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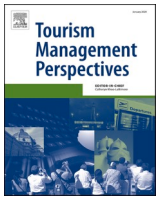

Predicting preventive travel behaviors under the COVID-19 pandemic through an integration of Health Belief Model and Value-Belief-Norm

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ABSTRACT

This study developed a conceptual framework for a preventive travel decision-making process amidst the COVID-19 pandemic, combining the Health Belief Model (HBM) and Value-Belief-Norm (VBN). Analyzing 409 responses collected from an online survey, this study verified the integrated model as a salient theory addressing the importance of social components and health belief factors in affecting behavior. The model revealed that altruistic value influences the HBM variables, whereas personal norms mediate preventive behaviors and beliefs in both VBN and HBM. These findings offer new theoretical insights into decision-making process and provide practitioners with effective crisis management strategies concerning pro-social and health beliefs.

1. Introduction

External events, including pandemics and natural disasters, significantly affect the tourism industry (Ritchie, 2004). Particularly, the year 2020 was among the most challenging times in modern tourism history, the industry almost brought to standstill by the COVID-19 pandemic (UNWTO, 2020). The Asia and the Pacific regions were most seriously affected by the pandemic since the first infection from the virus occurred in China, rapidly spreading throughout the region and advancing to worldwide pandemic in a matter of a month (Lu, Stratton, and Tang, 2020). As such, health crises have the propensity to affect the tourism industry severely and destinations should be urged to prepare countermeasures and to develop the appropriate plans for addressing travel continuity (Dodd, Cvejic, Bonner, Pickles, & McCaffery, 2021; Neumann-Böhme, Varghese, Sabat, et al., 2020; Wong, Alias, Wong, Lee, and AbuBakar, 2020). Past global health crises (e.g., SARS, Ebola, and H1N1) have influenced subsequent travel-related health preventative behaviors including reviewing public health and travel advisories (Chien, Sharifpour, Ritchie, and Watson, 2016), receiving recommended vaccines (Baeyens, 2010; Suess, Maddock, Dogru, Mody, and Lee, 2022; Wong et al., 2020), and even avoiding travel or changing travel plans (Cahyanto, Wiblishauser, Pennington-Gray, and Schroeder, 2016; Chua, Al-Ansi, Lee, and Han, 2020; Pennington-Gray, Thapa, Kaplanidou, Cahyanto, and McLaughlin, 2011; Wen, Huimin, and Kavanaugh, 2005). During the COVID-19 pandemic, people demonstrated preventive behaviors in both active (e.g., avoiding travel) or moderate ways (e.g., traveling with caution). However, predicting these behaviors depends on individuals' diverse situational factors, including health concerns, perceived risk, and beliefs (Bae and Chang, 2021; Chua et al., 2020; Han, Lee, Kim, and Ryu, 2020; Huang, Dai, and Xu, 2020; Suess et al., 2022; Wong et al., 2020), as well as on personal social responsibility, norms, and concern about others' health (Bavel, Baicker, Boggio, et al., 2020; Chan, 2021).

Recent research includes several examinations of COVID-19 and the impact such a pandemic has on travel behaviors (Han et al., 2020; Suess et al., 2022; Wong et al., 2020; Zenker and Kock, 2020), with many of the studies applying the Health Belief Model (HBM), underlying how individuals perceive the risk of contracting COVID-19, which subsequently affects various behavioral outcomes (Bae and Chang, 2021; Chua et al., 2020; Han et al., 2020; Huang et al., 2020). The HBM is a widely applied theoretical framework explaining health-related perceptions and behavioral changes (Abraham, Clift, and Grabowski, 1999; Champion and Skinner, 2008; Skinner, Tiro, and Champion, 2015). HBM was initially developed by Hochbaum in 1952, who explored several factors that influence preventative screening related to the diagnosis of tuberculosis (Rosenstock, 1974; Tarkang and Zotor, 2015).

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HBM has been applied to other health preventative measures (Champion and Skinner, 2008; Skinner et al., 2015), including vaccination prophylaxis (Bae and Chang, 2021; Chua et al., 2020; Coe, Gatewood, and Moczygemba, 2012; Huang et al., 2020).

The health considerations for the COVID-19 pandemic are far more serious, given ongoing issues related to mutated variants of the virus which are more infectious. As such, the resumption and continuity of international travel is contingent on achieving public health control. If individual-level preventative behavior represents the most effective mechanism to stop the spread of illness and, in doing so, stimulates travel (Wilson and Chen, 2020), then the beliefs and behavioral changes are important to understand. In this respect, research that applies theory to understand health-related behavior and leverages decision-making in terms of preventative measures at the individual level is lacking in the travel literature, in general, and more specifically in the case of pandemics.

As COVID-19 is transmitted among people, individuals' concerns about broader public health and their moral obligations and social behaviors (e.g., social-distancing and self-isolating) are critical in preventing or slowing further virus transmission (Brooks et al., 2020; Eaton and Kalichman, 2020). Specifically, individuals' concern about others' welfare (i.e., altruistic value) is an important factor with the propensity to influence their travel decision-making process (Wang, Liu-Lastres, Ritchie, and Mills, 2019). Value-Belief-Norm (VBN) is a theoretical framework that describes how individuals' values (e.g., altruistic, biospheric, and egoistic) influence their beliefs (e.g., awareness about the consequences and ascription of responsibility) and personal norms (internalized social perspective) which, in turn, drive behaviors or behavioral intentions through a sequential decision-making process (Aguilar-Luzón, García-Martínez, Calvo-Salguero, and Salinas, 2012; Schwartz, 1977; Stern, 2000). While VBN has been primarily applied in environmental research (Han, 2015; Han, Hwang, and Lee, 2017; Park, Lee, Lee, Kim, and Kim, 2018), it has also been recently applied in more socio-cultural and sustainability contexts (Golob, Podnar, Koklič, and Zabkar, 2018; Megeirhi, Woosnam, Ribeiro, Ramkissoon, and Denley, 2020). In this regard, it is believed that VBN provides a salient theoretical framework for explaining travelers' preventive behaviors concerning public health, from a pro-social perspective.

A review of the extant literature on HBM and VBN reveals that little previous research has identified either the decision-making process of individuals related to preventive travel behaviors from both individual and pro-social perspectives or examined how health-related travel behaviors change in response to the pandemic. Therefore, it is the aim of the present study to fill these gaps by integrating the aforementioned theories into a single conceptual framework. The integrated model highlights the complex relationships among the variables from each of these theories. The following specific objectives were developed: 1) identify whether altruistic values in the VBN influence the HBM variables; 2) investigate if personal norms in the VBN play a mediating role between the belief variables in both the VBN and HBM and preventive travel behaviors; and 3) examine how the VBN and HBM variables will influence preventive travel behaviors – (a) active or (b) moderate.

