International Journal of Tourism Research

WILEY

RESEARCH ARTICLE OPEN ACCESS

Overcrowding, Risk Perception, and Protective Behaviors: A Study on Tourist Decision-Making

Zhang Jieyao[1] | Jeetesh Kumar[2] | Erose Sthapit[2,3] | Brian Garrod[4]

[1]School of Management and Economics, Chuxiong Normal University, Chuxiong City, China | [2]School of Hospitality, Tourism & Events, Centre for Research and Innovation in Tourism (CRiT), Sustainable Tourism Impact Lab, Taylor's University, Subang Jaya, Malaysia | [3]Department of Marketing, International Business and Tourism, Manchester Metropolitan University, Manchester, UK | [4]School of Management, Swansea University, Swansea, UK

Correspondence: Erose Sthapit (e.sthapit@mmu.ac.uk)

Received: 24 April 2025 | **Revised:** 24 July 2025 | **Accepted:** 26 July 2025

Funding: The authors received no specific funding for this work.

Keywords: coping appraisal | overcrowding | protective behavioral intention | risk perception | threat appraisal

ABSTRACT

This study uses protection motivation theory as its theoretical foundation to examine the relationships between crowding experience, cognitive appraisal, risk perception, and protection behavioral intention. Data were gathered from 361 tourists who had experienced crowding situations. Structural equation modeling was then used to test a proposed conceptual model. The results indicate significant relationships between coping appraisal, risk perception, and tourists' protection intention. Risk perception, meanwhile, was found to fully mediate the relationship between crowding experience and protection behavior intention. Implications for tourism management include the need to promote not only awareness of overcrowding but also readiness among tourists to adapt to overcrowded conditions. More and better information is needed on the potential for overcrowding and its associated risks before tourists respond regarding protective behavior change.

1 | Introduction

Following rapid population growth and urbanization, the world has entered a more crowded era (Jo et al. 2024). Due to the exponential growth of tourists and their overcrowding in specific locations at specific times, land-use conflicts and overcrowding issues are now negatively impacting the environment, the local population's quality of living and life satisfaction, and the safety of tourists (Pai et al. 2024). As overcrowding has become an increasingly frequent phenomenon, mass media and governments have paid greater attention to its causes and consequences for public safety (Li, Liu, et al. 2024).

The overcrowding risks associated with tourism are similar in many ways to those related to events such as religious pilgrimages, music festivals, and sporting events, attendance at any of which carries the risk of physical injury from stampedes and traumatic asphyxiation (Khan and Aljohani 2024). According to Manoochehry and Rasouli (2017, 36), the "most dreaded trauma risk" for Muslim pilgrims attending Hajj is a stampede. For example, the 2015 Hajj stampede in Mina, Saudi Arabia, resulted in the death of 2431 pilgrims (Khan and Noji 2016). Another example of fatal overcrowding occurred on October 29, 2022, the night of Halloween celebrations in Seoul, South Korea, when tens of thousands of celebrants poured into the Itaewon district. The outcome was one of South Korea's worst ever stampede disasters, which killed 170 people and injured 156 others through crushing trauma (Sharma et al. 2023; Kumar et al. 2023). Even in the face of the risk of tourist crowding, people are still willing to travel, although they will often choose safer, possibly less well-known destinations (Neuburger and Egger 2021). Therefore, it is necessary to understand tourists' risk awareness and preventive protection awareness fully.

The experience of overcrowding has attracted much attention in the academic literature, as it is considered to play an

essential role in influencing travelers' destination choices (Miah et al. 2025; Pai et al. 2024). The rapid expansion of the tourism industry has widened and deepened tourists' personal experiences, which means they may have a higher degree of sensitivity to the possibility of encountering overcrowding in subsequent travels (Shukla et al. 2024). Tourists are increasingly likely to recognize and act upon safety risks because of the ever-greater amounts of information available to them (Swenson and Bansal 2024). Travelers who have experienced overcrowding may therefore have greater sensitivity to the effects of crowding and sharper risk perceptions (RPs) when it comes to overcrowding at tourist sites (Pai et al. 2024). Therefore, it is necessary to fully understand tourists' experience of crowding to better prevent and respond to its risks.

According to Mowen (2000), RP relates to the probability of a specific action having a negative outcome. Tourism RP can be defined as the subjective judgment of a tourist that a tourism activity will result in one or more unfavorable outcomes. Negative outcomes arise from an imbalance between the safety information given to the tourist and their subjective perceptions of the risks related to a particular tourism activity (Cui et al. 2016). However, only a few studies have explored how crowding experiences (CEs) influence intention to engage in protective behavior through RP (Lee et al. 2024). RP is multifaceted and may be related to resource–user conflict, unwelcome visitor behavior, and resource constraints (Chen et al. 2025; Rathnayake 2015). It is therefore necessary to discuss the intrinsic correlation between CE and RP to reduce the probability of crowding-related risk.

It is important to recognize that the human-induced risks related to tourism cannot be entirely eliminated by implementing safety precautions (Leatherman et al. 2024). Moreover, while some studies have focused on tourists' RPs, few have examined how individuals identify and adopt risk-reduction strategies (Glowka et al. 2024). This is despite the perception that stampedes and crushing fatalities still occur frequently in tourist areas (Sharma et al. 2023). Existing studies have instead explored the causes and effects of overcrowding in the tourism context (Neuts and Vanneste 2018), with few studies related to how tourists behave to preserve their safety when traveling (Chien et al. 2017). A popular finding is that it is crucial to increase tourists' awareness of the dangers of trauma and death in unfamiliar environments, and to educate them about the prevention strategies they can adopt, thereby improving tourists' ability to prevent the risks of overcrowding in destinations where overtourism is occurring (Moreschini et al. 2025).

Regarding guiding theories, protection motivation theory (PMT) attempts to explain why individuals safeguard their health and safety. PMT can be used to assess any risk for which a person can take appropriate preventative action (Mortada et al. 2021). Although PMT has been employed in the context of travel and tourism, these studies have tended to focus on general health and safety rather than the risks associated specifically with overcrowding (Wang et al. 2019). While some studies have applied PMT to identify defensive-perceived behavior, few of them are linked to the perceived threat of overcrowding at tourist sites (Pai et al. 2024). Few studies have explored how tourists, when faced with overcrowding, can take appropriate precautions and adopt risk-reduction strategies, including protective behaviors, to enhance their safety.

This study therefore aims to examine the impact of RP on tourists' protective intentions, along with the underlying dynamics and cognitive processes of tourists' protective behaviors. More specifically, using PMT as its theoretical foundation, this study examines how defensive measures and risk-reduction strategies are stimulated through cognitive processes when facing tourism overcrowding. It also examines whether cognitive appraisals (i.e., threat and coping appraisal [TA and CA]) and RPs regarding overcrowding mediate the relationship between tourists' CEs and their intention to adopt protective behaviors. This study therefore expands the understanding of preventive protection behavior by examining people's CE, cognitive processes, and RP (Wang et al. 2019). Based on the findings of the study, tourism destination managers can influence tourists' RP through management strategies such as publicity and guidance, making them more willing to take preventive measures during travel.

2 | Literature Review and Hypothesis Development

2.1 | PMT

The original intention of PMT was to afford a better understanding of how different people react to fear appeals (Rogers 1975). PMT describes how individuals cognitively assess a threat and engage in defensive actions (Floyd et al. 2000). The theory proposes that two cognitive processes—TA and CA—are combined to motivate individuals to protect themselves from threats and change their behavior under threatening conditions. TA evaluates and examines the severity of a situation, including the perceived threat severity and the perceived threat vulnerability (Chauhan 2024). According to Rogers (1975), perceived severity refers to the perceived level of harm to an individual associated with the event. Perceived vulnerability, in contrast, indicates the believed likelihood that a threatening event will occur (Chauhan 2024).

CA relates to a person's reaction to a situation based on response efficacy and self-efficacy (Rogers 1975). Response efficacy is the belief in the effectiveness of advised risk-preventive conduct, whereas self-efficacy is the belief in one's capacity to engage in such behavior (Floyd et al. 2000). PMT is widely used to understand how people perceive and evaluate risk. It is still one of the most commonly used models in public health to evaluate individual health behaviors such as disease prevention (Kim and Hyun 2024), smoking behavior (Lin et al. 2022), the adoption of healthy lifestyles (Cha et al. 2024), and environmental issues and pro-environmental behavior (Seow et al. 2022). More recently, it has been used in the travel and tourism domain (Zhu et al. 2022)—most recently in literature investigating the intersection of health and travel/tourism (Alhemimah 2023).

In the context of tourism overcrowding, PMT can help elucidate the behavioral dimension of travel attitudes, which offers an interdisciplinary technique to research tourism through the lens of health-and-safety science. Although PMT is quite widely used in tourism research (Lin et al. 2024),

inconsistencies in travel-risk research remain, with early studies often focusing on only one aspect of perceived vulnerability or perceived severity (Wang et al. 2019), making it challenging to translate theory into practice. Other studies have developed PMT and tested the relationships between its constructs, but the results have tended to be inconsistent with the original PMT hypothesis (Fisher et al. 2018). According to Miceli et al. (2008), the impact of two dimensions—TA and CA—differs according to the context. While some research suggests that CA is more important, other studies show TA is more strongly related to the resulting behaviors. Indeed, TA was found to have the most significant impact on protection motivation by Horng et al. (2014), while Fisher et al. (2018) found that CA significantly predicted protection motivation and subsequent intention (handwashing to prevent norovirus infection), while the TA constructs had no significant impact. In contrast, Wang et al. (2019) found that both threat assessment and CA affected protective motivation and behavioral intention. More investigation is required to gain further knowledge into the impact of these elements on travelers' desire for protection and behavioral intention.

