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Comparative analysis of the behavioral intention of potential wellness tourists in China and South Korea

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The main aim of this study is to develop and test a comprehensive model that can predict the tourism intention of potential wellness tourists. The study also investigates the mediating effect of attitude and discusses differences in the behavioral intentions of potential wellness tourists between China and South Korea. The data were collected via questionnaire surveys, and structural equation modeling was used as an analysis tool. The results reveal that perceived susceptibility and perceived benefits can significantly, positively influence the behavioral intention of potential wellness tourists in South Korea, while perceived barriers have a negative impact on that of potential wellness tourists in China; in both samples, perceived susceptibility and benefits can have a positive impact on attitude. Moreover, in South Korea, attitude had a significant mediating effect among perceived susceptibility, perceived benefits, and behavioral intention. This study enriches and expands the literature on the behavioral intention of potential wellness tourists, use of the health belief model (HBM), and the theory of planned behavior (TPB), and provides a theoretical basis as well as a scientific decision-making reference for wellness tourism management and relevant stakeholders.

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Introduction

With the ongoing development of the social economy, an aging society, and the deterioration of the living environment, the pressures of work and life have increased. Most people do not exercise sufficiently and are in a long-term "sub-health" condition (Tian et al., 2017; Moreno-González et al., 2020). Especially after the outbreak of highly infectious epidemics, such as SARS, MERS, and COVID-19, people's awareness of their health and safety has gradually increased, and health has become a topic of heightened concern (Pu et al., 2021; Robina-Ramírez et al., 2021; Liu et al., 2022). Health is closely related to overall well-being, and improving people's well-being through "tourism activities" has become a worthy topic of discussion in academia and industry (Haji et al., 2021, 2022). With the increased awareness of health needs among the public, a healthy diet, daily physical exercise, healthcare, and leisure have gradually entered the public consciousness. Tourism activities have a positive impact on individual well-being and health and have become an important part of daily life (Vrkljan and Hendija, 2016; Cohen et al., 2017; Haji et al., 2021). Evidently, people's health and tourism needs are closely related and mutually reinforcing. As a different type of tourism activity from traditional tourism, wellness tourism offers benefits to human development, in addition to enabling tourists to achieve a positive physical, mental, and spiritual condition (Kazakov and Oyner, 2020; He et al., 2021). In the context of the continued improvement of public health awareness and health-oriented demand, wellness tourism has gained greater development opportunities. According to the "Outline of the Healthy China 2030 Plan," China's wellness tourism market is expected to generate 16 trillion CNY in revenue by 2030. South Korea, which neighbors China, regards wellness tourism as its main countermeasure in confronting rapid aging and has intensified the development of its wellness tourism industry (Kim, 2021). For example, South Korea's Ministry of Culture, Sports and Tourism selected South Gyeongsang province, which encompasses the tourist cities of Tongyeong and Geoje, as a wellness tourism cluster in 2018, integrating vacation, leisure, and health. The South Korean government has created a major wellness tourism policy, largely based on medical tourism supplemented by health and treatment to promote the wellness tourism industry (Shin and Na, 2020). During the COVID-19 pandemic, wellness tourism's growth rate was twice that of the general tourism industry. Asia, the fastest-growing wellness tourism market in the world, suffered the smallest pandemic-related shrinkage rate compared with other regions (GWI, 2022). According to the ranking of wellness economies in the Asia-Pacific region, China's wellness market ranks first, growing from USD 500 million in 2010 to USD 1.17 billion in 2017 to USD 68.27 billion by the end of 2020 (Park et al., 2021; GWI, 2022). Meanwhile, the South Korean wellness market grew from USD 500 million in 2009 to USD 3.6 billion in 2016 to USD 9.41 billion by the end of 2020, ranking third (Kang, 2021; GWI, 2022). Therefore, although China and South Korea have developed their wellness tourism sectors over a relatively short time, they have become major wellness tourism countries in the Asia-Pacific region, a development experience that is worthy of reference by other countries. However, to the best of our knowledge, there is little to no transnational research on wellness tourism. Therefore, a comparative analysis exploring the behavioral intentions of potential wellness tourists in the Asia-Pacific region can provide an important reference for the sustainable development of this sector in the region.

Recently, several studies have confirmed that various activities combining wellness with tourism have had a positive effect on promoting human health. Some scholars have emphasized that wellness tourism, as a means of promoting and maintaining physical and mental health, plays an important role in reinvigorating the body and mind (Smith and Puczko, 2009; Hritz et al., 2014; Hartwell et al., 2018). This includes releasing stress and improving sleep and anxiety (Clark-Kennedy and Cohen, 2017; Cohen et al., 2017), alleviating substance abuse and improving mental health (Lončarić et al., 2015; Buckley et al., 2022), and enhancing vitality and well-being (Thal, 2015; Liu et al., 2023). Moreover, health tourism projects, such as foot massages, cupping, fire therapy, physical therapy, and active transport can be used to enhance the mood, relieve pressure, and alleviate pain (Islam, 2014; Chrysikou et al., 2018; Prabhakar et al., 2019; Kim and Hall, 2022). Some scholars have discussed the influence of wellness tourism on consumer behavior based on various theories. The theory of reasoned action (TRA) was the first theoretical model used to study people's behavior motivation (Fishbein, 1967). However, in the late 20th century, Ajzen (1985) proposed the theory of planned behavior (TPB) based on the TRA, gaining broad acceptance. TPB has since become a widely used model in social psychology, applied to more than 2000 empirical studies explaining human behavior (Ajzen, 2020). Another model, the health belief model (HBM), was first conceived to understand individual health behavior (Rosenstock, 1974), but was gradually applied to analyze the relationship between health tourism and consumer behavior in the early 21st century (Buglar et al., 2010; Lee et al., 2012; Cahyanto et al., 2016; Huang et al., 2020). From the end of the 20th century to the present, many theories studying behavioral intention have emerged, such as social cognitive theory (Patterson et al., 2005), protection motivation theory (Horng et al., 2014), and the theory of emotional evaluation (Zhou et al., 2022); nevertheless, HBM and TPB are still the most widely used theories (Hudson et al., 2017; Mirakzadeh et al., 2021). HBM and TPB are typically adopted to predict health-related behaviors in various contexts (Painter et al., 2008; Jones et al., 2015; Huang et al., 2020; Chaulagain et al., 2021; Zhao and An, 2021). HBM focuses on explaining and formulating interventions to promote health-related behavior changes (Janz and Becker, 1984), while TPB emphasizes the impact of personal attitudes, subjective norms, and perceived behavioral control on consumer behavior (Ajzen, 1991). However, there is some structural overlap between the two theories in predicting the important factors that affect individual behavior (Huang et al., 2020). To the best of our knowledge, most current studies apply a single theory on the behavioral intention of wellness tourists based on either HBM or TPB. A theoretical framework model combining both theories to study the behavioral intention of wellness tourism consumers is lacking, and empirical research on this topic is limited (Yan et al., 2021). Therefore, using an inter-state comparative analysis perspective, this study combines both HBM and TPB to analyze the behavioral intention mechanism affecting potential tourists' choice to experience wellness tourism, enriching tourist behavior research, and identifying potential opportunities for wellness tourism development.

Potential wellness tourists from China and South Korea—among the top three wellness economies of the Asia-Pacific region—were selected as the research object, and the structural frameworks of both HBM and TPB were applied to explore the influences on their behavioral intentions. Through an online survey, 396 potential wellness tourists from China and 334 from South Korea participated, and the data were analyzed using structural equation modeling.

This study contributes to the literature from the following three aspects. First, this study offers a comparative perspective with potential wellness tourists from China and South Korea to explore differences in the behavioral intentions of potential wellness tourists between the two countries. Previous studies have

mostly focused on a single country, and comparative analysis is lacking. Second, HBM and TPB are combined to construct a structural framework that further reveals the influence mechanism of their relevant dimensions on the behavioral intentions of potential wellness tourists; in contrast, previous studies have mostly used a single theory, and have seldom combined HBM and TPB specifically. This study also expands the research to other wellness tourism-related fields. Third, this study provides countermeasures and suggestions for wellness tourism destination managers and relevant tourism management departments, which can be used for reference to help achieve the sustainable development of the wellness tourism industry in both countries. The findings are also considerably significant for product design and precision marketing efforts targeting potential wellness tourists.

The remainder of the paper proceeds as follows. Section "Theoretical background and hypotheses" presents a detailed literature review on HBM and TPB, and the study's hypotheses are proposed. Sections "Methodology" and "Results" present the research design and empirical analysis. Section "Discussion" discusses the results, and section "Conclusion" presents the conclusion, including the study's limitations of this study and suggestions for future research.

Theoretical background and hypotheses

Wellness tourism. Dunn (1959) first proposed the term "wellness" by combining "well-being" and "fitness." He believed that true health is not merely the absence of disease and pain but should be the sum of the physical and spiritual states of well-being. Goodrich and Goodrich (1987) first defined health tourism, describing it as the ingenious design of products and services with the function of physical fitness and rehabilitation. Mueller and Kaufmann (2001) suggested that wellness tourism is a part of health tourism and is the sum of all phenomena and relationships for which people travel from their habitual residences to tourist destinations to improve their health. GWI (2018) defines wellness tourism as travel related to maintaining, pursuing, or enhancing one's physical and mental health, while Wang et al. (2020) argue that wellness tourism is a personal lifestyle choice, without any therapeutic intervention, to achieve physical and mental health through travel.

Wellness tourism in China began relatively recently. The concept of wellness tourism was first defined by Wang (2009), who described it as a tourist activity that relies on the ecological, humanistic, and cultural environment combined with forms of viewing, fitness, leisure, and recreation, with the ultimate goals of prolonging life, self-cultivation, and keeping fit. Ren (2016) argues that wellness tourism is a type of leisure vacation activity where tourists can stay in a better environment aimed at promoting their physical health and pleasure, thus achieving happiness. Xie et al. (2018) concluded that wellness tourism is a combination of healthcare, tourism activities, and resources meant to enable the public to enjoy healthcare and healthcare life during tourism, vacation, and leisure. Tian and Duan (2019) defined wellness tourism as tourism activities that tourists participate in for the ultimate purpose of achieving wellness, health care, health preservation, and recreation. Lian (2022) argued that wellness tourism should have the characteristics of health preservation and leisure vacation. In addition, in China, wellness tourism includes hot spring wellness tourism, forest wellness tourism, traditional Chinese medicine wellness tourism, marine wellness tourism, and wellness sojourn (Lian, 2022).

Regarding wellness tourism in South Korea, Yu et al. (2014) defined wellness tourism as an activity that improves physical and mental health and quality of life through tourism. Yu and Lee (2020) found that a series of activities that improve health or quality of life through travel activities, such as lodging, dining, and viewing, can be called wellness tourism. Choe and Rhie (2019) suggest that all activities that can improve health status toward pursuing a happy life should be called wellness tourism. Shin and Na (2020) define the concept of wellness tourism as a tourism activity to enjoy health management, beauty, self-cultivation, etc. Kim (2021) defined the journey for health and treatment as wellness tourism. Kim and Jee (2021) argue that wellness tourism is a combination of health and tourism, constituting a new trend to promote health and improve life satisfaction through tourism. In addition, in South Korea, wellness tourism includes medical tourism, forest wellness tourism, hot spring wellness tourism, and marine wellness tourism (Kim and Jee, 2021). This literature review shows that the academic community has yet to form a unified view on the definition of the concept of "wellness tourism." However, the relevant findings are still helpful for this study to deepen the understanding of wellness tourism.

Conceptual model. The HBM was first used to investigate why most people are unwilling to accept early disease prevention or screening, using the dimensions of perceived severity, perceived benefits, perceived susceptibility, and perceived barriers to test influences on people's health-related behaviors (Janz and Becker, 1984; Ban and Kim, 2020). HBM assumes that people encounter certain perceived risks in a given period (perceived susceptibility), subjectively perceive the degree of threat from those risks (perceived severity), and assess the possible positive effects produced by adopting certain responsive behaviors—disease prevention, health maintenance, and pain relief—(perceived benefits) or the obstacles that one may encounter (perceived barriers) (Janz and Becker, 1984). It has been widely used to explore the behavior of medical tourists (Ban and Kim, 2020), forest therapy tourists (Zhao and An, 2021), and tourists during the pandemic (Huang et al., 2020), among others, and is among the most widely used theories in health-related fields (Ban and Kim, 2020).

As an extension of TRA, TPB has stronger stability (Kim and Chung, 2011; Ajzen, 2020), positing that attitude, subjective norms, and perceived behavioral control can influence behavioral intentions (Ajzen, 1991, 2002). Attitude is the external expression of personal emotions, while subjective norms are the outward pressures on whether a certain behavior should be conducted. Perceived behavioral control refers to the degree of difficulty one feels when doing a certain behavior (Ajzen, 2002, 2020). TPB has been widely applied to choice behavior in medical tourism (Febrida et al., 2022), tourists' green purchase intention (Nekmahmud et al., 2022), dark tourism (Lewis et al., 2021), and others and has shown good behavioral prediction and explanatory power (Zoellner et al., 2017; Lewis et al., 2021).

In previous studies, TPB and HBM were combined and tested regarding disease prevention and health behavioral intention. For example, Huang et al. (2020) combined both theories to predict the health risk behaviors and satisfaction of tourists traveling to Tibet. Zhao and An (2021) analyzed the behavioral intentions of forest therapy tourists. Chaulagain et al. (2021) explained the behavior of medical tourists by constructing a research framework combining both theories. However, to the best of our knowledge, no model combining both theories has been used to explore the behavioral intention of wellness tourists in the existing literature. Therefore, this study fills this gap by constructing a complementary model combining TPB and HBM to enhance the predictive and explanatory abilities of both theories in terms of potential wellness tourists' travel behavior.

Hypotheses development

Health belief model and behavioral intention. HBM theory is widely used to explain people's health-related preventive behaviors (Nobiling and Maykrantz, 2017), positing that when people want to stay healthy and believe that certain behaviors can promote and improve their health, they will most likely choose healthy behaviors (Abbaszadeh et al., 2011). Previous studies have indicated that the main dimensions of HBM have a substantial impact on people's behavioral intentions. For example, Cahyanto et al. (2016) found a positive correlation between perceived susceptibility and travel behavior. Chien et al. (2017) suggested that an increase in tourists' perceived susceptibility to potential health risks will also increase their demand for medical tourism services. Recently, some scholars have found that the perceived barriers and benefits to medical tourists jointly stimulate their behavioral decision-making (Ban and Kim, 2020). In a study of medical staff, Bashirian et al. (2020) concluded that perceived susceptibility is an important factor affecting preventive behavior. Research by Dai et al. (2020) showed that perceived susceptibility and benefits in HBM can have a positive impact on preventive behavior. Prasetyo et al. (2020) found that people's perceived susceptibility directly affects their health behaviors. However, Kim et al. (2022) suggest that perceived susceptibility, benefits, and barriers jointly determine consumer health consumption behavior. Based on this, three of the four HBM dimensions—perceived susceptibility, benefits, and barriers—were selected to predict the behavioral intention of potential wellness tourists, upon which the following hypotheses are proposed.

H1a: Potential wellness tourists' perceived susceptibility has a significant positive impact on their behavioral intention.

H1b: Potential wellness tourists' perceived benefits have a significant positive impact on their behavioral intention.

H1c: Potential wellness tourists' perceived barriers have a significant negative impact on their behavioral intention.

Theory of planned behavior and behavioral intention. TPB is one of the most widely used psychosocial models and has been applied to various aspects of human behavioral science (Han and Stoel, 2017; Yuriev et al., 2020). Considerable research has confirmed that its main dimensions can directly predict people's behavioral intentions (Han, 2015; Park et al., 2016; Wu and Chen, 2018; Erul et al., 2020). For example, if tourists have a positive attitude and receive positive input regarding medical tourism, they will be more willing to participate in this activity (Chaulagain et al., 2021). Numerous studies have shown that subjective norms and attitudes have a significant predictive effect on tourists' behavioral intention (Park et al., 2016), including the intention to visit (Wang et al., 2018; Liu et al., 2021) and revisit (Soliman, 2021). Regarding dark tourists, Lewis et al. (2021) found that attitudes can have a direct positive impact on tourists' behavioral intentions. However, Febrida et al. (2022) suggest that subjective norms have more influence on the behavioral intention of medical tourists. Therefore, this study holds that subjective norms and attitudes are the TPB dimensions critical to predicting and influencing tourists' behavioral intentions.

Self-efficacy refers to people's confidence when performing a task, in being able to complete it and believe in its success (Major et al., 2013) and is often used to predict health behaviors (Stewart et al., 1996; Lee and Kim, 2018; Kim et al., 2019; Huang et al., 2020). In TPB, some scholars suggest that perceived behavioral control has a certain influence on behavior (La Barbera and Ajzen, 2020; Zhang et al., 2021). Ajzen (1991) found that self-efficacy and perceived behavioral control are interchangeable, later concluding (Ajzen, 2002) that perceived behavioral control should be composed of perceived controllability and self-efficacy. However, other scholars have come to the opposite conclusion, arguing that compared with perceived behavioral control, self-efficacy has a stronger predictive ability for travel behavior intention (Cooke et al., 2016; Lee and Kim, 2018; Huang et al., 2020; Ojo et al., 2022). Zheng et al. (2021) found that high self-efficacy can improve the self-protection function and help reduce fear during the trip. Thus, to better predict the behavioral intention of wellness tourists, TPB dimensions of attitude, subjective norms, and self-efficacy were selected to measure the behavioral intention of potential wellness tourists. Based on the above analysis, the following hypotheses are proposed.

H2a: Potential wellness tourists' attitude has a significant positive impact on behavioral intention.

H2b: Potential wellness tourists' subjective norms have a significant positive impact on behavioral intention.

H2c: Potential wellness tourists' self-efficacy has a significant positive impact on behavioral intention.

Mediating role of attitude. Attitude is often determined by people's beliefs about an event or project (Ajzen, 1991; Huang et al., 2020). When people perceive risks or threats from a project or event, this perceived susceptibility will negatively impact their attitude toward that project or event (Amuta et al., 2016; Zhang et al., 2018). Conversely, when people perceive that an event or project is safe and beneficial, perceived susceptibility and benefits can positively impact attitude (Rogers, 2010; Valois et al., 2020). Arnold (2018) analyzed the factors influencing health-threatening behaviors through HBM, finding that such predictive behaviors can improve respondents' attitudes toward health activities. Valois et al. (2020) found that some dimensions of HBM influence the attitudes of the elderly. Chaulagain et al. (2021) researched the willingness of 246 US residents to participate in medical tourism and found that perceived barriers have a negative impact on attitude, while perceived benefits have a significant positive impact. Moreover, changing an individual's attitude can further influence one's behavioral tendency (Chu and Chu, 2013; Bae and Chang, 2021). Therefore, the following hypotheses are proposed.

H3a: Potential wellness tourists' perceived susceptibility has a significant positive impact on their attitudes.

H3b: Potential wellness tourists' perceived benefits have a significant positive impact on their attitudes.

H3c: Potential wellness tourists' perceived barriers have a significant negative impact on their attitudes.

Previous studies have also found that attitude plays a mediating role in tourists' behavioral intentions. For example, Zhang et al. (2018) found that perceived benefits can indirectly affect the behavior of food consumers through attitudes. Huang et al. (2020) and Wang et al. (2021) reached the same conclusion regarding tourists' willingness to travel. Zhao and An (2021) found that the attitude dimension of TPB plays an important mediating role between health beliefs and tourists' behavioral intentions. Ates et al. (2021) found that health beliefs can affect attitude and predict behavior through attitude. Therefore, in this study, perceived susceptibility, benefits, and barriers (HBM dimensions) are considered to have a direct effect on the attitude of potential wellness tourists, with attitude playing a mediating role between HBM dimensions and behavioral intention. Hence, the following hypothesis is proposed.

H4: Potential wellness tourists' attitude plays a mediating role between the HBM dimensions of perceived susceptibility, benefits, and barriers and behavioral intention.

Figure 1 shows this study's research model.

Methodology

Sample. This study adopted the quota sampling method to select samples by population gender, age, and living area from the data

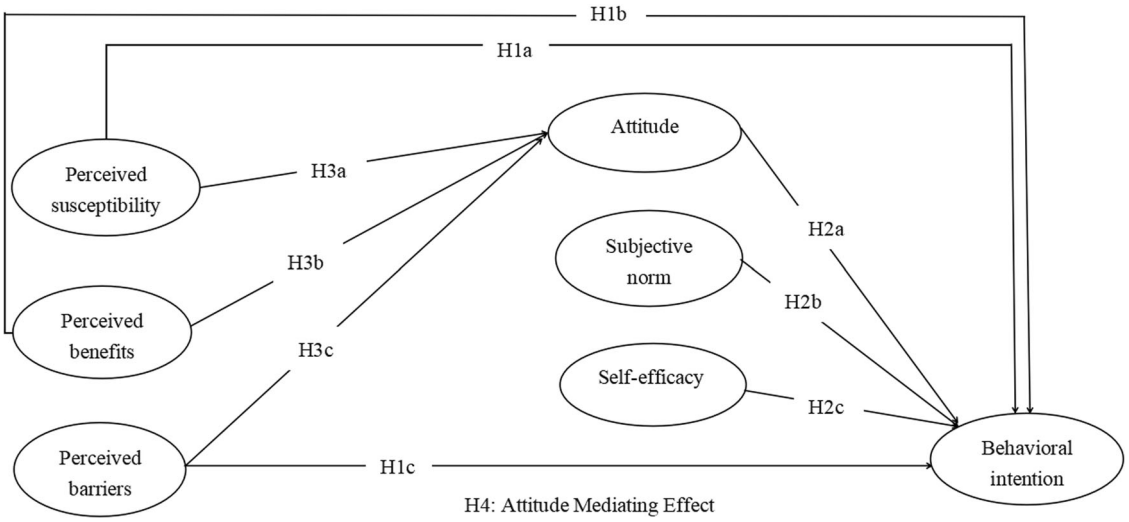

Fig. 1 The research model.

of the Ministry of the Interior and Safety of South Korea in 2021 and the seventh national census of the National Bureau of Statistics of China in 2021. An online questionnaire method was employed, using the survey platforms Question Star (www.wjx.cn) (China) and Korea Research (www.kr.co.kr) (South Korea). Both are professional questionnaire collection platforms with strict sample sampling procedures and network systems, allowing people to complete online tasks for some financial reward. The two platforms possess demographically diversified participants and present reliable ways to approach large Chinese and Korean population samples for this study. The online questionnaire survey form was selected for two reasons. First, if a specific scenic or tourist spot is used, most respondents are likely to choose wellness tourism, and an online questionnaire method can avoid the measurement error caused by this factor. Second, this study's research object is potential wellness tourism consumers. According to the economic definition of potential consumers, actual tourists in the process of consumption should be excluded, which can be largely accomplished by distributing questionnaires online (Xue, 2018; Xie et al., 2019).

Based on the consumer database, the questionnaire survey platform sent survey invitations to the respondents through email and WeChat by random sampling. In this study, participants were required to be at least 18 years old. Before the research survey questionnaire, the respondents were given a consent form, having read through and comprehended our study's purpose and objectives. Eligible participants were paid 10 CNY (China) or 2000 KRW (South Korea) after completing the survey. The survey was conducted from April 15 to June 15, 2022. A total of 576 participants from China and 498 from South Korea submitted questionnaires. Among them, two types of questionnaires were regarded as invalid. One was that respondents spent little time finishing the survey, like 20 s, far less than the average time of 110 s. The other type was that respondents gave the same answers to all questions. For example, all items were given a value of 3. Therefore, 396 valid questionnaires of potential wellness tourists from China and 334 from South Korea were finally obtained. The sample details are shown in Table 1.

An analysis of the demographic characteristics of the respondents showed that 53.8% of Chinese and 52.4% of South Korean respondents were male, indicating that the sample closely reflects the overall characteristics. Regarding age, most potential wellness tourists in China were aged 41–50, accounting for 30.8% of the total. In South Korea, most were aged 31–40, accounting for 30.5%. One possible reason is that young and middle-aged respondents have gradually increased their awareness of the need for health, while the proportions of people younger than 20 and over 50 years old are relatively small among respondents in both countries. The reason may be that these people spend less time using the Internet or are not familiar with the use of the Internet. Regarding educational level, the sample surveys in both countries were similar, with 55.3% and 53.9% of respondents having a bachelor's degree or below in China and South Korea, respectively. Regarding occupation, private sector employees in

Table 1 Details of sample responses.

Details		Chinese (*N* = 396)		South Korean (*N* = 334)	
		N	%	*N*	%
Gender	F	183	46.2	159	47.6
	M	213	53.8	175	52.4
Age	Under 20	15	3.8	8	2.4
	20–30	98	24.7	83	24.9
	31–40	86	21.7	102	30.5
	41–50	122	30.8	82	24.6
	Over 50	75	18.9	59	17.7
Education	Less than bachelor's degree	219	55.3	180	53.9
	Bachelor's degree or higher	177	44.7	154	46.1
Occupation	Student	36	9.1	18	5.4
	Public sector	87	22	60	18.0
	Private sector	119	30.1	90	26.9
	Self-employed	113	28.5	138	41.3
	Others	41	10.4	28	8.4
Monthly income	Under 2000 (CNY)/under 2,000,000 (KRW)	7	1.8	11	3.3
	2001–3000 (CNY)/ 2,000,001–3,000,000 (KRW)	59	14.9	131	39.2
	3001–4000 (CNY)/ 3,000,001–4,000,000 (KRW)	135	34.1	98	29.3
	4001–5000 (CNY)/ 4,000,001–5,000,000 (KRW)	129	32.6	68	20.4
	over 5000 (CNY)/over 5,000,000 (KRW)	66	16.7	26	7.8

Table 2 Source of questionnaire items.

Factors and items	Cronbach's alpha		Sources
	China	South Korea	
Perceived susceptibility	0.825	0.843	Hudson et al. (2017); Chaulagain et al. (2021)
Taking a wellness vacation will definitely relieve my stress.			
Taking a wellness vacation will help me develop good health habits.			
Taking a wellness vacation will make me feel better.			
Perceived benefits	0.742	0.830	
If I travel to another area to receive my wellness treatment, I will receive my wellness treatment faster.			
If I travel to another area to receive my wellness treatment, I will receive a higher level of quality of wellness treatment and care.			
If I take a wellness vacation, I will have the opportunity to combine my desired wellness treatment with a vacation.			
Perceived barriers	0.841	0.780	
My family and/or friends are not interested in traveling with me to take a wellness vacation.			
I don't have time to take a wellness vacation.			
I don't know what to expect to take a wellness vacation.			
Attitude	0.826	0.873	Kim et al. (2019); Bae and Chang (2021); Chaulagain et al. (2021)
Wellness tourism is useful to me.			
Wellness tourism is valuable to me.			
Wellness tourism is beneficial to me.			
Wellness tourism is attractive to me.			
Subjective norm	0.804	0.811	
People who influence my behavior think that I should participate in wellness tourism.			
I will participate in wellness tourism because many of my friends already have.			
People who are important to me think that I should participate in wellness tourism.			
Self-efficacy	0.772	0.818	
I can take a wellness vacation if I put my mind to it.			
I am confident in taking a wellness vacation regularly.			
Even if I am busy, I'll take a wellness vacation in my free time.			
Behavioral intention	0.801	0.849	Bae and Chang (2021); Chaulagain et al. (2021)
I intend to take a wellness vacation in the near future.			
I am planning to take a vacation in the near future.			
I will try to take a wellness vacation in the near future.			

the Chinese sample accounted for 30.1% of the total, while freelancers were the majority in the South Korean sample, accounting for 41.3%. Regarding income, potential wellness tourists in China with a monthly income of 3001–4000 CNY were the majority, accounting for 34.1% of the total. In South Korea those with a monthly income of 2,000,001–3,000,000 KRW were the largest, accounting for 39.2%. Based on this analysis, the data distribution was basically reasonable for both country samples.

Measurement instruments. The measurement of the questionnaire variables is based on the current, highly cited literature, and the questionnaire content was adjusted according to the characteristics of this study. Part 1 of the questionnaire encompasses the HBM dimensions (perceived susceptibility, benefits, and barriers), with a total of nine items, adapted from Hudson et al. (2017) and Chaulagain et al. (2021). Part 2 encompasses the TPB dimensions of attitude, subjective norms, and self-efficacy. The scales used by Kim et al. (2019), Bae and Chang (2021), and Chaulagain et al. (2021) were applied, which have been verified to have good reliability and validity. Part 3, based on the scales of Bae and Chang (2021) and Chaulagain et al. (2021), includes three items measuring the behavioral intention of potential wellness tourists. Part 4 of the questionnaire encompasses the control variables, including gender, age, education level, occupation, and monthly income.

To evaluate the research background of this study, four professors (two Chinese and two South Korean) and 10 undergraduate students (five Chinese and five South Korean) in tourism management were invited to conduct a pre-test. Based on the feedback from the pre-test, the content of the questionnaire was modified to further ensure its reliability and validity. Except for Part 4, all other variables were measured on a 5-point Likert (with 1–5 indicating "strongly disagree," "disagree," "unsure," "agree," and "strongly agree," respectively). To evaluate the reliability of the measured variables, Cronbach's alpha in SPSS 26.0 was used to analyze the reliability of the questionnaire. The analysis showed that the Cronbach's alpha values of all variables were higher than 0.7, indicating that the scale of the sample had high reliability. The details are shown in Table 2.

Results

Confirmatory factor analysis. Structural equation modeling can integrate many different variables into a research structure, reduce the restrictive conditions between independent and dependent variables, and better describe the effects of potential variables, validating the structural relationship between the hypotheses and latent variables (Sim, 2013). Therefore, this study adopted a structural equation modeling approach. Before hypothesis testing, common method bias was analyzed using Harman's single-factor test, and exploratory factor analysis was conducted on all items. The unrotated results of the sample of Chinese potential wellness tourists showed that all items were automatically aggregated into seven factors with eigenvalues >1. Further, the cumulative variance contribution rate was 71.757, of which the value of the first eigenvalue was 5.360, and the variance contribution rate was 24.365. Similarly, the unrotated results of the sample of South Korean potential wellness tourists showed that all items were automatically aggregated into seven factors

Table 3 CFA of measurement models.

Factors	Items	Factor loading		CR		AVE	
		China	South Korea	China	South Korea	China	South Korea
Perceived susceptibility	PS1	0.623	0.735	0.839	0.843	0.641	0.643
	PS2	0.895	0.826				
	PS3	0.857	0.842				
Perceived benefits	PBE1	0.658	0.789	0.744	0.832	0.493	0.622
	PBE2	0.726	0.813				
	PBE3	0.721	0.765				
Perceived barriers	PBA1	0.818	0.82	0.843	0.782	0.642	0.546
	PBA2	0.824	0.691				
	PBA3	0.761	0.699				
Attitude	AT1	0.818	0.844	0.831	0.875	0.556	0.637
	AT2	0.819	0.766				
	AT3	0.707	0.809				
	AT4	0.620	0.772				
Subjective norm	SN1	0.683	0.806	0.806	0.812	0.582	0.591
	SN2	0.791	0.776				
	SN3	0.810	0.722				
Self-efficacy	SE1	0.614	0.848	0.781	0.821	0.547	0.606
	SE2	0.835	0.786				
	SE3	0.753	0.694				
Behavioral intention	BI1	0.608	0.825	0.810	0.832	0.592	0.623
	BI2	0.856	0.74				
	BI3	0.822	0.801				

Table 4 Correlation coefficient and results of discriminant validity test.

Variable	PS	PBE	PBA	AT	SN	SE	BI
China							
PS	**0.800**						
PBE	0.236	**0.702**					
PBA	−0.163	−0.131	**0.801**				
AT	0.447	0.288	−0.154	**0.745**			
SN	0.013	−0.018	−0.017	−0.046	**0.762**		
SE	0.366	0.362	−0.113	0.491	0.027	**0.739**	
BI	0.179	0.164	−0.242	0.183	0.090	0.311	**0.769**
South Korea							
PS	**0.801**						
PBE	0.379	**0.788**					
PBA	−0.329	−0.363	**0.738**				
AT	0.409	0.331	−0.309	**0.798**			
SN	0.353	0.348	−0.322	0.232	**0.768**		
SE	0.446	0.479	−0.333	0.247	0.199	**0.778**	
BI	0.495	0.527	−0.360	0.387	0.376	0.538	**0.789**

The numbers in bold which proceed diagonally across the table are the AVE square roots, and the other numbers are the correlation coefficients between variables.
PS perceived susceptibility, *PBE* perceived benefits, *PBA* perceived barriers, *AT* attitude, *SN* subjective norm, *SE* self-efficacy, *BI* behavioral intention.

with eigenvalues >1. The cumulative variance contribution rate was 74.600, of which the value of the first eigenvalue was 7.624, and the variance contribution rate was 34.653. Moreover, the variance contribution rate of the samples did not exceed 50% of the total explanatory variables, and the variance inflation factors were <2, indicating that common method biases and collinearity did not seriously affect this study.

AMOS 26.0 software was used to test the validity of the scale through confirmatory factor analysis (CFA). As shown in Table 3, the results indicate that the factor loading of each observed variable is between 0.608 and 0.895, all of which are larger than the recommended value of 0.5. The composite reliability value ranged from 0.744 to 0.875, which is considerably higher than the standard value of 0.6. The analysis of the average variance extracted (AVE) value showed that only perceived susceptibility (in the Chinese sample) was slightly less than the recommended value of 0.5, while the AVE values of the other latent variables in all dimensions were higher than the recommended value of 0.5. However, this does not affect the convergent validity of the model (Sim, 2013). The correlation coefficient and AVE square root are shown in Table 4. The AVE square roots of the factors of the seven potential variables included in the survey samples from China and South Korea were all larger than the correlation coefficient between themselves and other factors, further demonstrating that the model has good discriminant validity and can be used for further studies.

Path analysis and hypothesis testing

Path analysis. Before hypothesis testing, a goodness-of-fit test of the model was conducted using AMOS 26.0 software. As shown

Table 5 Goodness of fit test.

Index	x^2/df	CFI	NFI	GFI	AGFI	IFI	RMSEA
China	2.394	0.920	0.872	0.905	0.877	0.921	0.059
Korea	2.025	0.943	0.894	0.910	0.884	0.943	0.055
Adaptive standard value	<3	>0.850	>0.850	>0.800	>0.800	>0.850	<0.080

Table 6 Hypotheses testing results.

Hypothetical path	Standardized path coefficient		S.E.		C.R.		*p*		Results	
	China	South Korea	China	South Korea	China	South Korea	China	South Korea	China	South Korea
H1a: PS → BI	0.057	0.200	0.060	0.069	0.849	2.973	0.396	0.003**	No	Yes
H1b: PBE → BI	0.044	0.240	0.079	0.065	0.655	3.347	0.512	***	No	Yes
H1c: PBA → BI	−0.240	−0.031	0.043	0.048	−3.939	−0.490	***	0.624	Yes	No
H2a: AT → BI	−0.063	0.341	0.058	0.056	−0.882	4.767	0.378	***	No	Yes
H2b: SN → BI	0.099	0.154	0.062	0.050	1.715	2.789	0.086	0.005**	No	Yes
H2c: SE → BI	0.291	0.192	0.068	0.054	4.527	3.486	***	***	Yes	Yes
H3a: PS → AT	0.427	0.315	0.070	0.088	6.722	4.710	***	***	Yes	Yes
H3b: PBE → AT	0.225	0.362	0.090	0.081	3.622	5.191	***	***	Yes	Yes
H3c: PBA → AT	−0.046	−0.110	0.047	0.064	−0.856	−1.674	0.392	0.094	No	No

PS perceived susceptibility, *PBE* perceived benefits, *PBA* perceived barriers, *AT* attitude, *SN* subjective norm, *SE* self-efficacy, *BI* behavioral intention.
**$p < 0.01$, ***$p < 0.001$.

in Table 5, the model fit of the sample of potential wellness tourism consumers in China (x^2/df = 2.394, CFI = 0.920, NFI = 0.872, GFI = 0.905, AGFI = 0.877, IFI = 0.921, RMSEA = 0.059) and South Korea (x^2/df = 2.025, CFI = 0.943, NFI = 0.894, GFI = 0.910, AGFI = 0.884, IFI = 0.943, RMSEA = 0.055) reached the standard values, indicating that the model fit meets the standard (Sim, 2013).

Based on the models' CFA and goodness-of-fit tests, the research hypotheses were tested using the maximum-likelihood estimate in AMOS 26.0 to analyze whether the study's hypotheses were supported. The test results are shown in Table 6. Regarding the impact of the HBM dimensions of perceived susceptibility, benefits, and barriers on the behavioral intention of potential wellness tourists, only H1c was supported in the Chinese sample ($t = -3.939$, $p < 0.001$)—perceived barriers have a significant negative impact on behavioral intention. Both H1a ($t = 2.973$, $p < 0.01$) and H1b ($t = 3.347$, $p < 0.001$) were supported in the South Korean sample. Regarding the impact of the TPB dimensions of attitude, subjective norms, and self-efficacy on behavioral intention, only H2c was supported in the Chinese sample ($t = 4.527$, $p < 0.001$)—self-efficacy has a significant positive impact on behavioral intention. H2a ($t = 4.767$, $p < 0.001$) and H2b ($t = 2.789$, $p < 0.01$) were supported in the South Korean sample. Regarding the impact of perceived susceptibility and perceived benefits on attitude, H3a ($t = 6.722$, $p < 0.001$ and $t = 4.710$, $p < 0.001$) and H3b ($t = 3.622$, $p < 0.001$ and $t = 5.191$, $p < 0.001$) were supported in the samples from both China and South Korea. Additionally, H3c (the impact of perceived barriers on attitude) was not supported in the samples from both countries; therefore, H3a and H3b are valid.

Mediating effect analysis. The bootstrap method in AMOS 26.0 was used to test the hypothesis of whether attitude plays a mediating role between perceived susceptibility, perceived benefits, perceived barriers, and potential tourist behaviors. First, 396 valid samples from China and 334 valid samples from South Korea were taken as the bootstrap population, from which a random sample was drawn with 5000 replications. Second, to determine the significance of the mediating effect, the 95% confidence interval (CI) was used to confirm whether the interval included 0. If the interval did not include 0, the mediating effect was considered significant. The bootstrap test (5000 replications) showed that the sample of potential wellness tourists in China contained 0 within the 95% CI. Further, the indirect effect of attitude between perceived susceptibility, perceived benefits, perceived barriers, and potential tourist behaviors was also insignificant, indicating that it had no mediating effect. Moreover, attitude did not play a mediating role between perceived barriers and behavioral intention in the South Korean sample. However, in the mediating effect test among perceived susceptibility, perceived benefits, and the behavioral intention of potential wellness tourists in South Korea, the 95% CI did not contain 0, which is significant. Therefore, H4 was verified. The specific analysis results are shown in Table 7.

Table 7 Bootstrap test results of the significance of the mediating effect.

Mediating effect path	Significance (two-tailed test)		95% of confidence interval			
			Lower limit		Upper limit	
	China	South Korea	China	South Korea	China	South Korea
PS → AT → BI	0.399	0.003	−0.024	0.036	0.005	0.233
PBE → AT → BI	0.474	0.003	−0.021	0.041	0.046	0.253
PBA → AT → BI	0.531	0.234	−0.040	−0.170	0.077	0.026

PS perceived susceptibility, *PBE* perceived benefits, *PBA* perceived barriers, *AT* attitude, *BI* behavioral intention.

Discussion

By comparing the empirical analysis results of potential wellness tourists in China and South Korea, this study found differences

Table 8 Summary of hypotheses.

Hypothesis	China	South Korea
H1a: Potential wellness tourists' perceived susceptibility has a significant positive impact on their behavioral intention.	Not supported	Supported
H1b: Potential wellness tourists' perceived benefits have a significant positive impact on their behavioral intention.	Not supported	Supported
H1c: Potential wellness tourists' perceived barriers have a significant negative impact on their behavioral intention.	Supported	Not supported
H2a: Potential wellness tourists' attitude has a significant positive impact on behavioral intention.	Not supported	Supported
H2b: Potential wellness tourists' subjective norms have a significant positive impact on behavioral intention.	Not supported	Supported
H2c: Potential wellness tourists' self-efficacy has a significant positive impact on behavioral intention.	Supported	Supported
H3a: Potential wellness tourists' perceived susceptibility has a significant positive impact on their attitudes.	Supported	Supported
H3b: Potential wellness tourists' perceived benefits have a significant positive impact on their attitudes.	Supported	Supported
H3c: Potential wellness tourists' perceived barriers have a significant negative impact on their attitudes.	Not supported	Not supported
H4: Potential wellness tourists' attitude plays a mediating role between the HBM dimensions of perceived susceptibility, benefits, and barriers, and behavioral intention.	Not supported	Supported

between the two countries in the factors influencing the behavioral intention of potential wellness tourists. The results show that perceived barriers in the Chinese sample have a significant negative impact on behavioral intentions (H1c). In other words, the stronger the perceived barriers for potential wellness tourists in China, the greater the negative impact on their behavioral intention. Thus, this study verifies the view that perceived barriers can negatively affect behavioral intention (Huang et al., 2016; Tsai et al., 2021). However, some studies have come to different conclusions, such as that perceived susceptibility is the main factor in predicting health behaviors, while perceived barriers do not have a significant impact (Mirakzadeh et al., 2021). Conversely, the South Korean sample shows that both perceived susceptibility and perceived benefits have a significant positive impact on behavioral intention. This is similar to the findings of Chien et al. (2017), Bashirian et al. (2020), and Dai et al. (2020). Therefore, this study shows that compared with the South Korean sample, the stronger the perceived barriers for potential wellness tourists in China, the more serious the impact on their behavioral intentions. Further, the perceived susceptibility and benefits of potential wellness tourists in South Korea are more consistent with their behavioral intentions, and the impact on their behavioral intention is more evident.

In the hypotheses on the impact of the TPB dimensions of attitude, subjective norms, and self-efficacy on behavior intention, H2c was supported in the Chinese sample. In other words, the self-efficacy of potential wellness tourists has a significant positive impact on their behavioral intention (Huang et al., 2020; Ojo et al., 2022). However, attitudes and subjective norms do not have a significant impact on their behavioral intentions (H2a and H2b). This may be because wellness tourism in China is still in the development stage, and there is insufficient public awareness. This finding is similar to those of Lam and Hsu (2006), Sim et al. (2014), and Li et al. (2021). Nevertheless, in the South Korean sample, all three TPB dimensions had a positive impact on the behavioral intention of potential wellness tourists, which is similar to the findings of Patwary et al. (2021) and Roberts and David (2021).

Regarding hypotheses on the impact of the HBM dimensions of perceived susceptibility and benefits on potential wellness tourists in China and South Korea, both showed a significant positive impact on attitude. This is similar to the findings of Huang et al. (2020) and Valois et al. (2020). However, perceived barriers had no direct impact on the attitudes of potential wellness tourists in both countries (H3c). This is similar to the findings of Chaulagain et al. (2021). A possible reason is that with the development of science, technology, and smart tourism, people's awareness of language barriers, time consumption, companion needs, and fear of the unknown during the journey has gradually decreased, reducing the lack of familiarity with wellness tourism. Therefore, this study concludes that perceived susceptibility and benefits are more critical than perceived barriers in terms of the attitudes of potential wellness tourists in both China and South Korea.

In the hypothesis on whether attitude plays a mediating role between the HBM dimensions (perceived susceptibility, benefits, and barriers) and the behavioral intention of potential wellness tourists, the hypotheses were partly supported. In the South Korean sample, attitude mediates the relationship between perceived susceptibility and perceived benefits, and behavioral intention and can significantly magnify the effects between them (H4a and H4b). These results are similar to those of Ates et al. (2021), Wang et al. (2021), and Zhao and An (2021). The findings verify that HBM can significantly predict the behavioral intention of potential wellness tourists and demonstrate that attitude plays an important transmission role in influencing behavioral intention for the dimensions of perceived susceptibility and benefits. However, in the Chinese sample, attitude did not play a mediating role between the HBM dimensions and behavioral intention. This finding is similar to that of Li et al. (2021). One possible reason is the limited sample size. With a larger sample size, attitude may have a significant mediating effect. In summary, the attitude has the most obvious mediating effect between the HBM dimensions of perceived susceptibility and benefits and behavioral intention in the South Korean sample. A summary of all the hypotheses results is shown in Table 8.

Conclusion

Main conclusions. This study surveyed potential wellness tourists in China and South Korea, constructing a combined research model using HBM, TPB, and behavioral intention to explore the internal relationship among their respective dimensions and examine their influence on the behavioral intention of the surveyed population. Based on a comparative analysis between China and South Korea, a structural equation model was used to evaluate the mediating effect of attitude on perceived susceptibility, perceived benefits, perceived barriers, and behavioral intention. The research conclusions can be summarized as follows. First, in the Chinese sample, perceived barriers had a significant negative impact on behavioral intention, while in the South Korean sample, perceived susceptibility and benefits had a positive impact on the behavioral intention of potential wellness tourists. Second, in the Chinese sample, the self-efficacy of potential wellness tourists had a positive impact on behavioral intention. In the South Korean sample, the attitude, subjective norms, and self-efficacy dimensions of TPB had a positive impact on behavioral intention. Third, in both the Chinese and South Korean samples, perceived susceptibility and benefits had a positive impact on the attitude of potential wellness tourists. In the South Korean sample, attitude mediated the relationship

between the perceived susceptibility and benefit dimensions of HBM and behavioral intention.

Theoretical implications. The theoretical contributions of this study are as follows. First, this research contributes to the fields of wellness tourism and behavioral intention by constructing a unique, combined model of behavioral intention, drawing together the well-established HBM and TPB theories to evaluate the intentions of potential wellness tourists. This combined approach has not been used in similar studies that have evaluated this population (Huang et al., 2020; Chaulagain et al., 2021; Zhao and An, 2021).

Second, as neighboring Asian countries, China and South Korea were selected for the comparative study of potential wellness tourists. Previous studies were mostly based on single-country samples, lacking a comparative perspective (Šegota et al., 2021; Yang et al., 2022). Through the investigation of potential wellness tourists in both countries, this study enhances the applicability of its theoretical and cross-cultural research findings and fills the research gap in comparative studies of wellness tourism.

Third, the mediating role of attitude is emphasized. Based on the analysis results, the attitude was shown to have a positive mediating effect (e.g., between perceived susceptibility, perceived benefits, and behavioral intention in the South Korean sample). Therefore, this study lays the theoretical foundation for further research on the attitude dimension of TPB as a mediating variable, enriching the application scope of the framework model with the addition of HBM. It also provides a theoretical research foundation for relevant stakeholders and scholars in wellness tourism.

