statistics (2020), in the first quarter of 2020, China's gross domestic product was 20,650.33bn yuan, for a year-on-year decrease of 6.8%. The value-added of the tertiary industry was 1,226,800bn yuan, constituting a 5.2% year-on-year decrease. The total retail sales of social consumer goods amounted to 78,580bn yuan, for a year-on-year decrease of 19.0%. In a national urban survey, the unemployment rates in the first, second and third months of 2020 were 5.3%, 6.2% and 5.9%, respectively, showing a significant increase over previous years. Given the extensive turbulence that the disease has caused, it is

interesting to explore what changes have been produced by COVID-19 and how the tourism industry has been affected.

The first impact comes from the harm to human health caused by COVID-19. As reported by the [World Health Organization \(2019\)](#), COVID-19 is extremely harmful to the human body. COVID-19 is highly contagious and can be transmitted between people through droplets, close contact and excrement ([World Health Organization, 2019](#)). [Melly and Hanrahan \(2020\)](#) also discussed that if people fail to manage the risk during traveling, it could have severe impacts on a destination's environment, society and economy. Therefore, tourism should be considered seriously during COVID-19.

Another impact is from related policies that aim to prevent and guard against COVID-19. To prevent the spread of the pandemic, countries have taken corresponding measures to manage people's behavior and reduce the concentration of people. Studies have shown that vaccines and home isolation are effective ways to deal with pandemics ([López et al., 2020](#)). According to a study by [de Bruin et al. \(2020\)](#), during the COVID-19 outbreak, various governments have introduced different measures to prevent people from gathering and have restricted travel, thereby preventing people from contracting the virus. At the socioeconomic level, many measures have been implemented, including the closing of schools, restaurants, swimming pools and entertainment venues. Limiting the distance between people has been another approach ([de Bruin et al., 2020](#)).

Currently, tourism development destinations exposed to COVID-19 may take liability in the process of attracting tourists in the future due to their deteriorating image, especially among those who are sensitive and vulnerable to risks ([Zenker and Kock, 2020](#)). Chinese people tend to travel independently or in small groups to less well-known areas ([Wen et al., 2020](#)). The decline of tourism also leads to unemployment and a reduction in government revenue ([de Bruin et al., 2020](#)), thereby causing an economic downturn.

As for the findings of this article, we have defined environmental changes and people's psychological changes during COVID-19 as environmental processes and personal processes, which are the conceptions in social cognitive theory. Then, the final results show that the environmental processes and personal processes of COVID-19 substantially reduces WT, which is also defined as behavioral processes of social cognitive theory. Therefore, to reverse changes in WT and recover the tourism industry, environmental and personal processes should be changed. The tourism industry is related to businesses and the economy. The recovery of tourism during COVID-19 requires the support of governments and policies. [Zhang et al. \(2020\)](#) study found that tourism departments of governments could set tailored incentive programs in the short-, medium- and long-term to motivate the development of tourism. Not only would this solve unemployment to some extent but it could also increase local government revenue and improve the vitality of the economy.

With regard to environmental aspects, the government could decrease NI by investing in infrastructure and personnel to provide abundant resources for visitors to avoid crowding and to organize traveling behaviors. When the objective conditions cannot satisfy people's traveling needs, "smart traveling" could serve travelers as an online way to maintain people's traveling passion.

With regard to personal issues, to reduce people's view that traveling is risky and has negative effects during COVID-19, governments should strictly establish policies to avoid gatherings of people. Additionally, governments could increase information transparency about COVID-19 and quickly provide updated information. At travel destinations, there should be workers who supervise the scenic spots and monitor visitors' health status.

There are also some limitations to this article. The questionnaires were designed aiming at Chinese and distributed within China, which means that the universal application of the results of the article requires caution and effort in the analysis of the different environments and situations. Another limitation of this research is that we studied the effects of COVID-19 on tourism from the view of

people's willingness to travel, which is only from the perspective of the demand of the tourism industry and not considers the supply side of the tourism industry.

As for the directions of further studies, we have two suggestions as follows.

If further studies are interested in the effects of COVID-19 on tourism worldwide, they could expand the sample size worldwide to determine the impact of COVID-19 on tourism from a broader perspective.

In addition, further studies could analyze from the view of the supply side of tourism. During COVID-19, there are many regulations and policies to restrict the number of people and shorten the opening time of some scenic spots (de Bruin *et al.*, 2020), which decreases the supply of tourist attractions. The following research could analyze from both the demand side and supply side of the tourism industry to have a full view of how tourism has been changed during COVID-19.

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### About the authors

Dr Yu Hao is currently a Professor at the Center for Energy and Environmental Policy Research (CEEP), Beijing Institute of Technology (BIT). He earned a PhD in Hamburg University in 2012. Currently, his main research interests include sustainable development, environmental policy, ecological economics and energy economics. So far, he has published over 80 papers in peer-reviewed journals in these fields of research. Yu Hao is the corresponding author and can be contacted at: [haoyuking@gmail.com](mailto:haoyuking@gmail.com)

Ms Hanyu Bai is an undergraduate student at the School of Economics and Management in Beijing Institute of Technology (BIT) Beijing, China. She is expected to earn a Bachelor's degree from Beijing Institute of Technology in 2021. Currently, her main research interests include tourism and ecological economics.

Dr Shiwei Sun is an Assistant Professor and Associate Research Fellow at the School of Economics and Management in Beijing Institute of Technology, China. He received his PhD degree in MIS at the Harbert College of Business at Auburn University, the USA in 2017. His research interests include information technology diffusion, digital Health and medical analytics and e-commerce. His research has appeared in several journals such as *Industrial Marketing Management*, *Journal of Computer Information Systems*, *Expert Systems with Applications*, *International Journal of Information Management* and some other leading conference proceedings AMCIS, PACIS and DSI. Dr Shiwei Sun is also a co-corresponding author and can be contacted at: [6120180059@bit.edu.cn](mailto:6120180059@bit.edu.cn)

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