Two primary strategies for reducing travel-related risk were highlighted by Hales and Shams (1991): altering consumption patterns and searching for more information. Subject to resource limitations, tourists can proactively acquire risk information (e.g., what level of overcrowding can lead to a stampede), and travelers can begin to control their safety risks (Wilks et al. 2013). Tourists can follow a basic logical sequence from risk information reception to RP to risk response behavior (Lindell and Hwang 2008). Although previous research has established the benefits of safety information search (Jaafar et al. 2017), these studies were not undertaken in the context of travel and tourism—nor did they consider the role of previous experience. Thus, although the authors support the use of PMT, we point out that crowding risk has not been sufficiently considered as an essential safety challenge in PMT-based studies. The perception of risk by tourists is one of the most prominent areas of overlap between PMT and travel risk research. The process mechanism of RP and behavioral intention under the protection motive perspective has, however, yet to be experimentally validated. Nor has RP been tested as a mediating variable in the decision-making behavior process (Huang et al. 2020), even though tourists base their risk judgments and, consequently, their decision-making behavior on cognitive assessment. By exposing this significant relationship, a theoretical foundation for directing and controlling tourists' protective behavior in risky situations can be established. In addition, existing studies do not focus on the willingness to participate in protective activities but examine the willingness to travel. This study therefore explores how CE, threat, CA, and RP affect protective motivation, and how these links affect the intention to take preventive behaviors.

2.2 | RP

The term "risk perception" describes how individuals feel about the negative effects of doing something beyond what they consider acceptably safe (Leung et al. 2024). Perceived risk in tourism refers to circumstances that may lead to the decision to forego travelling to a specific destination (Chauhan 2024). In the context of disasters and natural hazards, the relationship between risk experience and protective measures has already been demonstrated (Ju et al. 2025). Yang et al. (2024) identified two primary risk-reduction techniques related to travel: conducting an information search and altering consumption behavior. Such studies move in a logical sequence from the receipt of risk information to RP to risk-response behavior (Chen et al. 2024). The work of Beirman (2020) indicates the significance of RP in tourism, stressing that travelers' perceptions of safety and danger are primary determinants of a destination's appeal. Wen et al.'s (2020) study identified psychological and perceived risks as key factors influencing travel behavior and intentions. The present study, therefore, will integrate perceived risk into a conceptual framework based on PMT. Perceived risk is thus defined in this study as the degree of perceived possible loss due to tourism overcrowding resulting in adverse trip outcomes.

2.3 | CE as the Input

Past experiences provide valuable information and contribute to knowledge accumulation (Dong et al. 2024). Some tourist studies have used previous experience to determine current cognitions and behaviors (Maghrifani et al. 2024). As PMT has been successfully applied in various tourism studies, tourists' perceptions of the destination (in the present case, CE) can serve as a source of information (Zhang et al. 2025). Prior experience can counteract the impact of risk variables on consumer decisions and is a possible predictor of tourists' attitudes toward risk and risk-related behavior. Prior experience can also influence people's risk aversion toward the possible outcomes (Yang et al. 2024). Li, Zhang, et al. (2024), for example, found a correlation between travelers' experiences and their perception of risk, which influenced their choice of location and manner of traveling. International travelers with and without experience perceive risk differently, and prior experiences have been found to influence traveler choice significantly (Kim et al. 2024). Since experience is a component of consumer knowledge, the degree of experience can influence one's perception of risk, significantly influencing travel decisions. The present study thus adopts the following hypotheses:

H1. *CE has a significant positive effect on tourists' TAs.*

H2. *CE has a significant positive effect on tourists' CAs.*

H3. *CE has a significant positive effect on tourists' RP.*

H4. *CE has a significant positive effect on protective behavioral intention (PBI).*

2.4 | The Cognitive Medicating Process of PMT

Two essential adaptive elements in the cognitive mediating process of PMT are TA and CA (Zhang et al. 2023). Threat assessment thus combines an individual's judgment of the probability of a threat occurring (i.e., perceived vulnerability) and the harmfulness of the threat in a specific event (i.e., perceived severity) (Rogers 1975). It thus represents the effectiveness of the advised action in responding to a given danger (Wang et al. 2019). Threat assessment in the

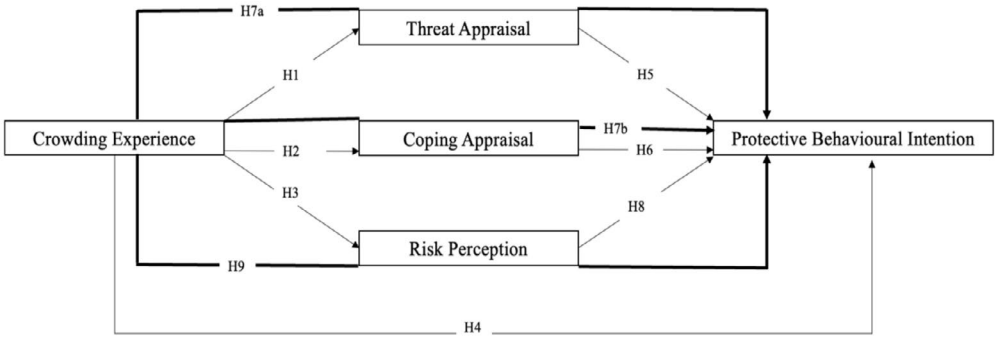

FIGURE 1 | Conceptual framework.

context of this study thus refers to tourists' perceptions of the severity of overcrowding risks and their susceptibility to it, although it can also include psychological trade-offs concerning other relevant threats. Verkoeyen and Nepal (2019) examined the responses of divers to coral bleaching by testing the relationship between threat and future behavior. In another study, Wang et al. (2019) found that Australian travelers' protection motivations (e.g., TA and CA) may influence their protection intentions when facing rabies threats and that such intentions may ultimately translate into actual behaviors. Given the concentrated nature of tourism flows, this study conjectures that overcrowding risk will be the most relevant threat to be concerned about during tourism.

According to PMT, TA and CA (including self-efficacy and response efficacy) impact people's decisions about taking precautionary risk measures (Mills et al. 2024). For example, Mortada et al. (2021) indicated a strong relationship between the desire to engage in protective behaviors on the one hand and self-efficacy and response efficacy on the other. Self-efficacy and response efficacy have also been researched as factors that enhance preventative behaviors since the advent of COVID-19 (Kim and Hyun 2024). Both response efficacy and self-efficacy in coping assessment positively influence self-protective behaviors (Rogers 1975). Individuals with high response efficacy and self-efficacy are likelier to adopt effective preventive behaviors (Downing et al. 2023). CA, therefore, leads either to a maladaptive reaction (e.g., engaging in potentially harmful behaviors) or to an adaptive response (i.e., protective behaviors) (Mackay et al. 2025). A tourist's motivation for protection would be expected to strengthen when their actions effectively lessen the danger (i.e., high response efficacy) and raise their expectations of successfully executing adaptive behavior (i.e., high self-efficacy) (Zhang et al. 2025). PMT and risk-reduction strategies may be particularly strongly correlated since, during the coping evaluation stage, people may devise a range of tactics to minimize and control potential travel risks when a choice to travel is expected to be made (Ma et al. 2024). The present study thus adopts the following hypotheses:

H5. *Tourists' TAs have a significant and positive effect on tourists' PBI.*

H6. *Tourists' CAs have a significant and positive effect on tourists' PBI.*

H7a. *TA serves as a significant mediator between CE and PBI.*

H7b. *CA serves as a significant mediator between CE and PBI.*

2.5 | The Mediating Influence of RP

RP is a complicated psychological experience impacted by resource conditions, undesired visitor behaviors, and user conflict (Ertaş and Kırlar-Can 2024). In addition, RP may mediate between the information source of prior threat experiences, fear, and travelers' intent to take precautions (i.e., protective behavior) (Lu and Wei 2019). Following a thorough search of the literature, Wang et al. (2019) identified 10 studies using PMT to assess perceived travel-related risk. Most of these studies sought to determine the association between RP and future actions in diverse settings. For example, McCaughey et al. (2017) examined people's perceptions of the hazards of a tsunami and their plans for preventing future health problems. In another study, Schroeder and Pennington-Gray (2016) developed a conceptual model to better understand the dynamics among risk-related constructs, finding that perceived risk and perceived efficacy can encourage risk-reduction behavior. Ud Din et al. (2024) indicated that overcrowding may put individuals at risk, and tourists may avoid crowded destinations. Accordingly, the following hypotheses are proposed:

H8. *Tourists' RP significantly and positively affects tourists' PBI.*

H9. *Tourists' RP significantly mediates the CE and PBI.*

The conceptual framework for this study is presented in Figure 1.