Practical implications. From a practical standpoint, the following countermeasures and suggestions for tourism scholars, managers of wellness tourism departments, and other stakeholders are presented. In the Chinese sample, perceived barriers and self-efficacy were important factors in predicting the behavioral intention of potential wellness tourists. Despite some of the hypothesized relationships not showing significance in the Chinese sample, the HBM dimensions of perceived susceptibility and perceived benefits were shown to have a positive impact on their attitude. Therefore, the relevant wellness tourism management departments should still pay attention (e.g., potential tourist attitudes and the health beliefs of potential tourists). Through social media, promotional videos, and other mediums, public enthusiasm for wellness tourism can be enhanced, as well as an understanding of the benefits of wellness tourism. Perceived barriers, such as tourism safety, interpersonal communication, and unfamiliar environment can be reduced, improving potential tourists' interest in realizing the green, ecological, healthy, and sustainable development of China's wellness tourism industry.

In the South Korean sample, perceived susceptibility and perceived benefits (HBM), as well as attitude, subjective norms, and self-efficacy (TPB) could all predict the behavioral intention of potential wellness tourists. Moreover, attitude has a mediating effect between perceived susceptibility, perceived benefits, and behavioral intention. Therefore, wellness tourism enterprise operators and other stakeholders in South Korea should highlight the original characteristics and resource advantages of wellness tourism destinations. They should master a more comprehensive management mode with advanced product development and marketing strategies (such as differentiation and customization of wellness tourism products), considering the decision-making process of potential wellness tourists and their expectations for such products. While considering market opportunities, the loss of existing customers should be prevented, and the sustainable development of wellness tourism products in South Korea should be implemented.

Limitations and future research. This study combines the theories of HBM and TPB to construct a comprehensive behavioral model. Compared with a model rooted in a single theory, it can explore the behavior of potential wellness tourists from different perspectives and better explain or predict the decision-making willingness and process of wellness tourists. However, there are still some limitations to this study. First, this research model focuses on predicting or explaining the decision-making willingness of wellness tourists before a certain behavior occurs; compared to other models, it cannot predict the loyalty or satisfaction of wellness tourists in depth. Future studies may analyze the influence of other factors through different theoretical frameworks to explore various valuable research topics. Second, the survey was only conducted on potential wellness tourists in China and South Korea, which is not extensive. Future research can expand the scope of the investigation and conduct comparative research on different Asian countries—and even countries with more developed wellness tourism—to analyze the development gap among countries. In addition, the survey scope can also be expanded to obtain a wider range of sample sizes in future research.

Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request. Some data is included in a supplementary file.

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References

Abbaszadeh A, Borhani F, Asadi N (2011) Effects of face-to-face health-belief oriented education about risk factors on knowledge and attitude of myocardial infarction patients after discharge. Iran J Med Educ 12:195–199

Ajzen I (1985) From intentions to actions: a theory of planned behavior. Springer, Berlin

Ajzen I (1991) The theory of planned behavior. Organ Behav Hum Dec 50:179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Ajzen I (2002) Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. J Appl Soc Psychol 32:665–683. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x

Ajzen I (2020) The theory of planned behavior: frequently asked questions. Hum Behav Emerg Technol 2:314–324. https://doi.org/10.1002/hbe2.195

Amuta AO, Jacobs W, Barry AE, Popoola OA, Crosslin K (2016) Gender differences in type 2 diabetes risk perception, attitude, and protective health behaviors: a study of overweight and obese college students. Am J Health Educ 47:315–323. https://doi.org/10.1080/19325037.2016.1203836

Arnold JC (2018) An integrated model of decision-making in health contexts: the role of science education in health education. Int J Sci Educ 40:519–537. https://doi.org/10.1080/09500693.2018.1434721

Ates H, Demir Özdenk G, Çaliskan C (2021) Determinants of science teachers' healthy eating behaviors: combining health belief model and theory of planned behavior. J Balt Sci Educ 20:573–589. https://doi.org/10.33225/jbse/21.20.573

Bae SY, Chang PJ (2021) The effect of coronavirus disease-19 (COVID-19) risk perception on behavioural intention towards 'untact' tourism in South Korea during the first wave of the pandemic. Curr Issues Tour 24:1017–1035. https://doi.org/10.1080/13683500.2020.1798895

Ban HJ, Kim HS (2020) Applying the modified health belief model (HBM) to Korean medical tourism. Int J Environ Res Public Health 17:36–46. https://doi.org/10.3390/ijerph17103646

Bashirian S, Jenabi E, Khazaei S, Barati M, Karimi-Shahanjarini A, Zareian S, Rezapur-Shahkolai F, Moeini B (2020) Factors associated with preventive

behaviours of COVID-19 among hospital staff in Iran in 2020: an application of the protection motivation theory. J Hosp Infect 105:430–433. https://doi.org/10.1016/j.jhin.2020.04.035
Buckley RC, Cooper MA, Chauvenet A, Zhong LS (2022) Theories of experience value & mental health at tourism destinations: senses, personalities, emotions and memories. J Destin Mark Manage 26:100744. https://doi.org/10.1016/j.jdmm.2022.100744
Buglar ME, White KM, Robinson NG (2010) The role of self-efficacy in dental patients' brushing and flossing: testing an extended health belief model. Patient Educ Couns 78:269–272. https://doi.org/10.1016/j.pec.2009.06.014
Cahyanto I, Wiblishauser M, Pennington-Gray L, Schroeder A (2016) The dynamics of travel avoidance: the case of Ebola in the US. Tour Manag Perspect 20:195–203. https://doi.org/10.1016/j.tmp.2016.09.004
Chaulagain S, Pizam A, Wang Y (2021) An integrated behavioral model for medical tourism: an American perspective. J Travel Res 60:761–778. https://doi.org/10.1177/0047287520907681
Chien PM, Sharifpour M, Ritchie BW, Watson B (2017) Travelers' health risk perceptions and protective behavior: a psychological approach. J Travel Res 56:744–759. https://doi.org/10.1177/0047287516665479
Choe JA, Rhie JM (2019) Analysis of transitions on healing-related concepts and trends: focusing on well-being, wellness, and healing keywords. Bull Korean Soc Basic Design Art 20:597–612. https://doi.org/10.47294/KSBDA.20.4.43
Chrysikou E, Tziraki C, Buhalis D (2018) Architectural hybrids for living across the lifespan: lessons from dementia. Serv Ind J 38:4–26. https://doi.org/10.1080/02642069.2017.1365138
Chu AZ, Chu RJ (2013) Service willingness and senior tourists: knowledge about aging, attitudes toward the elderly, and work values. Serv Ind J 33:1148–1164. https://doi.org/10.1080/02642069.2011.628659
Clark-Kennedy J, Cohen M (2017) Indulgence or therapy? Exploring the characteristics, motivations and experiences of hot springs bathers in Victoria, Australia. Asia Pac J Tour Res 22:501–511. https://doi.org/10.1080/10941665.2016.1276946
Cohen MM, Elliott F, Oates L, Schembri A, Mantri N (2017) Do wellness tourists get well? An observational study of multiple dimensions of health and well-being after a week-long retreat. J Altern Complement Med 23:140–148. https://doi.org/10.1089/acm.2016.0268
Cooke R, Dahdah M, Norman P, French DP (2016) How well does the theory of planned behaviour predict alcohol consumption? A systematic review and meta-analysis. Health Psychol Rev 10:148–167. https://doi.org/10.1080/17437199.2014.947547
Dai B, Fu D, Meng G, Liu B, Li Q, Liu X (2020) The effects of governmental and individual predictors on COVID-19 protective behaviors in China: a path analysis model. Public Admin Rev 80:797–804. https://doi.org/10.31234/osf.io/hgzj9
Dunn HL (1959) High-level wellness for man and society. Am J Public Health Nations Health 49:786–792. https://doi.org/10.2105/AJPH.49.6.786
Erul E, Woosnam KM, McIntosh WA (2020) Considering emotional solidarity and the theory of planned behavior in explaining behavioral intentions to support tourism development. J Sustain Tour 28:1158–1173. https://doi.org/10.1080/09669582.2020.1726935
Febrida N, Yacob S, Lubis TA (2022) Medical tourism behavior of Indonesian community from the development of theory planned behavior (health regulation and health needs) approach in Indonesia. Int J Soc Sci Res 4:121–149. https://myjms.mohe.gov.my/index.php/ijssr/article/view/18527
Fishbein M (1967) Attitude and the prediction of behavior. In: Readings in attitude theory and measurement. John Wiley & Sons, New York
Goodrich JN, Goodrich GE (1987) Health-care tourism: an exploratory study. Tour Manage 8:217–222. https://doi.org/10.1016/0261-5177(87)90053-7
GWI (2018) The global wellness tourism economy report. https://globalwellnessinstitute.org/industry-research/global-wellness-tourism-economy/
GWI (2022) The global wellness economy: country rankings. https://globalwellnessinstitute.org/industry-research/2022-global-wellness-economy-country-rankings/
Haji S, Surachman S, Ratnawati K, MintartiRahayu M (2021) The effect of experience quality, perceived value, happiness and tourist satisfaction on behavioral intention. Manage Sci Lett 11:1023–1032. https://doi.org/10.5267/J.MSL.2020.9.040
Han HS (2015) Travelers' pro-environmental behavior in a green lodging context: converging value-belief norm theory and the theory of planned behavior. Tour Manage 47:164–177. https://doi.org/10.1016/j.tourman.2014.09.014
Han TI, Stoel L (2017) Explaining socially responsible consumer behavior: a meta-analytic review of theory of planned behavior. J Int Consum Mark 29:91–103. https://doi.org/10.1080/08961530.2016.1251870
Hartwell H, Fyall A, Willis C, Page S, Ladkin A, Hemingway A (2018) Progress in tourism and destination well-being research. Curr Issues Tour 21:1830–1892. https://doi.org/10.1080/13683500.2016.1223609
He M, Liu B, Li Y (2021) Tourist inspiration: how the wellness tourism experience inspires tourist engagement. J Hosp Tour Res 24:1–21. https://doi.org/10.1177/10963480211026376
He M, Liu B, Li Y (2022) Recovery experience of wellness tourism and place attachment: insights from feelings-as-information theory. Int J Contemp Hosp Manage 34:2934–2952. https://doi.org/10.1108/IJCHM-10-2021-1237
Horng JS, Hu ML, Teng CC, Lin L (2014) Energy saving and carbon reduction behaviors in tourism—a perception study of Asian visitors from a protection motivation theory perspective. Asia Pac J Tour Res 19:721–735. https://doi.org/10.1080/10941665.2013.797002
Hritz NM, Sidman CL, D'Abundo M (2014) Segmenting the college educated generation health and wellness traveler. J Travel Tour Mark 31:132–145. https://doi.org/10.1080/10548408.2014.861727
Huang HT, Kuo YM, Wang SR, Wang CF, Tsai CH (2016) Structural factors affecting health examination behavioral intention. Int J Environ Res Public Health 13:395–410. https://doi.org/10.3390/ijerph13040395
Huang X, Dai S, Xu H (2020) Predicting tourists' health risk preventative behaviour and travelling satisfaction in Tibet: combining the theory of planned behaviour and health belief model. Tour Manage Perspect 33:e100589. https://doi.org/10.1016/j.tmp.2019.100589
Hudson S, Thal K, Cárdenas D, Meng F (2017) Wellness tourism: stress alleviation or indulging healthful habits? Int J Cult Tour Hosp 11:35–52. https://doi.org/10.1108/IJCTHR-09-2015-0111
Islam N (2014) Chinese Medicine as a product filling the wellness health tourism niche in China: prospect and challenges. Int J Tour Sci 14:51–69. https://doi.org/10.1080/15980634.2014.11434684
Janz NK, Becker MH (1984) The health belief model: a decade later. Health Educ Q 11:1–47. https://doi.org/10.1177/109019818401100101
Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J (2015) The health belief model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. Health Commun 30:566–576. https://doi.org/10.1080/10410236.2013.873363
Kang K (2021) Study on ways of Galvanizing local economy through health tourism: focusing on Andeok village, Wanju-gun, North Jeolla province, home to health & healing experience programs J Photo Geogr 31:85–99 I410-ECN-0102-2022-900-000657686
Kazakov S, Oyner O (2020) Wellness tourism: a perspective article. Tour Rev 76:58–63. https://doi.org/10.1108/TR-05-2019-0154
Kim SY (2021) Trend analysis and policy implications of wellness tourism policy in Korea and Japan. J Korea Converg Soc 12:183–195. https://doi.org/10.15207/JKCS.2021.12.6.183
Kim HY, Chung JE (2011) Consumer purchase intention for organic personal care products. J Consum Mark 28:40–47. https://doi.org/10.1108/07363761111101930
Kim MJ, Hall CM (2022) Does active transport create a win-win situation for environmental and human health? The moderating effect of leisure and tourism activity. J Hosp Tour Manag 52:487–498. https://doi.org/10.1016/j.jhtm.2022.08.007
Kim J, Jee J (2021) A study on the convergence model of Korean medical tourism and wellness tourism. Food Serv Ind J 17:23–33. https://doi.org/10.22509/kfsa.2021.17.3.002
Kim J, Yang K, Min J, White B (2022) Hope, fear, and consumer behavioral change amid COVID-19: application of protection motivation theory. Int J Consum Stud 46:558–574. https://doi.org/10.1111/ijcs.12700
Kim Y, Chung S, So J (2019) Success expectancy: a mediator of the effects of source similarity and self-efficacy on health behavior intention. Health Commun 35:1063–1072. https://doi.org/10.1080/10410236.2019.1613475
La Barbera F, Ajzen I (2020) Control interactions in the theory of planned behavior: rethinking the role of subjective norm. Eur J Psychol 16:401–417. https://doi.org/10.5964/ejop.v16i3.2056
Lam T, Hsu C (2006) Predicting behavioral intention of choosing a travel destination. Tour Manage 27:589–599. https://doi.org/10.1016/j.tourman.2005.02.003
Lee M, Han H, Lockyer T (2012) Medical tourism—attracting Japanese tourists for medical tourism experience. J Travel Tour Mark 29:69–86. https://doi.org/10.1080/10548408.2012.638564
Lee SJ, Kim HL (2018) Roles of perceived behavioral control and self-efficacy to volunteer tourists' intended participation via theory of planned behavior. Int J Tour Res 20:182–190. https://doi.org/10.1002/jtr.2171
Lewis H, Schrier T, Xu S (2021) Dark tourism: motivations and visit intentions of tourists. Int Hosp Rev 36:107–123. https://doi.org/10.1108/IHR-01-2021-0004
Li X, Li Z, Song C, Lu W, Zhang Q (2021) Exploring consumer behavior in virtual reality tourism using the theory of planned behavior. Tour Trib 36:15–26. https://doi.org/10.19765/j.cnki.1002-5006.2021.08.007
Lian R (2022) Research on the influencing factors and optimization countermeasures of wellness tourism experience quality from the perspective of embodiment. Dissertation, Liaoning Normal University

