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Risk reduction and adventure tourism safety: An extension of the risk perception attitude framework (RPAF)

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ABSTRACT

Visitor safety is an important topic in adventure tourism but remains underexplored. Using a psychological approach, this study applies and extends Rimal and Real's risk perception attitude framework to include personality traits and emotions to understand adventure tourists' safety behaviours on site. Focusing on tidal-bore watching activities in China, this study consists of two phases: interviews with nine local stakeholders followed by a field survey involving 302 visitors. Cluster analyses were conducted and three visitors' groups were identified that varied in risk perception attitudes and safety behaviours. Mediation analyses were conducted to explore the role played by worry during visitors' decision-making related to safety behaviours. Based on the findings, this study provided managerial insight for developing risk communication strategies to engage visitors in self-protective behavior. This study also provided recommendations on how to improve visitors' safety and to protect their lives in adventure-tourism sites in China.

1. Introduction

Adventure tourism is one of the fastest growing sectors and is expanding its appeal to mainstream mass tourists (UNWTO, 2014). Risk, is an important consideration for those involved in adventure tourism because risk is linked to uncertainty, challenge, novelty, exploration, discovery, and how such characteristics can conflict with emotions (Swarbrooke, Beard, Leckie, & Pomfret, 2003). Adventure travelers tend to engage in risky recreational activities and explore natural environments and bio-diverse habitats. However, adventure tourism safety remains understudied despite its importance (Cheng, Edwards, Darcy, & Redfern, 2018). The literature shows that injuries and even fatalities are no strangers to touristic and recreation activities (Bentley, Page, & Walker, 2004). Although serious incidents in such tourism are more common in specific tourist locations, academic interest in adventure tourism safety seems to have declined after the early 2000s (Cheng et al., 2018).

Tidal bore watching is one such adventure tourism activity. In many regions, tidal bores serve as important cultural heritage resources for tourism development. Examples of these attractions include the Severn River Bore in UK, the Dordogne River Bore in France, and Qiantang River Bore in China. A tidal bore is a phenomenon caused by the leading edge of the incoming tide forming a wave of water that travels up a river or narrow bay against the prevailing current (Li, Pan, Chanson, & Pan, 2017). It can take many forms, varying from single breaking waterfronts with a roller like a hydraulic jump to large bores which comprises several rounds of waves (Chanson, 2011). Although tidal bore sites are valuable destinations, the interactions between tidal bores and humans are complex and sometimes conflicting. A 'sinister reputation' of tidal bores reflects the safety challenge for destination management (Chanson, 2011). China's Qiantang River has the world's largest tidal bores, which have led to a rapid growth of tourism development at these locations. Cities alongside Qiantang River have established multiple tide-watching sites attracting over two million visitors each year, with most attending during the River's annual tide-watching festivals.

Visitor safety, accordingly, has become one of the challenges for local government in managing tide-watching attractions. In the Qiantang River, tragic accidents are reported every year with 112 deaths having been caused by some 'Tsunami-like' tidal bores in the past two decades (The Qiantang River Administration of Zhejiang Province, 2015). Most of these misfortunes occurred because visitors lacked awareness of the potential risks or, on some occasions, ignored the warnings and safety instructions (Yu & Wang, 2018). Accordingly, there is a need for research to focus on visitors' risk perceptions and safety behaviors and to provide evidence to design suitable risk

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communication strategies. Surprisingly, the existing tidal bore studies predominantly apply to hydraulic engineering and applied mathematics. Very few have taken a social science perspective to tide-watchers' risk perceptions and self-protective behaviors.

One important initiative in managing visitors' safety is to help them engage in self-protective behaviors, yet previous research on tourist risk suggests that tourists' are not homogenous (Ritchie, Chien, & Sharifpour, 2017). One approach to better understand differences among tourist populations is segmentation, which describes marketing's propensity to divide a broad market into sub-groups according to certain shared characteristics. Segmenting can be used to gain market intelligence, but also to target visitor safety campaigns and manage them strategically. Because tourists' protective behaviors are related to their risk perception and self-efficacy (e.g., Chien, Sharifpour, Ritchie, & Watson, 2016; Law, 2006), what is called, the risk perception attitude framework (RPAF) can help segment and categorize people into groups that possess such attitudes (i.e., by ascertaining what risk they perceive and the efficacy of their beliefs) (Rimal & Real, 2003). After exploring perceived risks, efficacy beliefs, and behaviors, RPAF can be used to support our research theoretically because it focuses on individuals' safety. RPAF is also useful in practice because it takes a segmenting approach.

However, applying the RPAF to the adventure tourism context comes with two shortcomings. First, it does not address the affective dimension of one's perceived risk even though the emotion associated with tourists' decision making (e.g., fear, anger and worry) is important. This is because, in most cases, it motivates their capability to evaluate risk and determine their subsequent safety behaviors (Chien et al., 2016; Walters & Li, 2017). Second, RPAF does not consider tourists' enduring patterns of thought, feeling, and behavior that influence their risk-taking behaviors (Fyhri & Backer-Grøndahl, 2012). After acknowledging these deficiencies, this study extended the RPAF to include emotions (e.g., worry) and personality traits (e.g., sensation seeking). This extension allows this study to investigate the specifics of risk perception, efficacy beliefs, worry, and sensation-seeking on tide-watchers' safety behavior.

Furthermore, empirical research into non-Western adventure tourists is little. To the best of our knowledge, only one attempt (Buckley, McDonald, Duan, Sun, & Chen, 2014) has studied mass adventure tourism in China. As these authors note China has developed a domestic model for 'passive' mass river-based adventure tourism, which differs from Western models that expect much greater individual involvement and responsibility for safety. Nevertheless, cultural differences do apply to outdoor adventure tourism in how government policy applies, business is practiced, product is marketed, clients are motivated, and safety is managed. Thus, more research into adventure tourism safety in non-Western markets, such as China, is needed.

2. Literature review

2.1. Risk and safety in tide-watching adventure tourism

While little consensus is found over what is defined as adventure tourism, the Adventure Travel Trade Association (ATTA) describes it as a trip that includes at least two out of the following three conditions: physical activity, natural environment, and cultural immersion (UNWTO, 2014). Depending on their level of risk, two other types of adventure tourism are: 'Hard' adventure, which involves higher level of risks (e.g., climbing and caving) and 'soft' adventure, which bears relatively lower level of risks (e.g., surfing, whitewater kayaking, skiing and snowboarding) (ATTA, 2013). While adventure tourists are motivated varyingly, defining adventure has changed from focusing on physical aspects (e.g., wilderness, remoteness and outdoor activity) to psychological aspects (e.g., seeking excitement, challenges, fear, unusual ventures, heroism, and self-development) (Cheng et al., 2018).

In China, tidal-bore watching is considered a type of mass adventure tourism activities for two reasons. First, tidal bore watching is a river-based leisure activity in China with a history of more than 2000 years and is thus well-established in Chinese culture to the extent that many local destinations traditionally host cultural festivals coinciding with tidal bores. These occur during Chinese Mid-Autumn Festival (also called Moon Festival) when the strong waves arrive. Second, as a water-based recreation activity, tidal-bore watching relies largely on the natural environment and encourages individuals to celebrate nature, which is consistent with the scope of adventure tourism. Over recent decades, while tidal-bore watching and the festivals have increased popularity among the Chinese, they have also generated substantial economic benefits. For example, Xiaoshan city's tide-watching festival of 2014 contributed US$355 million to the local economy (*Tidal Bore Bulletin*, 2014). Haining city has held over 20 tide-watching cultural festivals since 1992, altogether attracting over nine million visitors.

Tidal bore watching, however, can be dangerous. Qiantang River tidal bore in eastern China is the largest in the world, which happens every lunar month and normally reaches the strongest waves in the fall. The leading edge of the Qiantang River tidal bores can move as fast as 40 km per hour, often reaching heights of up to 10 m (approximately the height of a three-story building) (National Geographic Society, 2011). Qiantang tidal bore is referred to as "Tsunami-like" river tides. This perception is verified when a *Calgary Herald's* story misused an image of Qiantang River tidal bore on Sep 9, 2002 to report the devastating Indian Ocean tsunami in 2004 (Boese, 2005). This story best exemplifies the dangerous nature of Qiantang tidal bore (see Image 1). Additionally, because visitor numbers have rapidly increased for tide-watching festivals, crowd safety has become important for destination safety management. Unlike beach tourism, mass-gatherings of tide-watching happen when the waves pass by the river bank within a few minutes. This creates a big challenge in governance, operations, and attraction management.

To ensure visitor safety and protect people against the risk of tide-watching, the local government has invested extensively in facilities (e.g., 320,000 m' protection fences), warning systems (e.g., 100 warning equipment including CCTVs, loudspeakers, and LED display screens), and human resources of 300 full- and part-time safety and security staff (The Qiantang River Administration of Zhejiang Province, 2015) (See Image 2). While these measures are useful to some degree, they are expensive and have not yet fully eliminated the casualties and fatalities caused by tidal bores. One reason is that while the tide-watchers include local residents, a growing number of visitors are unaware of the risks associated with tide-watching and thus are insufficiently motivated to protect themselves (Wang, 2011)..

The success of tourism is linked directly to its ability to offer tourists a safe and pleasant visit (Breda & Costa, 2006). As important as it is to provide a thrilling experience for adventure tourists, tourist safety is crucial for adventure tourism and should never be overlooked (Bentley et al., 2004). In the adventure tourism literature, while *tourists experience* has received great attention, the interplay between *adventure tourism operations* and *destination planning and development* has been overlooked (Cheng et al., 2018). Regarding tide-watching, visitors tend to believe that it involves relatively low risk, because most people watch tidal bore by standing along the riverbank (Yu & Wang, 2018). Such perceptions however ignore the strong power and unpredictability of a tidal bore, which may open the possibility of tourists getting hurt or being whirled away by the "Tsunami-like" tides.

In aiming to reduce risks and enhance safety in tide-watching, we need to understand what factors influence visitors' self-protective behaviors. Risk is one positive factor in gaining travel experience as some tourists are risk seekers and think it contributes to the sense of excitement and adventure (Cohen, 1972; Plog, 1974). However, more recently, risk perception has affected tourists' travel decisions and behavior, because many who perceive risk as confronting are likely to avoid unsafe tourism products (Chien et al., 2016; Fuchs & Reichel, 2006; Liu, Kim, & Pennington-Gray, 2015). A growing sense of uncertainty and

Image 1. The dangerous nature of Qiantang tidal bore.
Note: (Left) An image of Qiantang River tidal bore (Source: "Tsunami death toll could pass 100,000," 2004, p. 1); (Right) The original photo taken on 09 Sep 2002 was provided by courtesy of Mr Jiahua Chen.

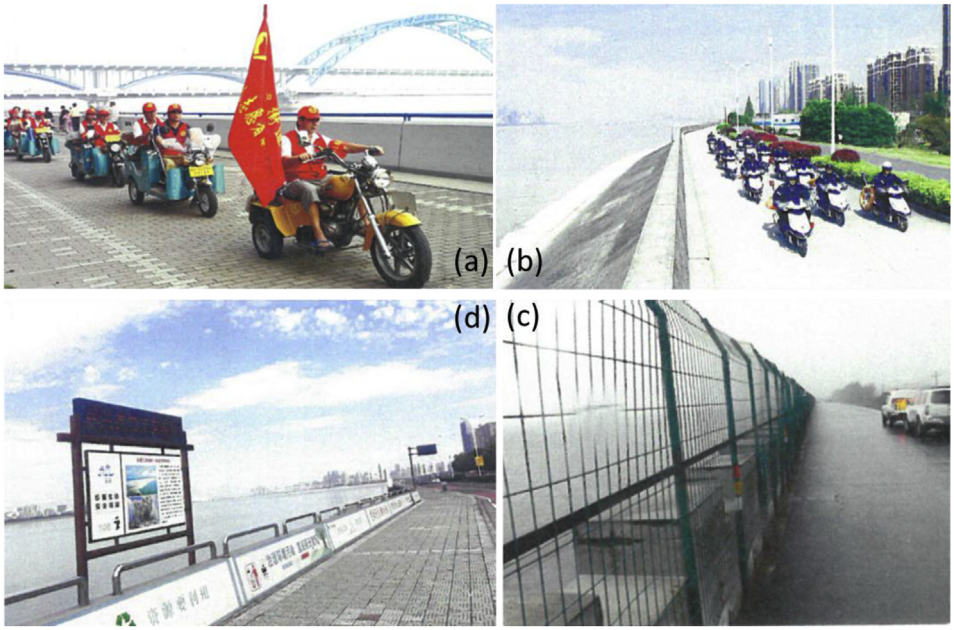

Image 2. Facilities and resources for safety protection by the local government.
Note: (a) 'yelling men', (b) safety inspectors, (c) protection fences, (d) on-site display boards
Source: (The Qiantang River Administration of Zhejiang Province, 2015)

insecurity is also more recent as the literature increasingly focuses on travel risk and what risk means, what led to its analysis, how it is perceived and managed, what it leads to, how it relates to crisis management and what informs its search (Yang & Nair, 2014). However, tourism risk literature has been criticized for lacking theoretical foundation and thus limiting knowledge creation (Yang, Khoo-Lattimore, & Arcodia, 2017). Similarly, the literature does not cover the safety of tourists involved in tide-watching adventure tourism. Tide-watchers' safety is timely because of the fast-developing tourism attractions and the increase of cultural festivals and visitor numbers. While an important way to reduce drowning and injuries is to encourage tourists to self-protect, very few empirical studies cover this topic. Achieving this prevention outcome and more research about it calls for using strong risk communication and understanding visitors' risk perception and behavior better within the field of adventure tourism management.

2.2. Cognitive threat and coping appraisal: risk beliefs and efficacy beliefs

Many risk theories suggest that behavioral changes in response to risk are determined directly by tourists' risk beliefs, which consist of two primary factors, their *perceived vulnerability* (i.e., the probability of being exposed to the risk), and the risk's *perceived severity* (i.e., related to the consequences) (Hichang, 2010). In other words, people are more likely to engage in protective behaviors when they believe that they are at risk (vulnerability) and that the threat is serious (severity). After examining individuals' self-protective behavior, we note that efficacy beliefs are also important, as they regulate how humans function emotionally work, and whether the change they seek occur (Bandura, 1990). Efficacy beliefs are analyzed as *self-efficacy* (i.e., one's confidence in their ability to perform a recommended behavior) and *response efficacy* (i.e., that behavior's perceived value) (Thrasher et al., 2016). While efficacy belief is powerful and robust in predicting protection motivation and behavior (Hichang, 2010), efficacy has been neglected in the travel risk literature (Liu et al., 2015). However, as mentioned earlier, the RPAF adopted in this study, also considers how tourists' efficacy beliefs affect individuals' self-protective behaviors and how they perceive risk.

Developed by Rimal and Real (2003), RPAF was built upon the extended parallel process model and social cognitive theory (Skubisz, 2014). Rimal and Real (2003) suggest that how perceived risk affects people's self-protective motivations and behaviors will be moderated by their efficacy beliefs. These authors divide people into four attitudinal groups based on their efficacy and risk perceptions. People who are *Responsive* (high risk, high efficacy) are most likely to adopt self-protective behaviors. People who are *Avoidant* (high risk, low efficacy) are more likely to have conflicted feelings and therefore, less likely to adopt self-protective behaviors. People who are *Proactive* (low risk, high efficacy) sometimes display an interest in adopting self-protective behavior. *Indifference* people (low risk, low efficacy) are least likely to adopt any protective actions because of their low level of perceived risk and efficacy beliefs. The pragmatic utility of RPAF in tourism risk management has also been supported by the literature. For example, RPAF was used to test US travelers' risk and concerns about visiting Jordan (Liu, Schroeder, Pennington-Gray, & Farajat, 2016). It has also been used to understand ocean cruisers' travel decisions in risky situations (Liu-Lastres, Schroeder, & Pennington-Gray, 2018). Both studies strongly support using RPAF to examine the impact of perceived risk on tourists' perceptions, attitudes, and behaviors.

2.3. Beyond risk and efficacy: the role of worry in self-protective behavior

More recently, tourism scholars have stressed a significant role for emotion (such as fear, anger, and anxiety) in the determination of risk perception and risk decision-making (Fennell, 2017). Worry appears to be one of the most salient affective elements that influences risk perceptions (Breakwell, 2014). Normally, clinical psychologists understand *worry* to reflect a generalized anxiety disorder that reconciles people's problem-solving activity and self-protective behaviors (Borkovec, Alcaine, & Behar, 2004; Moser, Mccaul, Peters, Nelson, & Marcus, 2007). This is similar in the tourism literature where tourists' *worry* is defined as "an individual's attempt to engage in mental problem solving regarding tourist trip-related issues where outcomes are thought to be uncertain and contain possibilities for negative results" (Larsen, Brun, & Øgaard, 2009, p. 261). Worry can draw individuals' attention to a threat in the process of analytical thinking and, in some cases, lead to behaviors aiming at reducing the threat (Davey, Tallis, & Capuzzo, 1996). Furthermore, worry more greatly impacts on risk cognition and behavioral response, and sometimes can better predict intentions to act with prior caution that perceive risk (Breakwell, 2014).

The mechanism by which worry drives tourists' decision-making process, however, remains unclear. Chien et al. (2016) regards emotion to be significant in changing tourists' beliefs and how they behave. To these authors, worry leads to tourists' risk perception and motivates how they form risk reduction strategies. On the other hand, "emotions mediate the relationship between individuals' cognition and behavior" (e.g., Pligt, 2002, p. 265). Loewenstein, Weber, Hsee, and Welch (2001) propose the *risk-as-feelings* hypothesis and argue that emotional responses to risky situations powerfully impact on individuals' decision-making. Sometimes emotions can override individuals' risk cognition, which manifests itself in perceived vulnerability and severity. Additional empirical evidence exploring the underlying relationships between risk perception and emotions is required to provide theoretical clarifications. Furthermore, worry is situation-specific, whereby the worry on general vacations and the worry on a specific vacation differ (Wolff & Larsen, 2013). This difference suggests that situation-specific worry is more likely to affect how people will behave regarding self-protection (Szabó & Lovibond, 2002). More specifically, when people are exposed to a risky situation, worry can make the risk noticeable, and thus remind them protect themselves (Mullens, McCaul, Erickson, & Sandgren, 2004). In such situations, worry actually cues people's action so that they behave in ways that reduce their worry (Mullens et al., 2004). In other words, worry can be seen as a cognitive response that carries negative affection over the uncertain outcome (Yang & Nair, 2014).

Our research, into the risk of tide-watching argues that worry is significant to responding to risky events generally and tidal bores specifically. In other words, when undertaking tide-watching activities, visitors may call on diverse types of risk perception that causes worry. To comfort themselves and reduce worry, they may protect themselves varyingly. Thus, this study proposes that worry mediates the relationship between one's risk perception attitude (risk and efficacy beliefs) and their adoption of self-protective behaviors.

2.4. How sensation seeking relates to risk perception for adventure tourism

Sensation seeking is a personality trait that determines whether people will take risks but also the extent to which they might seek novel experiences in various multiple areas of life (Pizam et al., 2004). Unlike most travel risk research, which focuses on various risk factors, psychologists suggest that risk-taking is a personal trait and risk behavior manifests itself in activities that entail the novelty or danger that underlie people's anxieties (Keinan, Meir, & Gome-Nemirovsky, 1984; Levenson, 1990; Lopes, 1994; Robinson, 1985). Sensation seeking is positively correlated with risky behavior, and thus provide a suitable perspective to examine tourists' risk perception from a personality perspective (Lepp & Gibson, 2008). In other words, sensation seeking emanates from an individual difference associated with (1) a need for arousal and (2) the willingness to take risks to obtain it (Horvath & Zuckerman, 1993; Stephenson & Southwell, 2006).

Individuals who strongly need varied, novel, and complex sensations and experiences could be labeled high sensation seekers; low sensation seekers need less arousal and are more reluctant to behave

riskily (Everett & Palmgreen, 1995; Pizam et al., 2004). When applied to tourism management setting, similar findings are noted. Sensation seeking relates positively to individuals' willingness to participate in risky touristic activities, such as extreme sports (Pizam, Reichel, & Uriely, 2001). While sensation seekers are also more willing to accept uncertainty and risks and travel to less familiar kinds of places, they do not seek risk for risk's sake; instead, they handle risk differently (Lepp & Gibson, 2008). For example, risk takers are more likely to engage in protective measures, so they can enjoy the excitement without endangering themselves (Apter, 1982). Similarly, high sensation seekers suffers lower injury rates in downhill skiing as they are more experienced in dealing with risks (Bouter, Knipschild, Feij, & Volovics, 1988). Additionally, although sensation seeking can represent a dimension of tourists' risk perception, its focus differs from tourists' general perception of risk. For example, tourists' sensation seeking scores are not related to their perceived risk (Lepp & Gibson, 2008). Individuals who undertake risky outdoor behaviors are sensation seekers in that they usually perceive natural environments as stimulating adventure (Zuckerman, 1994). Nowadays, adventure tourism operators are challenged when dealing with a market (including sensation-seeking tourists) that want high thrill but low risk (Dickson & Dolnicar, 2004). Hence, we argue that RPAF should be extended by including sensation seeking and be tested further in the adventure tourism context.

2.5. Conceptual framework: an extended RPA framework

This study aimed to provide a comprehensive framework to understand tide-watchers' attitudes, perceptions, and self-protective behaviors. Fig. 1 shows that the first objective of this study was to segment the tide-watching visitors into two dimensions. Guided by RPAF, the first dimension relates to risk evaluation associated with the tide-watching activities that considers their perceived severity and vulnerability, self-efficacy, and response efficacy. The second dimension is sensation seeking, which highlights the personality trait related to one's perceived risk.

The second objective of this study was to examine the role played by worry as a mediator during decision making. We assume that, when exposed to a situation, worry may be aroused within the tidal bore watchers, and therefore, motivate their subsequent self-protective behaviors. Accordingly, the following two research questions were developed for this study:

RQ1 Can tide-watching visitors be divided into different segments based on their risk perception attitude and sensation seeking tendency?

RQ2 Can worry mediate the relationship between one's risk perception segment and their actual self-protective behavior?

3. Methods

3.1. Research design

This study data are collected during two phases. A series of face-to-face interviews were undertaken in Phase 1 where nine participants from the tidal bore destination management committee and the local government office were included. Each interview took between 30 and 45 min and were used to gain perspectives about three important conditions: (1) the possible negative consequences of tide-watching; (2) the existing risk protecting behaviours that the destination has recommended; and (3) some important reasons why tide-watchers' adopting prevention behavior in the Qiantang River tide-watching attractions may be constrained or encouraged. Two main unfavorable dangers were identified, namely, "hurt by the tidal bore", and "being whirled away by the tidal bore". Three important self-protection actions were, "watch the tidal bore behind the protection fences", "follow the instructions of the safety inspectors and yelling men", and "arrange tidal bore watching activities based on the information of the official webpage". A survey was developed using the results of the interviews and the literature. It was then sent to local government officers and scholars for review to ensure its quality and clarity. Minor changes were made based on the feedback.

Phase 2 involved an on-site survey among tide-watching visitors. A group of trained researchers distributed hardcopy survey questionnaires during the peak season in five tide-watching sites: Da Que Kou, Yan Guan, Lao Yan Cang, Xiao Shan, and Hang Zhou City. All these sites are major tide-watching locations along the Qiantang River mentioned by interviewees, and normally contain around 250,000 visitors during the peak season. The convenience sampling technique was used to recruit the participants. The questionnaire was written in Chinese and the back-translation method was used to ensure translation quality and content consistency.

3.2. Measurement

The survey instrument included questions related to the following constructs: tide-watching visiting information, risk beliefs (namely, perceived vulnerability and perceived severity), efficacy beliefs (namely, self-efficacy and response-efficacy), worry, sensation seeking, self-protective behavior, and demographics.

Perceived vulnerability is defined as the expectation of being exposed to a threat (Lwin & Saw, 2007). Two case-specific items in the perceived vulnerability scale were identified from the interviews: "hurt by the tidal bore" and "being whirled away by the tidal bore". The respondents were asked to rate the likelihood of a risk event using a 7-point Likert-type scale (1 = extremely unlikely, 7 = extremely likely) (Sharifpour, Walters, Ritchie, & Winter 2014) ($\alpha = 0.807$).