3 | Methods

3.1 | Research Procedure and Samples

The study site is Lijiang Ancient Town, located in southwest China, which combines China's Han majority with Tibetan civilizations. This ancient town is home to an ethnic minority group (called Naxi) for over 800 years and is situated on a flatland 2400 m above sea level, with the Yulong Snow Mountain as a natural barrier that practically isolates Lijiang from the rest of China. Eight hundred years of continuous evolution have endowed the town with a distinct built environment that won it World Heritage site status in 1997 (Su 2010). Based on data from the Tourist Administration of Lijiang City website, Lijiang's tourism industry received 67.9 million domestic tourists in 2023 and realized a domestic tourism revenue of 129.87 billion yuan (18.092 billion USD) (Cui 2024). The large-scale influx of tourists has brought serious challenges to the sustainable

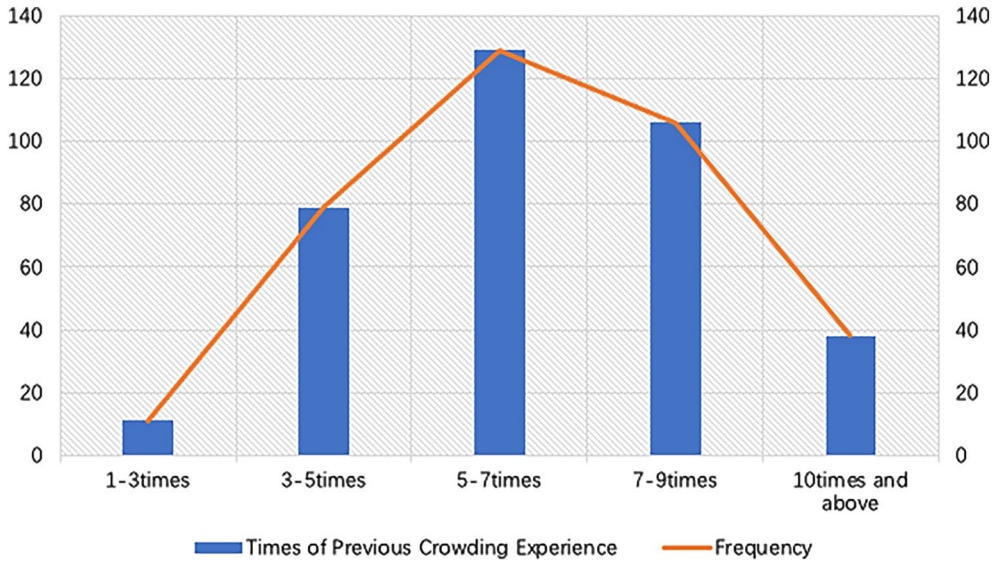

FIGURE 2 | Frequency diagram of crowding experience.

development of the site. The growth of tourism is manifested in persistent overtourism, which has in turn affected tourists' perception of crowding and their awareness of the need for protection. Lijiang Old Town was thus chosen as a suitable case location for the study.

The target respondents in this study were tourists aged 18 years and older who had previously experienced tourism-related overcrowding. At the beginning of the questionnaire, the meanings of "crowded experience" and "risk perception" were explained to the respondents. To ensure data quality, a screening question was asked at the beginning of the questionnaire: respondents were asked whether they had experienced overtourism or overcrowding in the tourist destination in the past year. If the answer selected was "yes," they could proceed to complete the online questionnaire. Any login and IP address could be used only once. The survey also set up some relevant questions, such as asking respondents to indicate the number of times they encountered crowding in previous travels (1–3 times, 3–5 times, 5–7 times, 7–9 times, 10 times and more), and to identify a specific crowded scene to help respondents recall the required information (Figure 2).

The data were collected using a purposive sampling technique (Hollebeek and Rather 2019) through an on-site, self-administered questionnaire. This nonprobability sampling technique relies on the researcher's opinion to choose the respondents (Hair et al. 2019). It was chosen because it does not require an established theoretical foundation (as is the case with this study). Nor does it require a predetermined number of participants (Black 2019). Two tourism professors translated the English questionnaire into Chinese to verify its applicability in a cross-cultural context. The questionnaire was then tested using a pilot study with a sample of 60 respondents over 5 days. Respondents from potential traveler groups encountered at Kunming Changshui International Airport in China were selected. Results showed no issues regarding item clarity or readability. The study employed SPSS to compute reliability statistics for the main study. The Cronbach's alpha (CA) scores ranged from 0.707 to 0.793, indicating that all constructs exceeded the recommended threshold. The full data set was gathered between October and November 2024. Tourists were approached in key hotspots, including hotels and tourism attraction sites. Although 430 questionnaires were distributed and subsequently received, only 361 were considered fully valid and used in the analysis. The response rate was thus 84%. Based on G*Power, the minimum sample size required to obtain a power of 0.95 for the present analysis is 178 (Faul et al. 2009). The sample of 361 participants would thus be considered sufficient to achieve the desired statistical power for this study.

3.2 | Survey Instrument

A structured questionnaire composed of question statements was employed. The first part of the study comprised an analysis of the demographic characteristics of the respondents. This included gender, age, marital status, education level, monthly salary income, accompanying persons, and duration. The second part was the scale question section, which comprised 22 items measuring five key constructs (Table 2). These were: (1) CE, which was measured using three items adapted from Nugraha et al. (2016); (2) TA, which was measured using six items adapted from Ruan et al. (2020) and Su et al. (2022); (3) CA, which was measured using six items adopted from Ruan et al. (2020) and Su et al. (2022); (4) RP, which was measured using four items from Lu and Wei (2019); and (5) protective behavioral intention, which was measured by adapting three items from Nugraha et al. (2016). All items were scored on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*).

4 | Data Analysis and Results

Descriptive statistics were generated in SPSS software. SPSS was also used for preliminary data analysis, including cleaning the data, determining the response rate, handling missing data, identifying outliers, and calculating descriptive statistics.

The study then used partial least-squares structural equation modeling (PLS-SEM) to develop the measurement model, determine correlations between the latent constructs, and evaluate the model's validity and reliability. PLS-SEM was also used to determine if the framework parameters met an inverse assessment hypothesis and to check for common method bias (CMB) in the conceptual model. The findings revealed that no CMB problem exists in this study, as a single factor explained less than the recommended threshold (< 50%) of the total variance (Podsakoff et al. 2003). Moreover, the inner VIF values in this study were found to be below 3.3, indicating no substantial CMB (Kock 2017).

PLS-SEM analyses a network of connected effects using factor analysis, regression, and various other approaches and multivariate methods. PLS-SEM is frequently used in travel and tourism literature (Usakli and Kucukergin 2018). Furthermore, PLS-SEM is recommended for theory development and testing, as well as research to identify essential components and/or predict outcomes (Hair et al. 2016). Therefore, PLS-SEM was adopted as the most suitable analytical tool.

4.1 | Profile of Respondents

The sociodemographic profile of the respondents is shown in Table 1. There are slightly more females (51.5%) than males (48.5%). Regarding age, the largest age group was 56 years of age and above (20.4%), followed by 36–45 years (19.6%). Most respondents were married (52.6%). With regard to education, the largest group (38.3%) had a university degree. Regarding their monthly income, 22.3% earned from 7001 to 9000 Chinese Yuan (975–1253 USD), while 21.5% earned 9001 Chinese Yuan (1254 USD) or more. Regarding travel companions, the largest group (30.9%) was those traveling with friends. In terms of length of stay, the largest group (38.3%) stayed for 3–5 days, followed by 34.7% who stayed for 5–7 days.

TABLE 1 | Sociodemographic profile of the respondents.

Characteristics of respondents		Frequency	Percentage
Gender	Male	176	48.5
	Female	187	51.5
Age	18 and below	40	11.0
	19–25	45	12.4
	26–35	64	17.6
	36–45	71	19.6
	46–55	69	19.0
	56 and above	74	20.4
Marital status	Single	172	47.4
	Married	191	52.6
Education level	High school or lower	98	27.0
	University degree	139	38.3
	MSc degree	82	22.6
	PhD degree	44	12.1
Monthly salary income (Chinese Yuan = $0.14)	Up to 3000	65	17.9
	3001–5000	68	18.7
	5001–7000	71	19.6
	7001–9000	81	22.3
	Over 9000	78	21.5
Accompanying	Single	75	20.7
	Family	106	29.2
	Friends	112	30.9
	Travel group	70	19.3
Duration	1–2 days	55	15.2
	3–5 days	139	38.3
	6–7 days	126	34.7
	Over 7 days	43	11.8

4.2 | Correlation Analysis of Constructs

Asa noted previously, a major aim of this study was to identify factors influencing protective behavioral intention. To this end, a correlation analysis was conducted to examine the relationships among key constructs (Table 2). The results showed moderate associations, with the strongest correlation being between CA and RP ($r = 0.603$). CE was moderately related to TA ($r = 0.347$), while protective behavioral intention exhibited weak correlations with all variables. Overall, the low-to-moderate correlation values indicate acceptable discriminant validity and no multicollinearity issues.

4.3 | Measurement Model

Each item was first evaluated for validity and reliability using CA, composite reliability (CR), and average variance extracted (AVE). Table 3 displays the CR (which ranges from 0.735 to 0.836), CR values (which range from 0.834 to 0.883), and AVE (which ranges from 0.549 to 0.716) for each construct (Table 3). These results demonstrate strong internal consistency and reliability of the scales, along with the loadings at the individual item level. Several loadings in the measurement model (i.e., for CA1, CA2, CA6, RP1, and TA1) were marginally less than 0.7. It was therefore decided to remove CA1 in order to meet the recommended AVE thresholds, with the CR and AVE value of 0.496 for CA1 being less than 0.5. The PLS algorithm was restarted once the unqualified elements were removed, and fresh results that satisfied all suggested thresholds were produced. The square of the AVE for each of the variables exceeded the relevant inter-construct correlations (i.e., the Fornell–Larcker criterion was met), while the heterotrait–monotrait ratios were less than 0.90, confirming the discriminant validity of the reflective constructs (Tables 4 and 5).

TABLE 2 | Correlation analysis of constructs.

