Risk and ambiguity of COVID-19 inhibit intentions for post-pandemic travel via reduced valuation of tourism

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Abstract

Purpose – This study aims to examine how the initial ambiguity of COVID-19 contributed to tourists' intentions for visiting a once-viral outbreak site in the future.

Design/methodology/approach – The present study (N = 248) used partial least-squares structural equation modeling (PLS-SEM) to examine whether perceptions of ambiguity and mismanagement of COVID-19 are indirectly related to intentions to travel to Wuhan in a post-pandemic world through perceptions of risk and tourism value. Further, whether the model effects differed as a function of individual safety orientation was examined.

Findings – Perceptions of COVID-19 risk and tourism value serially mediated the effects of perceived COVID-19 ambiguity on post-pandemic travel intentions. Safety orientation did not moderate any paths. Perceived risk was a negative direct correlate of post-pandemic travel intentions.

Originality/value – The current study's strength is rooted in its specific targeting of post-pandemic travel intentions to Wuhan—the first city to experience a widescale outbreak of COVID-19 and subsequent international stigma—compared to general travel inclinations.

Keywords Risk, Ambiguity, Travel intention, Tourism value, Tourist safety orientation, COVID-19

Paper type Research paper

Introduction

The COVID-19 pandemic brought about an unprecedented level of new concerns about the risks of domestic and international travel (Bae and Chang, 2021; Bhati *et al.*, 2021; Neuburger and Egger, 2021; Rather, 2021; Sánchez-Cañizares *et al.*, 2021). Compared to studies of general travel intentions, however, relatively few have documented the effects of COVID-19's initial ambiguity on travel intentions to sites that were once hotspots for viral outbreaks (Li and Ito, 2021), particularly, in a post-COVID-19 world (e.g. Rather, 2021). Although travel intentions naturally fluctuate over a pandemic's lifespan, early perceptions of risk and tourism value establish impressions that impact future travel considerations (Çetinsöz and Ege, 2013; Chew and Jahari, 2014; Fuchs and Reichel, 2011; Matiza, 2022).

Key empirical studies of COVID-19 and tourism were largely conducted during the middle of 2020 (Bae and Chang, 2021; Neuburger and Egger, 2021; Sánchez-Cañizares *et al.*, 2021), months after the first outbreak in Wuhan in December 2019. The novel and sudden introduction of the virus offered little time for psychological preparation, particularly, for Chinese residents as local and central governments were delayed in their responses (Liu and Saltman, 2020). In other words, studies conducted after this "*ambiguity period*" may not accurately reflect the perceptions travelers had for their social-ecological surroundings. In turn, whether travelers' early subjective appraisals

of the said social surroundings factored into their evaluation of Wuhan's tourism scene and future intentions to visit post-pandemic remains understudied. Wuhan served as a unique destination to investigate these associations based on its simultaneous status as a stigmatized epicenter of COVID-19 and a popular domestic tourism site during otherwise normative times.

Ambiguity, mismanagement and risk assessment

We first consult the economic sciences to derive a systematic operationalization of *ambiguity* and *uncertainty*—two concepts we hereafter refer to interchangeably. Ambiguity pertains to the psychological state of facing unknown outcomes (Platt and Huettel, 2008) and lacking proper frames of reference (Rabin, 1998) to estimate future tangible gains (Bernoulli, 1954; Machina, 2009). In contrast to known and quantifiable risks, people generally show greater discomfort and anxiety with ambiguity (i.e. *ambiguity aversion*) as it inhibits one's ability to avoid or properly prepare for potentially negative outcomes (Gao and Gudykunst, 1990; Grupe and Nitschke, 2013). The aversion to ambiguity is so strong that people often opt to favor lower —but certain—gains over potentially higher gains—but at uncertain odds—across both simulated experiments (Ellsberg, 1961; Machina, 2009; Platt and Huettel, 2008; Rabin, 1998) and real-world administrative situations (Im and Chen, 2020; Li *et al.*, 2013).