Risk severity (also called perceived seriousness) refers to the degree

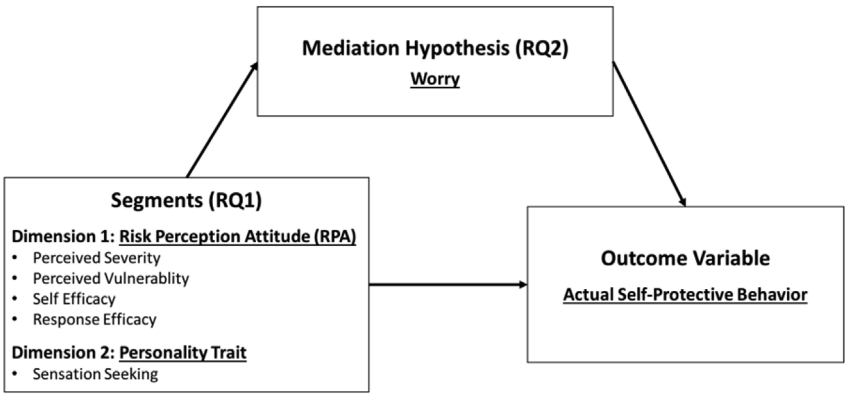

Fig. 1. Conceptual model.

Table 1
Auto-clustering statistics.

Number of Clusters	Bayesian Information Criterion (BIC)	BIC Change [a]	Ratio of BIC Changes [b]	Ratio of Distance Measures [c]
1	1045.258			
2	894.136	−151.122	1.000	1.802
3	835.453	−58.684	.388	1.626
4	821.149	−14.303	.095	1.335
5	824.644	3.495	-.023	1.039
6	830.146	5.502	-.036	1.239
7	845.510	15.364	-.102	1.493
8	874.470	28.960	-.192	1.044
9	904.603	30.133	-.199	1.083
10	936.771	32.168	-.213	1.141
11	971.960	35.189	-.233	1.348
12	1012.666	40.706	-.269	1.117
13	1055.031	42.366	-.280	1.044
14	1098.000	42.968	-.284	1.092
15	1142.112	44.112	-.292	1.056

Notes.
[a] The changes are from the previous number of clusters in the table.
[b] The ratios of changes are relative to the change for the two-cluster solution.
[c] The ratios of distance measures are based on the current number of clusters against the previous number of clusters.

of negative consequences an individual associates with an event (Hichang, 2010). Items in the perceived severity scale are aimed to evaluate the respondents' belief in the severity of the threat (Lwin & Saw, 2007). Adapted from Martin, Bender, and Raish (2007), perceived severity was measured by asking "how serious are the potential dangers you might face in the tidal bore watching attraction" using a 7-point Likert scale ranging from "1 = not at all serious" to "7 = extremely serious".

To measure *self-efficacy* (Bandura, 1990), the respondents were asked to evaluate their confidence in dealing with incidents (Rimal & Real, 2003) (1 = not confident at all, 7 = extremely confident) ($\alpha = 0.905$).

To measure *response efficacy*, respondents were asked to evaluate the effectiveness of multiple risk protecting behaviors that were identified from the interviews (e.g., tide-watching behind the fence, follow instructions, and arrange activities based on official information) using a 7-point Likert-type scale (1 = not effective at all, 7 = most effective) (Martin et al., 2007) ($\alpha = 0.733$). Additionally, to measure *the actual self-protective behavior*, we used a binomial scale (1 = yes, 2 = No) to ask participants to indicate if they have undertaken these three risk reduction behaviors.

To measure *worry* (Chien et al., 2016, see Section 2.3), participants were asked to indicate how worried they were regarding the potential risks related to tide-watching on a 7-point Likert scale (1 = not worried at all, 7 = extremely worried) (Larsen et al., 2009) ($\alpha = 0.815$).

To measure *sensation seeking*, we used the brief sensation seeking scale (BSSS), comprising eight Likert-type items (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002). The BSSS is a short form of Zuckerman's 40-item SSS, and its validity and applicability have been confirmed by previous studies in tourism (Litvin, 2008) ($\alpha = 0.861$).

Lastly, the participants' tide-watching trip information and demographics were collected. Participants were asked (1) if they were a first-time tide-watching visitor, (2) if they were local residents, (3) which location they chose to watch Qiantang River tidal bore, (4) if they had children accompanied the trip, and (5) if they could swim. With respect to the demographic information, they were asked (1) age, (2) gender, (3) education level, (4) marital status, and (5) family status (i.e., have or have no children).

3.3. Data analysis

Cluster analysis was employed to answer the first research question. Clustering that can form homogenous groups within a complex data set (Borgen, Barnett, & Gelso, 1987) is one of the most widely used tools for exploratory data analysis. Our study thus identified targets that shared similar types of risk perception attitudes and sensation seeking tendencies. This technique usually provides an analysis method that combines all theoretical dimensions of risk perception attitudes. From a practical perspective, cluster analysis can identify different target groups whose needs and benefits vary. Such information can benefit how practitioners devise the best strategy and campaign for visitor safety (Clatworthy, Buick, Hankins, Weinman, & Horne, 2005). Answering the second research question involved a series of mediation analyses.

4. Results

4.1. Sample profile

After performing data entry and screening in SPSS, a total of 302 useable questionnaires were included for further analysis. The average age of the sample was 34 years old. Nearly two thirds (63.2%, n = 191) were male, and above half (56.1%, n = 169) were either married or had *de-facto* partners. Half (54.0%, n = 163) of the sample had children. Around one fifth (21%, n = 63) had a university degree and most respondents (78.4%, n = 236) were not residents. Half (50.3%, n = 152) of the respondents were first-time tide-watchers; only 24.7% of them (n = 58) had brought their children on the trip. Half (53.5%, n = 160) of them knew how to swim.

4.2. Results of cluster analysis

To achieve the first research objective, a two-step cluster analysis was used to profile tide-watchers. We firstly scanned and pre-clustered the data, and secondly finalized the arrangement using a standard hierarchical clustering algorithm. This method is useful both to automatically determine the highest number of clusters based on the selected standards, and to reveal natural groupings (Norušis, 2012).

Guided by our theoretical framework, the following five predictors were entered to generate the clusters: (1) perceived severity, (2) perceived vulnerability, (3) self-efficacy, (4) response efficacy, and (5) sensation seeking. Schwarz's Bayesian information criterion (BIC) was used for clustering while log likelihood was used as the distance measure. Table 1 shows that the BIC drops significantly from −151.122 for a two-cluster solution to −58.684 for a three-cluster solution, while the remaining changes were relatively small. Thus, the algorithm influenced a three-cluster solution, which was further supported by the

Table 2
Summary of predictor importance.

Category	Predictor	Predictor Importance	Strength
RPA related variable	Self-Efficacy	1	Strong (0.8–1)
Not RPA-related variable	Sensation Seeking	0.84	Strong (0.8–1)
RPA related variable	Perceived Vulnerability	0.30	Moderate (0.2–0.8)
RPA related variable	Response Efficacy	0.15	Weak (0–0.2)
RPA related variable	Perceived Severity	0.07	Weak (0–0.2)

Table 3
Cluster characteristics.

Clusters		Cluster 1 *Vulnerable Visitors*	Cluster 2 *Cautious Visitors*	Cluster 3 *Adventurous Visitors*	*F* or χ^2 Value	*P*-value
Size		63 (22%)	120 (42%)	103 (36%)		
INDIVIDUAL CHARATERSTICS						
Age_mean		34 [2, 3]	40 [1, 3]	27 [1, 2]	25.99	.000**
Gender						
Male		37	77	68	.92	.630
Female		26	43	35		
Education						
Junior school		12	31	5	41.37	.000**
Junior high school		10	29	14		
High school		17	33	32		
Certificate/Diploma		15	12	15		
University degree		9	14	37		
Marital Status						
Not married		24	32	67	34.11	.000**
Married		39	88	36		
Family Status						
Have no children		23	32	73	46.02	.000**
Have children		40	88	30		
Residence						
Local resident		17	16	28	7.88	.019*
Visitor		46	104	75		
Repeat visit to destination						
First visit		34	52	55	2.95	.229
Repeat visit		29	68	48		
Accompanying children on trip						
Yes		15	27	13	3.14	.208
No		36	70	61		
RISK-RELATED VARIABLES						
Perceived Severity						.000**
Average Level		3.48 [3]	3.76 [3]	2.72 [1, 2]	10.72	
Perceived Vulnerability						.000**
Average Level		2.14 [2, 3]	1.20 [1]	1.08 [1]	48.37	
Self-Efficacy						.000**
Average Level		3.07 [2, 3]	6.51 [1]	6.43 [1]	239.55	
Response Efficacy						.000**
Average Level		5.41 [2]	6.35 [1, 3]	5.62 [2]	23.12	
Sensation Seeking						.000**
Average Level		3.29 [2, 3]	2.05 [1, 3]	4.43 [1, 2]	183.21	
Undertook protective behavior						
Inactive (Did 0–2 actions)	Count	35	74	43	9.02	.011*
	%	55.6%	61.7%	41.8%		
Active (Did all 3 actions)	Count	28	46	60		
	%	44.4%	38.3%	58.3%		
Worry		4.70 [2]	5.82 [1, 3]	4.48 [2]	17.35	.000**

Note. (a): ** The mean difference is significant at the 0.01 level; *The mean difference is significant at the 0.05 level.
(b): Superscript indicates that there are significant contrast comparisons in the corresponding groups according to the results of post-hoc tests.

number of silhouette measure of cohesion and separation (Average Silhouette = 0.4), which is above an acceptable level of 0.2 (Norušis, 2012). Consequently, three clusters were identified.

When it comes to the importance of predictors (see Table 2), self-efficacy and sensation seeking appear to be the most important predictors and are most impactful during the clustering process. Perceived vulnerability plays a moderate role predicting the cluster outcomes, while response efficacy and perceived severity were least important. To further explore the characteristics of each cluster, a series of ANOVA and chi-square tests were conducted. Table 3 reports the major results of comparing the segments regarding their individual characteristics and variables related to their risk perception attitudes.

Segment I: Vulnerable Visitors. This cluster comprised individuals who perceived a weak efficacy appraisal including both the lowest self-efficacy (M_{SE} = 3.07) and response efficacy (M_{RE} = 5.41). Notably, compared to the other two groups, this segment had relatively higher perceived vulnerability associated with tide-watching risks ($M_{vulnerablity}$ = 2.14). Both their sensation seeking (M_{SS} = 3.29) and perceived severity ($M_{severeity}$ = 3.48) were at a moderate level. Nearly half of participants in this segment (44.4%) had undertaken all three recommended risk reduction behaviors. When it comes to individual characteristics, this segment included individuals who appeared to be of middle age (M_{age} = 34), moderately educated (38% with tertiary degree), and more than half of them had children (63.5%).

Segment II. Cautious Visitors. This cluster comprised individuals who appeared to be low sensation seekers (M_{LSS} = 2.05) and appraised efficacy as strong in both the highest self-efficacy (M_{SE} = 6.51) and response efficacy (M_{RE} = 6.35). This segment perceived relatively higher severity towards the risks associated with tide-watching ($M_{severeity}$ = 3.76) and worried the most (M_{Worry} = 5.82). Notably, most of this segment (61.7%) were inactive and did not undertake all three recommended risk reduction behaviors. Furthermore, this segment appeared to be relatively older (M_{age} = 40), less educated (21.7% with tertiary degree), were married and were parents (73.3%). Most of them (86.7%) were visitors from nearby regions rather than residents.

Segment III Adventurous Visitors. This segment comprised individuals who were high sensation seekers (M_{HSS} = 4.43), and notably perceived a lowest threat appraisal for both lowest severity ($M_{severeity}$ = 2.72) and vulnerability ($M_{vulnerablity}$ = 1.08). It seems that they did not worry too much about the risks associated with tide-watching (M_{worry} = 4.48); they had a relatively high level of self-efficacy (M_{SE} = 6.43) and a moderate response efficacy (M_{RE} = 5.62). Regarding their individual characteristics, this segment was likely to be younger (M_{age} = 27) and single. This segment was also better educated, with half of them (50.5%) having tertiary degrees. Notably, this group tended to actively engage more in risk reduction strategies as more than half (58.3%) were active protectors and undertook all three recommended behaviors.

4.3. Testing the mediating role of worry

To achieve the second research objective, mediation analyses were conducted. The independent variable in the model is the cluster assignment, and this variable has three categories: (1) Cluster 1 (Vulnerable Visitors), (2) Cluster 2 (Cautious Visitors), and (3) Cluster 3 (Adventurous Visitors). Given that the independent variable is a multi-categorical construct, several analysis steps were undertaken following Hayes and Preacher's (2014) recommendations. Firstly, the cluster assignment was used as the independent variable, *worry* as the mediator, and actual behavior as the outcome variable. Behavior was coded as a categorical variable, where 1 = 'have undertaken self-protective behavior' and 0 = 'have not taken all recommended preventive measures'. Secondly, Cluster 2 was used as the reference group and was not included in the model testing. It was used as a baseline for interpreting results since they were more likely to be engaged in the efficacy appraisal and appear to be more worried than others. Identifying the differences between the Cautious Visitors and others would provide important perspectives into encouraging tide-watching visitors adapting safety measures.

Thirdly, the SPSS MARCRO PROCESS was used for analysis (Model 4) and a 10,000-bootstrap sample was employed. According to Hayes and Preacher (2014), the bootstrapping method uses a repeated sampling method and is applicable to the situation when the normality assumption is not satisfied. Fourthly, the specific testing procedure involves two model tests. The first used Cluster 1 as the independent variable, *worry* as the mediating variable, behavior as the outcome variable, and Cluster 3 as a covariate. The second test used Cluster 3 as the independent variable, *worry* as the mediating variable, behavior as the outcome variable and Cluster 1 as a covariate. Fig. 2 displays the results of this analyses.

The results of the first model testing revealed that the direct effect from Cluster 1 on respondents' actual behaviors was not significant (Effect = 0.0172, p = .957, 95%CI -0.609, 0.644). However, the

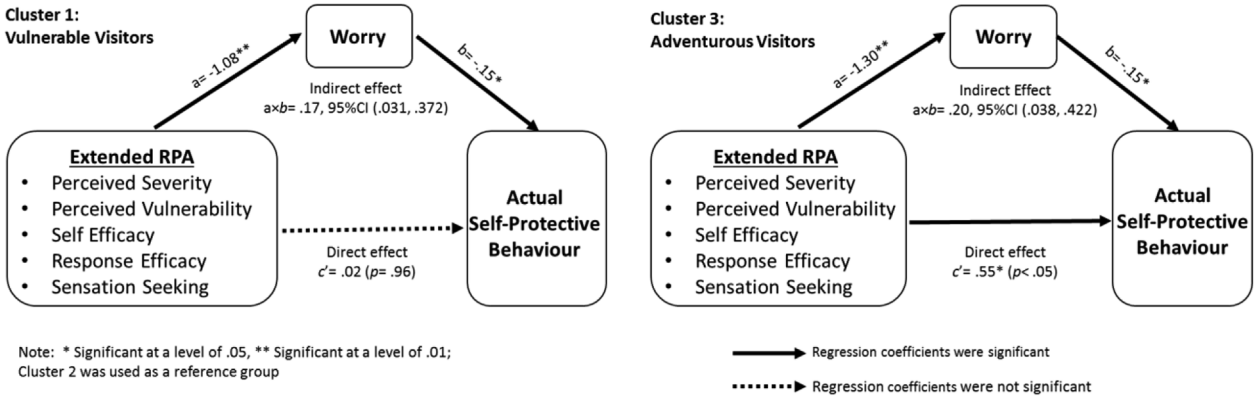

Fig. 2. Path diagram of simple mediation (worry).

indirect effect of Cluster 1 on the outcome variable via *worry* was significant (Effect = 0.165, 95% CI 0.031, 0.372). These results suggested a full mediation relationship, indicating that the relationship between RPA and the outcome variable depends on *worry*. More specifically, compared to Cluster 2, participates in Cluster 1 were less likely to feel *worry*, which in turn resulted in less likelihood of actively adopting self-protective behaviors.