	Crowding experience	Threat appraisal	Coping appraisal	Risk perception	Protective behavioral intention
Crowding experience	1				
Threat appraisal	0.347	1			
Coping appraisal	0.139	0.312	1		
Risk perception	0.179	0.316	0.603	1	
Protective behavioral intention	0.024	0.137	0.263	0.278	1

4.4 | Structural Model

To determine significance levels, 5000 resamples were bootstrapped using SmartPLS to obtain the standardized path coefficients (β) and associated t-values (Table 5). The model's predictive relevance (Q^2) and explained variance (R^2) were computed. The interpretation of the weights of the perception and cognitive processes dimensions, TA (0.128), CA (0.022), RP (0.032), and protective behavioral intention (0.096) showed that the TA contributed more to the formation of protective behavior. The model's predictive significance was also sufficient because the derived Q^2 values were higher than 0.

Regarding the direct effect, the results show that five out of seven path relationships were positive and significant, including CE to TA (H1, $\beta = 0.358$, $p < 0.001$), CE to CA (H2, $\beta = 0.147$, $p < 0.001$), CE to RP (H3, $\beta = 0.180$, $p < 0.001$), CA to PBI (H6, $\beta = 0.130$, $p < 0.01$), RP to PBI (H8, $\beta = 0.207$, $p < 0.001$). Thus, H1, H2, H3, H6, and H8 were accepted, while H4 and H5 were rejected (Figure 3 and Table 6).

4.5 | The Mediating Role of Cognitive Process and RP

To create 95% bias-corrected confidence intervals (CIs) for indirect effects, 5000 samples were employed in a bootstrapping technique. The statistical significance of the effects is shown by the lack of a zero in the range of lower limit and upper bound CIs (Fu et al. 2019). The indirect path H9 (CE → RP → PBI) was significant and positive ($\beta = 0.037$, $p < 0.05$), but indirect paths H7a (CE → TA → PBI) and H7b (CE → CA → PBI) were not ($\beta = 0.020$, $p = 0.186$, and $\beta = 0.019$, $p = 0.086$ respectively). Only RP, therefore, fully mediated the relationship between crowding experience and protective behavioral intention, confirming H9. Thus, H9 was accepted, while H7a and H7b were rejected (see Figure 3 and Table 7).

5 | Discussion and Implications

5.1 | Discussion

This study has investigated how tourists' overcrowding experiences motivate their protective behaviors in the face of overtourism. It provides insights into how tourists' cognitive processes and RP play important roles in increasing protective behaviors in response to tourist crowding.

The experience of overcrowding had a significant positive relationship with TA, CA, and RP, indicating that when tourists participated in overcrowded tourism activities or visited overcrowded tourist cities during peak tourism seasons, they were more aware of the potential dangers of tourism overcrowding and its potential risks. With the experience of crowding, they were more confident and capable of overcoming the potential harms brought by overcrowding. Memories and feelings about a disaster are responses to a positive reappraisal of the experience (Ju et al. 2025). Munanura et al. (2024) indicated that tourism attributes and affective emotions can play important roles in the cognitive processes determining locals' support for tourism. Personal engagement and prior experience with the phenomenon have a significant role in informing the tourist's decision-making, which indicates that exposure to dangerous circumstances led to differences with respect to coping with coastal dangers.

The present study did not find, however, that overcrowding had a significant impact on protective behavioral intention. This is contrary to the finding that the experience of overcrowding had a significantly positive effect on precautionary behavior in a previous study (Lombardi and Ciceri 2021). These findings are also contrary to the results of Reichel et al.'s (2007) study, which indicates that travelers' attitudes towards risk and associated behaviors may be predicted by prior experience, and that this can also mitigate the influence of risk factors on consumer choices. As a result, the experience of overcrowding might not positively affect protective behavioral intention, which may not have been fully interpreted in the previous studies.

The results of this study also failed to demonstrate a significant relationship between environment appraisal and PBI. It can be argued that tourists believe they are less likely to encounter dangerous overcrowding in a regular tourism environment, so they will not take more protective behaviors, such as choosing less-popular tourist destinations to avoid tourist crowding. This finding contradicts Grano et al. (2022) and Williams et al. (2015).

The present findings further revealed a significant relationship between CA and protective behavioral intention, indicating

TABLE 3 | Validity and reliability test results.

Construct	Items	Loadings	Cronbach's α	rho_A	CR	AVE
Crowding experience (CE)	CE1: Past experiences have made me more aware of the risks of tourism overcrowding.	0.807***	0.802	0.812	0.883	0.716
	CE2: Past experiences have taught me the serious consequences tourism overcrowding can have.	0.866***				
	CE3: Past experiences have enabled me to reduce the potential risks to me of tourism overcrowding.	0.863***				
Threat appraisal (TA)	TA2: Overcrowding will affect tourists' mood.	0.74***	0.836	0.844	0.879	0.549
	TA3: Overcrowding will affect the quality of tourists' travel.	0.75***				
	TA4: Overcrowding is a serious threat.	0.82***				
	TA5: Overcrowding endangers tourists' safety.	0.73***				
	TA6: There are serious safety consequences if I encounter tourism overcrowding.	0.76***				
Coping appraisal (CA)	CA2: I have enough basic skills to protect myself from tourism overcrowding.	0.693***	0.799	0.805	0.861	0.553
	CA3: I can learn to take preventive measures to protect myself from overcrowding when traveling.	0.704***				
	CA4: The efforts made by the tourism industry to protect me from the threat of overcrowding are effective.	0.806***				
	CA5: The safety measures available in the tourism venues I visit are effective in preventing the risk of overcrowding.	0.739***				
	CA6: The precautions provided by the tourism venues I visit are helpful in mitigating the dangers of overcrowding.	0.772***				
Risk perception (RP)	RP1: Overcrowding causes harm to social order of the scenic spot.	0.693***	0.735	0.736	0.834	0.558
	RP2: Overcrowding in scenic spots may endanger my safety.	0.765***				
	RP3: Overcrowding causes harm to my mental health and emotional state.	0.776***				
	RP4: Overcrowding causes harm to my satisfaction of the scenic spot.	0.749***				
Protective behavioral intention (PBI)	PBI1: I take all precautions to protect myself in the face of tourism overcrowding.	0.847***	0.790	0.790	0.877	0.705
	PBI2: If overcrowding is expected, I will try to cancel my travel plans.	0.866***				
	PBI3: If overcrowding is expected, I will try to shorten the duration of my planned trip.	0.805***				

Abbreviations: AVE = average variance extracted; CR = composite reliability.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

TABLE 4 | Fornell–Larcker ratio.

	Coping appraisal	Crowding experience	Protective behavioral intention	Risk perception	Threat appraisal
Coping appraisal	0.744				
Crowding experience	0.147	0.846			
Protective behavioral intention	0.241	0.022	0.840		
Risk perception	0.500	0.180	0.280	0.747	
Threat appraisal	0.282	0.358	0.138	0.315	0.741

Note: Numbers on the diagonal represent the square of the AVE.

TABLE 5 | Discriminant validity using the heterotrait–monotrait ratio of correlations test.

	Coping appraisal	Crowding experience	Protective behavioral intention	Risk perception
Coping appraisal				
Crowding experience	0.184			
Protective behavioral intention	0.297	0.075		
Risk perception	0.647	0.235	0.367	
Threat appraisal	0.348	0.429	0.168	0.402

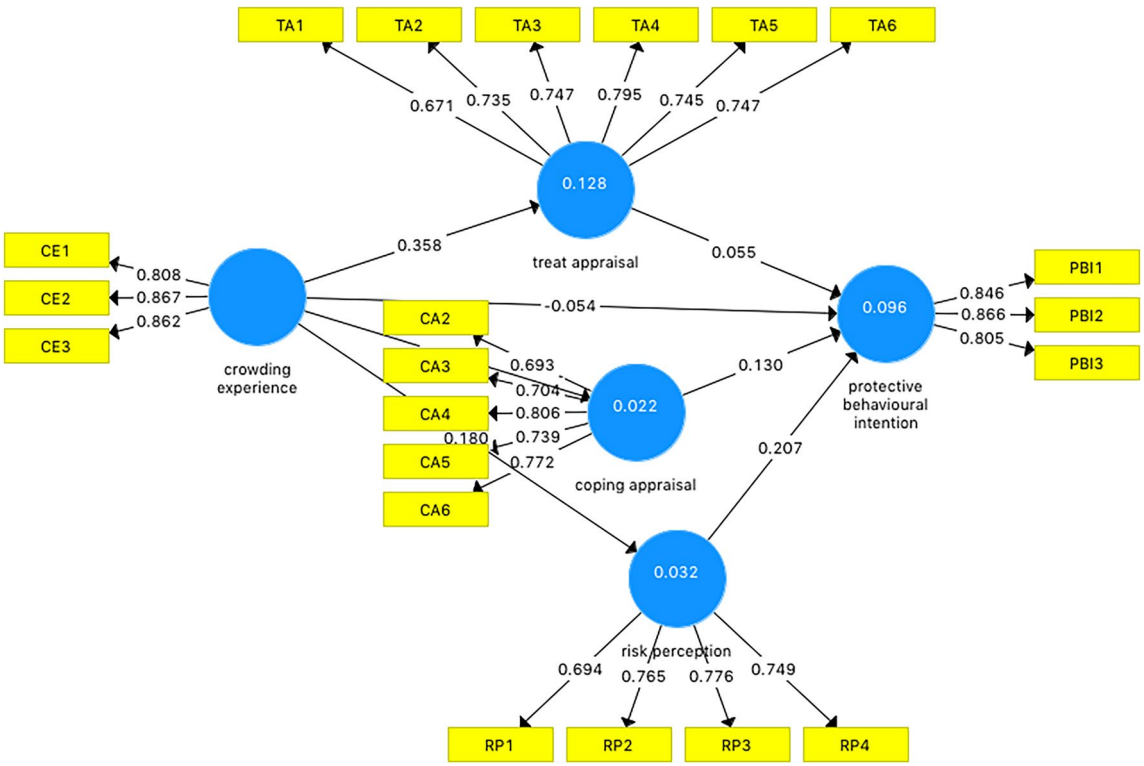

FIGURE 3 | Results of structural model assessment.

that if tourists believe they can better cope with and protect against the risks brought by overcrowding, they will perform more protective behaviors. This finding is consistent with those of Lu and Wei (2019), who suggested that effectiveness-related characteristics and preventative measures showed a positive correlation. Available coping mechanisms facilitate the adoption of protective behaviors. High response efficacy improves self-protection and trust in the efficiency of protective behaviors

(Milne et al. 2000). In PMT, self-efficacy tends to be the strongest predictor of intention to engage in protection behavior (Grano et al. 2022).