Related to tourism, *travel ambiguity* pertains to unknown chances of events occurring on the way to or at the destination, and the decisions that must be made under imperfect information (Williams *et al.*, 2022; Williams and Baláž, 2015). Familiar travel risks, such as pickpocketing rates against tourists/visitors or the presence of crime organizations, afford tourists the ability to make informed decisions about their travels. In contrast, the expected potential for—but unknown likelihood or forms of—negative outcomes induces travel anxiety and reservations about the safety of destinations (Williams and Baláž, 2015). For instance, COVID-19 in early 2020 imposed ambiguity for travelers due to the dearth of information on the disease's contagiousness, modes of transmission and extent of viral containment to the localized outbreak sites. Tourists cope with ambiguity by seeking more information (Quintal *et al.*, 2010a) or reevaluating the desirability of destinations altogether (Quintal *et al.*, 2010b). The impact of ambiguity on travel behavior has remained consistent during the COVID-19 pandemic (Chua *et al.*, 2021; Golets *et al.*, 2023; Williams *et al.*, 2022), and echoes a recent push for integrating ambiguity into traditional models of tourism behavior (Karl, 2018; Quintal *et al*., 2010a, b; Williams and Baláž, 2015).

In the absence of viable pharmaceutical interventions (e.g. vaccines) early in the pandemic, one of the key sources of public control for the tourism industry was effective administrative action (Liu and Saltman, 2020; Yang *et al.*, 2022). Effective government actions were critical to mitigating public panic and rapid changes in consumer attitudes (Neuburger and Egger, 2021). However, local and central government actions in response to the first outbreak of COVID-19 in Wuhan, China, were met with several faults attributed to both administrative inefficiencies and insufficient medical supplies (Liu and Saltman, 2020). Further, the Chinese central government issued a strict Zero-COVID-19 policy, marked by a 76-day lockdown order on January 23, 2020, just two days before the 2020 Chinese New Year Spring Festival that effectively shuttered the country's social and economic growth (Austermann *et al.*, 2020). Thus, Chinese citizens during the infant stages of the pandemic may have used perceptions of ambiguity and inefficacy of disease containment to guide their assessments of risk, tourism value and intentions to visit Wuhan in a post-COVID-19 world. Taking these into consideration, we posit the following hypotheses:

H1. People who perceive a) ambiguity and b) mismanagement of COVID-19 also perceive a greater risk of COVID-19 in Wuhan.

H2. People who perceive a) ambiguity and b) mismanagement of COVID-19 also devalue traveling to Wuhan.

H3. People who perceive a) ambiguity and b) mismanagement of COVID-19 also have lower intentions to travel to Wuhan post-COVID-19.

Risk assessment on travel intention

Past studies have well documented that risk perceptions are obstacles to one's intentions to travel (Artuğer, 2015; Baker, 2014; Çetinsöz and Ege, 2013; Rittichainuwat and Chakraborty, 2009). For example, travelers routinely avoid destinations at risk of man-made (e.g. terrorism) or natural disasters (e.g. earthquakes, diseases) (Pizam and Fleischer, 2002; Rittichainuwat and Chakraborty, 2009; Williams and Baláž, 2015). Risk perceptions for destinations can range widely in severity, such as being victims of petty theft to more serious ones like human trafficking, while more recent concerns have commonly centered around viral infection (Williams *et al.*, 2022). Both the *Health Belief Model* (Champion and Skinner, 2008) and the *Theory of Planned Behavior* (Ajzen, 1991) propose that perceived dangers motivate risk-mitigating and safeguarding practices, such as handwashing when exposed to harmful pathogens or canceling travel plans when exogenous sources of risk are beyond one's scope of control. Accordingly, those who report perceiving a greater risk of COVID-19 also state lower intentions to travel (Bae and Chang, 2021; Bhati *et al.*, 2021; Golets *et al.*, 2023; Neuburger and Egger, 2021; Sánchez-Cañizares *et al.*, 2021).

In a similar vein, risk also poses obstacles to revisitation intentions after a disaster (Çetinsöz and Ege, 2013; Chew and Jahari, 2014; Fuchs and Reichel, 2011), particularly, for pandemics as large a scale as COVID-19 (Matiza, 2022). Current impressions of travel risks psychologically ground one's frame of reference for inferring the future social ecology (i.e. "*COVID-19 world*"), leading to the overestimation of coming threats even in the presence of new information (Matiza, 2022; Rabin and Schrag, 1999; Wolff *et al.*, 2019). For example, a recent study conducted in April 2020 found that Sapporo (Japan) residents were less willing to travel to Wuhan (or China broadly) within the next 12 months, the more they perceived it to be currently risky (Li and Ito, 2021). However, as there were no indications of the COVID-19 pandemic being contained within such a short timeframe at the time of their data collection—and uncertainty surrounding the future trajectory of the pandemic—there remains a need to further investigate intentions to visit sites of COVID-19 outbreaks in an adequately distal and abstract post COVID-19 world (Matiza, 2022).

Tourists consider multiple dimensions of risks (e.g. physical, financial, etc.) when determining whether revisiting allegedly volatile destinations is worthwhile and vary in its distal relation to behavior (Çetinsöz and Ege, 2013; Fuchs and Reichel, 2011). For example, concerns about physical risk (e.g. theft) can directly deter revisitation intentions, while socio-psychological risks first deteriorate the image of destinations that subsequently influences one's revisitation considerations (Chew and Jahari, 2014). In other words, a destination's tourism imagery can be highly sensitive to perceptions of volatility and instances of crises (Li *et al.*, 2018). Such future concerns have been a staple component of the COVID-19 pandemic (Rather, 2021; Zhan *et al.*, 2022). Based on prior studies, we conjecture that the perception of Wuhan's volatility would likely have negatively impacted its destination image (Chew and Jahari, 2014; Li *et al.*, 2018) and deterred people's intentions to travel there even after the pandemic subsides (Çetinsöz and Ege, 2013; Fuchs and Reichel, 2011). Further, if perceptions of uncertainty and mismanagement of COVID-19 factor into one's risk assessments of a destination, then perceived risk ought to play a mediating role. Thus, we posit the following hypotheses:

H4a-b. People who perceived the risk of COVID-19 also a) devalue tourism to Wuhan and b) show lower intention to travel to Wuhan post-COVID-19.

H4c. Perceived risk of COVID-19 mediates the effect of perceived ambiguity and mismanagement.

Tourism value perception as a mediator

It is crucial for tourism service departments to properly maintain and manage the interplay between the value of tourism and travel intentions (Baker, 2014; Prebensen *et al.*, 2018). The *perceived value of tourism* refers to the subjective weighting of the benefits of travel (e.g. scenery, culture, entertainment) against the possible costs (e.g. money, danger) (Cheng and Lu, 2013; Petrick and

Backman, 2002) and is one of the fundamental building blocks of a tourist's customer experience (Andrades and Dimanche, 2018). Exogenous threats and risks serve to deteriorate the subjective value of anticipated trips and work against one's higher-order abstractions of expected satisfaction (Cham *et al.*, 2021; Chen and Petrick, 2016; Chen and Chen, 2010; Gallarza and Gil Saura, 2006; Prebensen *et al.*, 2018). Thus, the risk of COVID-19 infection and the unclear—but real—possibility of sudden government-sanctioned quarantines against visitors served to counteract the value added by Wuhan's domestic tourism scene. We conjecture that travelers' early perceptions of uncertainty and risk have conceptual downstream effects by lowering the value of Wuhan's tourism image (Li *et al.*, 2018) which, in turn, discourages one from traveling there (Bae and Chang, 2021; Sánchez-Cañizares *et al.*, 2021). We posit the following to reflect this:

> *H5.* People who value Wuhan's tourism scene also show a) more intention to travel to Wuhan and this mediates the effects of people's perceived b) risk, c) novelty and d) mismanagement of COVID-19.

Tourist safety orientation as a moderator

It remains important to also consider individual variability in reactance to risk and ambiguity. Specifically, *Protection Motivation Theory* (PMT) posits that when faced with impending threats, people engage in more behaviors that minimize and mitigate the said threats (Floyd *et al.*, 2000; Rogers, 1975). For those with a high inherent tendency to engage in precautionary behaviors in anticipation of perceived risks and hazards (i.e. *personal safety orientation*; Curcuruto, 2016), the cognitive saliency of losses (e.g. risks) is exaggerated over gains (e.g. benefits) (Machina, 2009; Rabin, 1998). Thus, tourists with a high personal safety orientation are more concerned about conceivable dangers and accordingly readjust the expected value of going on a trip (Bernoulli, 1954; Machina, 2009; Wang, 2009).