Additionally, the results of the second model testing showed that the direct effect from the assignment of Cluster 3 on the probability of participants' engagement of self-protective behavior was significant (Effect = −0.553, p = .048, 95%CI 0.006, 1.10). The indirect effect from Cluster 3 on the outcome variable via *worry* was also significant (Effect = 0.20, 95% CI.038, 0.422). The findings suggested that the relationships between the extended RPA and the outcome variable was partly mediated by *worry*. Compared to Cluster 2, Cluster 3 was more likely to engage in adopting self-protective behaviors. Moreover, the more worried they felt, the more likely they would engage in self-protective behaviors.

5. Discussion

The purpose of this study was to develop and apply an extended RPAF to examine visitors' safety behaviors in water-based mass adventure tourism in China. One aim of this study was to investigate mass adventure tourism in a non-western country. Although the global homogeneity of adventure tourism products has been reported, Buckley et al. (2014) argue that adventure tourism is culturally heterogeneous, and the potential effect of cultural differences on safety need to be noted and thoroughly examined. Buckley et al. (2014) reveal that the Chinese domestic model for river-based adventure tourism reflects passive mass tourism, which differs markedly from Western models that expect individuals to be involved and responsible for safety. Our findings indicated that most tide-watching visitors did not realize the risks they were exposed to and were not actively engaged in self-protective behaviors on site. This may partly be because visitors had not been effectively engaged in the government's safety communication (e.g., online safety advices, onsite warnings, and safety instruction) (Yu & Wang, 2018). Thus, for practitioners, the most important task is to develop useful strategies that can educate visitors about all potential risks. This is especially important considering that most mass adventure tourists are often unskilled and more likely to be passive receivers of safety information.

The first objective of this study was to develop and apply an extended RPAF to segment tide-watching visitors. The results showed that tide-watchers can be divided into three groups based on their risk perception attitudes and sensation seeking propensity. This supplements the original theoretical assumption suggesting that groups with distinctive attitudes can be identified within society, and all differ depending on how they are motivated and how likely they will protect themselves (Rimal & Real, 2003). This study noticed a relatively low level of risk appraisal (i.e., perceived severity and vulnerability) across the whole sample, which indicates that most Chinese who tide-watch did not perceive it as risky and were not aware of the potential risk associated with this activity. This may be one of the main reasons why only three groups were identified in this study instead of four groups as suggested by the original RPAF. Meanwhile, the findings here stress the importance of modifying the RPAF when applying it to tourism management and the significance of addressing different contexts in tourist safety research (Liu-Lastres et al., 2018).

Sensation seeking was identified as the second most important factor influencing tide-watchers. Consistent with the literature (Bouter et al., 1988), this study found that "adventurous visitors" (Cluster 3) were more likely to take protective measures. Cater (2006) pointed out that the most successful adventure tourism operators are those who can reduce risk levels while offering thrilling experience. In addition, low sensation seekers (Cluster 2), who are labeled 'cautious visitors', had the strongest efficacy appraisal and worried fairly intensely. Notably, this segment appears to be more inactive with only some of them taking all three recommended safety precautions. This is somehow peculiar to Chinese mass adventure tourism, where visitors do not perceive tide-watching as a form of adventure tourist activities, but rather a type of mass entertainment. Thus, instead of seeking excitement and thrilling experience, this group of visitors pursues entertainment and pleasure. Influenced by Chinese culture, this group seems not to pay attention to safety. Low-risk beliefs may be why they were not fully motivated to protect themselves on site.

Our second research objective was to explore the role of worry during visitors' decisions-making related to safety behaviors. Overall, the findings suggest that worry varied with the conditions. The tourism literature (e.g., Chien et al., 2016) suggests that worry leads to tourists' risk perception and is also related to their self-protection. Notably, our findings showed that, for participants in Cluster 2, although they worried strongly, they perceived risk (i.e., perceived vulnerability) relatively lowly, and did not actively adopt self-protective behaviors. It seems that worry did not affect their perceived risk and safety behaviors. For the other two clusters (Clusters 1 & 3), worry mediated the relationship between their RPAs and safety behaviors. The mediating role played by worry reflects that people who feel more worried about a risky situation are more likely to participate in safety behaviors. This suggests that worry can reflect a person's feeling about a situation and therefore, can drive their subsequent behavior (i.e., Mullens et al., 2004; Szabó & Lovibond, 2002; Wolff & Larsen, 2013).

More closely examining our results indicates that worry fully mediated the relationship between Vulnerable Visitors' (Cluster 1) RPA and safety behavior, but partly mediated the relationship between Adventurous Visitors' (Cluster 3), RPA, and safety behavior. This means that, compared to Cluster 2, Clusters 1's stronger likelihood to adopt self-protective behavior occurred because of a stronger sense of worry.

While for Cluster 3, the higher likelihood of undertaking all self-protective behaviors may be partly due to a different RPA and a stronger sense of worry. Given the different role played by *worry* in various situation, it is likely that efficacy beliefs may moderate the relationship between worry and individuals' safety behaviors. Future studies should consider this and explore the validity of a moderation model.

6. Managerial implications

The findings of this study contribute to management in the following important ways. They show the characteristics of Chinese mass-adventure tourists who are normally not safety-driven and do not completely understand the risks associated with adventure-tourism activities. This means that tour operators, attraction managers, and DMOs (Destination Management Operators) need to more responsibly provide enough risk information and safety advice about tide-watching. China's Tourism Law states that tour operators should do this to increase tourism safety. Additional measures (e.g., valuable tourism information and safety advice) are strongly needed to emphasize the importance of safety and to educate visitors to take safety precautions (Yu & Wang, 2018).

In addition to investing in suitable facilities to support tidal bore watching (see Section 2.1), public campaigns that promote safety among mass adventure tourists are needed. From the interviews, it becomes apparent that most of operators were unwilling to fully reveal to the public the risks associated with tide-watching. This is mainly because they were afraid that full exposure would scare visitors away and harm the tourism industry that has been developing around tide-watching. This is understandable as most destinations and attraction do not want to be associated with negative images. However, without information transparency, the public cannot understand the risk and thus adopt adequate safety behavior.

Additionally, this research found that individual attributes and personality traits should be considered when risk is communicated (Nordfjærn & Rundmo, 2015). Sensation seeking is negatively correlated with age. For the younger segment of adventure seekers, governments need to provide worthwhile safety equipment and training, and therefore, encourage adventurers to be fully aware of risks. For other clusters who are already willing to engage in risk-reduction, the officials need to ensure that these visitors receive the most accurate, up-to-date information. What they need is not a motivation to act, but rather, information on what to do and how to stay safe. In summary, consistent with the assumptions of the RPAF, the safety campaign should be threefold: (1) emphasizing the potential risk associated with tide-watching, (2) educating the public about effective preventive measures, and (3) engaging risk communication through different channels, such as commercials, brochures, or interactive interpretation systems.

7. Conclusion, limitations, and future studies

This paper extends the RPAF to examine tide-watchers' safety behaviors on-site and to identify the major reasons why visitors should protect themselves from harm. This study contributes to knowledge in three ways. First, it increases the current understanding of tourists' safety decision-making and protective behavior within river-based adventure tourism. Second, by examining the Chinese market and its mass adventure tourists' characteristics, this study can add a non-Western perspective to adventure tourism. Third, our findings can inform future planning and marketing initiatives to improve safety for participants at mass gatherings like tide-watching festivals. This knowledge can also provide intelligence to local government and tourism operators to help them to develop risk communication strategies for leading visitors to self-protective behavior, and therefore, improve their safety in adventure tourism sites, such as tide-watching attraction and festivals. The overall aim is to protect the life of those visiting these sites.

However, there are several limitations to this study. First, this study indicates an overall low level of risk appraisal across the whole sample: both perceived severity and perceived vulnerability are lower than the average score of the scale. Therefore, this study did not generate four groups as predicted by the original RPAF. This reflects the differences between theoretical assumption and field data, but also provides some insight for the future study to further modify or extend the RPAF for a better application in various risk contexts.

