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Introduction

While novelty-seeking is considered a major motivator for visitors, the novelty offered by destinations can also entail risk to visitors (Lee and Crompton 1992). Lew (1987) proposes the cognitive perspective for classifying the appeal of attractions according to the risk and safety levels perceived by potential visitors. Natural resources that experience crustal activity such as volcanoes are examples of attractions that have both attractive and anxiety-inducing characteristics for visitors. Destinations with volcanoes not only provide visitors with opportunities for recreational activities such as bathing in a hot spring (Erfurt-Cooper and Cooper 2009), but can also expose them to natural disasters, such as a volcanic eruption (Sigurdsson et al. 2000).

Therefore, potential visitors are likely to avoid visiting a volcanic destination once an eruption occurs. The Social Amplification of Risk Framework (SARF) (Kasperson, Renn, Slovic, Brown, Emel, Goble, Kasperson, and Ratick 1988) illustrates that the risk level perceived by the general public may be greater than the risk level determined by experts, and that avoidance behavior can be induced even when experts do not evaluate the actual risk as potentially fatal. Therefore, the transmission of information that can reduce potential visitors' disproportionately high perception of volcano-related risk is crucial for the promotion of tourism. However, to the best of the authors' knowledge, there are no empirical studies that examine the effects of such information on volcano-related risk perceptions of potential visitors.

Relying on knowledge of risk perception, this study aims to elucidate the effect of intervention through information on a model of potential visitors' intentions to avoid visiting volcanic destinations. Past studies have examined the effect of information on the risk of natural disasters such as hurricanes on certain visitors' mental states, such as risk perception or behavioral intention (Matyas, Srinivasan, Cahyanto, Thapa, Pennington-Gray, and Villeagas 2011; Villeagas, Matyas, Srinivasan, Cahyanto, Thapa, and Pennington-Gray 2013). Unlike those studies, this study aims to examine the effect of information on a model that incorporates multiple concepts to explain potential visitors' behavioral intentions.

Literature Review

Due to space constraints, the names of the models and concepts mentioned in the literature review first appear in full accompanied by their corresponding acronyms and are thereafter indicated only through their acronyms. The dual-process model (DPM) has often been applied to risk-perception studies. This model assumes that human thoughts comprise an affective system (AS) and a cognitive system (CS); the former refers to intuitive and vague thoughts, while the latter reflects logical and precise thoughts (Solvic 2007; Solvic, Finucane, Peters, and MacGregor 2004). With reference to this model, many risk-perception studies related to natural disasters divide risk perception into cognitive risk perception (CRP) and affective risk perception (ARP) (Altarawneh, