

Factors influencing Chinese residents' post-pandemic outbound travel intentions: an extended theory of planned behavior model based on the perception of COVID-19

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Abstract

Purpose – This study aims to explore the factors influencing the post-pandemic intentions of Chinese residents to participate in outbound travel. The mechanism by which residents' perception of the coronavirus disease (COVID-19) influenced their outbound travel intentions are studied.

Design/methodology/approach – This study developed an extended theory of planned behavior (TPB) model and used structural equations to analyze data received from 432 questionnaires. Responses were obtained through a combination of online surveys and a traditional paper-based distribution of questionnaires.

Findings – Results showed that attitude, subjective norms, perceived behavioral control and past outbound travel behavior have significant positive effects on post-pandemic outbound travel intentions. Although the perception of COVID-19 directly and negatively influences outbound travel intentions, it also has an indirect influence on outbound travel intentions through the mediating effect of non-pharmaceutical interventions. The authors also found that risk tolerance has a negative moderating effect on the direct impact of residents' perception of COVID-19 on their travel intentions.

Practical implications – The findings can serve as a reference for formulating appropriate tourism development policies by government agencies, tourism management departments and tourism enterprises in destination countries.

Originality/value – This study developed an extended TPB model by adding more constructs into the TPB model. Compared with the original TPB model, the extended TPB model has better explanatory power of post-pandemic travel intentions. The study also provides evidence for the applicability of the TPB model in studying travel intentions within the context of major public health emergencies and has expanded the application scope of the TPB model.

Keywords Theory of planned behavior, Perception of COVID-19, Chinese residents, The coronavirus disease

Paper type Research paper

新冠肺炎疫情后中国居民出境旅游意愿的影响因素研究……………——基于疫情感知的扩展TPB模型

摘要

研究目的：本研究致力于探索新冠肺炎疫情后（以下简称“疫情”）中国居民出境旅游意愿的影响因素，以及疫情感知对出境旅游意愿的作用机制。

设计/方法/手段：本文以TPB理论为基础，通过构建扩展TPB模型，并利用结构方程对432份问卷进行数据分析。问卷通过网络发放与传统纸质问卷调查相结合的方式获得。

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研究发现：态度、主观规范、感知行为控制及过去出境旅游行为对中国居民疫情后出境旅游意愿具有显著正向影响；疫情感知在直接负向影响出境旅游意愿的同时，还通过非药物干预行为的中介作用间接影响出境旅游意愿；在疫情感知对出境旅游意愿的直接影响中，风险容忍度起着负向调节作用。

实际意义：研究结果对旅游目的地政府、旅游管理部门及旅游企业制定相应旅游发展政策具有一定前瞻性参考价值。

原创性/价值：本文通过在原始TPB模型的基础上加入更多变量，进而构建了扩展TPB模型。与原始模型相比，扩展TPB模型对疫情蔓延背景下中国居民疫情后出境旅游意愿有着更好的解释力和预测力。本文证实了在突发重大公共卫生事件背景下TPB模型对于研究旅游意愿的适用性，扩展了TPB模型的应用范围。

关键词：新冠疫情，疫情感知，出境旅游意愿，中国居民，计划行为理论

文章类型：研究型论文

Investigación sobre los factores que influyen en la voluntad de viajar al extranjero de los residentes chinos después de la nueva epidemia de neumonía coronaria: un modelo extendido de TPB basado en la percepción de la epidemia

Resumen

Propósito : Este estudio tiene como objetivo explorar los factores que influyen en las intenciones posteriores a la pandemia de los residentes chinos de participar en viajes al extranjero. Se estudia el mecanismo por el cual la percepción de los residentes sobre la enfermedad por coronavirus (COVID-19) influyó en sus intenciones de viajar al extranjero.

Diseño/metodología/enfoque : Este estudio tiene como objetivo explorar los factores que influyen en la intención de viaje de salida de los residentes chinos después de la pandemia, en particular el mecanismo por el cual la percepción de los residentes de COVID-19 influyó en sus intenciones de viaje de salida.

Hallazgos : Los resultados mostraron que la actitud, las normas subjetivas, el control conductual percibido y el comportamiento de viajes de ida y vuelta en el pasado tienen efectos positivos significativos sobre la intención de viajar de ida después de la pandemia. Si bien la percepción de COVID-19 influye directamente de forma negativa en la intención de viaje de ida, también influye indirectamente en la intención de viaje de ida a través del efecto mediador de las intervenciones no farmacéuticas. También encontramos que la tolerancia al riesgo tiene un efecto moderador negativo sobre el impacto directo de la percepción de los residentes sobre el COVID-19 en la intención de viaje.

Implicaciones prácticas : Nuestros hallazgos se pueden utilizar como referencia para las agencias gubernamentales, los departamentos de gestión del turismo y las empresas turísticas en los países de destino en la formulación de políticas de desarrollo turístico adecuadas.

Originalidad/valor : Este estudio desarrolló un modelo TPB extendido agregando más constructos en el modelo TPB. En comparación con el modelo TPB original, el modelo TPB extendido tiene un mejor poder explicativo de las intenciones de viaje posteriores a una pandemia en el contexto de una pandemia. Este estudio también proporcionó evidencia de la aplicabilidad del modelo TPB para estudiar las intenciones de viaje en el contexto de las principales emergencias de salud pública y amplió el ámbito de aplicación del modelo TPB.

Palabras clave : La enfermedad del coronavirus, Percepción de COVID-19,

Intención de viaje al exterior, Residentes chinos, Planificación de la teoría del comportamiento

Tipo de artículo : Trabajo de investigación

1. Introduction

The COVID-19 pandemic of late 2019 and 2020 has spread globally. Although the pandemic is largely under control within China, the situation abroad remains severe, and the global economy has been seriously impacted. For tourism, the travel restrictions adopted by some countries, and regions have caused severe damage to the global tourism industry (Wen *et al.*, 2020). For instance, the USA imposed travel bans on China, Iran, the European Schengen area, the UK, Ireland and Brazil (The US Centers for Disease Control and Prevention, 2020). The number of international tourists is forecast to decrease by 58%–78% in 2020 compared to figures from the previous year (UNWTO, 2020).

As the World Health Organization categorized COVID-19 as a Public Health Emergency of International Concern on January 30, 2020, China's outbound tourism industry has stagnated. The impact of the pandemic on China's outbound tourism has far exceeded the

impact of the severe acute respiratory syndrome outbreak in 2003. As the world's largest source of outbound tourists (Huang and Lu, 2017), the post-pandemic recovery of the Chinese outbound tourism industry is critical to the sound development of tourism globally. Therefore, it is necessary to study the factors that influence the post-pandemic outbound travel intentions of Chinese residents.

In recent years, the theory of planned behavior (TPB) model has been widely used in studies related to tourists' intentions and behavior (Croy *et al.*, 2010; Pröbstl-Haider and Haider, 2013). Although the usefulness of the TPB model in predicting tourists' intentions is proven, many scholars insist that the explanatory power of this model is, nonetheless, insufficient (Juschten *et al.*, 2019). Certain scholars suggest that other essential constructs related to the specific tourism context should be added to the TPB model so as to improve its explanatory power (Yuzhanin and Fisher, 2016). The TPB was proposed by Ajzen (1991). Ajzen (2020) also noted that if other variables could capture a certain proportion of variation of intention, after considering existing variables, then the TPB is open to the addition of other predictive variables.

Based on the above analysis, this study developed an extended TPB model to better explore the factors that influence Chinese residents' post-pandemic outbound travel intentions, focusing on the mechanism via which residents' perception of COVID-19 influences their travel intentions. The extended TPB model was developed by the inclusion of a number of variables – such as the perception of COVID-19, non-pharmaceutical interventions, risk tolerance and past outbound travel behavior – to the original TPB model. In this manner, the model can better account for the decision-making processes to be expected in relation to the post-pandemic outbound travel behavior of Chinese residents.

This study makes the following contributions. First, it reveals the mechanism through which the perception of COVID-19 influences Chinese residents' travel intentions. These findings offer nuanced insights into the future intentions of tourists during a pandemic. Second, this study provides evidence for the applicability of the TPB model to the study of Chinese residents' outbound travel intentions in the context of major public health emergencies, further expanding the scope of the TPB model's application. Third, this study develops an extended TPB model via the inclusion of additional constructs found beyond the original TPB model, thereby improving the original TPB model's explanatory and predictive power concerning travel intention. This study lays a stable foundation for the follow-up study of tourists' intentions. Fourth, this study innovates by adding risk tolerance as a moderator variable to the model from the perspective of individual psychology – this allows for the exploration of the role of personality traits in the impact of potential tourists' perception of COVID-19 on their travel intentions. This makes up for the lack of focusing on individual psychology in tourism risk-related research.

2. Literature review and theoretical basis

2.1 Theory of planned behavior

The TPB is a psychological theory that studies the relationship between attitudes, intentions and behaviors (Juschten *et al.*, 2019). It is rooted in the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1977). According to the TRA, individuals' behavioral intentions are determined by volitional factors, including attitude and subjective norms. "Attitude" refers to an actor's evaluation of a specific behavior, whereas the term "subjective norms" refers to the social pressures which encourage or discourage an actor to engage in a specific behavior (Ajzen, 1991). As an individual's intention or behavior cannot be completely determined by oneself, the TPB expanded to include non-volitional factors, namely, perceived behavioral control, into the TRA (Meng and Cui, 2020). The TPB model's power to predict the behavioral intention is significantly improved by the integration of non-volitional factors (Wang and Wong, 2020). Perceived behavioral control refers to the self-evaluation of the individual's ability to

perform specific behaviors in terms of factors such as talent and resources (Juschten *et al.*, 2019). In the TPB, positive attitudes and supportive subjective norms motivate individuals to engage in a specific behavior; however, it is only when the individual's perceived control over the behavior is strong enough that the specific intent to engage in the behavior is formed (Ajzen, 2020).

As it can effectively predict individuals' intentions, the TPB has been commonly applied to the prediction of diverse intentions in the context of tourism (Shen and Shen, 2020), such as tourists' intention to revisit a location (Huang *et al.*, 2019), pro-environmental behavior (Wang and Wong, 2020), medical tourism (Seow *et al.*, 2020) and residents' intentions to support tourism (Erul *et al.*, 2020). However, few studies have adopted this model in studying Chinese residents' outbound travel intentions in the context of a pandemic. In light of this, this study bridges this gap and expands the application scope of TPB model.

To improve the TPB's explanatory power, some scholars have attempted to include other variables within the TPB according to specific research contexts. These variables include: place attachment (Shen and Shen, 2020), authenticity (Girish and Lee, 2020) and destination image (Park *et al.*, 2017). Although these variables can improve the TPB model's explanatory power under specific contexts, they are not adopted in this paper as they are either not suitable or are not the main variables theoretically affecting intentions within the context of the COVID-19 pandemic.

In addition to the TRA and TPB, the model of goal-directed behavior (MGB) is also an important theory in the study of human behavior from a social psychology perspective (Lee *et al.*, 2020). However, our study chooses TPB as a framework for the following reasons: first, compared with TRA and MGB, the TPB model is more widely used in the research of tourist intention and has been widely accepted in the academic community (Choi and Park, 2017). Second, as stated above, compared with TRA, the TPB's power to predict humans' intentions has been greatly improved (Meng and Cui, 2020; Hall *et al.*, 2011). Third, the MGB is an extended model based on the TPB. However, the MGB model is based on the strong assumption that a person's behavior is directly and largely dependent on their desire to participate in the behavior (Perugini and Bagozzi, 2004). Thus, the MGB model mainly emphasizes the role of desire present during an individual's decision-making process (Meng and Choi, 2016). As our study focuses more on behavioral intention, the TPB has been chosen as its research framework.

2.2 Attitude, subjective norms, perceived behavior control and outbound travel intention

Abundant studies within the TPB framework have supported the positive effects of attitudes, subjective norms and perceived behavior control on travel intentions. For instance, in explaining the formation of tourists' intention to revisit home-based accommodations, Meng and Cui (2020) indicated that attitudes, subjective norms and perceived behavior control significantly and positively affect the intention to revisit. Juschten *et al.* (2019) studied urban residents' intention to travel to nearby summer resorts and found that subjective norms, along with perceived behavioral control, are the most potent factors in determining intention, and that the predictive power of attitude is relatively weak.

Accordingly, the following hypotheses are proposed according to the TPB:

- H1.* Attitude has a significant positive impact on Chinese residents' post-pandemic outbound travel intentions.
- H2.* Subjective norms have a significant positive impact on Chinese residents' post-pandemic outbound travel intentions.
- H3.* Perceived behavioral control has a significant positive impact on Chinese residents' post-pandemic outbound travel intentions.

2.3 Past outbound travel behavior and outbound travel intention

According to theories of human behavior, the best predictor of behavioral intentions and future behavior is the frequency of related past behavior (Sonmez and Graefe, 1998). Past behavior is a representation of personal habits, and people tend to maintain the consistency of behavior and values (Fredricks and Dossett, 1983). Many scholars have found that the TPB model's explanatory power is improved when past behavior is included. Among them, Lam and Hsu (2004) studied the intention of Mainland Chinese tourists to travel to Hong Kong. They found that past behavior had a significant and positive influence on intentions. Juschten *et al.* (2017) found that past travel behavior will make tourists experience a sense of "knowing one's way around" before and during travel, and thus have a positive impact on future travel intentions. Based on the above, this study further proposes the following hypothesis:

- H4. Past outbound travel behavior has a significant positive impact on the post-pandemic outbound travel intentions of Chinese residents.

2.4 Perception of COVID-19 and outbound travel intention

Natural disasters, political unrest, war, epidemics and terrorism are some of the risk factors that tourists face when they travel, and they all influence tourists' risk perceptions (Mansfeld, 2006; Çakar, 2020; Khan *et al.*, 2019). Bae and Chang (2020) studied the influence of South Korean COVID-19 risk perceptions on their intention toward "untact tourism" during the first wave of the epidemic – the results showed that affective risk perception had a significant and negative impact on behavioral intentions. Neuburger and Egger (2020) pointed out that the perception of COVID-19 had a positive impact on tourists' intention to cancel or avoid traveling to destinations with reported cases. Abraham *et al.* (2020) found that international tourists' perceived travel risk during the COVID-19 pandemic negatively affected their travel intentions to China in the future. Based on the above analysis, this study proposes the following further hypothesis:

- H5. The perception of COVID-19 has a significant negative impact on the post-pandemic travel intentions of Chinese residents.

2.5 Mediating effect of non-pharmaceutical interventions

Personal non-pharmaceutical interventions include learning more about diseases, improving personal hygiene habits whereas traveling, maintaining social distancing to avoid suspicious people and places and monitoring personal health before and after traveling (Cowling *et al.*, 2020; Nicoll, 2006). Personal non-pharmaceutical interventions are adaptive behaviors. Through this adaptive behavior, potential tourists can reduce the threat of infectious diseases to a level they deem acceptable, thereby strengthening their desire to support their behavioral intentions (Lee *et al.*, 2012). Raude and Setbon (2009) have found that the French public had moderate adaptive beliefs and attitudes toward new infectious respiratory diseases, which prompted them to take non-pharmaceutical interventions as a mean to reduce the risk of infection. Lee *et al.* (2012) studied the outbound travel intentions of South Korean tourists during the H1N1 influenza pandemic in 2009 – they found that non-pharmaceutical interventions played a mediating role between pandemic perceptions and outbound travel intentions. Therefore, the following hypotheses are also proposed:

- H6. Perception of COVID-19 has a significant positive impact on non-pharmaceutical interventions.
- H7. Non-pharmaceutical interventions have a significant positive impact on post-pandemic travel intentions.
- H8. Non-pharmaceutical interventions play a mediating role between the perception of COVID-19 and outbound travel intentions.

2.6 Moderating effect of risk tolerance

Risk tolerance refers to the degree to which an individual is willing to take risks in pursuit of goals (Hunter, 2002), as opposed to risk aversion. The more risk-averse a person is the lower their risk tolerance (Faff *et al.*, 2008). Ji *et al.* (2011) pointed out that specific situations and individual characteristics moderate risk perceptions. Risk tolerance will have an impact on tourists' travel behavior as a personality trait. Alvarez and Asugman (2006) pointed out that, among tourists traveling to Turkey, "risk-averse planners" had a lower risk tolerance and were more likely to participate in group tourism. Williams and Balaž (2013) noted that individual tourists, and especially those who prefer local facilities, have a higher risk tolerance and are more willing to take risks. This study argues that risk tolerance weakens the negative impact of the perception of COVID-19 on outbound travel intentions; the higher the risk tolerance, the weaker the negative impact of the perception of COVID-19 on outbound travel intentions. Therefore, the research hypothesis is as follows:

H9. Risk tolerance plays a negative moderating role between the perception of COVID-19 and outbound travel intentions.

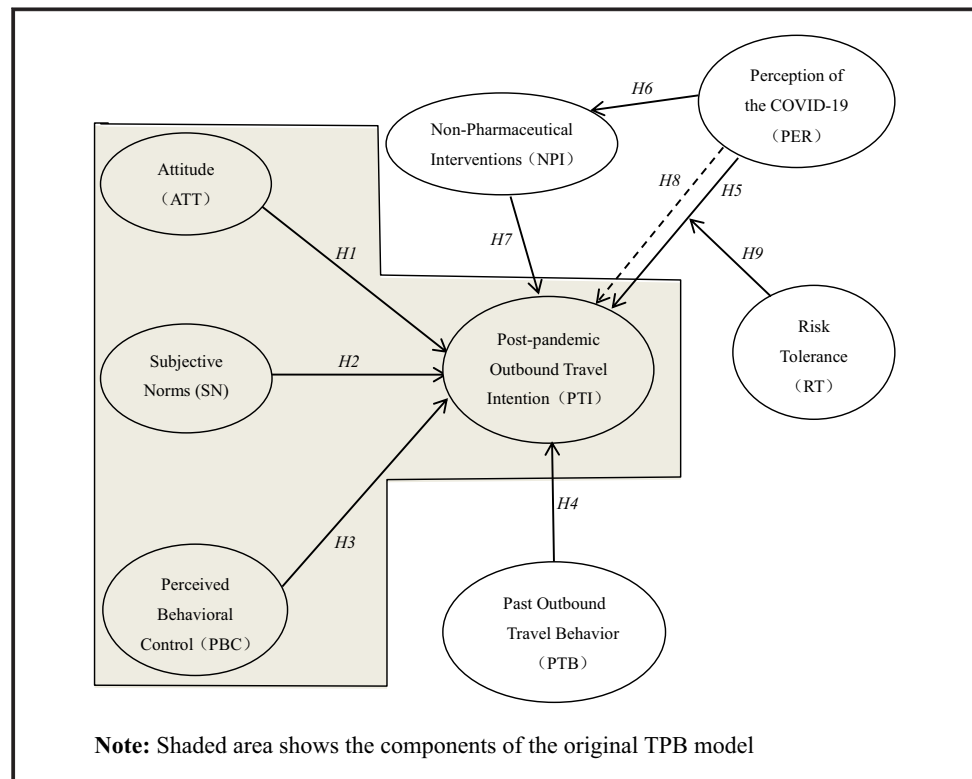
Based on the above, the extended TPB model shown in Figure 1 was constructed.

3. Research design

3.1 Variable measurement

In this study, data was collected through the questionnaire survey method. The questionnaire included measurements of attitude, subjective norms, perceived behavioral control, post-pandemic outbound travel intentions, perception of COVID-19, non-pharmaceutical interventions, risk tolerance and past outbound travel behavior, as well as demographic

Figure 1 Extended TPB model based on the perception of COVID-19



information. To ensure the content validity of the questionnaire, all items drew on the existing international literature and references. The items were designed in line with the COVID-19 pandemic, and relevant experts were invited to modify and polish the structure and statements of the scale so as to ensure that the questionnaire is easy to understand and answer.

Attitude, subjective norms, perceived behavioral control and post-pandemic outbound travel intentions are measured by referencing the TPB model measurement scale proposed by [Ajzen \(1991\)](#) and based on the scales used by [Lam and Hsu \(2006\)](#) and [Sparks and Pan \(2009\)](#) in their works using the TPB to study tourist behavior. The final number of items in the questionnaire for the 4 variables totaled 19. Items concerning the perception of COVID-19 and non-pharmaceutical interventions mainly referenced the work of [Lee et al. \(2012\)](#) on the impact of the 2009 H1N1 pandemic on the travel intentions of South Korean tourists. The questionnaire included six items regarding the respondent's perception of COVID-19. Non-pharmaceutical interventions were combined with personal protective behaviors currently advocated by countries to prevent COVID-19 infection – such as wearing masks, washing hands frequently and maintaining social distance. The measurement scale used by [Lee et al. \(2012\)](#) was modified to include a total of seven items on non-pharmaceutical interventions, which included increasing awareness of diseases and taking some actions beneficial to personal hygiene and health. Currently, there is no mature scale for risk tolerance. This study referenced [Williams and Balaž \(2013\)](#) and [Campara et al. \(2017\)](#) in designing the six items on risk tolerance. These included measurements of financial risk tolerance, general risk tolerance and tourism risk tolerance. Items on past outbound travel behavior referenced the scales used by [Juschten et al. \(2019\)](#) and [Bentler and Speckart \(1981\)](#). The question “In the past five years, how many times have you traveled abroad?” was the only item regarding individuals' past outbound travel behavior. The list of items measuring other variables is shown in [Table 1](#). Except for past outbound travel behavior, the other variables were measured using a seven-point Likert scale where “1” indicates that the respondent strongly disagrees with the statement, whereas “7” indicates strong agreement.

3.2 Data collection and sampling frame

To ensure the representativeness of the sample, this study used a combination of online surveys and traditional paper-based surveys to collect primary data. The online survey was conducted using Wenjuanxing, an online survey platform, to issue and collect questionnaires. The survey was forwarded to the Wenjuanxing virtual community. Some samples were concurrently collected through snowball sampling via WeChat Moments. The off-line surveys were conducted by four well-trained surveyors at the Qingxiu Mountain Scenic Spot (5A level scenic spot) in Nanning, Guangxi, and two transportation hubs in Nanning, namely, Nanning Railway Station and Nanning Wuxu International Airport.

The survey period was from June 20 to July 10, 2020. A total of 508 questionnaires were collected – 212 of which were electronic and 296 were paper based. A total of 432 were deemed valid. The ratio of effective samples to the number of observed items (38) is between 10:1 and 15:1 range, as recommended by [Thompson \(2000\)](#), which indicates that the sample size of the model is suitable for structural equation model analysis and will not affect the statistical power of the model. The demographic characteristics of the samples are shown in [Table 2](#).

Of the 432 respondents, 54.2% of the residents were female, whereas 56.3% were married. The majority of residents was between the ages of 20 and 29 years (43.1%), followed by those between 30 and 39 years (24.5%). In terms of education, undergraduates made up the largest proportion of respondents (44.0%), followed by those with a master's degree or greater (23.4%). In terms of occupation, enterprise staff accounted for the largest proportion of respondents (35.4%), followed by students (15.5%). The most-frequent

Table 1 Measurement items of variables

<i>Variables</i>	<i>Measurement items</i>
Attitude (ATT)	ATT1 I think it is good to travel abroad when the epidemic is over ATT2 I think it is valuable to travel abroad when the epidemic is over ATT3 I think it is interesting to travel abroad when the epidemic is over ATT4 I think it is delightful to travel abroad when the epidemic is over ATT5 I like to travel abroad when the epidemic is over
Subjective norms (SN)	SN1 Most people who are important to me think that I should travel abroad when the epidemic is over SN2 Most people who are important to me understand that I travel abroad when the epidemic is over SN3 Most people whose opinion I value agree with me about traveling abroad when the epidemic is over SN4 Most people whose opinion I value support that I travel abroad when the epidemic is over SN5 Most of the people Whose opinions I value recommend that I travel abroad when the epidemic is over
Perceived behavioral control (PBC)	PBC1 I have enough time to travel abroad when the epidemic is over PBC2 I have enough money to travel abroad when the epidemic is over PBC3 I am confident that if I want, I can travel abroad when the epidemic is over PBC4 I feel there is nothing that prevents me from traveling abroad when the epidemic is over if I want to
Post-pandemic outbound travel intention (PTI)	PTI1 I want to travel abroad after the epidemic PTI2 I intend to travel abroad after the epidemic PTI3 I am planning to travel abroad after the epidemic PTI4 I will make an effort to travel abroad after the epidemic PTI5 I will certainly invest time and money to travel abroad after the epidemic
Perception of the COVID-19 (PER)	PER1 The COVID-19 is a very frightening disease PER2 Compared to SARS, avian flu and Influenza A (H1N1), the COVID-19 is more dangerous PER3 I am afraid of the COVID-19 PER4 I have much information about the COVID-19 PER5 It is dangerous to travel abroad because of the COVID-19 PER6 People around me seem to refrain from traveling abroad due to the COVID-19
Non-pharmaceutical interventions (NPI)	NPI1 When the epidemic is over, I will still visit the official website of the Chinese Ministry of Foreign Affairs or WHO for information about the epidemic before traveling abroad NPI2 When the epidemic is over, I will read and check precautions about the COVID-19 as much as possible before traveling abroad NPI3 When the epidemic is over, I will get the information about local medical facilities and Chinese Embassy for preparing for an emergency because of the COVID-19 before traveling abroad NPI4 After the epidemic, I will frequently wash my hands when I travel abroad NPI5 After the epidemic, I will try to keep social distance when I travel abroad NPI6 After the epidemic, I will try to wear masks when I travel abroad NPI7 I will pay close attention to my health condition after traveling abroad
Risk tolerance (RT)	RT1 I don't mind taking risks on the financial side RT2 I often take part in some adventure sports, such as mountaineering, gliding, rock climbing and so on RT3 My best friends think that I take a lot of risks RT4 When traveling, I like to travel alone, have no fixed itinerary and like to stay with local people RT5 When traveling, I like to spend more money on adventure travel

reported income was RMB 3000 Yuan and below (34.3%), followed by the group with RMB 3001–5000 Yuan (30.1%). In addition, 55.8% of residents belonged to Guangxi and 44.2% of residents came from other parts of the Chinese Mainland. Although the geographical coverage of the paper questionnaire is limited due to the impact of the epidemic, the electronic questionnaires cover a wide range of regions. The overall questionnaire sample is, to a certain extent, representative.

4. Data analysis

4.1 Descriptive statistical analysis

This study used SPSS 20.0 to perform descriptive statistical analysis of each variable. The results are shown in Table 3. The average value of each variable ranges between 1.900 and 5.770. The average value of an individual's post-pandemic outbound travel intentions,

Table 2 Demographic characteristics of the samples

Category	Item	Sample size	(%)	Category	Item	Sample size	(%)
Gender	Male	198	45.8	Occupation	Master's degree or above	101	23.4
	Female	234	54.2		Enterprise staff	153	35.4
Marital status	Married	243	56.3		Civil servants	35	8.1
	Unmarried	189	43.7		Educators or scientific researchers	47	10.9
Region	Guangxi Zhuang Autonomous Region	241	55.8		Staff members of public institutions and social organizations other than educational and scientific research institutions	25	5.8
	Other Areas of Mainland China	191	44.2		Students	67	15.5
Age	Under the age of 20 years	44	10.2		Freelancers	40	9.3
	20–29 age group	186	43.1		Self-employed people	44	10.2
	30–39 age group	106	24.5		Retirees	18	4.2
	40–49 age group	46	10.6		Other occupations	3	0.7
	50–59 age group	38	8.8	Monthly income	RMB 3000 Yuan and below	148	34.3
	59 years old or above	12	2.8		RMB 3001~5000 Yuan	130	30.1
Educational Background	Junior high school and below	24	5.6		RMB 5001~8000 Yuan	79	18.3
	High school/Technical secondary school	30	6.9	RMB 8001~10000 Yuan	38	8.8	
	Junior college	87	20.1	RMB 10001~15000 Yuan	26	6.0	
	Undergraduate	190	44.0	More than RMB 15001 Yuan	11	2.5	

Table 3 Descriptive statistical analysis of variables

Variables	Average value	SD
Attitude (ATT)	3.761	1.494
Subjective Norms (SN)	3.234	1.593
Perceived behavioral control (PBC)	3.462	1.430
Post-pandemic outbound travel intention (PTI)	2.973	1.671
Perception of the COVID-19(PER)	5.723	0.946
Non-pharmaceutical interventions (NPI)	5.770	1.157
Risk tolerance (RT)	3.209	1.226
Past outbound travel behavior (PTB)	1.900	1.281

2.973, is relatively low, indicating that, overall, Chinese tourists do not have high post-pandemic outbound travel intentions. The average value of the perception of COVID-19 is relatively high at 5.723, indicating that Chinese tourists have a strong perception of COVID-19, which also explains their low post-pandemic outbound travel intentions, to some extent. The average value of non-pharmaceutical interventions is the highest at 5.770, indicating that Chinese tourists will be more likely to adopt non-pharmaceutical interventions when traveling abroad after the pandemic.

4.2 Reliability and validity tests

Before testing the relationship between variables, this study used SPSS 20.0 and AMOS 23.0 to test the reliability and validity of the data. As the variable “past outbound travel behavior” only contains one item – refer to the practice of [Lam and Hsu \(2006\)](#) and [Lee et al. \(2012\)](#) – its reliability and validity were not tested. Cronbach's α and composite reliability (CR) were used for the reliability test. It can be seen from [Table 4](#) that the Cronbach's α coefficients of each variable are between 0.802 and 0.969 and the overall

Table 4 Reliability and confirmatory factor analysis results of the questionnaire items

<i>Variables</i>	<i>Measurement items</i>	<i>Standardized factor loading</i>	<i>Composite reliability (CR)</i>	<i>Average extracted variance (AVE)</i>	<i>Cronbach's α coefficient</i>
Attitude (ATT)	ATT1	0.846	0.938	0.751	0.937
	ATT2	0.847			
	ATT3	0.901			
	ATT4	0.887			
	ATT5	0.850			
Subjective norms (SN)	SN1	0.911	0.972	0.874	0.961
	SN2	0.967			
	SN3	0.959			
	SN4	0.924			
	SN5	0.911			
Perceived behavioural control (PBC)	PBC1	0.852	0.895	0.684	0.890
	PBC2	0.904			
	PBC3	0.676			
	PBC4	0.858			
Post-pandemic outbound travel intention (PTI)	PTI1	0.895	0.969	0.862	0.969
	PTI2	0.945			
	PTI3	0.943			
	PTI4	0.935			
	PTI5	0.924			
Perception of the COVID-19 (PER)	PER1	0.796	0.895	0.589	0.893
	PER2	0.803			
	PER3	0.814			
	PER4	0.653			
	PER5	0.818			
	PER6	0.706			
Non-pharmaceutical interventions (NPI)	NPI1	0.872	0.970	0.821	0.969
	NPI2	0.932			
	NPI3	0.916			
	NPI4	0.924			
	NPI5	0.884			
	NPI6	0.898			
	NPI7	0.915			
Risk tolerance (RT)	RT1	0.599	0.872	0.583	0.802
	RT2	0.853			
	RT3	0.878			
	RT4	0.610			
	RT5	0.829			

Cronbach's α coefficient is greater than 0.8 at 0.928. The CR ranges between 0.872 and 0.972, which is greater than the common standard of 0.7. This shows that the internal consistency of the scale is good and that it has a high degree of reliability.

As some of the variable measurement scales used in this study, such as the non-pharmaceutical interventions and risk tolerance measurement scales, have been modified to a certain extent (as compared to their use in the original literature), it is necessary to use exploratory factor analysis (EFA) to test the construct validity of the scales. The Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity results shows that KMO = 0.927, which is much greater than 0.7. The Bartlett test of sphericity is significant, indicating that the data are suitable for factor analysis. Principal components analysis was used to extract common factors with eigenvalues greater than 1. The varimax method was used to perform the Kaiser normalized orthogonal rotation on the factor loading matrix. A total of seven common factors were extracted, and the cumulative contribution rate of variance was 79.633%. As shown in [Table 5](#), the factor loading values of each component are above 0.5, and there is no cross-loading, thereby ensuring good scale validity.

Table 5 Exploratory factor analysis after rotation of the factor loading matrix

Measurement items	1	2	3	4	5	6	7
ATT1			0.704				
ATT2			0.776				
ATT3			0.813				
ATT4			0.771				
ATT5			0.733				
SN1		0.828					
SN2		0.818					
SN3		0.843					
SN4		0.776					
SN5		0.797					
PBC1						0.770	
PBC2						0.792	
PBC3						0.713	
PBC4						0.819	
PTI1							0.628
PTI2							0.683
PTI3							0.764
PTI4							0.716
PTI5							0.709
PER1				0.826			
PER2				0.841			
PER3				0.823			
PER4				0.723			
PER5				0.805			
PER6				0.734			
NPI1	0.892						
NPI2	0.928						
NPI3	0.916						
NPI4	0.931						
NPI5	0.892						
NPI6	0.912						
NPI7	0.925						
RT1					0.701		
RT2					0.850		
RT3					0.875		
RT4					0.706		
RT5					0.852		

Notes: ATT, attitude; SN, subjective norms; PBC, perceived behavioral control; PTI, post-pandemic outbound travel intention; PER, perception of the COVID-19; NPI, non-pharmaceutical interventions; RT, risk tolerance

Furthermore, confirmatory factor analysis (CFA) was used to test convergent validity and discriminant validity. Convergent validity can be tested using the standardized factor loading and average extracted variance (AVE) of variables (Fornell and Larcker, 1981). As shown in Table 4, the standardized factor loading of attitude, subjective norms, perceived behavioral control, post-pandemic outbound travel intentions, perception of COVID-19, non-pharmaceutical interventions and risk tolerance ranged between 0.599 and 0.967, greater than the critical value of 0.5. Their AVE were, likewise, all greater than 0.5. Therefore, the scale of each variable has good convergent validity. In addition, the square root of the AVE of each variable, as shown in Table 6, is greater than the correlation coefficient between that variable and other variables in the correlation matrix, indicating that there is good discriminant validity among them (Fornell and Larcker, 1981). The fitting index of the CFA showed that $\chi^2/df = 3.126$ (which is less than 5), root mean square error of approximation (RMSEA) = 0.070 (which is less than 0.08), and comparative fit index (CFI) = 0.925, incremental fit index (IFI) = 0.925 and Tucker-Lewis index (TLI) = 0.918 (all of which meet the fitting standard of more than 0.90). These results indicate that the measurement model and sample data have a good fit.

Table 6 Correlation coefficient of each variable

Variables	ATT	SN	PBC	PTI	PER	NPI	RT	PTB
ATT	1.000							
SN	0.746**	1.000						
PBC	0.586**	0.591**	1.000					
PTI	0.724**	0.722**	0.670**	1.000				
PER	-0.259**	-0.254**	-0.211**	-0.319**	1.000			
NPI	0.140**	0.131**	0.112*	0.195**	0.142**	1.000		
RT	0.168**	0.260**	0.275**	0.328**	-0.059	-0.003	1.000	
PTB	0.252**	0.208**	0.284**	0.341**	-0.085	0.036	0.133**	1.000
The square root of the AVE	0.867	0.935	0.827	0.928	0.767	0.906	0.764	–

Notes: ** $P < 0.01$; * $P < 0.05$, two-tailed test. ATT, attitude; SN, subjective norms; PBC, perceived behavioral control; PTI, post-pandemic outbound travel intention; PER, perception of the COVID-19; NPI, non-pharmaceutical interventions; RT, risk tolerance; AVE, average extracted variance

4.3 Common-method variance test

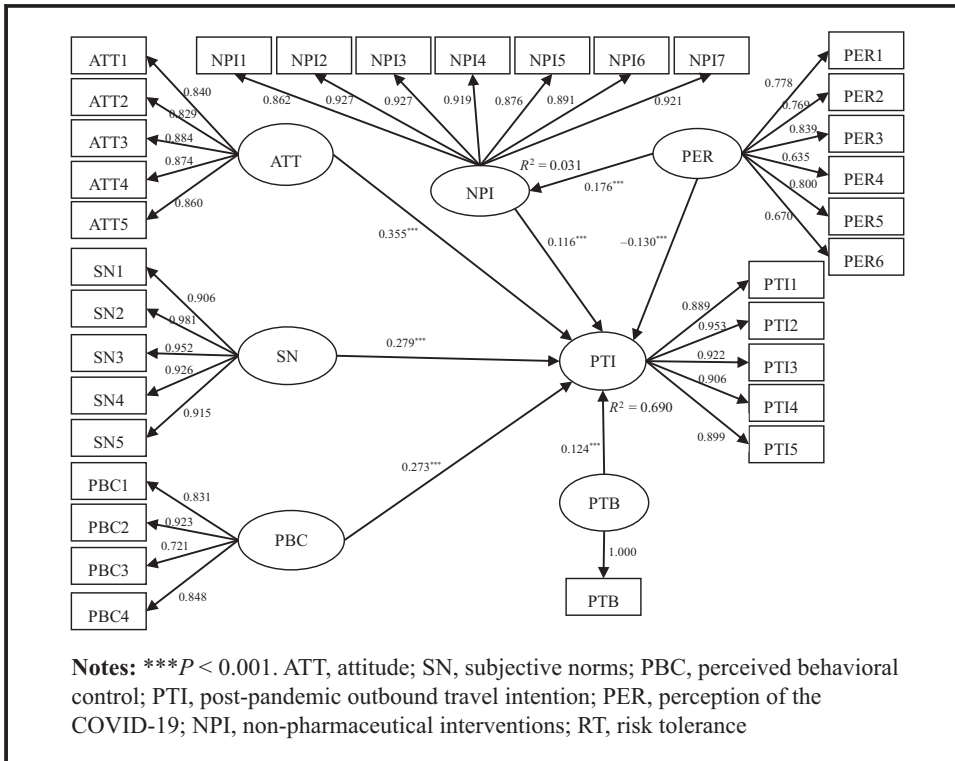
Although some measures have been taken to ensure the accuracy of the surveys – such as requiring subjects to answer the questionnaire truthfully, emphasizing the anonymity and confidentiality of the process, and explaining the academic purpose of data collection – common-method variance may occur if all items are answered by the same subject. This study used Harman’s one-factor test to check the degree of common-method variance of the data. The measurement items of seven variables (excluding those for the variable “past travel behavior”) were included in the factor analysis. Seven factors with characteristic values greater than 1 were obtained without rotating. The first factor explains 36.048% of the total variance, which is lower than the critical standard of 50%. This indicates that the common-method variance of the data is not severe and will not affect the empirical results of the study.

4.4 Test of research hypotheses

4.4.1 Modeling comparison. The original TPB model and the extended TPB model were compared for their relative explanatory power for Chinese residents’ travel intentions via the use of AMOS 23.0. For the extended TPB model, the results of the fitting index analysis showed that $\chi^2/df = 2.811$ (which is less than 5), RMSEA = 0.065 (which is less than 0.08), and CFI = 0.947, NFI = 0.921, RFI = 0.910, IFI = 0.948 and TLI = 0.940 (all of which are greater than 0.9). The value of R^2 for travel intention was 0.690. These results indicated that the overall fit of the extended TPB model meets the requirements, and the extended TPB model explained about 69.0% of the total variance in the intentions. For the original TPB model, $\chi^2/df = 3.674$, RMSEA = 0.079, CFI = 0.970, NFI = 0.960, RFI = 0.940, IFI = 0.970 and TLI = 0.955. The value of R^2 for travel intentions was 0.583. The findings showed that, although the original TPB model was slightly better in some fitting indexes – such as CFI, NFI and RFI – the extended TPB model has better explanatory power because it improved R^2 from 0.583 to 0.690.

4.4.2 Structural equation model analysis. The maximum likelihood estimation method within AMOS 23.0 was selected to obtain the path coefficient values. The results of the path analysis are shown in Figure 2. The results show that, in the basic TPB model, attitude, subjective norms and perceived behavioral control all have a significant positive impact on post-pandemic outbound travel intentions. The standardized path coefficients are 0.355, 0.279 and 0.273, respectively. Therefore, $H1-H3$ stand. Among the variables not included in the basic TPB model, past outbound travel behavior also significantly and positively affected post-pandemic outbound travel intention, which supports hypothesis $H4$. The perception of COVID-19 had a significantly negative impact on post-pandemic outbound travel intentions, with a standardized path coefficient of -0.130 , and a significantly positive

Figure 2 Structural equation model



impact on non-pharmaceutical interventions, with a standardized path coefficient of 0.176. Therefore, *H5* and *H6* also stand. In addition, non-pharmaceutical interventions have a significantly positive impact on post-pandemic outbound travel intentions with a standardized path coefficient of 0.116. Therefore, *H7* stands as well.

4.4.3 Mediating effect test. To further test the mediating effect of non-pharmaceutical interventions on the relationship between perception of COVID-19 and outbound travel intentions, the Bootstrap method is used because it does not need to consider whether or not the data is normally distributed, whereas its statistical effect is better than that of the Sobel test and other methods (Hayes, 2014). Therefore, the percentile, bias-corrected and non-parametric Bootstrap methods were used for repeated sampling of 2,000 times to test the mediating effect where the confidence level was set at 95%. The test results, shown in Table 7, reveal that the 95% confidence interval of the direct and mediating effects of non-pharmaceutical interventions does not contain 0, indicating that non-pharmaceutical interventions play a partial mediating role in the relationship between the perception of COVID-19 and post-pandemic outbound travel intentions. Therefore, *H8* stands.

4.4.4 Moderating effect test. To verify *H9*, this study used the method proposed by Kenny and Judd (1984) of adding the interaction terms of the independent variables and moderator variables into the structural equation, so as to test the moderating effect of risk tolerance. According to the paired product index strategy of Marsh et al. (2004), the single factor CFA was carried out on the perception of COVID-19 and risk tolerance. The three indexes with the largest standardized factor loading were selected among the measurement items on these two variables, respectively. Based on decentralizing these indexes, and in accordance with the principle of matching factor loadings by size, these indexes were matched (via similar factor loadings in size) and multiplied together to obtain the measurement index of the

interaction terms. AMOS 23.0 was then used to construct the structural equation of the moderating effect. The analysis results are shown in [Table 8](#).

It can be seen from [Table 8](#) that the path coefficient of the interaction term of the perception of COVID-19 and risk tolerance on post-pandemic outbound travel intentions is 0.169, $P = 0.003$, which means that the moderating effect of risk tolerance is significant. To reflect the moderating effect of risk tolerance more intuitively, the moderating effect diagram was drawn, as illustrated in [Figure 3](#). It shows that tourists' perceptions of COVID-19 have a

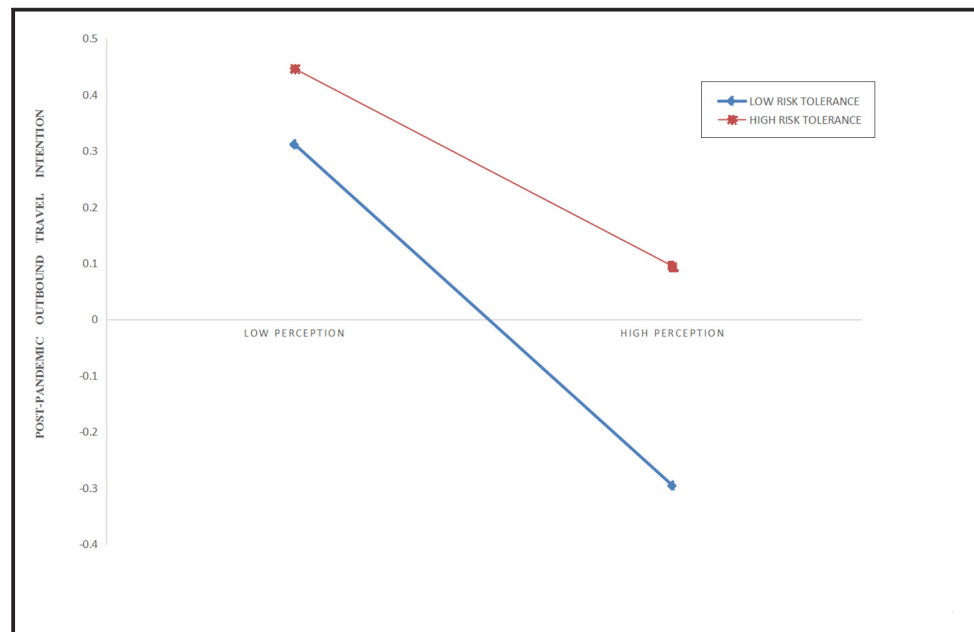
Table 7 Breakdown of the total effect, direct effect and mediating effect

The path	Effect value	The Boot standard error	P values	Lower limit of Boot confidence interval	Upper limit of Boot confidence interval
Total effect	-0.332	0.048	0.001	-0.425	-0.234
Direct effect	-0.375	0.047	0.001	-0.466	-0.280
Mediating effect of non-pharmaceutical interventions	0.043	0.016	0.001	0.017	0.079

Table 8 Moderating effect test

The path	Standardized path coefficient	P values	Standard error	Critical ratio
Interaction item → post-pandemic outbound travel intention	0.169	0.003	0.054	3.016
Perception of the COVID-19 → post-pandemic outbound travel intention	-0.308	$P < 0.001$	0.084	-6.172
Risk tolerance → post-pandemic outbound travel intention	0.228	$P < 0.001$	0.066	4.289

Figure 3 Moderating effect diagram



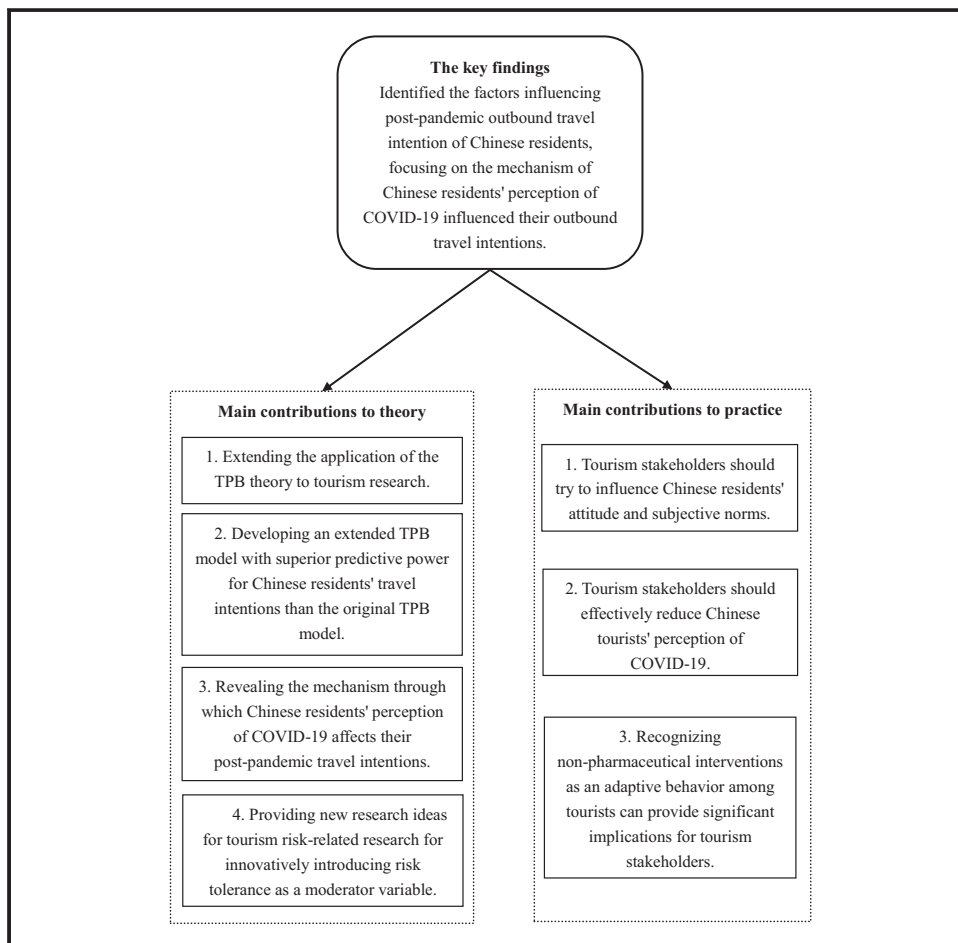
negative impact on their travel intentions, and the higher the risk tolerance, the smaller the effect of their risk perception on their post-pandemic outbound travel intentions. Therefore, *H9* stands, meaning that risk tolerance does have a negative moderating effect on the impact of the perception of COVID-19 on travel intentions.

5. Conclusion and discussion

This paper developed an extended TPB model to explore the factors that affect Chinese residents' travel intentions. The combination of online surveys and traditional paper-based surveys were adopted to collect a total of 432 valid questionnaires, and the structural equation was used to analyze the data. The main research conclusions of this study are shown in [Figure 4](#).

Chinese residents' travel intentions are generally low. Attitude, subjective norms and perceived behavioral control have significant positive impacts on travel intentions. Remarkably, this study found that attitude has the strongest explanatory power for travel intentions when compared with subjective norms and perceived behavior control. This result contradicts the findings of [Juschten *et al.* \(2019\)](#) and [Meng and Cui \(2020\)](#), within which attitude has a low influence on travel intentions. This result is, however, in line with the findings from [Wang and Wong \(2020\)](#) and [Bae and Chang \(2020\)](#). This shows that attitudes may have a controversial role among different research contexts ([Juschten *et al.*, 2019](#)).

Figure 4 Key findings and main contributions to theory and practice



The reasons could be that Chinese residents have a certain degree of fear of the epidemic, which makes them believe that there are particular risks in outbound travel – even when the pandemic is over. In this case, the decision to travel abroad depends more on one’s volitional aspects, and especially one’s psychological state. Thus, the personal attitude has a stronger explanatory power for travel intention. The findings from [Bae and Chang \(2020\)](#), which proved that South Korean intentions toward “untact tourism” during the first wave of the pandemic were most strongly affected by attitude, can also provide evidence for this statement to a certain extent.

The frequency of past outbound travel behavior also significantly and positively affected outbound travel intentions. The findings are consistent with previous studies ([Lam and Hsu, 2006](#); [Leung, 2019](#)). It might well be that the frequency of past behavior represents the strength of the habit ([Ouellette and Wood, 1998](#)). Even when a behavior is performed in an unstable context, the frequency of past behavior can indirectly affect the behavior through intention because people are likely to form favorable intentions for the behaviors they used to do ([Lam and Hsu, 2006](#)).

The perception of COVID-19 affects outbound travel intentions via two pathways. First, the perception of COVID-19 has a direct negative impact on post-pandemic travel intentions. This finding is similar to [Zhu and Deng \(2020\)](#) and [Wang et al. \(2020\)](#), all of which have found that risk perceptions during the COVID-19 pandemic negatively affected travel intentions. Second, the perception of COVID-19 indirectly affects outbound travel intentions through non-pharmaceutical intervention. Non-pharmaceutical interventions partially mediate the relationship between perception of COVID-19 and outbound travel intentions. In [Lee et al. \(2012\)](#), non-pharmaceutical interventions completely mediate the relationship between the perception of the 2009 H1N1 influenza and tourists’ travel intentions. It might well be that the H1N1 influenza pandemic was not as severe as COVID-19 and people’s perception of the H1N1 influenza is not as strong, such that non-pharmaceutical intervention behaviors can completely eliminate the negative impact of H1N1 influenza risk perceptions.

Risk tolerance plays a negative moderating role in the direct impact that the perceptions of COVID-19 have on post-pandemic outbound travel intentions. This means that the higher the risk tolerance of tourists, the weaker the negative impact that their perception of COVID-19 has on their outbound travel intentions. This result supports the findings of [Williams and Balaž \(2013\)](#) and [Alvarez and Asugman \(2006\)](#), which found that tourists with higher risk tolerance are more likely to choose more adventurous travel styles.

6. Theoretical and practical implications

6.1 Theoretical implications

The main theoretical implications are as follows (also shown in [Figure 4](#)):

First, this study provided evidence for the applicability of the TPB model to study travel intention under major public health emergencies. Although the TPB model has been used many times in previous studies on tourists’ travel intentions or behavior, few studies have applied the theory in the context of major public health emergencies. This study extended the application of the TPB in tourism research.

Second, this study provided more stable ground for explaining tourists’ intentions during outbreaks of infectious diseases, because the extended TPB model has the superior predictive ability for explaining greater variance in travel intentions than the original TPB model. This study can lay a foundation for subsequent scholars to study tourists’ intentions after the epidemic.

Third, this study revealed the pathway through which Chinese residents’ perception of COVID-19 affects their post-pandemic travel intentions. The results are important theoretical

extensions of research, which will offer nuanced insights on tourist intentions during pandemics in the future.

Fourth, this study innovatively introduced risk tolerance as a moderator variable, which is a response to the proposal of [Kozak et al. \(2007\)](#) to “conceptualize psychological personality in risk research.” In existing research on tourism risk, scholars have seldom paid attention to the impact of general personality traits on the risk-taking behavior of tourists ([Williams and Balaž, 2013](#)), especially in the context of perceived disease risk. Therefore, this study provides new research ideas for tourism risk-related research.

6.2 Practical implications

The findings of this study also offer a number of practical implications to destination managers or marketers (also shown in [Figure 4](#)).

First, according to the findings, the most significant variable influencing intention is attitude, followed by subjective norms. Tourism advertisers and agents should try to influence Chinese tourists’ attitudes by introducing local unique and attractive characteristics so that they may identify with the feeling that traveling abroad after this epidemic will be pleasant and valuable. To increase subjective norms, tourism operators and managers should try their best to provide tourists with satisfactory and safe experiences to increase their likelihood of spreading positive word of mouth. Destination operators should also take some other ways to encourage Chinese tourists to recommend and share their experiences with others on social networking sites, such as offering gifts and discounts to tourists if they share their experiences.

Second, to effectively reduce Chinese tourists’ perception of the COVID-19 risk, local governments should strengthen tourism-related public health safety management, and establish a mechanism for the prevention and control for post-pandemic normalization. Tourism managers should make full use of social media to publicize the safety and quality of the local tourism environment. When communicating with tourists, tourism operators should consistently inform them of health and safety measures taken by the government and tourism sector as a whole, in addition to the effectiveness of local medical and health systems in responding to the spread of infectious diseases in an updated and transparent manner. Furthermore, tourism sectors can consider “untact tourism” as a new tourism paradigm to minimize tourists’ perceived risk. “Untact” means consumer behavior that minimizes face-to-face contact ([Bae and Chang, 2020](#)). For example, hotels can offer family exclusive dining rooms or room service of the breakfast buffet, and tourism sectors can make full use of digital technology to reduce unnecessary contact.

Third, recognizing non-pharmaceutical interventions as an adaptive behavior can provide significant implications for local governments and tourism sectors. For instance, tourism marketers should vigorously publicize the role and necessity of non-pharmaceutical interventions and encourage tourists to adopt such behaviors. Destination governments and tourism managers should publish a series of guidebooks for non-pharmaceutical interventions, and provide hygiene and information kiosks to serve tourists’ personal protective behaviors. Tourism enterprises and hospitality services should distribute masks for tourists and provide them with portable disinfectants and hand sanitizers. Furthermore, tourist attractions and transport systems should strengthen their monitoring of the health and flow of people to help tourists adopt better personal non-pharmaceutical interventions.

7. Limitations and future research

This study still has the following limitations: first, the questionnaire collection and research were conducted in a relatively short period, whereas the international pandemic situation remained severe. As time passes, and as the alert level decreases, the effect of tourists’

perception of the pandemic on their post-pandemic outbound travel intentions may change. Therefore, future studies can consider collecting multiple sets of data covering a longer time period for longitudinal comparative analysis. Second, this study only focused on Chinese tourists. In the future, the object of research can be expanded to more countries or regions to explore the differences in the impact of tourists from different countries on the effect of their perception of the pandemic on their outbound travel intentions. Third, this study did not consider demographic differentiation in the impact of the perception of COVID-19 on outbound travel intentions. In addition, the similarities and differences in the risk tolerance of different groups were not considered. Future studies can consider expanding on these. Fourth, the structural equation conceptual model constructed in this paper may ignore some complicated relationships among existing constructs and may ignore some other influential variables. For example, non-pharmacological interventions may play moderating roles in the influence of other variables on travel intentions. Future studies can conduct in-depth research on the relationships between these constructs and try to identify more constructs that affect travel intentions.

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