Second, this study used a convenience sample. The current data, while valuable in testing framework propositions, may not be able to fully represent the entire population. To reduce this limitation, this study attempted to collect data from multiple tide-watching sites during the peak season to increase diversity. Future studies should keep this in mind and use random sampling in data collection.

Third, some theoretically important factors were not all included in the study. For instance, social influence factors such as social norms may prove important in shaping individual's protective behavior. This normative influence factor is a central component of risk theories (see protection motivation theory and the theory of reasoned action). This study did not test this factor because confusion exists about what is meant by 'norm' as it might relate to Chinese tide-watching. There are also disagreements about the process through which norms impact behavior (Reynolds, Subašić, & Tindall, 2014). However, future studies may incorporate additional norm constructs in the research framework.

Four, this study adapted the brief sensation seeking scale (BSSS) to measure sensation seeking. Although participants responded well to BSSS, it was adapted from Western literature, which may not fully apply to China. Also, the data were not normally distributed; however, the bootstrap sampling process was used because it is the most popular method of testing mediation and does not require the normality assumption to be met.

Lastly, while surveys are frequently used for data collection in tourism risk studies, self-reported measurement may not be a true representation of actual behavior. Future research can extend the model in an experimental setting and add value to risk communication.

Author contribution

Dr Wang contributed to leading the project in the overall design, research scope, theoretical framework development, data collection, analysis and manuscript writing. Dr Liu-Lastres contributed to theory building, data analysis, manuscript writing and revision. Prof Ritchie contributed to this article on theory building, manuscript writing and revision. Prof Pan contributed to study design, data collection, and manuscript revision. All authors wrote the manuscript, discussed the results and gave final approval of the version to be submitted.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.tourman.2019.03.012.

References

Apter, M. J. (1982). *The experience of motivation: The theory of psychological reversals.* London: Academic Press, Inc.

ATTA (2013). *Adventure tourism market study.* Retrieved from http://files.adventuretravel.biz/docs/research/adventure-tourism-market-study-2013-web.pdf.

Bandura, A. (1990). Perceived self-efficacy in the exercise of personal agency. *Journal of Applied Sport Psychology, 2*(2), 128–163. https://doi.org/10.1080/10413209008406426.

Bentley, T. A., Page, S., & Walker, L. (2004). The safety experience of New Zealand adventure tourism operators. *Journal of Travel Medicine, 11*(5), 280–286.
Boese, A. (2005). *Real tsunami, wrong ocean.* Retrieved from http://hoaxes.org/weblog/comments/real_tsunami_wrong_ocean#.
Borgen, F., Barnett, D., & Gelso, C. (1987). Applying cluster analysis in counseling psychology research. *Journal of Counseling Psychology, 34*(4), 456–468. https://doi.org/10.1037/0022-0167.34.4.456.
Borkovec, T. D., Alcaine, O. M., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.). *Generalized anxiety disorder: Advances in research and practice* (pp. 77–108). New York: Guilford.
Bouter, L., Knipschild, P., Feij, J., & Volovics, A. (1988). Sensation seeking and injury risk in downhill skiing. *Personality and Individual Differences, 9*(3), 667–673.
Breakwell, G. M. (2014). *The psychology of risk* (2nd ed.). Cambridge, United Kingdom: Cambridge University Press.
Breda, Z., & Costa, C. (2006). Safety and security issues affecting inbound tourism in the People's Republic of China. In Y. Mansfeld, & A. Pizam (Eds.). *Tourism, security, and safety: From theory to practice* (pp. 187–208). (1st ed.). Burlington, MA: Elsevier Butterworth-Heinemann.
Buckley, R., McDonald, K., Duan, L., Sun, L., & Chen, L. X. (2014). Chinese model for mass adventure tourism. *Tourism Management, 44*, 5–13. https://doi.org/10.1016/j.tourman.2014.01.021.
Cater, C. I. (2006). Playing with risk? Participant perceptions of risk and management implications in adventure tourism. *Tourism Management, 27*, 317–325. https://doi.org/10.1016/j.tourman.2004.10.005.
Chanson, H. (2011). Current knowledge in tidal bores and their environmental, ecological and cultural impacts. *Environmental Fluid Mechanics, 11*, 77–98. https://doi.org/10.1007/s10652-009-9160-5.
Cheng, M., Edwards, D., Darcy, S., & Redfern, K. (2018). A tri-method approach to a review of adventure tourism literature: Bibliometric analysis, content analysis, and a quantitative systematic literature review. *Journal of Hospitality & Tourism Research, 42*(6), 997–1020. https://doi.org/10.1177/1096348016640588.
Chien, P. M., Sharifpour, M., Ritchie, B. W., & Watson, B. (2016). Travelers' health risk perceptions and protective behavior: A psychological approach. *Journal of Travel Research, 56*(6), 1–16. https://doi.org/10.1177/0047287516665479.
Clatworthy, J., Buick, D., Hankins, M., Weinman, J., & Horne, R. (2005). The use and reporting of cluster analysis in health psychology: A review. *British Journal of Health Psychology, 10*(3), 329–358. https://doi.org/10.1348/135910705X25697.
Cohen, E. (1972). Toward a sociology of international tourism. *Social Research, 39*(1), 164–182.
Davey, G. C., Tallis, F., & Capuzzo, N. (1996). Beliefs about the consequences of worrying. *Cognitive Therapy and Research, 20*(5), 499–520.
Dickson, T., & Dolnicar, S. (2004). *No risk, no fun - the role of perceived risk in adventure tourism.* Brisbane, Queensland: Paper presented at the the 13th International Research Conference of the Council of Australian University Tourism and Hospitality Education (CAUTHE 2004).
Everett, M. W., & Palmgreen, P. (1995). Influences of sensation seeking, message sensation value, and program context on effectiveness of anticocaine public service announcements. *Health Communication, 7*(3), 225–248.
Fennell, D. A. (2017). Towards a model of travel fear. *Annals of Tourism Research, 66*, 140–150. https://doi.org/10.1016/j.annals.2017.07.015.
Fuchs, G., & Reichel, A. (2006). Tourist destination risk perception: The case of Israel. *Journal of Hospitality & Leisure Marketing, 14*(2), 83–108. https://doi.org/10.1300/J150v14n02.06.
Fyhri, A., & Backer-Grøndahl, A. (2012). Personality and risk perception in transport. *Accident Analysis & Prevention, 49*, 470–475. https://doi.org/10.1016/j.aap.2012.03.017.
Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with amulticategorical independent variable. *British Journal of Mathematical and Statistical Psychology, 67*(3), 451–470. https://doi.org/10.1111/bmsp.12028.
Hichang, C. (2010). Determinants of behavioral responses to online privacy: The effects of concern, risk beliefs, self-efficacy, and communication sources on self-protection strategies. *Journal of Information Privacy and Security, 6*(1), 3–27. https://doi.org/10.1080/15536548.2010.10855879.
Horvath, P., & Zuckerman, M. (1993). Sensation seeking, risk appraisal, and risky behavior. *Personality and Individual Differences, 14*(1), 41–52.
Hoyle, R. H., Stephenson, M. T., Palmgreen, P., Lorch, E. P., & Donohew, R. L. (2002). Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences, 32*(3), 401–414.
Keinan, G., Meir, E., & Gome-Nemirovsky, T. (1984). Measurement of risk takers' personality. *Psychological Reports, 55*(1), 163–167.
Larsen, S., Brun, W., & Øgaard, T. (2009). What tourists worry about – construction of a scale measuring tourist worries. *Tourism Management, 30*(2), 260–265. https://doi.org/10.1016/j.tourman.2008.06.004.
Law, R. (2006). The perceived impact of risks on travel decisions. *International Journal of Tourism Research, 8*, 289–300. https://doi.org/10.1002/jtr.576.
Lepp, A., & Gibson, H. (2008). Sensation seeking and tourism: Tourist role, perception of risk and destination choice. *Tourism Management, 29*(4), 740–750. https://doi.org/10.1016/j.tourman.2007.08.002.
Levenson, M. R. (1990). Risk taking and personality. *Journal of Personality and Social Psychology, 58*(6), 1073.
Li, Y., Pan, D.-Z., Chanson, H., & Pan, C.-H. (2017). Tidal bore progressing on a small slope. *Experimental Thermal and Fluid Science, 88*, 513–518.
Litvin, S. W. (2008). Sensation seeking and its measurement for tourism research. *Journal of Travel Research, 46*(4), 440–445.
Liu-Lastres, B., Schroeder, A., & Pennington-Gray, L. (2018). Cruise line customers' responses to risk and crisis communication messages: An application of the risk perception attitude framework. *Journal of Travel Research*. https://doi.org/10.1177/0047287518778148.
Liu, B., Kim, H., & Pennington-Gray, L. (2015). Responding to the bed bug crisis in social media. *International Journal of Hospitality Management, 47*(5), 76–84. https://doi.org/10.1016/j.ijhm.2015.03.005.
Liu, B., Schroeder, A., Pennington-Gray, L., & Farajat, S. A. (2016). Source market perceptions: How risky is Jordan to travel to? *Journal of Destination Marketing & Management, 5*(4), 294–304.
Loewenstein, G. F., Weber, E. U., Hsee, C. K., & Welch, N. (2001). Risk as feelings. *Psychological Bulletin, 127*(2), 267–286.
Lopes, L. L. (1994). Psychology and economics: Perspectives on risk, cooperation, and the marketplace. *Annual Review of Psychology, 45*(1), 197–227.
Lwin, M. O., & Saw, S.-M. (2007). Protecting children from myopia: A PMT perspective for improving health marketing communications. *Journal of Health Communication, 12*(3), 251–268. https://doi.org/10.1080/10810730701266299.
Martin, I., Bender, H., & Raish, C. (2007). What motivates individuals to protect themselves from risks: The case of wildland fires. *Risk Analysis, 27*(4), 887–900. https://doi.org/10.1111/j.1539-6924.2007.00930.x.
Moser, R. P., Mccaul, K., Peters, E., Nelson, W., & Marcus, S. E. (2007). Associations of perceived risk and worry with cancer health-protective actions: Data from the health information national trends survey (HINTS). *Journal of Health Psychology, 12*(1), 53–65.
Mullens, A. B., McCaul, K. D., Erickson, S. C., & Sandgren, A. K. (2004). Coping after cancer: Risk perceptions, worry, and health behaviors among colorectal cancer survivors. *Psycho-Oncology, 13*(6), 367–376. https://doi.org/10.1002/pon.751.
National Geographic Society (2011). *Tidal bore.* Retrieved from https://www.nationalgeographic.org/encyclopedia/tidal-bore/.
Nordfjærn, T., & Rundmo, T. (2015). Personality, risk cognitions and motivation related to demand of risk mitigation in transport among Norwegians. *Safety Science, 73*, 15–22. https://doi.org/10.1016/j.ssci.2014.11.008.
Norušis, M. (2012). *IBM SPSS statistics 19 guide to data analysis.* Upper Saddle River, NJ: Prentice Hall.
Pizam, A., Jeong, G. H., Reichel, A., van Boemmel, H., Lusson, J. M., & Steynberg, L. (2004). The relationship between risk-taking, sensation-seeking, and the tourist behavior of young adults: A cross-cultural study. *Journal of Travel Research, 42*(3), 251–260.
Pizam, A., Reichel, A., & Uriely, N. (2001). Sensation seeking and tourist behavior. *Journal of Hospitality & Leisure Marketing, 9*(3–4), 17–33.
Pligt, J. v. d. (2002). Cognition and affect in risk perception and risky decision making. In C. v. Hofsten, & L. Backman (Eds.). *Psychology at the turn of the millennium (Volume 2) Social, developmental, and clinical perspectives* (pp. 247–269). Stockholm: Psychology Press.
Plog, S. (1974). Why destination areas rise and fall in popularity. *Cornell Hotel and Restaurant Administration Quarterly, 14*(4), 55–58. https://doi.org/10.1177/001088047401400409.
Reynolds, K. J., Subašić, E., & Tindall, K. (2014). The problem of behaviour change: From social norms to an ingroup focus. *Social and Personality Psychology Compass,* 1–12. https://doi.org/10.1111/spc3.12155.
Rimal, R. N., & Real, K. (2003). Perceived risk and efficacy beliefs as motivators of change: Use of the risk perception attitude (RPA) framework to understand health behaviors. *Human Communication Research, 29*(3), 370–399. https://doi.org/10.1111/j.1468-2958.2003.tb00844.x.
Ritchie, B. W., Chien, P. M., & Sharifpour, M. (2017). Segmentation by travel related risks: An integrated approach. *Journal of Travel & Tourism Marketing, 34*(2), 274–289. https://doi.org/10.1080/10548408.2016.1156616.
Robinson, D. W. (1985). Stress seeking: Selected behavioral characteristics of elite rock climbers. *Journal of Sport Psychology, 7*(4), 400–404.
Sharifpour, M., Walters, G., Ritchie, B. W., & Winter, C. (2014). Investigating the role of prior knowledge in tourist decision making: A structural equation model of risk perceptions and information search. *Journal of Travel Research, 53*(3), 307–322. https://doi.org/10.1177/0047287513500390.
Skubisz, C. (2014). Risk perception attitude framework. In T. L. Thompson (Ed.). *Encyclopedia of health communication.* Thousand Oaks: SAGE Publications, Inc.
Stephenson, M. T., & Southwell, B. G. (2006). Sensation seeking, the activation model, and mass media health campaigns: Current findings and future directions for cancer communication. *Journal of Communication, 56*, 38–56.
Swarbrooke, J., Beard, C., Leckie, S., & Pomfret, G. (2003). *Adventure tourism: The new frontier.* Oxford: Butterworth Heinemann.
Szabó, M., & Lovibond, P. F. (2002). The cognitive content of naturally occurring worry episodes. *Cognitive Therapy and Research, 26*(2), 167–177.
The Qiantang River Administration of Zhejiang Province (2015). *Hangzhou Qiantang River tide safety management and warning.* Hangzhou.
Thrasher, J. F., Swayampakala, K., Borland, R., Nagelhout, G., Yong, H.-H., Hammond, D., et al. (2016). Influences of self-efficacy, response efficacy, and reactance on responses to cigarette health warnings: A longitudinal study of adult smokers in Australia and Canada. *Health Communication, 31*(12), 1517–1526. https://doi.org/10.1080/10410236.2015.1089456.
Tidal Bore Bulletin (2014). *The Qiantang River administration of Zhejiang Province_ 2014 tidal bore Bulletin.* Hangzhou.
Tsunami death toll could pass 100,000 (2004). Calgary Herald.
UNWTO (2014). *Global report on adventure tourism*Madrid, Spain: United National World Tourism Organization (UNWTO).
Walters, G., & Li, S. (2017). The role and influence of emotions on tourist behaviour. In S. K. Dixit (Ed.). *The Routledge handbook of consumer behaviour in hospitality and tourism* (pp. 46–54). Routledge.

Wang, N. (2011). *Qiantang tidal bore 'flooded' a hundred people in the past twenty years.* Legal Evening News. Retrieved from http://www.fawan.com/Article/gn/jd/2011/09/16/124154130187.html.

Wolff, K., & Larsen, S. (2013). Tourist worries – here and now vs. there and then: The effect of item wording in the Tourist Worry Scale. *Tourism Management, 35*, 284–287. https://doi.org/10.1016/j.tourman.2012.09.013.

Yang, E. C. L., Khoo-Lattimore, C., & Arcodia, C. (2017). A systematic literature review of risk and gender research in tourism. *Tourism Management, 58*, 89–100. https://doi.org/10.1016/j.tourman.2016.10.011.

Yang, E. C. L., & Nair, V. (2014). Tourism at risk: A review of risk and perceived risk in tourism. *Asia-Pacific Journal of Innovation in Hospitality and Tourism, 3*(2), 1–21. https://doi.org/10.7603/s40930-014-0013-z.

Yu, X., & Wang, J. (2018). Tourist safety information: Channel integration and content design - the case of safety in Qiantang river tidal-bore watching. *Tourism Forum, 11*(3), 42–57 (in Chinese).

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking.* Cambridge, UK: Cambridge University Press.

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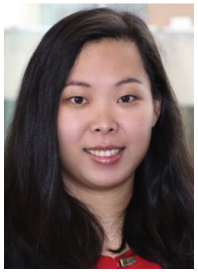

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