2. Literature review

2.1. Theoretical background

2.1.1. Tourist behavior during health crises

Understanding tourist behavior has been a major research focus amidst previous epidemics, including SARS (Kim, Chun, and Lee, 2005; Wen et al., 2005), Ebola (Cahyanto et al., 2016), and H1N1 outbreaks (Leggat, Brown, Aitken, and Speare, 2010). The outbreak of any disease influences individuals' perceived health risk, travel decisions, travel behaviors, and actual tourism demand (Chien et al., 2016). Previous studies suggest that people respond to a disease outbreak in various ways and, as a result, form diverse travel behaviors, including taking preventive measures before departure, seeking travel advice, getting vaccinated (Chien et al., 2016), avoiding travel (Cahyanto et al., 2016; Chua et al., 2020), and changing destinations or travel plans (Pennington-Gray et al., 2011; Wen et al., 2005). Recent studies on the COVID-19 pandemic have highlighted various travel behavior patterns, including avoiding international travel (Chua et al., 2020), changing or canceling travel plans (Neuburger and Egger, 2021), choosing an alternative destination (e.g., rural tourism) (Zhu and Deng, 2020), or selecting no-contact tourism options (Bae and Chang, 2021). On one hand, individuals are likely to refrain from traveling when they perceive that doing so will prevent or slow down transmission of the COVID-19 virus, thereby benefitting the health and safety of their own and of the public. On the other, despite high risk of catching the virus, some individuals still choose to travel because they believe that traveling with caution is safe as long as they follow the guidelines formulated by the government and experts (e.g., Centers for Disease Control and Prevention) (Leggat et al., 2010; Rittichainuwat and Chakraborty, 2009).

With regard to the questions related to preventive travel behaviors and how it can facilitate travel activity even amid ongoing COVID-19 infections and future outbreaks (Hall, Scott, and Gössling, 2020), the Health Belief Model (HBM) was applied to the present study to test factors that influence beliefs and subsequent behavior. Suess et al. (2022) assessed the factors influencing beliefs about COVID-19 and their influence on preventative vaccine behavior and support for vaccine requirement prior to travel and found that key constructs of the model—higher perceived susceptibility to COVID-19 and severity of the illness—significantly influenced respective outcomes. The findings of this research implicate HBM would also be an appropriate framework to explain travelers' altruistic beliefs and social norms that, in turn, influence both moderate and more active preventative behavioral measures, in an effort to understand the how to safely resume regional and international travel activities. In this respect, the present study conceptualizes HBM in the context of dynamic travel decision-making and health beliefs as determinants of effective health preventative behavior.

2.1.2. Value-Belief-Norm (VBN) theory

Researchers have developed myriad conceptual frameworks to understand individuals' decision-making processes in environment-related contexts (e.g., ecosystems and eco-tourism). VBN has been recognized as a particularly parsimonious model that describes how individuals' behavioral actions or intentions can be determined by underlying concepts, including values, beliefs, and norms (Stern, Dietz, Abel, Guagnano, and Kalof, 1999). VBN extends the Norm Activation Model, focused on specific beliefs of an individual (e.g., awareness of consequences and ascription of responsibility), while personal norms predict environmentally responsible behaviors (Park et al., 2018). Moreover, VBN suggests that both values and the New Environmental Paradigm are important factors that influence pro-environmental behaviors and enhance its predictive ability (Dunlap, 2008; Han et al., 2017; Park et al., 2018; Stern, 2000).

VBN represents a decision-making process that hierarchically describes how values, beliefs (e.g., New Environmental Paradigm, awareness of consequences, ascription of responsibility), and personal norms influence individuals' behaviors (Aguilar-Luzón et al., 2012; Stern, 2000). This theory identifies the concept of values as an important initial point that guides a person's or society's behavior. Values can be categorized as biospheric, altruistic, and egoistic (Schwartz, 1994). Altruistic value is a salient component that leads to pro-social behavior. The new environmental paradigm is an environmental worldview that represents the importance of human–environment interdependent relationships (Klöckner, 2013). Awareness of consequences is a belief that addresses issues related to conditions that may threaten one's own environment (Steg, Drijerink, and Abrahamse, 2005; Stern, 2000). Ascription of responsibility entails individuals' sense of responsibility for the negative consequences associated with environmental neglect (De Groot and Steg, 2009). Personal norms refer to individuals' moral

obligations to engage in certain behaviors to minimize adverse consequences (Johansson, Rahm, and Gyllin, 2013). These variables work together to influence behavioral intention, that is, values influence the new ecological paradigm, which in turn stimulates awareness of adverse consequences and ascribed responsibility and further affects personal norms as a predictor of either behavioral intentions or behavior (Wynveen, Wynveen, and Sutton, 2015).

In past research, VBN has been mostly applied to explain individuals' environmental behaviors across various industries, namely hospitality and tourism (Park et al., 2018) and organizations (Harland, Staats, and Wilke, 2007). Several studies have used this model to predict consumers' sustainable behaviors in various contexts (e.g., support for political candidates, recycling, electricity use, organic and/or local foods selection, and transportation choice) (Aguilar-Luzón et al., 2012; Whitley, Takahashi, Zwickle, Besley, and Lertpratchya, 2018; Zepeda and Deal, 2009). Recent studies have applied this theory in sociocultural contexts to examine stakeholders' cultural tourism support and social responsibility (Golob et al., 2018; Megeirhi et al., 2020). These applications suggest that VBN can be used as a conceptual framework to underlie travelers' sustainable behaviors and explain sequential and hierarchical mechanisms in their decision-making processes.

2.1.3. Health Belief Model (HBM)

HBM has been widely applied across studies, mostly in the public health literature, to explain health-related behavioral change and maintenance (Champion and Skinner, 2008; Skinner et al., 2015). More specifically, the HBM model was developed to understand avoidance of preventive health actions (e.g., getting screening tests for diseases, or vaccinations and other prophylaxis) (Janz and Becker, 1984; Rosenstock, 1974). HBM assumes that people will act to prevent illnesses or diseases when they perceive a high likelihood of catching them (perceived susceptibility) (Champion and Skinner, 2008; Skinner et al., 2015).

HBM has four belief antecedents thought to influence action; including, perceived susceptibility to an illness, perceived severity of an illness, benefits associated with prevention of the illness, and barriers to preventative action (Glanz, Rimer, and Viswanath, 2008). Perceived susceptibility to an illness includes various beliefs about pre-exiting health and other factors influencing the probability of a negative health outcome, such as catching a disease, whereas perceived severity refers to individual's beliefs about the risk of a contracted illness or a negative health outcome (Rosenstock, 1974; Skinner et al., 2015). Both susceptibility and severity focus on an individual's perception of a negative outcome, thereby suggesting that these factors can be considered perceived threats (Carpenter, 2010). Several studies have empirically treated perceived threats as one salient variable that includes the sub-dimensions of susceptibility and severity (Bashirian, Barati, Shoar, Mohammadi, and Dogonchi, 2019). Perceived benefits refer to individuals' beliefs about the positive effects of a recommended behavior on reducing potentially negative health outcomes. These beliefs aim to make people aware of an increased likelihood of receiving favorable outcomes after an early detection of diseases (Champion and Skinner, 2008). Meanwhile, perceived barriers refer to the potential obstacles and negative consequences of adopting a preventive behavior.