Liu B, Li Y, Kralj A, Moyle B, He M (2022) Inspiration and wellness tourism: the role of cognitive appraisal. J Travel Tour Mark 39:173–187. https://doi.org/10.1080/10548408.2022.2061676

Liu L, Zhou Y, Sun X (2023) The impact of the wellness tourism experience on tourist well-being: the mediating role of tourist satisfaction. Sustain 15:1872. https://doi.org/10.3390/su15031872

Liu Y, Shi H, Li Y, Amin A (2021) Factors influencing Chinese residents' post-pandemic outbound travel intentions: an extended theory of planned behavior model based on the perception of COVID-19. Tour Rev 76:871–891. https://doi.org/10.1108/TR-09-2020-0458

Lončarić D, Lončarić D, Markovic S (2015) Health tourism, customer satisfaction and quality of life: the role of specialty hospitals. In: 3rd International scientific conference tourism in southern and eastern Europe. Soc Sci Electronvol 3:159–173. https://www.researchgate.net/publication/282858453

Major A, Martinussen R, Wiener J (2013) Self-efficacy for self-regulated learning in adolescents with and without attention deficit hyperactivity disorder (ADHD) science direct. Learn Individ Differ 27:149–156. https://doi.org/10.1016/j.lindif.2013.06.009

Ministry of the Interior and Safety (2021) Resident registration demographics. https://jumin.mois.go.kr/#

Mirakzadeh AA, Karamian F, Khosravi E, Parvin F (2021) Analysis of preventive behaviors of rural tourism hosts in the face of COVID-19 pandemic: application of health belief model. Front Public Health 9:793173. https://doi.org/10.3389/fpubh.2021.793173

Moreno-González AA, León CJ, Fernández-Hernández C (2020) Health destination image: the influence of public health management and well-being conditions. J Destin Mark Manage 16:100430. https://doi.org/10.1016/j.jdmm.2020.100430

Mueller H, Kaufmann EL (2001) Wellness tourism: market analysis of a special health tourism segment and implications for the hotel industry. J Vacat Mark 7:5–17. https://doi.org/10.1177/135676670100700101

National Bureau of Statistics (2021) The Seventh National Population Census. https://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/

Nekmahmud M, Ramkissoon H, Fekete-Farkas M (2022) Green purchase and sustainable consumption: a comparative study between European and Non-European tourists. Tour Manag Perspect 43:e100980. https://doi.org/10.1016/j.tmp.2022.100980

Nobiling BD, Maykrantz SA (2017) Exploring perceptions about and behaviors related to mental illness and mental health service utilization among college students using the health belief model (HBM) Am J Health Educ 48:306–319. https://doi.org/10.1080/19325037.2017.1335628

Ojo KE, Ferreira S, Salazar J, Bergstrom J, Woosnam KM (2022) Recreational travel behavior and COVID-19: insights from expected utility and the theory of planned behavior. Tour Econ 43:e13548166211059642. https://doi.org/10.1177/13548166211059642

Painter JE, Borba CP, Hynes M, Mays D, Glanz K (2008) The use of theory in health behavior research from 2000 to 2005: a systematic review. Ann Behav Med 35:358–362. https://doi.org/10.1007/s12160-008-9042-y

Park D, Quising P, Bodeker G, Helble M, Qureshi I, Tian S (2021) Wellness for a healthy Asia. Asian Development Bank, Philippines

Park SH, Hsieh C, Lee C (2016) Examining Chinese college students' intention to travel to Japan using the extended theory of planned behavior: testing destination image and the mediating role of travel constraints. J Travel Tour Mark 34:113–131. https://doi.org/10.1080/10548408.2016.1141154

Patterson TL, Semple SJ, Fraga M, Bucardo J, Davila-Fraga W, Strathdee SA (2005) An HIV-prevention intervention for sex workers in Tijuana, Mexico: a pilot study. Hisp J Behav Sci 27:82–100. https://doi.org/10.1177/0739986304270299

Patwary MM, Bardhan M, Disha AS, Hasan M, Haque MZ, Sultana R, Hossain MR, Browning MH, Alam MA, Sallam M (2021) Determinants of COVID-19 vaccine acceptance among the adult population of Bangladesh using the health belief model and the theory of planned behavior model. Vaccines 9:1393. https://doi.org/10.3390/vaccines9121393

Prabhakar A, Kaiser JM, Novitch MB, Cornett EM, Urman RD, Kaye AD (2019) The role of complementary and alternative medicine treatments in Fibromyalgia: a comprehensive review. Curr Rheumatol Rep 21:1–7. https://doi.org/10.1007/s11926-019-0814-0

Prasetyo YT, Castillo AM, Salonga LJ, Sia JA, Seneta JA (2020) Factors affecting perceived effectiveness of COVID-19 prevention measures among Filipinos during enhanced community quarantine in Luzon, Philippines: integrating protection motivation theory and extended theory of planned behavior. Int J Infect Dis 99:312–323. https://doi.org/10.1016/j.ijid.2020.07.074

Pu B, Du F, Zhang L, Qiu Y (2021) Subjective knowledge and health consciousness influences on health tourism intention after the COVID-19 pandemic: a prospective study. J Psychol Afr 31:131–139. https://doi.org/10.1080/14330237.2021.1903181

Ren X (2016) Wellness tourism: connotation analysis and development path. Tour Trib 31:1–4. https://doi.org/10.3969/j.issn.1002-5006.2016.11.001

Roberts JA, David ME (2021) Improving predictions of COVID-19 preventive behavior: development of a sequential mediation model. J Med Internet Res 23:e23218. https://doi.org/10.2196/23218

Robina-Ramírez R, Medina-Merodio JA, Moreno-Luna L, Jiménez-Naranjo HV, Sánchez-Oro M (2021) Safety and health measures for COVID-19 transition period in the hotel industry in Spain. Int J Environ Res Public Health 18:718. https://doi.org/10.3390/IJERPH18020718

Rogers AT (2010) Exploring health beliefs and care-seeking behaviors of older USA-dwelling Mexicans and Mexican-Americans. Ethn Health 15:581–599. https://doi.org/10.1080/13557858.2010.500018

Rosenstock IM (1974) Historical origins of the health belief model. Health Educ Monogr 24:328–335. https://doi.org/10.1177/109019817400200403

Šegota T, Chen N, Golja T (2021) The impact of self-congruity and evaluation of the place on WOM: perspectives of tourism destination residents. J Travel Res 61:800–817. https://doi.org/10.1177/00472875211008237

Shin MY, Na JM (2020) A exploratory research of economic effects on wellness tourism industry in Korea: exogenous specified input-output model. J Asia-Pac Stud 27:350–378. https://doi.org/10.18107/japs.2020.27.1.012

Sim JG (2013) Structural equation modeling (SEM) with SPSS/Amos. Cheongram, Seoul

Sim SW, Moey KSP, Tan NC (2014) The use of facemasks to prevent respiratory infection: a literature review in the context of the health belief model. Singap Med J 55:160–167. https://doi.org/10.11622/smedj.2014037

Smith M, Puczko L (2009) Health and wellness tourism. Elsevier Butterworth-Heinemann, Oxford

Soliman M (2021) Extending the theory of planned behavior to predict tourism destination revisit intention. Int J Hosp Tour Adm 22:524–549. https://doi.org/10.1080/15256480.2019.1692755

Stewart JE, Wolfe GR, Maeder L, Hartz GW (1996) Changes in dental knowledge and self-efficacy scores following interventions to change oral hygiene behavior. Patient Educ Couns 27:269–277. https://doi.org/10.1016/0738-3991(95)00843-8

Thal KI (2015) Self-determination theory and wellness tourism: how do wellness facilities contribute to wellbeing? Dissertation, University of South Carolina

Tian Y, Duan W (2019) Study on the development of Shanxi wellness tourism. J Hebei Tour Vocat Coll 24:30–38. https://doi.org/10.3969/j.issn.1674-2079.2019.01.008

Tian YF, Zhai CT, Gao HN, Chen M, Wang J (2017) Effect of moxi-bustion on the nailfold microcirculation of young and middle-aged people in sub-health status. World J Acupunct-Moxib 27:1–7. https://doi.org/10.1016/S1003-5257(18)30003-5

Tsai FJ, Hu YJ, Chen CY, Tseng CC, Yeh GL, Cheng JF (2021) Using the health belief model to explore nursing students' relationships between COVID-19 knowledge, health beliefs, cues to action, self-efficacy, and behavioral intention: a cross-sectional survey study. Medicine 100:e25210. https://doi.org/10.1097/MD.0000000000025210

Valois P, Talbot D, Bouchard D, Renaud JS, Caron M, Canuel M, Arrambourg N (2020) Using the theory of planned behavior to identify key beliefs underlying heat adaptation behaviors in elderly populations. Popul Environ 41:480–506. https://doi.org/10.1007/s11111-020-00347-5

Vrkljan S, Hendija Z (2016) Business performance of health tourism service providers in the Republic of Croatia. Acta Clin Croat 55:79–85. https://doi.org/10.20471/acc.2016.55.01.12

Wang Z (2009) International tourism island: Hainan should develop the "prescription" of wellness tourism. Hainan Today 12:12. CNKI:SUN:JRHN.0.2009-12-006

Wang J, Wang S, Wang Y, Li J, Zhao D (2018) Extending the theory of planned behavior to understand consumers' intentions to visit green hotels in the Chinese context. Int J Contemp Hosp Manage 30:2810–2825. https://doi.org/10.1108/IJCHM-04-2017-0223

Wang K, Xu H, Huang L (2020) Wellness tourism and spatial stigma: a case study of Bama, China. Tour Manage 78:e104039. https://doi.org/10.1016/j.tourman.2019.104039

Wang X, Lai IKW, Zhou Q, Pang YH (2021) Regional travel as an alternative form of tourism during the COVID-19 pandemic: impacts of a low-risk perception and perceived benefits. Int J Environ Res Public Health 18:9422. https://doi.org/10.3390/ijerph18179422

Wu ST, Chen YS (2018) Local intentions to participate in ecotourism development in Taiwan's Atayal communities. J Tour Cult Change 16:75–96. https://doi.org/10.1080/14766825.2016.1253705

Xie D, He B, Cai J, Yang X, Zhu L (2019) Study on the behavioral intention of potential tourists in health and well-being tourism: based on the theory of planned behavior. Forest Econ 41:33–40. https://doi.org/10.13843/j.cnki.lyjj.2019.03.006

Xie X, Guo Q, Wu Y (2018) The research of China's healthy tourism pattern in the Regional Characteristic Towns. Ecol Econ 34:150–154. CNKI:SUN:STJJ.0.2018-09-027

Xue Z (2018) Economics lecture notes. CITIC Publishing Group, Beijing

Yan R, Wu D, Fang Z (2021) A review of Studies on wellness tourism at home and abroad. J Green Sci Technol 23:209–213. https://doi.org/10.16663/j.cnki.lskj.2021.21.062

Yang S, Isa SM, Ramayah T (2022) Does uncertainty avoidance moderate the effect of self-congruity on revisit intention? A two-city (Auckland and Glasgow) investigation. J Destin Mark Manage 24:e100703. https://doi.org/10.1016/j.jdmm.2022.100703

Yu SH, Lee H (2020) Development of evaluation scale for wellness tourism. J Tour Stud 32:25–56. https://doi.org/10.21581/jts.2020.8.32.3.25

Yu JY, Lim JA, Kim SI (2014) Research on the development of residence-type medical tourism cluster models. Korea Tourism Organization, Seoul

Yuriev A, Dahmen M, Paillé P, Boiral O, Guillaumie L (2020) Pro-environmental behaviors through the lens of the theory of planned behavior: a scoping review. Resour Conserv Recycl 155:e104660. https://doi.org/10.1016/j.resconrec.2019.104660

Zhang H, Li L, Yang Y, Zhang J (2018) Why do domestic tourists choose to consume local food? The differential and non-monotonic moderating effects of subjective knowledge. J Destin Mark Manage 10:68–77. https://doi.org/10.1016/j.jdmm.2018.06.001

Zhang Y, Wong IA, Duan X, Chen YV (2021) Craving better health? Influence of socio-political conformity and health consciousness on goal-directed rural-eco tourism. J Travel Tour Mark 38:511–526. https://doi.org/10.1080/10548408.2021.1952149

Zhao J, An Y (2021) Behavioural intention of forest therapy tourism in China: based on health belief model and the theory of planned behaviour. Curr Issues Tour 24:3425–3432. https://doi.org/10.1080/13683500.2021.1886256

Zheng D, Luo Q, Ritchie BW (2021) Afraid to travel after COVID-19? Self-protection, coping and resilience against pandemic 'travel fear'. Tour Manage 83:1–13. https://doi.org/10.1016/j.tourman.2020.104261

Zhou Y, Liu LG, Sun X (2022) The effects of perception of video image and online word of mouth on tourists' travel intentions: based on the behaviors of short video platform users. Front Psychol 13:5631. https://doi.org/10.3389/fpsyg.2022.984240

Zoellner JM, Porter KJ, Chen Y, Hedrick VE, You W, Hickman M, Estabrooks PA (2017) Predicting sugar-sweetened behaviours with theory of planned behaviour constructs: outcome and process results from the SIP smart ER behavioural intervention. Psychol Health 32:509–529. https://doi.org/10.1080/08870446.2017.1283038

Author contributions

Conceptualization: YZ and LL; methodology: YZ and SH; data curation: YZ, SH, and XS; writing—original draft preparation: YZ and LL; writing—review and editing: YZ and LL.

Competing interests

The authors declare no competing interests.

Ethical approval

Ethical approval was obtained from the Department Ethics Committee (DEC) at the Business School of Liaoning University in Shenyang, Liaoning Province. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent

Before the research survey questionnaire, the participants were given a consent form, having read through and comprehended the study's purpose and objectives. All those who understood the purpose and goals of the research participated. The consent form included the authors' contact information for inquiries about the study and withdrawal from participation. We believe that the participants provided informed consent and that the institution's ethics committee granted permission to conduct the research. More so, the questionnaire survey instrument does not have any identifiable information.

Additional information

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