Moreover, this study has demonstrated that RP positively affects protective behavioral intention. This is consistent with the findings of Alqahtani et al. (2021), who indicate that RP is a significant predictor of taking precautions. Assessing RP is one of the most important steps in avoiding and delaying COVID-19 infections. Despite disagreements regarding the nature of the risk, individuals who perceived higher risks were more inclined to apply preventive behaviors (De Bruin and Bennett 2020). Chua et al. (2021) indicate that perceived health risks can trigger psychological well-being and perceived uncertainty, leading to avoidance behaviors on the part of tourists. Chang (2021) indicates that risk awareness and employee perceptions of risk can be utilized to identify ways to maintain the service capacity of sustainable operations. Lu and Wei (2019) found that RP significantly influenced the adoption intention.

This study also examined the mediating effect of TA, CA, and RP on the link between CE and protective behavioral intention. The results confirm that RP effectively mediates between CE and protective behavioral intention. This indicates that past overcrowding experiences improve tourists' perceptions of crowding risk, so they implement more protective behaviors. This aligns with Lu and Wei's (2019) study, suggesting that the impact of previous overcrowding experiences on people's propensity to take precautions was mediated by RP. It can be argued, however, that the threat and CA variables of PMT do not effectively mediate the relationship between overcrowding experience and protective behavior intention.

TABLE 6 | Hypotheses, results, and quality criteria.

	Hypothesis	Path coefficients β	*t*-Statistics	Support
H1	CE → TA	0.358***	7.878	Yes
H2	CE → CA	0.147***	2.654	Yes
H3	CE → RP	0.180***	3.440	Yes
H4	CE → PBI	−0.054	0.935	No
H5	TA → PBI	0.055	0.890	No
H6	CA → PBI	0.130**	1.664	Yes
H8	RP → PBI	0.207***	2.906	Yes

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

5.2 | Theoretical Implications

Since tourism research is multidisciplinary, its advancement necessitates integrating methods from other fields. The PMT model is a technique that may examine tourism phenomena from several angles (Darbellay and Stock 2012). This study uses the PMT model to investigate tourists' safety behaviors when traveling and to understand travelers' protective behaviors in response to overcrowding concerns (Kim and Hyun 2024). The findings of this study add to the literature on public safety and tourism while advancing the understanding of travelers' personal-safety-protection practices. The analysis conducted in this study extends the existing PMT-based understanding by applying PMT to the problem of tourism overcrowding in conjunction with two other constructs: CE and RP. PMT explains tourists' cognitive process of protective behavior and considers destination factors (such as a tourist's prior experience of overcrowding) as information sources. It enriches the literature on tourism, travel, and safety information search by examining the role of travel information sources as protection motivations. Although past studies have demonstrated the benefits of safe information search (Jaafar et al. 2017), such studies did not explore it in the context of travel and tourism, considering the critical roles of related experience and RP. Furthermore, the significant impact of the overcrowding experience suggests that travelers experiencing overcrowding would be more inclined to seek out travel-safe information. This finding motivates more research to elucidate the aforementioned link.

Popular destinations can attract large numbers of tourists, which may lead to dangerous situations such as overcrowding, trampling, and physical conflicts. However, few studies have explored how the overcrowding experience affects willingness-to-protect behavior through RP. This study incorporated overcrowding experience and RP into a model to test this. Past research has confirmed that RP is a multidimensional and complex concept influenced by external risk factors and tourists' abilities. Individual RP is mainly controlled by previous overcrowding experiences and the individual's coping ability. The results of this study showed that the past experience of overcrowding was positively associated with protective behaviors. It

TABLE 7 | Significance tests of mediating effect.

	Bootstrapping procedure		Sobel test	
	Boot indirect effect	95% Bias-corrected bootstrap CI	*t*	Support
H7a: CE → TA → PBI	0.020	[−0.019 to 0.054]	0.891	No
H7b: CE → CA → PBI	0.019	[0.001–0.045]	1.363	No
H9: CE → RP → PBI	0.037	[0.013–0.070]	2.122*	Yes

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

demonstrated that tourists' concerns about the CE in popular attractions will trigger a greater perception of risks, which in turn drives protection intentions and encourages them to undertake decision-making behaviors by changing their level of participation. This is consistent with the original PMT hypothesis and some studies suggesting that individuals with greater risk awareness may take preventive measures after experiencing overcrowded tourism situations (Ruan et al. 2020; Wang et al. 2019). Tourists' self-protection and threat coping behaviors against overcrowding risks are thus embedded in their past level of participation and their destination choice (Wang et al. 2019). Overcrowding experience and RP can thus determine a person's visit intention and thus, to a certain extent, influence tourists' destination decisions.

Based on these results, future research might investigate whether the decision-making process follows a particular sequence (Floyd et al. 2000). Most PMT-based tourism risk research uses people's travel intentions as the outcome variable. However, this study provides a unique perspective by using travelers' intention to adopt preventive behaviors as the outcome variable. It shows that converting intention and behavior based on the PMT model to measure travelers' behavior (such as researching destination restrictions and buying insurance before travel) is crucial in tourism-risk research.

This study conceptualizes TA and CA as second-order constructs. Second-order conceptualization enables researchers to describe complicated phenomena by investigating the underlying components that contribute to them while keeping the model simple (Crocetta et al. 2021). In previous studies, the relationship between subcomponents (e.g., vulnerability of threat, response efficacy) has been investigated, but conceptualizing TA and CA as higher-order constructs provides researchers with a flexible approach to studying concepts both at the abstract level (referred to as higher-order components) and at the specific, more concrete level (referred to as lower-order components) (Sarstedt et al. 2019). Using this approach, the study extends our traditional understanding of constructs, which typically consists of one level of abstraction (Al-Rasheed 2020).

5.3 | Practical Implications

The results of this study have several important managerial implications. First, in this study, the overcrowding experience is important in promoting the adoption of protective behaviors. Thus, it is crucial for tourism destination managers to advise and motivate tourists to adopt protective behaviors, even when they have previously encountered overcrowding in tourist sites. Tourism destination managers can achieve this by providing clear information on potential risks associated with overcrowding, promoting awareness of coping strategies such as choosing off-peak visit times, and implementing digital tools that help tourists assess crowding levels in real time. Second, educational campaigns and proactive communication can strengthen tourists' ability to evaluate overcrowding risks and adopt protective behaviors, ultimately improving both their safety and overall travel experience. People who are more inclined to use coping mechanisms are more likely to engage in protective behaviors. Third, tourism destination managers are important in improving tourists' coping abilities by providing clear guidance on appropriate protective measures, delivering real-time information on potential dangers, and ensuring access to required resources. Strategies such as educational campaigns, digital crowd-monitoring systems, and advertising alternative travel alternatives might boost tourists' confidence in their capacity to handle difficult situations.

Fourth, tourism destination managers may support protective behavioral intentions among tourists by increasing their knowledge and readiness, resulting in a safer and more pleasurable tourism experience. People will be more inclined to perform protective behavior when they perceive greater risk. Tourism destination managers must therefore change the public perception of risk to reflect the true dangers of overcrowding as well as use clear and focused communication tactics to advise or improve tourists' RPs. This could involve disseminating accurate and timely information on possible risks, such as health hazards, safety problems, or environmental threats, through multiple channels such as websites, mobile apps, and on-site signage. Given that different tourists have different preferences for crowding levels, timely information about crowding levels can be provided at the destination's entrance as well as on official websites and social media (Park et al. 2021). Furthermore, providing practical instructions, safety training, or examples of protective measures might assist tourists in comprehending the need to engage in such behaviors.

Fifth, tourism destination managers may successfully impact visitors' RPs by instilling a feeling of responsibility and knowledge, making them more willing to take precautionary measures while traveling. Serious consideration should be given to encouraging staggered travel to ease the pressure of arrivals and reduce the risk of overcrowding. For example, October to January is usually considered the peak season for domestic tourism in China due to the National Day and Spring Festival holidays. Travel agencies and policymakers can consider conducting more tourism marketing activities targeting tourists in March, April, or August, as there are fewer traditional festivals in these months, providing more travel options for tourists with more time to travel (Schuckert and Wu 2021).