Tourism studies have applied HBM to understand tourist behavior in light of health-related concerns and used this model as a framework for assessing those factors that are relevant in predicting health-related behaviors. For example, Abraham et al. (1999) combined HBM with Theory of Planned Behavior (TPB) as a social-cognition framework underlying tourist adherence to malaria regimens upon returning from affected regions. Notably, they found that susceptibility is a critical factor that predicts tourist behavior. Ban and Kim (2020) applied HBM in the medical tourism context and found that all health belief factors, namely, perceived susceptibility, severity, barriers, and benefits, significantly influence travel intention. Following the COVID-19 outbreak, several studies have applied this model to predict tourist behaviors (e.g., Bavel et al., 2020; Bourassa, Sbarra, Caspi, and Moffitt, 2020; Carico, Sheppard, and Thomas, 2020; Costa, 2020; Jose, Narendran, Bindu, Beevi, and Benny, 2020; Lee and You, 2020; Sreelakshmi and Prathap, 2020; Suess et al., 2022). Bae and Chang (2021) identified perceived risk associated with contracting COVID-19 as a critical factor in HBM, focusing on "untact" tourism, a health-protective form of travel that minimizes face-to-face contact. They found that cognitive and affective perceived risks, alike, influence behavioral intention. Overall, the aforementioned studies support the applicability of HBM in explaining tourists' health-related behaviors during the COVID-19 pandemic.

2.2. Theoretical framework

Both HBM and VBN confirm the concept of beliefs as salient factors in the decision-making process as multiple studies in social psychology have shown the role of beliefs in relationships with values and behavior (Dietz, Fitzgerald, and Shwom, 2005; Ponizovskiy, Grigoryan, Kühnen, and Boehnke, 2019; Stern et al., 1999). VBN underlies how peoples' values, beliefs, and personal norms can lead to preventive travel behaviors from a social perspective while HBM can predict how individuals develop preventive travel behaviors, focusing on perceived health conditions and concern antecedents (Abraham et al., 1999; Huang et al., 2020). In particular, the concepts of ascription of responsibility in VBN and perceived benefits in HBM are common constructs that represent one's belief or ability to reduce the impact of COVID-19. Ascription of responsibility reflects an individual's accountability for a health-related situation. Meanwhile, perceived benefits refer to the benefits one might receive by showing responsibility for negative outcomes of neglecting conditions or threats in health-related situations. Following public health measures is a deontological ethical responsibility of individuals in order to reduce the spread of COVID-19. Therefore, the common shared construct is viewed as a connection point that integrates the two models into a single conceptual framework labeled as responsibility/benefits. The proposed research model grounded in HBM and VBN proposes individuals' pro-social decision-making process during the COVID-19 crisis (Fig. 1). The COVID-19 pandemic requires both individual and social perspectives to understand preventive travel behaviors.

2.3. Hypotheses

In discourse linking value and behavior, social psychologists have argued the indirect nature of the relationship, suggesting that values affect beliefs and personal norms and then behavior (Dietz et al., 2005; Ponizovskiy et al., 2019). In this respect, among the three dimensions of values in VBN, this study focuses on altruistic value, which has a key role in inspiring a representative pro-social behavior that can reflect tourists' social values in the COVID-19 context (Stern et al., 1999; Stern, Dietz, and Guagnano, 1995). Altruistic value has a positive impact on adverse consequences and ascribed responsibility (Han, 2015; Han et al., 2017; Park et al., 2018). However, the New Environmental Paradigm of VBN was excluded because it is an environmental concept, irrelevant in the COVID-19 context. Recent health research considering COVID-19 suggested that moral value - altruism - influences an individual's health beliefs, including benefits, threats, and barriers (Bavel et al., 2020; Brooks et al., 2020; Chan, 2021; Kasting, Head, Hartsock, Sturm, and Zimet, 2020). The following hypothesis is then proposed:

H1. : Tourists' altruistic value significantly affects their beliefs of adverse consequences (H_{1-1}), responsibility/benefits (H_{1-2}), threats (H_{1-3}), and barriers (H_{1-4}).

VBN describes the causal relationships among the belief factors. Specifically, awareness of consequences precedes ascription of responsibility (De Groot and Steg, 2009; Steg and De Groot, 2010; Stern,

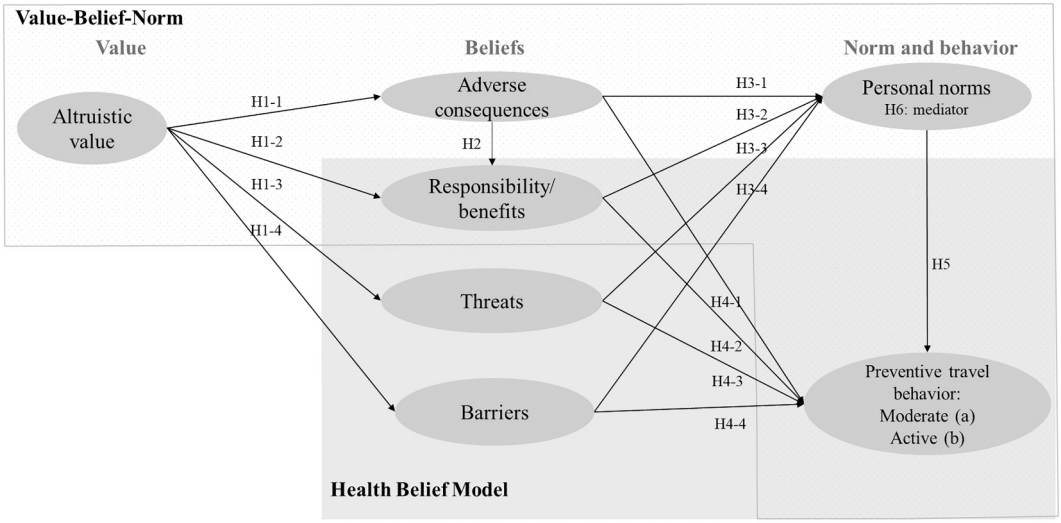

Fig. 1. Research model.

2000; Stern et al., 1999). Previous studies show that when people are aware of adverse consequences, they tend to show responsibility for negative outcomes (Aguilar-Luzón et al., 2012; Han, 2015; Han et al., 2017; Park et al., 2018; Stern et al., 1999; Van Riper and Kyle, 2014). In addition, recognizing the consequences can lead to the identification of benefits (Loebnitz and Grunerta, 2018). The following hypothesis is then proposed:

H2. : Tourists' adverse consequences have a significant positive impact on responsibility/benefits.

VBN posits that personal norms are derived by the belief that an individual can behave in a way that can reduce threats under certain conditions (Stern, 2000). Adverse consequences and ascribed responsibility accounts for personal norms in travelers' decision-making processes (e.g., Han, 2015; Han et al., 2017; Park et al., 2018). While personal norms have not been specified as a construct within an HBM framework in previous studies, Stern et al. (1999) highlighted the critical role of personal norms in changing an individual's action in ways to support social changes. Thus, the following hypothesis is then proposed:

H3. : Tourists' beliefs of adverse consequences (H_{3-1}), responsibility/benefits (H_{3-2}), threats (H_{3-3}), and perceived barriers (H_{3-4}) significantly affect personal norms.

Tourists' beliefs may be important in determining their preventive travel behaviors. In VBN, adverse consequences and ascribed responsibility can increase the possibility for individuals to take preventive actions (Park et al., 2018). Meanwhile, in HBM, perceived benefits (e.g., following preventive COVID-19 protocols) and threats positively influence the likelihood of demonstrating protective travel behaviors (Carico et al., 2020). In addition, perceived barriers have been shown to negatively influence preventive behavior (Carpenter, 2010; Champion and Skinner, 2008; Huang et al., 2020; Skinner et al., 2015), that is, when individuals perceive barriers to following preventive advice, their preventive behaviors decrease. Furthermore, preventive travel behaviors in response to the COVID-19 pandemic may be either moderate or active. Moderate preventive behaviors can be viewed as an action of traveling amid the pandemic with caution and following government protocols, whereas active behavior is a more defensive form of postponing or refraining from travel (Leggat et al., 2010; Rittichainuwat and Chakraborty, 2009). If people believe that following the government advisories for preventing the spread of the COVID-19 virus would benefit their health or that of others, then they tend to postpone or refrain from traveling. However, some may think that traveling with caution is appropriate as long as they follow government protocols. The following hypothesis is then proposed:

H4. : Tourists' beliefs of adverse consequences (H_{4-1}), responsibility/benefits (H_{4-2}), threats (H_{4-3}), and perceived barriers (H_{4-4}) significantly affect their preventive travel behaviors in two ways, namely, moderate (a) and active (b).

VBN provides strong support for personal norms as a significant antecedent of pro-environmental behavior (Han et al., 2017). Steg et al. (2005) found that individuals with strong personal norms tend to demonstrate environmentally responsible behavior and support pro-environmental policies. In other words, an individual's strong feeling of moral obligation can lead to responsible behaviors (Zhang, Zhang, Zhang, and Cheng, 2014). Therefore, this study assumes that when travelers have strong moral obligations to follow pro-social regulations and advices, they tend to exhibit preventive travel behavior. The following hypothesis is then proposed:

H5. : Personal norms significantly affect preventive travel behaviors in two ways, namely, moderate (a) and active (b).

Based on H3 and H5, this study further hypothesizes that personal norms can mediate the relationship between beliefs and behaviors (Stern, 2000; Widegren, 1998). Through the integrated model, the mediating role of personal norms can be further expanded to preventive behaviors given their relationship with both VBN (e.g., adverse consequences and responsibility) and HBM (e.g., benefits, threats, and perceived barriers) variables. In other words, personal norms can be a salient mediator that links beliefs to behaviors (Stern et al., 1999). The following hypothesis is then proposed:

H6. : Personal norms significantly mediate the relationships of beliefs of adverse consequences (H_{6-1}), responsibility/benefits (H_{6-2}), threats (H_{6-3}), and perceived barriers (H_{6-4}) with preventive travel behaviors in two ways, namely, moderate (a) and active (b).

3. Method

3.1. Measurement

The study's measurements included multiple items that were derived from a thorough literature review (see Appendix A). Specifically, the constructs of responsibility/benefits, threats, barriers, and preventive travel behaviors were derived and adapted from the HBM literature (Champion, 1999; Jones et al., 2015), whereas the measurements of altruistic value, adverse consequences, and personal norms were derived

and adapted from the VBN literature (Han et al., 2017; Hartmann, Eisend, Apaolaza, and D'Souza, 2017; Lee, Song, Bendle, Kim, and Han, 2012; Stern, 2000; Stern et al., 1999). The concept of perceived threats was measured as a second-order construct with the two sub-dimensions of perceived severity and seriousness (Bashirian et al., 2019). The research model included a total of 33 items that measure the conceptual constructs. Altruistic value was evaluated using4 items rated on a 5-point Likert-type scale (1 = *not very important*, 5 = *very important*) (Han et al., 2017; Hartmann et al., 2017), whereas the other items were measured on another 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Preventative travel behaviors (PTB) was measured in the two dimensions of moderate PTB (three items) and active PTB (four items) following previous studies (Cahyanto et al., 2016; Chua et al., 2020; Rittichainuwat and Chakraborty, 2009). Demographic questions included gender, age, income, education, marital status, and occupation. For content validity, three tourism professors were asked to evaluate the appropriateness of the measurement items in the research context. A pre-test was also conducted by five graduate students in tourism to ensure the understandability of the questionnaire. Through these processes, those items that seemed ambiguous were reworded for clarity.

3.2. Data collection and analysis

An online survey was performed with the help of Embrain, a top-ranking Korean online survey company that includes over 1,300,000 online panel respondents. Embrain's selection criteria is included in the form of responses to a sampling questionnaire in addition to adequate completion time (Embrain, 2020). Embrain matches Korean resident registration numbers against personal passwords to verify the identity of panelists. Data were collected in May 2020 when the number of confirmed cases of COVID-19 in Korea slightly increased. The survey questionnaire was randomly distributed to 1384 potential tourists, and 495 responses were collected, yielding a 35.7% response rate. However, after removing 86 cases that were identified as outliers, show a too short response time, and have any missing values, only 409 responses were retained in the final dataset.

Data were analyzed using SPSS and Mplus for the structural equation modeling. Confirmatory factor analysis was initially performed to evaluate the fit, validity, and reliability of the measurement model. A structural model was then used to examine the hypothesized relationships among the constructs. Model fit was assessed using chi-square ($\chi 2$) statistics, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR).

4. Results

4.1. Respondents' profile

As shown in Table 1, the proportion of males (50.6%) in the sample was almost similar to that of females (49.6%). The age of these respondents was almost evenly categorized in 1 of 5 categories, with an average of 44.57 years. About 58.7% of the respondents were married, and 38.1% were single. The majority of the respondents had high education levels, of whom 58.2% held a university degree, 11.0% held a graduate degree, and 16.9% finished two years of college. Most of the respondents were earning a monthly income of 2 million KRW to 2.99 million KRW (1 USD = 1102 KRW). About 31.3% of the respondents were office workers, 16.1% were professionals/technicians, and 13.7% were housewives.

4.2. Descriptive analysis

Univariate normality tests revealed skewness values ranging from −1.08 to −0.29 and kurtosis values ranging from −0.69 and 2.14, indicating normal distribution of responses at the univariate level (Hair, Babin, Anderson, and Black, 2018) (Table 2). However, multivariate level analysis of Mardia's multivariate skewness ($\beta = 83.12$, $p < .005$) and kurtosis ($\beta = 85.07$, $p < .005$) revealed data non-normality (DeCarlo, 1997; Mardia, 1970). Given such non-normality, the maximum likelihood robust estimator was used to test the proposed model.

Table 1
Respondents' profile.

		n (%)			n (%)
Gender	Male	207 (50.6)	Marital status	Single	156 (38.1)
	Female	202 (49.4)		Married	240 (58.7)
				Other	13 (3.2)
Age (years)	20–29	79 (19.3)	Education	High school or less	57 (13.9)
	30–39	77 (18.8)		Two-year college	69 (16.9)
	40–49	80 (19.6)		University	238 (58.2)
	50–59	86 (21.0)		Graduate school	45 (11.0)
	Over 60	87 (21.3)			
Monthly income (million KRW)	Less than 1	57 (13.9)	Occupation	Professional/ technician	66 (16.1)
	1–1.99	42 (10.3)		Businessman	33 (8.1)
	2–2.99	115 (28.1)		Service worker	31 (7.6)
	3–3.99	67 (16.4)		Office worker	128 (31.3)
	4–4.99	51 (12.5)		Civil servant	19 (4.6)
	Over 5	77 (18.8)		Housewife	56 (13.7)
				Student	28 (6.8)
				Other	48 (11.7)

4.3. Measurement model

The measurement model indicated a good model fit ($\chi 2 = 547.996$, $df = 295$, $\chi^2/df = 1.86$, CFI = 0.947, TLI = 0.936, RMSEA =0.048 [90% CI: 0.040, 0.052], and SRMR =0.057) (Hair et al., 2018). As shown in Table 2, the factor loadings of most items exceeded 0.65 (Hair et al., 2018). Table 3 shows that all average variance extracted (AVE) values exceeded 0.50, thereby confirming convergent validity (Bagozzi and Yi, 1988). The values of Cronbach's alpha and composite reliability were greater than 0.70, which confirmed reliability (Nunnally, 1978). In addition, the AVE values were greater than the squared correlations of the corresponding constructs (Table 3), thereby confirming discriminant validity (Hair et al., 2018).

4.4. Structural model

The proposed structural model indicated a good fit to the data (S-Bχ^2 = 663.740, $df = 302$, $\chi^2/df = 1.188$, CFI = 0.922, TLI = 0.909, RMSEA = 0.054 [90% CI: 0.049–0.060], and SRMR =0.083). However, multivariate Lagrange multiplier tests revealed two significant relationships, namely, the direct effect of adverse consequences on threats and the direct effect of threats on barriers. While the proposed model excluded these relationships, previous studies have examined and validated the significant paths (Jones et al., 2015). Therefore, the proposed model was modified to include these paths (Fig. 2), which improved the model fit to the data (S-B$\chi 2 = 586.872$, $df = 299$, $\chi^2/df = 1.963$, CFI = 0.938, TLI = 0.927, RMSEA = 0.049 [90% CI: 0.043–0.054], and SRMR =0.060)

Table 2
Descriptive statistics of all constructs.

Construct	λ	M	SD	SK	KU
Altruistic value (VAL)					
Equality: equal opportunity for all	0.766	4.240	0.625	−0.413	0.254
A world at peace: free of war and conflict	0.695	4.350	0.688	−0.719	−0.087
Social justice: care for the weak	0.781	4.200	0.665	−0.644	1.231
Helpful: working for the welfare of others	0.711	4.030	0.654	−0.291	0.204
Consequences (CON)					
It is dangerous to travel because of COVID-19.	0.823	4.100	0.737	−0.939	1.819
I am afraid I will be infected with COVID-19 if I travel.	0.840	3.940	0.848	−0.707	0.581
Traveling during the COVID-19 pandemic is likely to harm my family.	0.854	4.110	0.824	−0.952	1.247
Responsibility/benefits (R/B)					
Following precautions such as washing my hands frequently will decrease my chances of getting COVID-19.	0.726	4.270	0.666	−0.871	1.866
Maintaining social distance will decrease my chances of getting COVID-19.	0.805	4.350	0.608	−0.747	2.003
Following advices of the government is the best way for me to decrease the chances of getting COVID-19.	0.774	4.280	0.632	−0.430	−0.086
Threats (THR)					
Susceptibility	***0.917***				
It is likely that I will get COVID-19 if I don't follow the advice for prevention.	0.837	4.200	0.650	−0.594	0.931
If I am not careful, I will be most likely infected with COVID-19 in the future.	0.796	4.120	0.691	−0.573	0.835
Seriousness	***0.817***				
I believe that COVID-19 is severe.	0.772	4.360	0.654	−0.800	0.723
I believe that COVID-19 is painful.	0.774	4.050	0.796	−0.682	0.375
I believe that COVID-19 can lead to death.	0.658	3.820	0.946	−0.549	−0.240
Barriers (BRR)					
It's hard for me not to travel with people because of the COVID-19 pandemic.	0.806	3.230	1.116	−0.288	−0.688
It is uncomfortable that mobility is restricted due to the COVID-19 pandemic.	0.706	3.720	0.937	−0.693	0.302
It is frustrated because I couldn't travel because of the COVID-19 pandemic.	0.908	3.440	1.077	−0.626	−0.200
Personal norms (NORM)					
Even though I feel uncomfortable,					
_____					
I think I should follow the government's the COVID-19 precautions.	0.897	4.390	0.663	−1.083	2.139
I think I should follow social distancing guidelines for others.	0.862	4.410	0.605	−0.632	0.180
I think I should refrain from going out for others.	0.716	4.210	0.682	−0.664	0.707
I think I should refrain from traveling for others.	0.688	4.330	0.657	−0.621	0.069
Moderate PTB (MOD)					
If I go on a trip, I will travel a short distance rather than a long distance.	0.782	3.980	0.833	−0.625	0.236
If I go on a trip, I will do a day trip rather than staying overnight.	0.776	3.800	0.933	−0.507	−0.227
Active PTB (ACT)					
I try to refrain from traveling.	0.808	4.090	0.798	−0.765	0.834
I am going to put off all the trips until the COVID-19 pandemic subsides.	0.865	4.030	0.858	−0.809	0.559
I would like to replace my trip with other leisure activities, both inside and outside the house.	0.657	3.800	0.832	−0.556	0.427

Notes. λ: standardized loadings, M: Mean, SD: standard deviation, SK: skewness, KU: kurtosis.

(Hair et al., 2018).

As shown in Fig. 2, results of the final model revealed that altruistic value had positive and significant effects on adverse consequences ($\beta_{VAL\rightarrow CON} = 0.379$, $p < .001$), responsibility/benefits ($\beta_{VAL\rightarrow R/B} = 0.621$, $p < .001$), and threat ($\beta_{VAL\rightarrow THR} = 0.433$, $p < .001$) yet showed a negative and significant effect on barriers ($\beta_{VAL\rightarrow BRR} = -0.223$, $p < .05$), thereby supporting all sub-hypotheses of H1. Meanwhile, adverse consequences had a positive impact on responsibility/benefits ($\beta_{CON\rightarrow R/B} = 0.180$, $p < .01$), thereby supporting H2. Responsibility/benefits ($\beta_{R/B\rightarrow NORM} = 0.570$, $p < .001$) and threats ($\beta_{THR\rightarrow NORM} = 0.367$, $p < .001$) showed positive effects on personal norms, whereas barriers ($\beta_{BRR\rightarrow NORM} = -0.116$, $p < .001$) had a negative effect on personal norms, thereby supporting H3–2, H3–3, and H3–4. Adverse consequence had a positive impact on both moderate preventive ($\beta_{CON\rightarrow MOD} = 0.256$, $p < .05$) and active behaviors ($\beta_{CON\rightarrow ACT} = 0.762$, $p < .001$), whereas barriers showed a negative significant effect only on active preventive behaviors ($\beta_{BRR\rightarrow ACT} = -0.127$, $p < .05$), thereby supporting H4–1(a), H4–1(b), and H4–4(b). Personal norms showed a significant impact on both moderate preventive ($\beta_{NORM\rightarrow MOD} = 0.315$, $p < .01$) and active behaviors ($\beta_{NORM\rightarrow ACT} = 0.221$, $p < .05$), thereby supporting H5. For the mediation effect of personal norms, bias corrected bootstrap test with 1000 samples was conducted (Table 4). The finding shows that personal norms significantly fully mediated the relationship between beliefs (responsibility/benefits, treats, and barriers) and preventive travel behaviors, thereby supporting H6–2(a), H6–3(a), H6–4(a), and H6–2(b).

Surprisingly, adverse consequences had a significant direct impact on threats ($\beta_{CON\rightarrow THR} = 0.495$, $p < .001$), whereas threats had an impact on barriers ($\beta_{THR\rightarrow BRR} = 0.381$, $p < .001$). These additional findings helped the model further explain the relationships among the constructs. Overall, the conceptual framework explained 14.3%, 50.2%, 59.5%, 8.9%, 67.1%, 23.2%, and 54.4% of the variances in adverse consequence, responsibility/benefits, threats, barriers, personal norms, moderate preventive behaviors, and active preventive behaviors, respectively.

5. Discussion

By developing and testing a combined VBM with HBM framework, this study examined various beliefs and how they influence preventive behaviors in travelers, given the perceived impacts of the COVID-19 pandemic on the global tourism industry. Results highlight significant sequential relationships among the VBN (value, adverse consequences, responsibility/benefits, and personal norms) and HBM (benefits, threats, and barriers) variables that predict health-related preventive behaviors,

Table 3
Results of reliability and validity.

	VAL	CON	BNF	THR	BRR	NORM	MOD	ACT
Altruistic value (VAL)	0.546	0.377	0.641	0.565	0.003	0.671	0.304	0.304
Consequences (CON)	0.142	0.704	0.398	0.625	0.183	0.462	0.375	0.707
Responsibility/benefits (R/B)	0.411	0.158	0.591	0.688	0.121	0.754	0.336	0.276
Threats (THR)	0.319	0.391	0.473	0.754	0.209	0.674	0.338	0.392
Barriers (BRR)	0.000	0.033	0.015	0.044	0.658	0.032	-0.030	-0.026
Personal norms (NORM)	0.450	0.213	0.569	0.454	0.001	0.633	0.429	0.401
Moderate behaviors (MOD)	0.092	0.141	0.113	0.114	0.001	0.184	0.607	0.471
Active behaviors (ACT)	0.092	0.500	0.076	0.154	0.001	0.161	0.222	0.611
Cronbach alpha	0.825	0.875	0.809	0.823	0.844	0.833	0.752	0.814
Composite reliability (CR)	0.828	0.877	0.813	0.859	.851	0.872	0.755	0.823

Notes: AVE values in gray highlighted on the diagonal; Correlations above the diagonal; Squared correlations below the diagonal.

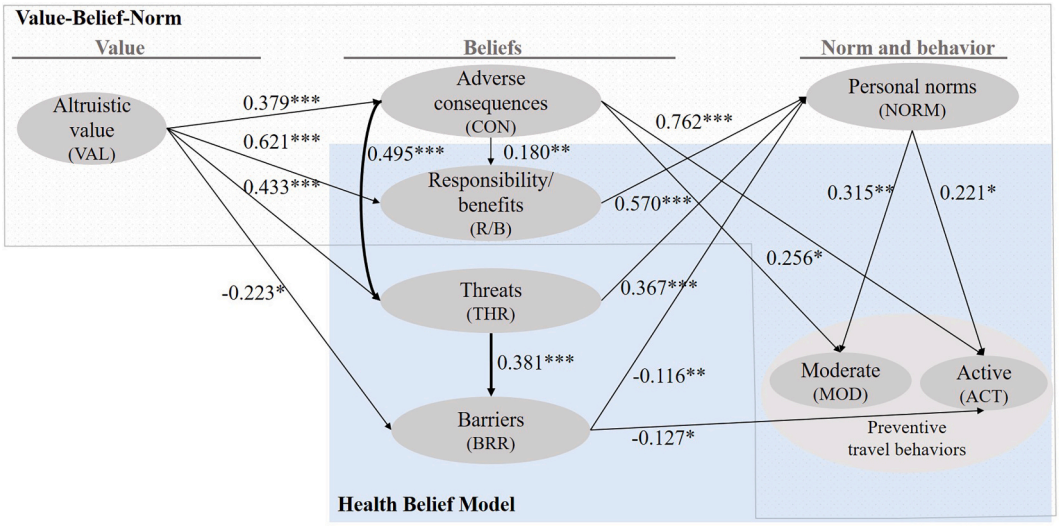

Fig. 2. Estimation of the structural model.
Note. *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4
Mediation effects of personal norms.

Path	Estimate			Mediation effects
	Indirect *[95% CI]*	Direct	Total	
CON → NORM → MOD	0.059 *[−0.050, 0.168]*	0.256*	0.315*	n.s.
R/B → NORM → MOD	0.179 *[0.041, 0.318]* *	0.020	0.199*	Full
THR → NORM → MOD	0.116 *[0.007, 0.225]* *	−0.033	0.083	Full
BRR → NORM → MOD	−0.036 *[−0.072, −0.001]* *	−0.080	−0.117*	Full
CON → NORM → ACT	−0.053 *[−0.152, 0.045]*	0.762***	0.709*	n.s.
R/B → NORM → ACT	0.126 *[0.016, 0.236]* *	−0.103	0.023	Full
THR → NORM → ACT	0.023 *[−0.078, 0.124]*	−0.146	−0.123	n.s.
BRR → NORM → ACT	−0.026 *[−0.054, 0.003]*	−0.127*	−0.152*	n.s.

Notes. CON = Consequences; R/B = Responsibility/benefits; THR = Threats; BRR = Barriers; NORM = Personal norms; MOD = Moderate preventive travel behaviors; ACT = Active preventive travel behaviors; *$p < .05$; ***$p < .001$.

specifically moderate and active behavioral measures. Effectively, the integrated model explains preventive travel decision-making processes that concerns both the pro-social beliefs and individual-health-oriented attitudes of travelers during the COVID-19 pandemic.

Results of the model analyses demonstrated that altruistic value significantly influences both adverse consequences and ascription of responsibility, which is consistent with the findings of previous studies (Stern, 2000). Altruistic value further influences the HBM variables of benefits, threats, and barriers. These findings indicate that when people have a high degree of altruistic values that are oriented on equality, peace, social justice, and welfare of others, they become aware of the consequences of traveling during the COVID-19 pandemic, tend to follow preventive measures, recognize the benefits of being responsible, acknowledge the seriousness of the COVID-19 pandemic, and perceive less barriers in following guidelines for reducing the impact of COVID-19. By connecting altruistic value to the HBM variables, this study reveals how an individuals' values concerning others' welfare can influence their health-related beliefs in the COVID-19 context.

The HBM factors (responsibility/benefits, threats, and barriers) further influence personal norms in VBN, suggesting that when people acknowledge the serious consequences of COVID-19, identify the benefits of following government guidelines (e.g., social distancing), and perceive limited barriers in following regulations, they believe that following the guidelines is an important moral obligation for them to show concern for the others' welfare. In other words, when people feel

uncomfortable with the COVID-19 restrictions, they are less likely to follow the active preventive travel actions (e.g., they postpone their travel or refrain from taking trips). While partially supported by previous studies showing that health benefits directly affect behaviors (Bae and Chang, 2021; Chua et al., 2020; Han et al., 2020; Huang et al., 2020; Suess et al., 2022; Wang et al., 2019), these findings support the contentions of previous VBN studies in that the personal norms are the main factor that activates pro-social behavior and mediates the relationship between beliefs and behavior (Han et al., 2017; Stern, 2000; Widegren, 1998). These findings also highlight that the health belief variables are important elements that influence decision-making processes in a travel amid pandemic context.

Results further evidenced personal norms as a mediating factor, connecting the belief constructs to preventive travel behaviors. This finding implies that people who develop a sense of responsibility and perceive more severe health consequences from COVID-19 will acknowledge their moral obligations to minimize the adverse consequences to others which, in turn, inspired further active preventive behavior. This significance of these relationships support the notion that personal norms are a crucial mediator effective in activating pro-social behaviors, as indicated in previous studies (Han et al., 2017; Stern, 2000; Widegren, 1998). Further, this is consistent with recent studies showing that moral values are important factors with the propensity to change health behaviors of individuals living among others in communities (Bavel et al., 2020; Everett, Colombatto, Chituc, Brady, and Crockett, 2020).

Personal norms, although not a conceptual element in original HBM framework, also mediate the relationship between the HBM belief variables (e.g., benefits, threats, and barriers) and preventive behaviors. These results are partially notable, given findings of previous studies showing that health benefits directly affect behaviors (Bae and Chang, 2021; Chua et al., 2020; Han et al., 2020; Huang et al., 2020) and imply that pro-social actions (e.g., following COVID-19 guidelines) are determined by personal norms when the importance of collective practices and public health is acknowledged by the society. Everett et al. (2020) and Chan (2021) also supported the notion that a moral imperative may have an important role in changing behaviors to reduce the spread of the COVID-19 virus. Therefore, this study suggests that personal norms are an important additional component in the HBM framework to explain health-related behaviors, grounded in the social aspect (Bavel et al., 2020).

Through the integrated model, this study reveals how preventive travel behaviors, either active or moderate, can be determined by various constructs among VBN and HBM frameworks. Specifically, personal norms act as an important antecedent of preventive travel behaviors in two ways (i.e., moderate and active). When individuals exhibit strong moral obligations, they modify their trip plans (e.g., short-trip or day trip) or choose leisure activities conducive to social-distancing, instead. In addition, adverse health consequences have a direct impact on both active and moderate preventive behaviors, whereas perceived barriers have a direct impact only on active behaviors. The former relationship implies that when people are aware of the seriousness of the pandemic and the dangers of traveling, they tend to demonstrate preventive travel behaviors promptly and not through an alternative route mediated by personal norms. This finding represents a unique additional view in understanding the role of adverse health consequences. Meanwhile, the latter finding indicates that people who perceive more barriers resulting from the COVID-19 pandemic are less likely to exhibit active preventive travel behaviors. This relationship suggests that perceived barriers can have a significant role in directly reducing tourists' preventive active behaviors.

Some unexpected findings are also obtained. First, awareness of adverse consequences directly affected perceived threats, which in turn influences personal normss. While not having any direct effect on personal norms, awareness of adverse consequences exerts an indirect effect through threats. In other words, awareness of the consequences of traveling and not following public health protocols during the COVID-19 pandemic increases the perceived risk of contracting the virus. Therefore, people have a moral obligation to follow government guidelines and refrain from traveling for the sake of others' welfare. This finding highlights a sequential relationship among adverse consequence, threats, and personal norms in the decision-making process. Moreover, threats and barriers show a significant, sequential, link that was not included in the proposed model. Such a relationship suggests that the more people perceive the threats to their health from COVID-19, the more they recognize the barriers to travel during the pandemic. As such, this study empirically verifies a sequential relationship between threats and barriers. This finding is supported by Carpenter (2010), who suggested that future studies on the HBM should examine a possible mediation and moderation among the variables. Overall, these findings indicate that people make preventive travel decisions through a systematical and progressive process rather than in a simultaneous way.

6. Conclusion

6.1. Theoretical contributions

This study makes several theoretical contributions. Foremost, this study offers an expanded theoretical framework for explaining how people make preventive travel behavior decisions during the COVID-19 pandemic by considering health issues not only at the individual level but also from a pro-social perspective. Conceptualizing a framework grounded in two well-established theories—VBN and HBM—, this study highlights the importance of health beliefs, altruistic value, and personal norms in decision-making processes during the pandemic. By identifying the connection between the concepts of responsibility in VBN and benefits in HBM, this study develops an integrated model that can better explain the decision-making process compared to a single factor model while taking into account both pro-social beliefs and individual health-oriented attitudes during the COVID-19 pandemic.

The HBM offers an important perspective on the role of individuals' health beliefs in developing their preventive travel behaviors. These findings support the applicability of HBM in the tourism context, describing how the health belief variables are important in determining tourists' decision-making process of future tourists in the context of the pandemic. In addition, the significant impact of threats on barriers offers new insights into the progressive relationships within HBM, which has not been fully addressed in the HBM literature. Overall, the application of HBM provides important evidence that increases the potential of expanding the proposed model in both tourism and health crisis contexts.

Meanwhile, VBN has a significant role in highlighting the importance of the social components of altruism and personal norms in describing individuals' preventive travel behaviors. The significant relationships of altruistic value with the VBN variables and HBM beliefs (benefits, threats, and barriers) reflect how an individual's values concerning others' welfare can influence his/her health-related beliefs in the COVID-19 context. In addition, personal norms are identified as a crucial mediator of the connection between beliefs and behaviors that highlights the significant role of personal norms in activating pro-social behaviors during the COVID-19 pandemic. Therefore, by using VBN, this study provides unique insights into preventive travel behaviors from the social perspective.

The integration approach adopted in this model enhances our understanding on potential travelers' decision-making processes influenced by the COVID-19 pandemic. By integrating HBM and VBN, this study reveals intricate relationships among the variables from each model and indicates that the decision-making process may be complex instead of simple. Previous literature separately investigates cognitive factors to alter behavior at the individual level and social level. Such integration reveals several paths that are yet to be examined while simultaneously strengthening the relationships between the two models.

Specifically, this study reveals serial relationships among the variables (i.e., altruistic values → adverse consequences → threats → barriers → personal norms → behaviors). Therefore, this integration creates a holistic framework that offers a highly logical perspective describing how people develop preventive travel behaviors during the pandemic through a hierarchical and sequential decision-making process.

The integrated model also reveals how people develop preventive travel behaviors in two levels, namely, moderate and active. While adverse consequences and personal norms in VBN directly affect preventive travel behaviors in both moderate and active ways, perceived barriers in HBM shows a direct impact only on active behaviors. These findings suggest how different levels of preventive behaviors can be determined by different variables. By revealing these patterns, this study provides a comprehensive understanding of how each theory explains tourists' preventive behaviors during the COVID-19 pandemic in a collective way.

6.2. Practical implications

The findings offer some implications for government policy and destination management. Policy makers and destination managers are facing a dilemma resulting from the pandemic. On the one hand, the pandemic directly harms the tourism industry and many tourism destinations. On the other hand, incautious travel activities may only exacerbate the situation. Therefore, destination managers and governments need to ensure that potential tourists will follow their guidelines and protect their residents from being infected by tourists at the same time. To address this dilemma, appropriate policies and crisis management strategies should be developed in consideration of the research findings. As this study highlights the importance of both individual and social perspectives in understanding preventive travel behaviors, destinations should develop and implement well-balanced management plans that reflect both perspectives. Furthermore, given the different decision-making processes concerning preventive travel behavior in moderate and active levels, tourism policies and regulations should be carefully discussed and implemented in accordance to the COVID-19 situation in the destination (Centers for Disease Control and Prevention, 2021).

First, given that altruistic value is a critical factor that influences individual beliefs (e.g., adverse consequences, responsibility/benefits, threats, and barriers), personal norms, and preventive travel behaviors, destination management organizations (DMOs) should communicate an effective message that reflects altruistic value and emphasizes a pro-social perspective. The crisis management literature supports this suggestion in that altruistic messages can encourage people to heed the advice of the government and health experts (Bavel et al., 2020; Chan, 2021; Everett et al., 2020). Therefore, DMOs should consider altruistic- and moral-based messages that can increase the awareness of people about the adverse consequences of the COVID-19 pandemic, promote their sense of responsibility, help them understand the benefits of being responsible, allow them to recognize potential threats, and lower those barriers that prevent them from following the present restrictions. Moreover, given the direct impact of adverse consequences on both active and moderate preventive travel behaviors, DMOs need to emphasize the danger and severe situation of the COVID-19 pandemic in their messages. These efforts will eventually encourage people to change their travel behaviors, hence curbing the spread of the virus.

Second, given the significant effect of perceived barriers on the preventive active behaviors of tourists, the government should implement an effective policy that can reduce the perceived difficulty and concerns related to travel restrictions, which in turn will promote people's active preventive travel behaviors. This implementation should be carefully considered especially when the spread of the virus reaches severe levels. In response to the COVID-19 outbreak, many tourism destinations went on lockdown and enforced quarantine policies. Despite being an effective public health measure (Brooks et al., 2020), quarantines also have serious psychological impacts (e.g., corona blue), including stress, confusion, depression, and anxiety. Long-term quarantine may also make people feel restless due to limited travel opportunities, thereby driving them to continue with their travel plans despite the pandemic. Unlike other countries, Korea was not placed under strict lockdown but emphasized the importance of wearing masks and limiting the number of gatherings, hence leaving the mobility of people unrestricted even during the peak of the pandemic. If the pandemic stabilizes, then allowing travel with caution would mitigate the negative effects of the perceived barriers to following health measures. In addition, proactive approaches, such as exclusive travel bubbles between countries, and COVID-19 vaccination incentives, such as vaccine passports for quarantine-free travel, can simultaneously restore the tourism demand while slowing down the spread of virus.

Third, destination managers should develop effective communication messages that concern both tourists and local residents in consideration of the finding that adverse consequences and personal norms directly affect preventive travel behaviors. People with a high degree of moral obligation are concerned not only about themselves but also about others. Therefore, these people would travel by following the government guidelines or modify their travel plans according to the present situation. In this case, if the COVID-19 situation in a certain destination is serious, then destination managers should formulate a crisis communication strategy that appeals to people's moral obligations and provides timely and transparent information about the situation. These clear and prompt communications will help potential tourists change their travel behavior at a time when traveling is not safe and motivate them to follow government guidelines when traveling is allowed. In addition, the social media platforms of destinations can provide pre-experience opportunities by using various technologies (e.g., social media contents or real-time virtual tours), which can be used as effective promotional tools that attract potential travelers to visit after the pandemic and lower the perceived barriers.

Fourth, once the spread of the COVID-19 virus decelerates, destination managers should carefully implement crisis management strategies. Results show that health belief factors affect personal norms and then preventive travel behaviors. Therefore, managers should consider the following strategies that emphasize individuals' pro-social responsibilities and benefits: (1) provide travel guidelines for safety and security in consideration of government advice, such as washing hands, wearing masks, and maintaining social distance; (2) maintain strict hygiene control at tourist attractions, accommodations, and restaurants; (3) provide information regarding safe places where social distancing can be maintained during travel; and (4) limit and manage the number of visitors by introducing a reservation system even in open spaces. Messages regarding the current COVID-19 situation in a destination should be also communicated to tourists through social media. These efforts will help DMOs promote a destination as a safe and secure place and encourage potential tourists to visit such destination in the near future.

6.3. Limitation and directions for future research

Despite its contributions, this study is not free from limitations, from which directions for future research can be derived. First, this study used cross-sectional data that were collected during the first peak of the COVID-19 pandemic. Although results highlight the critical role of altruistic value and personal norms in travel-related decision-making processes during the pandemic, health threats and extending more than a year may intensify individuals' COVID-19-related stress and change their perceptions toward COVID-19 and travel. In addition, many countries experienced a third wave of the pandemic in 2021, over a year after the first case was reported. Therefore, longitudinal studies should be performed to provide a comprehensive understanding of travelers' preventive travel behaviors and changes over time.

Second, this study was conducted in Korea where the total cases of the COVID-19 infection were much less than those in many other

countries. The COVID-19 situation and responsiveness of governments vary across countries and regions. Therefore, future research should conduct follow-up studies in other countries or cultures to increase the generalizability of the proposed integrated model. They may also confirm the applicability of the proposed model by examining other crisis situations and health-related issues across different contexts and settings.

CRediT authorship contribution statement

Namhyun Kim: Conceptualization, Investigation, Methodology, Writing – original draft. **SoJung Lee:** Data curation, Methodology, Formal analysis, Writing – original draft, Visualization. **Choong-Ki Lee:** Investigation, Writing – review & editing, Supervision. **Courtney Suess:** Writing – review & editing.

Appendix A. Research instrument

1. Please rate the importance of altruistic value **as a guiding principle in your life**, using the following scale from (1) not at all important to (5) extremely important

Questions	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Equality: equal opportunity for all					
A world at peace: free of war and conflict					
Social justice: care for the weak					
Helpful: working for the welfare of others					

2. The following statements are about your perception and beliefs related to the COVID-19 pandemic. For each statement, please indicate the extent to which you agree or disagree.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Susceptibility	It is likely that I will get COVID-19 if I don't follow the advice for prevention.					
	If I am not careful, I will be most likely infected with COVID-19 in the future.					
Seriousness	I believe that COVID-19 is severe.					
	I believe that COVID-19 is painful.					
	I believe that COVID-19 can lead to death.					
Responsibility/benefits	Following precautions such as washing my hands frequently will decrease my chances of getting COVID-19.					
	Maintaining social distance will decrease my chances of getting COVID-19.					
	Following advices of the government is the best way for me to decrease the chances of getting COVID-19.					
Barriers	It's hard for me not to travel with people because of the COVID-19 pandemic.					
	It is uncomfortable that mobility is restricted due to the COVID-19 pandemic.					
	It is frustrated because I couldn't travel because of the COVID-19 pandemic.					
Awareness of adverse consequences	It is dangerous to travel because of COVID-19.					
	I am afraid I will be infected with COVID-19 if I travel.					
	Traveling during COVID-19 pandemic is likely to harm my family.					

3. The following statements are about your perceived personal norms during the COVID-19 pandemic. For each statement, please indicate the extent to which you agree or disagree.

Even though I feel uncomfortable	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think I should follow the government's the COVID-19 precautions.					
I think I should follow social distancing guidelines for others.					
I think I should refrain from going out for others.					
I think I should refrain from traveling for others.					

4. The following statements are about your preventive travel behaviors during the COVID-19 pandemic. For each statement, please indicate the extent to which you agree or disagree.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Moderate	If I go on a trip, I will travel a short distance rather than a long distance.					
	If I go on a trip, I will do a day trip rather than staying overnight.					
	I try to refrain from traveling.					
Active	I am going to put off all the trips until the COVID-19 pandemic subsides.					
	I would like to replace my trip with other leisure activities, both inside and outside the house.					

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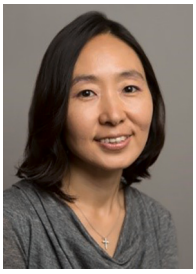

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