Although recent investigations into safety orientation in tourism amid COVID-19 have been sparse, related studies have similarly documented people responding to perceptions of COVID-19 risk with greater motivation for appropriate self-protective biosecurity behaviors (Qiao *et al.*, 2022; Yang *et al.*, 2022), such as wearing masks or gloves (Kim *et al.*, 2022). Because the government's containment efforts and others' behaviors are often beyond one's immediate control, those highly disposed toward safety likely opt to conservatively infer greater hazards of ambiguity out of an abundance of caution. In doing so, tourists likely devalue tourism imagery of regions where their safety from COVID-19 cannot be reasonably guaranteed and readjust their travel frequency (Kim *et al.*, 2021). Thus, we posit the following hypothesis:
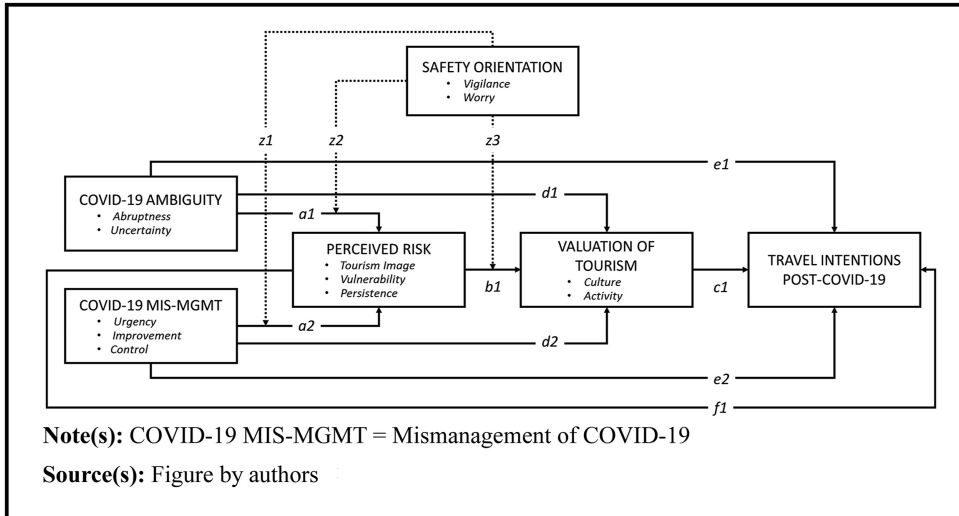
> *H6.* The effects of a) perceived ambiguity and b) mismanagement on perceived risk, and the effect of c) risk on Wuhan's tourism value are exacerbated for people with high personal safety orientation.

Present study

During the current study's data collection period (February 14–24, 2020), more than 70% of daily new confirmed cases in China were clustered in Wuhan. As China's COVID-19 wave hit during otherwise peak travel times, the current study investigated perceptions about travel during a unique window fraught with ambiguity and traveler angst. Further, compared to studies that examined generic travel intentions, the current study investigated intentions to travel to Wuhan—a destination highly stigmatized as a volatile site for the resurgence of outbreaks. Taken together, the current study tested a predictive serial moderated mediation conceptual model (Figure 1). We specifically sampled residents outside of Wuhan to investigate the effects of initial localized public health uncertainty on travel tourism image for potential domestic visitors. We entered gender, age, income and history of visiting Wuhan as controls for financial ability to travel and proxy of familiarity with Wuhan's tourism scene.

To examine the direct, indirect and interaction effects, we utilized the variance-based partial least squares structural equation modeling (PLS-SEM) approach using the R package SEMinR v.2.2.1

Figure 1 Conceptual serial mediation model

Note(s): COVID-19 MIS-MGMT = Mismanagement of COVID-19

Source(s): Figure by authors

([Hair *et al.*, 2021b](); [Ray *et al.*, 2021]()). Compared to the more common covariance-based structural equation modeling (CB-SEM) approach, PLS-SEM is more suitable for predictive research (vs. theory confirmation) as it maximizes variance explained between paths with smaller sample sizes ([Hair *et al.*, 2017](); [Hair *et al.*, 2021a]()). Further, PLS-SEM is a non-parametric approach that relaxes the conservatively strict measurement and structural assumptions imposed by CB-SEM (e.g. normality, number of indicators), making it suitable for modeling applied behavioral and attitudinal data that commonly yield greater measurement errors and variability. Lastly, PLS-SEM differentially weights each measurement indicator's contribution to the composite score and allows for a more organic representation of the overarching construct ([Hair *et al.*, 2021a]()) compared to other path modeling strategies (e.g. GLM mediation) that utilize unweighted sum scores or averages.

Method

Participants and procedures

Three hundred Chinese participants residing outside of Wuhan were recruited for the study electronically [1] through the online survey platform SurveyStar (www.wjx.cn) and Credamo's (www.credamo.com) human participant sample database during February 14–24, 2020 [2]. Participants were free to withdraw from the study at any time. Upon reaching the end of the study, participants were compensated 5 RMB. Thirty-eight participants did not complete the entirety of the study and were removed from further analysis. Fourteen additional participants were ineligible to provide informed consent (i.e. below the age of majority) and removed from analysis for a total of 248 participants in the final analysis (53.1% female, median age between 31 and 40, median monthly income between 2,000 and 5,000 RMB). All remaining participants provided informed consent. The majority of participants (66.1%) reported never having visited Wuhan. The study was approved by the first listed author's University Ethics Committee.

Measures

Perceived risk of COVID-19 in Wuhan. Perceived risk of COVID-19 in Wuhan was measured with nine items adapted from the Tourism Destination Risk Attributes Scale ([Feng and Bai, 2016]()) to fit the context of COVID-19. The new scale consisted of three dimensions: a) tourism image (three items, e.g. "The novel coronavirus will seriously affect Wuhan's tourism image"), b) vulnerability (three items, e.g. "The novel coronavirus may break out again in Wuhan") and c) persistence (three items,

e.g. "The negative impact of the novel coronavirus will continue for some time"), ω = 0.771. All items were measured on a seven-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*).

Perceived ambiguity of COVID-19. Perceived ambiguity of COVID-19 was measured via six items adapted from the Tourism Destination Risk Attributes Scale (Feng and Bai, 2016) to fit the context of COVID-19. The new scale consisted of two dimensions: a) abruptness (3 items, e.g. "The outbreak of the novel coronavirus was surprising") and b) uncertainty (3 items, e.g. "The scale of the impact of the novel coronavirus is uncertain"), ω = 0.711. All items were measured on a seven-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*).

Perceived mismanagement of COVID-19 in Wuhan. Perceived mismanagement of COVID-19 was measured via six items adapted from the Tourism Destination Risk Attributes Scale (Feng and Bai, 2016) to fit the context of COVID-19. The new scale consisted of three dimensions: a) urgency (two items, e.g. "The relevant management personnel in Wuhan faced great time pressure when dealing with the incident"), b) improvement (two items, e.g. "The novel coronavirus will promote the upgrade and improvement of Wuhan's crisis management system"), and c) control (two items, e.g. "The impact of the novel coronavirus can be controlled"), ω = 0.799. All items were measured on a seven-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The improvement and control dimensions were reverse-coded.

Perceived valuation of tourism. Tourists' perceived value of tourism was measured via a shortened COVID-19 adaptation of the Tourists' Perceived Value Scale (Huang and Huang, 2007). The scale consisted of two dimensions: a) valuation of culture (five items, e.g. "I can experience the unique cultural and folk customs of Wuhan") and b) activities (five items, e.g. "I can participate in adventurous and exciting activities in Wuhan"), ω = 0.862. All items were measured on a seven-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*).

Tourist safety orientation. Safety orientation was measured using a shortened COVID-19 adaptation of the Destination Tourist Safety Scale (Zou, 2015). The adapted scale consisted of two dimensions: a) vigilance (three items, e.g. "When dealing with strangers, I will be vigilant and worry about being scammed") and b) worry (three items, e.g. "Due to lack of preventive measures, I am worried that I cannot cope with the spread of local diseases"), ω = 0.713. All items were measured on a five-point Likert (1 = *Strongly disagree* to 5 = *Strongly agree*).

Post-COVID-19 travel intention. Participants' intention to travel to Wuhan post-COVID-19 was measured with a four-item scale. The scale asked participants to what extent they agreed with the given statements under the context of when the COVID-19 pandemic was over (e.g. "I am willing to travel to Wuhan"). Items were rated on a seven-point Likert scale (1 = *Strongly disagree* to 7 = *Strongly agree*), ω = 0.708.

Results

Descriptive statistics, diagnostics and correlations

The structural validity of the COVID-19 adapted scale items is given in Table 1. Because measurements for perceived risk, ambiguity and mismanagement were adapted and derived from a single source, a higher-order structural model inclusive of all three measurements—representing broad perceived risk—was tested against models of each construct in their separate lower-order models. Although the higher-order model of broad risk perceptions yielded acceptable to good metrics for RMSEA and SRMR, CFI was far lower than acceptable conventions and thus indicated model misspecification. Across all comparisons of the higher-order model against individual lower-order models, the individual lower-order models yielded lower (i.e. better) AIC and EVCI metrics. Thus, our subsequent analyses treated the three constructs as related but independent. The measures of tourism value, safety orientation and travel intention all yielded good structural validity.

A diagnostic examination of the relevant study variables revealed no distributional problems (skew from −0.738 to 0.265, kurtosis from −0.366 to 0.983). Descriptive statistics and bivariate correlations are given in Table 2.

PLS-SEM path analyses

Direct and indirect path coefficients from a PLS-SEM are given in Table 3. Post-hoc power analyses of regression paths indicated sufficient statistical power at each path (Intent, R^2_{adj} = 0.232, $1 - \beta$ = 1.000; Value, R^2_{adj} = 0.110, $1 - \beta$ = 0.996; Risk, R^2_{adj} = 0.472, $1 - \beta$ = 1.000). Multicollinearity checks also indicated VIF values ranged from 1.032 to 2.076 at all paths. Perceived risk of COVID-19 was negatively associated with both travel intentions (p = 0.005) and tourism valuation (p = 0.001). Perceived ambiguity ($p < 0.001$) and mismanagement of COVID-19 were positively related to perceived risk (p = 0.001) but neither interacted with safety orientation (p from 0.520 to 0.606). Tourism value was negatively associated with perceived risk ($p < 0.001$) but not ambiguity or mismanagement (p from 0.280 to 0.675). Safety orientation was not associated with tourism value or perceived risk (p from 0.053 to 0.305). Lastly, travel intention was negatively related to perceived risk (p = 0.005) but not associated with either ambiguity or mismanagement (p from 0.092 to 0.177). Perceived risk and tourism value serially mediated the effects of perceived ambiguity, but not mismanagement, on travel intentions. Perceived risk mediated the effects of ambiguity and mismanagement on both tourism value and travel intentions.

Table 1	Confirmatory factor analyses of adapted scales								
					90% CI				
Model	χ^2	df	CFI	RMSEA	Lower	Upper	SRMR	AIC	ECVI
Higher Order Model of Broad Risk	465.815	178	0.813	0.081	0.072	0.090	0.067	17,396.940	2.306
Perceived Risk	54.153	24	0.932	0.071	0.046	0.097	0.046	7571.764	0.388
Perceived Ambiguity	22.589	8	0.938	0.086	0.045	0.128	0.047	5129.842	0.196
Perceived Mismanagement	34.140	6	0.933	0.138	0.095	0.184	0.045	4917.935	0.259
Travel Value	62.926	34	0.964	0.059	0.035	0.081	0.041	8340.033	0.423
Safety Orientation	16.896	8	0.962	0.067	0.019	0.112	0.044	3879.377	0.173
Post-Pandemic Travel Intention	1.375	2	1.000	0.000	0.000	0.113	0.014	3333.841	0.070

Note(s): χ^2 = chi-square statistic, df = degrees of freedom, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, 90% CI = 90% Confidence Interval, SRMR = Standardized Root Mean Square Residual, AIC = Akaike Information Criterion, ECVI = Expected Cross Validation Index
Source(s): Authors' own elaboration

Table 2	Descriptive statistics and bivariate correlations							
Variable	M	SD	1	2	3	4	5	6
1. Risk	4.542	0.850	–					
2. Ambiguity	4.742	0.925	0.565***	–				
3. Mismanagement	4.755	1.011	0.541***	0.603***	–			
4. Tourism Value	4.217	1.013	−0.206**	−0.044	−0.074	–		
5. Safety Orientation	3.386	0.612	0.408***	0.439***	0.455***	0.015	–	
6. Travel Intention	4.025	1.023	−0.358***	−0.281***	−0.164**	0.352***	−0.129*	–

Note(s): *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$
Source(s): Authors' own elaboration

Table 3 PLS-SEM direct and indirect regression paths

Path	Path	β	SD	t	95% CI Lower	95% CI Upper
Direct Effects Paths						
Ambig → Risk	a1	0.390***	0.073	5.557	0.247	0.536
Ambig → Value	d1	0.102	0.094	1.040	−0.080	0.291
Ambig → Intent	e1	−0.166	0.097	−1.692	−0.359	0.027
Mgmt → Risk	a2	0.290**	0.087	3.296	0.109	0.461
Mgmt → Value	d2	0.040	0.095	0.235	−0.144	0.230
Mgmt → Intent	e2	0.109	0.079	1.328	−0.041	0.276
Risk → Value	b1	−0.350***	0.105	−3.172	−0.553	−0.145
Risk → Intent	f1	−0.256**	0.093	−2.775	−0.421	−0.063
Value → Intent	c1	0.309***	0.069	4.428	0.158	0.433
Safety → Risk	–	0.140	0.074	1.602	0.004	0.287
Safety → Value	–	0.107	0.107	0.994	−0.115	0.295
Risk × Safety → Value	z3	−0.198	0.109	−1.450	−0.375	0.143
Ambig × Safety → Risk	z1	−0.045	0.086	−0.500	−0.211	0.130
Mgmt × Safety → Risk	z2	0.067	0.112	0.542	−0.159	0.248
Indirect Effects Paths						
Ambig → Risk → Value → Intent		−0.042*	0.018	−2.347	−0.078	−0.013
Mgmt → Risk → Value → Intent		−0.032	0.017	−1.684	−0.073	−0.005
Risk → Value → Intent		−0.109**	0.041	−2.476	−0.192	−0.034
Ambig → Risk → Intent		−0.100*	0.041	−2.532	−0.187	−0.024
Ambig → Risk → Value		−0.136**	0.047	−2.885	−0.231	−0.052
Mgmt → Risk → Intent		−0.073*	0.033	−2.224	−0.141	−0.015
Mgmt → Risk → Value		−0.104*	0.049	−1.946	−0.209	−0.022

Note(s): *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Abbreviations: Ambig = Perceived Ambiguity of COVID-19 in Wuhan; Mgmt = Perceived Mismanagement of COVID-19 in Wuhan; Risk = Perceived Risk of COVID-19 in Wuhan; Value = Tourism Value of Wuhan; Intent = Travel Intention to Wuhan post-COVID-19; Safety = Individual Safety Orientation; Path coefficients controlling for age, gender, income and past travel history to Wuhan
Source(s): Authors' own elaboration

Discussion

Consistent with propositions from behavioral economics (Machina, 2009; Platt and Huettel, 2008; Rabin, 1998) and applied behavioral sciences (Im and Chen, 2020; Li et al., 2013; Quintal et al., 2010a, b), tourists perceived more risk of COVID-19, the more they felt the pandemic was ambiguous. In doing so, they devalued the tourism imagery of Wuhan and showed greater aversion to traveling, further evidencing that a destination's macro-environment influences the appraised value of tourism (Chen and Chen, 2010; Cheng and Lu, 2013; e.g. Choi et al., 2018; Gallarza and Gil Saura, 2006). Citizens likely used the government's efficiency, or lack thereof (Liu and Saltman, 2020), as a frame of reference to adjust and update perceptions of the potential dangers associated with COVID-19.

Participants' reported perceived risk of COVID-19 remained a direct deterrent to travel intentions, suggesting that not only do current risk perceptions negatively influence travel intentions in the short term (e.g. Bae and Chang, 2021; Li and Ito, 2021) but also that sites of major outbreaks may be stigmatized even in the abstract future (Matiza, 2022; Quintal et al., 2022; Xie et al., 2020). General perceived health risks in specific destinations, however, may be remedied by greater implementation of formal policies and measures that serve to improve the destination image to travelers (Matiza, 2022). This may have been observed in the case of the Wuhan Tourism Administration, 2020 National Day Golden Week celebration tourism recovery to approximately 83.21% and 73.18% of 2019's attendance and revenue (i.e. pre-pandemic market). After the initial hurdles, efforts by local agencies may have demonstrated Wuhan's commitment to safety (Wuhan Tourism Administration, 2020). Nonetheless, further research is needed to examine whether longitudinal trends corroborate the implications of the current study.

Our results also showed that the effects of ambiguity/mismanagement on COVID-19 risk or risk on tourism valuation did not vary across people with different personal safety orientations, failing to support our hypotheses and past findings (Wang, 2009). Nonetheless, bivariate correlations showed that safety orientation was positively and directly associated with perceptions of ambiguity and mismanagement, consistent with recent propositions that factors conducive to risk increase motivations for self-protection (Kim *et al.*, 2021; 2022; Qiao *et al.*, 2022; Yang *et al.*, 2022). Targeted marketing toward tourists with a high disposition for biosecurity concerns may therefore be necessary to incentivize subsequent travel and maintain a public image.

Practical implications

Based on the findings from the current study, there are several recommendations for policymakers and industry professionals aiming to revive tourism in cities that were once sites of COVID-19 outbreaks. Emphasizing the various systematic steps implemented to ensure health safety in their travel marketing (e.g. mask use, vaccination requirements) with evidence of high standard health compliance is likely to minimize the uncertainty of health hazards and improve trust in administrative competence (Matiza, 2022). For instance, the tourism department of Wuhan dispatched more than 800 law enforcement officers and supervisory groups to their 1,582 tour operators to ensure compliance with COVID-19 prevention ahead of the 2020 National Day Golden Week (Wuhan Tourism Administration, 2020). Failure to prevent the exacerbation of the perception of uncertainty or administrative incompetence has the potential for negative downstream effects.

Second, during times of uncertainty, distrust and risk, emphasizing an increased degree of customization for tourists may be beneficial. Providing "untact" alternatives to traditional services (e.g. food services) and offering customizable tourism programs can attend to tourists' specific safety needs (Bae and Chang, 2021). Although market research commonly employs discrete choice models (i.e. choice-based conjoint, qualitative choice) to identify combinations of bundled travel offerings, the marketability of such packages may diminish should any of the specific options pose new health concerns (Bae and Chang, 2021). Thus, practitioners may explore introducing greater flexibility of alternatives for potential tourists to substitute undesired features during times of health uncertainty. In a similar vein, practitioners are recommended to regularly conduct panel surveys across the lifespan of public health crises to identify travelers' changing feature preferences shift with the changing dynamics of the social ecology.

Limitations

Several limitations exist for the current study. First, the study relied on cross-sectional self-report measures and causal inferences are limited. Future research may seek to utilize experimental manipulations and longitudinal tracking to infer how changing attitudes correspond with subsequent updates to intentions to visit sites of COVID-19 outbreaks. Second, the research was limited in its scope of only examining tourism to Wuhan, China. As the extent of the pandemic largely differs from place to place, further research is necessary to examine whether the findings remain robust across cultures, regions, and time. Lastly, the current study utilized a strictly quantitative approach to investigate the proposed conceptual correlates that limit the scope of the proposed model. Future research may utilize mixed methods with both qualitative and quantitative approaches to build and confirm the theoretical connections between different constructs.

Conclusion

Although further research is needed, this study is an important step in unpacking how the perceived risk of tourism destination related to travel intention amid the COVID-19 pandemic. In doing so, we repeat the need to integrate uncertainty as a rudimentary variable of interest for modeling travelers' values and behaviors. Uncertainty aversion as a basic behavioral tendency has significant implications for quickly revitalizing damages to the tourism industry as man-made and natural disasters will, no doubt, pose future hurdles for eager travelers.

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Notes

1. As the study was conducted during China's nationwide lockdown order, all forms of research recruitment and data collection were conducted online to avoid in-person contact.
2. Because the study was disseminated by research and educational data services vendors, there is no participation rate to report. Data from respondents that drop out mid-study are automatically deleted and are not accessible to the researchers.

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Supplemental materials
The supplementary material for this article can be found online.

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