5.4 | Limitations and Avenues for Future Research

Although this study provides several theoretical and practical implications, it is important to acknowledge its limitations. These include the complexity of the task of accurately measuring subjective constructs such as RP and overcrowding experience, which can vary widely among individuals and contexts. Furthermore, reliable causal links might be difficult to establish in tourist contexts due to their dynamic character, including changing legislation or unforeseen incidents (Li, Hyun, and Kim 2024). The interaction of these elements may also be influenced by cultural variations and different traveler demographics, which would limit the findings' generalizability (Hosany et al. 2022). Future research should employ longitudinal studies to document changes over time and cross-cultural comparisons to better understand environmental factors and thereby overcome these limitations. Combining quantitative surveys and

qualitative interviews, using mixed-method techniques, can offer a more in-depth understanding of the attitudes and actions of visitors. Additionally, real-time tracking tools and sophisticated data analytics may (Xu et al. 2024) improve measures and provide more precise forecasts of protective behavior in various tourism contexts.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

Alhemimah, A. 2023. "How COVID-19 Impacts Travel-Health Information Seeking and Tourists' Travel Intentions: A Protection Motivation Theory-Based Model." *Journal of Destination Marketing & Management* 27: 100757. https://doi.org/10.1016/j.jdmm.2022.100757.

Alqahtani, M. M., B. A. Arnout, F. H. Fadhel, and N. S. S. Sufyan. 2021. "Risk Perceptions of COVID-19 and Its Impact on Precautionary Behavior: A Qualitative Study." *Patient Education and Counseling* 104, no. 8: 1860–1867. https://doi.org/10.1016/j.pec.2021.02.025.

Al-Rasheed, M. 2020. "Protective Behavior Against COVID-19 Among the Public in Kuwait: An Examination of the Protection Motivation Theory, Trust in Government, and Sociodemographic Factors." *Social Work in Public Health* 35, no. 7: 546–556. https://doi.org/10.1080/19371918.2020.1806171.

Beirman, D. 2020. *Restoring tourism destinations in crisis: A strategic marketing approach*. Routledge.

Black, K. 2019. *Business Statistics for Contemporary Decision Making*. John Wiley & Sons.

Cha, J., M. Jo, T. J. Lee, and S. S. Hyun. 2024. "Characteristics of Market Segmentation for Sustainable Medical Tourism." *International Journal of Tourism Research* 26, no. 1: e2626. https://doi.org/10.1002/jtr.2626.

Chang, T. S. 2021. "Social Distancing in Retail: Influence of Perceived Retail Crowding and Self-Efficacy on Employees' Perceived Risks." *Journal of Retailing and Consumer Services* 62: 102613. https://doi.org/10.1016/j.jretconser.2021.102613.

Chauhan, V. 2024. "Understanding Users' Protective Behavior and Its Suppressor Effect on the Perceived Risk in M-Wallet/Banking Use: An Indian Urban-Rural Comparison." *Technological Forecasting and Social Change* 201: 123255. https://doi.org/10.1016/j.techfore.2024.123255.

Chen, S., K. Zhang, X. Li, H. Ye, K. J. Lin, and R. Law. 2024. "Potential Tourists' Response to Nuclear and Radiation Crises From Risk Information to Actions." *Asia Pacific Journal of Tourism Research* 29, no. 10: 1237–1253. https://doi.org/10.1080/10941665.2024.2380047.

Chen, X., T. J. Lee, and S. S. Hyun. 2025. "Visitors' Self-Expansion and Perceived Brand Authenticity in a Cultural Heritage Tourism Destination." *Journal of Vacation Marketing*. https://doi.org/10.1177/13567667241309122.

Chien, P. M., M. Sharifpour, B. W. Ritchie, and B. Watson. 2017. "Travelers' Health Risk Perceptions and Protective Behavior: A Psychological Approach." *Journal of Travel Research* 56, no. 6: 744–759. https://doi.org/10.1177/0047287516665479.

Chua, B. L., A. Al-Ansi, M. J. Lee, and H. Han. 2021. "Impact of Health Risk Perception on Avoidance of International Travel in the Wake of a Pandemic." *Current Issues in Tourism* 24, no. 7: 985–1002. https://doi.org/10.1080/13683500.2020.1829570.

Crocetta, C., L. Antonucci, R. Cataldo, et al. 2021. "Higher-Order PLS-PM Approach for Different Types of Constructs." *Social Indicators Research* 154: 725–754. https://doi.org/10.1007/s11205-020-02563-w.

Cui, F., Y. Liu, Y. Chang, J. Duan, and J. Li. 2016. "An Overview of Tourism Risk Perception." *Natural Hazards* 82: 643–658. https://doi.org/10.1007/s11069-016-2208-1.

Cui, Y. 2024. "Social Sustainability in Cultural Heritage Tourism: The Case of Lijiang Old Town and Venice." *Journal of Sustainable Business and Economics* 7, no. 3: 33–38. https://doi.org/10.26549/jsbe.v7i3.21534.

Darbellay, F., and M. Stock. 2012. "Tourism as Complex Interdisciplinary Research Object." *Annals of Tourism Research* 39, no. 1: 441–458. https://doi.org/10.1016/j.annals.2011.07.002.

De Bruin, W. B., and D. Bennett. 2020. "Relationships Between Initial COVID-19 Risk Perceptions and Protective Health Behaviors: A National Survey." *American Journal of Preventive Medicine* 59, no. 2: 157–167. https://doi.org/10.1016/j.amepre.2020.05.001.

Dong, L., J. Hou, L. Huang, Y. Liu, and J. Zhang. 2024. "Impacts of Normative and Hedonic Motivations on Continuous Knowledge Contribution in Virtual Community: The Moderating Effect of Past Contribution Experience." *Information Technology & People* 37, no. 1: 502–520. https://doi.org/10.1108/ITP-07-2022-0529.

Downing, S. T., R. J. Mccarty, A. D. Guastello, D. L. Cooke, and J. P. Mcnamara. 2023. "Assessing the Predictors of Adaptive and Maladaptive Covid-19 Preventive Behaviours: An Application of Protection Motivation Theory." *Psychology, Health & Medicine* 28, no. 2: 460–474. https://doi.org/10.1080/13548506.2022.2093925.

Ertaş, M., and B. Kırlar-Can. 2024. "Recreational Motorcyclists: The Relationships Among Sensation Seeking, Risk Perception, Fear, and Risk Handling." *Current Issues in Tourism* 27, no. 10: 1631–1648. https://doi.org/10.1080/13683500.2023.2214718.

Faul, F., E. Erdfelder, A. Buchner, and A. G. Lang. 2009. "Statistical Power Analyses Using G* Power 3.1: Tests for Correlation and Regression Analyses." *Behaviour Research Methods* 41, no. 4: 1149–1160. https://doi.org/10.3758/BRM.41.4.1149.

Fisher, J. J., B. A. Almanza, C. Behnke, D. C. Nelson, and J. Neal. 2018. "Norovirus on Cruise Ships: Motivation for Handwashing?" *International Journal of Hospitality Management* 75: 10–17. https://doi.org/10.1016/j.ijhm.2018.02.001.

Floyd, D. L., S. Prentice-Dunn, and R. W. Rogers. 2000. "A Meta-Analysis of Research on Protection Motivation Theory." *Journal of Applied Social Psychology* 30, no. 2: 407–429. https://doi.org/10.1111/j.1559-1816.2000.tb02323.x.

Fu, X., X. Yi, F. Okumus, and W. Jin. 2019. "Linking the Internal Mechanism of Exhibition Attachment to Exhibition Satisfaction: A Comparison of First-Time and Repeat Attendees." *Tourism Management* 72: 92–104. https://doi.org/10.1016/j.tourman.2018.11.002.

Glowka, G., R. Eller, M. Peters, and A. Zehrer. 2024. "Risk Perception in Small-and Medium-Sized Hospitality Family Enterprises." *Tourism Review*. https://doi.org/10.1108/TR-06-2023-0421.

Grano, C., C. Singh Solorzano, and A. Di Pucchio. 2022. "Predictors of Protective Behaviours During the Italian Covid-19 Pandemic: An Application of Protection Motivation Theory." *Psychology & Health* 37, no. 12: 1584–1604. https://doi.org/10.1080/08870446.2022.2062355.

Hair, J. F., M. Page, and N. Brunsveld. 2019. *Essentials of Business Research Methods*. Routledge. https://doi.org/10.4324/9780429203374.

Hair, J., C. Ringle, and M. Sarstedt. 2016. "Partial Least Squares Structural Equation Modeling (PLS-SEM) With SmartPLS 3." In *Academy of Marketing Science (AMS) Annual Conference*, 1–3.

Hales, C., and H. Shams. 1991. "Cautious Incremental Consumption: A Neglected Consumer Risk Reduction Strategy." *European Journal of Marketing* 25, no. 7: 7–21. https://doi.org/10.1108/03090569110144197.

Hollebeek, L., and R. A. Rather. 2019. "Service Innovativeness and Tourism Customer Outcomes." *International Journal of Contemporary Hospitality Management* 31, no. 11: 4227–4246. https://doi.org/10.1108/IJCHM-03-2018-0256.

Horng, J. S., M. L. M. Hu, C. C. C. Teng, and L. Lin. 2014. "Energy Saving and Carbon Reduction Behaviors in Tourism: A Perception Study of Asian Visitors From a Protection Motivation Theory Perspective." *Asia Pacific Journal of Tourism Research* 19, no. 6: 721–735. https://doi.org/10.1080/10941665.2013.797002.

Hosany, S., E. Sthapit, and P. Björk. 2022. "Memorable Tourism Experience: A Review and Research Agenda." *Psychology & Marketing* 39, no. 8: 1467–1486. https://doi.org/10.1002/mar.21665.

Huang, X., S. Dai, and H. Xu. 2020. "Predicting Tourists' Health Risk Preventative Behaviour and Travelling Satisfaction in Tibet: Combining the Theory of Planned Behaviour and Health Belief Model." *Tourism Management Perspectives* 33: 100589. https://doi.org/10.1016/j.tmp.2019.100589.

Jaafar, N. I., S. Ainin, and M. W. Yeong. 2017. "Why Bother About Health? A Study on the Factors That Influence Health Information Seeking Behaviour Among Malaysian Healthcare Consumers." *International Journal of Medical Informatics* 104: 38–44. https://doi.org/10.1016/j.ijmedinf.2017.05.002.

Jo, W., Y. Lin, P. Xue, and M. Joppe. 2024. "Role of Deindividuation Between Perceived Crowding and Tourist Behaviors: Moderating Effect of Environmental Knowledge." *International Journal of Tourism Research* 26, no. 5: e2748. https://doi.org/10.1002/jtr.2748.

Ju, H., T. J. Lee, H. L. Kim, and S. S. Hyun. 2025. "Negative Memories Toward Airlines: Scale Development and Validation." *International Journal of Tourism Research* 27, no. 2: e70017. https://doi.org/10.1002/jtr.70017.

Khan, A. A., and M. Aljohani. 2024. "Mass Gatherings." In *Ciottone's Disaster Medicine*, edited by G. Ciottone, 380–387. Elsevier. https://doi.org/10.1016/B978-0-323-80932-0.00058-6.

Khan, A. A., and E. K. Noji. 2016. "Hajj Stampede Disaster, 2015: Reflections From the Frontlines." *American Journal of Disaster Medicine* 11, no. 1: 59–68. https://doi.org/10.5055/ajdm.2016.0225.

Kim, H. L., and S. S. Hyun. 2024. "Paradoxical Effects of Tourism Ethnocentrism on Domestic Tourism: The Moderating Effect of Pandemic Anxiety Travel." *International Journal of Tourism Research* 26, no. 1: e2628. https://doi.org/10.1002/jtr.2628.

Kim, Y. R., A. Nsom Kimbu, S. Ramakrishnan, and P. Saha. 2024. "Understanding the Travel Decision-Making Behaviors of Ethnic Minority Tourists: The Moderating Role of Psychological Empowerment." *Journal of Travel Research* 64, no. 5: 1064–1084. https://doi.org/10.1177/00472875241245407.

Kock, N. 2017. "Common Method Bias: A Full Collinearity Assessment Method for PLS-SEM." In *Partial Least Squares Path Modeling*, edited by H. Latan and R. Noonan. Springer. https://doi.org/10.1007/978-3-319-64069-3_11.

Kumar, J., S. Shagirbasha, and R. Konar. 2023. "Destination Image, COVID-19 Perceived Risk and Intention to Travel: Malaysian Case." *Academica Turistica* 16, no. 2: 221–232.

Leatherman, S. P., S. B. Leatherman, and N. Rangel-Buitrago. 2024. "Integrated Strategies for Management and Mitigation of Beach Accidents." *Ocean and Coastal Management* 253: 107173. https://doi.org/10.1016/j.ocecoaman.2024.107173.

Lee, S., N. Lee, T. J. Lee, and S. S. Hyun. 2024. "The Influence of Social Support From Intermediary Organizations on Innovativeness and Subjective Happiness in Community-Based Tourism." *Journal of Sustainable Tourism* 32, no. 4: 795–817. https://doi.org/10.1080/09669582.2023.2175836.

Leung, D. Y. L., S. Khan, H. Hwu, et al. 2024. "The Risk Perception of the Chinese Diaspora During the COVID-19 Pandemic: Targeting Cognitive Dissonance Through Storytelling." *International Journal of Environmental Research and Public Health* 21, no. 5: 556. https://doi.org/10.3390/ijerph21050556.

Li, L., X. Liu, L. Zheng, and Y. Cai. 2024. "Don't Squeeze Me! Exploring the Mechanisms and Boundary Conditions Between Social Crowding and Uncivilised Tourist Behaviour." *Current Issues in Tourism* 28, no. 12: 2021–2040. https://doi.org/10.1080/13683500.2024.2362374.

Li, X., S. S. Hyun, and H. Kim. 2024. "Perception of Medical Practitioners on the Importance of Medical Tourism Services." *International Journal of Tourism Research* 26, no. 1: e2617. https://doi.org/10.1002/jtr.2617.

Li, Z., H. Zhang, Y. Xu, T. Fang, and H. Wang. 2024. "How Does Cultural Distance Affect Tourism Destination Choice? Evidence From the Correlation Between Regional Culture and Tourism Flow." *Applied Geography* 166: 103261. https://doi.org/10.1016/j.apgeog.2024.103261.

Lin, H., M. Chen, Q. Yun, L. Zhang, and C. Chang. 2022. "Protection Motivation Theory and Smoking Quitting Intention: Findings Based on Structural Equation Modelling and Mediation Analysis." *BMC Public Health* 22, no. 1: 838. https://doi.org/10.1186/s12889-022-13263-0.

Lin, W., Q. Lin, D. Tang, and Y. Yan. 2024. "A Study on the Factors Influencing the Intention to Revisit Forest Tourism Based on PMT-TPB?" *Current Psychology* 43, no. 13: 11841–11853. https://doi.org/10.1007/s12144-023-05278-6.

Lindell, M. K., and S. N. Hwang. 2008. "Households' Perceived Personal Risk and Responses in a Multihazard Environment." *Risk Analysis* 28, no. 2: 539–556. https://doi.org/10.1111/j.1539-6924.2008.01032.x.

Lombardi, D. B., and M. R. Ciceri. 2021. "Dealing With Feeling Crowded on Public Transport: The Potential Role of Design." *Environment and Behavior* 53, no. 4: 339–378. https://doi.org/10.1177/0013916519879773.

Lu, S., and J. Wei. 2019. "Public's perceived overcrowding risk and their adoption of precautionary actions: A study of holiday travel in China." *Journal of Risk Research* 22, no. 7: 844–864.

Ma, C., D. P. Culhane, and S. S. Bachman. 2024. "Understanding the Dynamic Process of Human Behavior Changes Towards Disaster Preparedness: An Application of the Integrated TTM With SCT and PMT." *International Journal of Disaster Risk Reduction* 110: 104606. https://doi.org/10.1016/j.ijdrr.2024.104606.

Mackay, M. I., A. Klas, J. Fernando, E. J. Kothe, and M. Ling. 2025. "Using Protection Motivation Theory to Explain Australian's Motivations to Engage in Individual and Collective Climate Actions." *Asian Journal of Social Psychology* 28, no. 1: e12660. https://doi.org/10.1111/ajsp.12660.

Maghrifani, D., F. Liu, and J. Sneddon. 2024. "The Effects of Past and Expected Experiences on Revisit Intention: A Study of Australian and Indonesian Tourists." *Consumer Behavior in Tourism and Hospitality* 19, no. 1: 1–17. https://doi.org/10.1108/CBTH-11-2022-0199.

Manoochehry, S., and H. R. Rasouli. 2017. "Recurrent Human Tragedy During Hajj." *International Journal of Travel Medicine and Global Health* 5, no. 1: 36–37. https://doi.org/10.15171/IJTMGH.2017.07.

McCaughey, J. W., I. Mundir, P. Daly, S. Mahdi, and A. Patt. 2017. "Trust and Distrust of Tsunami Vertical Evacuation Buildings: Extending Protection Motivation Theory to Examine Choices Under Social Influence." *International Journal of Disaster Risk Reduction* 24: 462–473. https://doi.org/10.1016/j.ijdrr.2017.06.016.

Miah, M., M. M. Haq, S. Biswas, G. Szabo-Szentgroti, and V. Walter. 2025. "Effects of Tourists' Perceived Crowding on Tourist Loyalty Based on Overcrowded Tourist Attraction in Bangladesh: The Mediating

Role of Destination Attractiveness." *International Journal of Tourism Research* 27, no. 2: e2764. https://doi.org/10.1002/jtr.2764.

Miceli, R., I. Sotgiu, and M. Settanni. 2008. "Disaster Preparedness and Perception of Flood Risk: A Study in an Alpine Valley in Italy." *Journal of Environmental Psychology* 28, no. 2: 164–173. https://doi.org/10.1016/j.jenvp.2007.10.006.

Mills, A., N. Todorova, and J. Zhang. 2024. "The Role of Threat and Coping Appraisals in Motivating the Use of Personalised Mobile Emergency Alert Systems." *Information Technology & People*. https://doi.org/10.1108/ITP-04-2021-0297.

Milne, S., P. Sheeran, and S. Orbell. 2000. "Prediction and Intervention in Health-Related Behavior: A Meta-Analytic Review of Protection Motivation Theory." *Journal of Applied Social Psychology* 30, no. 1: 106–143. https://doi.org/10.1111/j.1559-1816.2000.tb02308.x.

Moreschini, I., L. Cugliari, L. Cerbara, F. La Longa, M. Crescimbene, and A. Amato. 2025. "Tsunami Risk Perception of the Touristic Population of Stromboli Island: Towards Effective Risk Communication Strategies." *Natural Hazards* 121, no. 1: 519–542. https://doi.org/10.1007/s11069-024-06845-1.

Mortada, E., A. Abdel-Azeem, A. Al Showair, and M. M. Zalat. 2021. "Preventive Behaviors Towards Covid-19 Pandemic Among Healthcare Providers in Saudi Arabia Using the Protection Motivation Theory." *Risk Management and Healthcare Policy* 14: 685–694. https://doi.org/10.2147/RMHP.S289837.

Mowen, J. C. 2000. *The 3M Model of Motivation and Personality: Theory and Empirical Applications to Consumer Behavior*. Springer Science & Business Media. https://doi.org/10.1007/978-1-4757-6708-7.

Munanura, I. E., J. A. Parada, and J. D. Kline. 2024. "A Cognitive Appraisal Theory Perspective of Residents' Support for Tourism." *Journal of Ecotourism* 23, no. 3: 308–327. https://doi.org/10.1080/14724049.2023.2198169.

Neuburger, L., and R. Egger. 2021. "Travel Risk Perception and Travel Behaviour During the COVID-19 Pandemic 2020: A Case Study of the DACH Region." *Current Issues in Tourism* 24, no. 7: 1003–1016. https://doi.org/10.1080/13683500.2020.1803807.

Neuts, B., and D. Vanneste. 2018. "Contextual Effects on Crowding Perception: An Analysis of Antwerp and Amsterdam." *Tijdschrift voor Economische en Sociale Geografie* 109, no. 3: 402–419. https://doi.org/10.1111/tesg.12284.

Nugraha, A., H. Hamin, and G. Elliott. 2016. "Tourism Destination Decisions: The Impact of Risk Aversion and Prior Experience." *Asia Pacific Journal of Tourism Research* 21, no. 12: 1274–1284. https://doi.org/10.1080/10941665.2016.1141225.

Pai, C. K., H. Chen, T. J. Lee, S. S. Hyun, Y. Liu, and Y. Zheng. 2024. "The Impacts of Under-Tourism and Place Attachment on Residents' Life Satisfaction." *Journal of Vacation Marketing* 30, no. 4: 694–712.

Park, I. J., J. Kim, S. S. Kim, J. C. Lee, and M. Giroux. 2021. "Impact of the COVID-19 Pandemic on Travelers' Preference for Crowded Versus Non-Crowded Options." *Tourism Management* 87: 104398. https://doi.org/10.1016/j.tourman.2021.104398.

Podsakoff, P. M., S. B. MacKenzie, J. Y. Lee, and N. P. Podsakoff. 2003. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies." *Journal of Applied Psychology* 88, no. 5: 879–903.

Rathnayake, R. M. W. 2015. "How Does 'Crowding' Affect Visitor Satisfaction at the Horton Plains National Park in Sri Lanka?" *Tourism Management Perspectives* 16: 129–138. https://doi.org/10.1016/j.tmp.2015.07.018.

Reichel, A., G. Fuchs, and N. Uriely. 2007. "Perceived Risk and the Non-Institutionalized Tourist Role: The Case of Israeli Student Ex-Backpackers." *Journal of Travel Research* 46, no. 2: 217–226. https://doi.org/10.1177/0047287507299580.

Rogers, R. W. 1975. "A Protection Motivation Theory of Fear Appeals and Attitude Change." *Journal of Psychology* 91, no. 1: 93–114. https://doi.org/10.1080/00223980.1975.9915803.

Ruan, W., S. Kang, and H. Song. 2020. "Applying Protection Motivation Theory to Understand International Tourists' Behavioural Intentions Under the Threat of Air Pollution: A Case of Beijing, China." *Current Issues in Tourism* 23, no. 16: 2027–2041. https://doi.org/10.1080/13683500.2020.1743242.

Sarstedt, M., J. F. Hair Jr., J. H. Cheah, J. M. Becker, and C. M. Ringle. 2019. "How to Specify, Estimate, and Validate Higher-Order Constructs in PLS-SEM." *Australasian Marketing Journal* 27, no. 3: 197–211. https://doi.org/10.1016/j.ausmj.2019.05.003.

Schroeder, A., and L. Pennington-Gray. 2016. "Moving the Travel Risk Literature Forward Conceptually and Operationally." In Tourism and Travel Research Association International Conference. https://scholarworks.umass.edu/ttra/2016/Academic_Papers_Visual/15.

Schuckert, M., and J. S. Wu. 2021. "Are Neighbour Tourists More Sensitive to Crowding? The Impact of Distance on the Crowding-Out Effect in Tourism." *Tourism Management* 82: 104185. https://doi.org/10.1016/j.tourman.2020.104185.

Seow, A. N., C. K. Choong, I. C. Chen, and Y. O. Choong. 2022. "Can Protection Motivation Theory Explain the Perception of International Tourists' on Medical Tourism?" *Journal of Hospitality and Tourism Insights* 5, no. 2: 394–412. https://doi.org/10.1108/JHTI-10-2020-0189.

Sharma, A., B. McCloskey, D. S. Hui, et al. 2023. "Global Mass Gathering Events and Deaths due to Crowd Surge, Stampedes, Crush and Physical Injuries: Lessons From the Seoul Halloween and Other Disasters." *Travel Medicine and Infectious Disease* 52: 102524. https://doi.org/10.1016/j.tmaid.2022.102524.

Shukla, V., S. Rana, and S. Prashar. 2024. "Examining the Potential of Virtual and Augmented Reality in Enhancing Tourism Experiences." *Bottom Line*. https://doi.org/10.1108/BL-05-2023-0139.

Su, D. N., T. M. Truong, T. T. Luu, H. M. T. Huynh, and B. O'Mahony. 2022. "Career Resilience of the Tourism and Hospitality Workforce in the COVID-19: The Protection Motivation Theory Perspective." *Tourism Management Perspectives* 44: 101039. https://doi.org/10.1016/j.tmp.2022.101039.

Su, X. 2010. "The Imagination of Place and Tourism Consumption: A Case Study of Lijiang Ancient Town, China." *Tourism Geographies* 12, no. 3: 412–434. https://doi.org/10.1080/14616688.2010.494688.

Swenson, M. S., and A. Bansal. 2024. *Medical, Dental, and Wellness Tourism: A Post-Pandemic Perspective*. CRC Press.

Ud Din, N., S. Nazneen, and B. Jamil. 2024. "Tourism Crowding and Resident Approach/Avoidance Reactions Through Sustainable Tourism: Moderating Role of Proenvironmental Behavior." *Tourism Review* 79, no. 9: 1509–1524. https://doi.org/10.1108/TR-10-2023-0678.

Usakli, A., and K. G. Kucukergin. 2018. "Using Partial Least Squares Structural Equation Modeling in Hospitality and Tourism: Do Researchers Follow Practical Guidelines?" *International Journal of Contemporary Hospitality Management* 30, no. 11: 3462–3512. https://doi.org/10.1108/IJCHM-11-2017-0753.

Verkoeyen, S., and S. K. Nepal. 2019. "Understanding Scuba Divers' Response to Coral Bleaching: An Application of Protection Motivation Theory." *Journal of Environmental Management* 231: 869–877. https://doi.org/10.1016/j.jenvman.2018.10.030.

Wang, J., B. Liu-Lastres, B. W. Ritchie, and D. J. Mills. 2019. "Travellers' Self-Protections Against Health Risks: An Application of the Full Protection Motivation Theory." *Annals of Tourism Research* 78: 102743. https://doi.org/10.1016/j.annals.2019.102743.

Wen, J., J. Aston, X. Liu, and T. Ying. 2020. "Effects of Misleading Media Coverage on Public Health Crisis: A Case of the 2019 Novel Coronavirus

Outbreak in China." *Anatolia* 31, no. 2: 331–336. https://doi.org/10.1080/13032917.2020.1730621.

Wilks, J., J. Stephen, and F. Moore, eds. 2013. *Managing Tourist Health and Safety in the New Millennium*. Routledge. https://doi.org/10.1016/B978-0-08-044000-2.50014-6.

Williams, L., S. Rasmussen, A. Kleczkowski, S. Maharaj, and N. Cairns. 2015. "Protection Motivation Theory and Social Distancing Behaviour in Response to a Simulated Infectious Disease Epidemic." *Psychology, Health & Medicine* 20, no. 7: 832–837. https://doi.org/10.1080/13548506.2015.1028946.

Xu, C., Y. Meng, J. Wang, X. Zhou, and D. Peng. 2024. "Exploring the Decision Model for Tourism Symbiosis of Ancient Villages and Towns Based on Tourist Reviews: A Case Study of Huaihua City in China." *International Journal of Tourism Research* 26, no. 4: e2679. https://doi.org/10.1002/jtr.2679.

Yang, R., P. O'Connor, and S. Wibowo. 2024. "Unpacking Risk Aversion and Uncertainty Avoidance: An Analysis From a Tourists' Personality Traits and Information Search Perspective." *Tourism Recreation Research* 50, no. 2: 261–281. https://doi.org/10.1080/02508281.2023.2260978.

Zhang, D., R. Liu, X. Li, Y. Yuan, and G. Zhou. 2023. "How Do Self-Exempt Beliefs Affect Intentions to Quit Smoking? An Exploration of the Mediating Role of Threat Appraisal and Coping Appraisal." *Frontiers in Psychology* 14: 1260561. https://doi.org/10.3389/fpsyg.2023.1260561.

Zhang, F., Q. Cheng, Y. Lv, and N. Li. 2025. "Risk Perception, Travel Intentions and Self-Protective Behavior of Chronically Ill Tourists Under the Protection Motivation Perspective." *Scientific Reports* 15, no. 1: 5578. https://doi.org/10.1038/s41598-025-90410-8.

Zhu, Z., R. Wang, J. Hu, and Z. Jiang. 2022. "Can Protection Motivation Theory Predict Pro-Environmental Behaviour of Small Rural Tourism Enterprises? An Extended Model Including Community Involvement." *Asia Pacific Journal of Tourism Research* 27, no. 4: 428–442. https://doi.org/10.1080/10941665.2022.2075777.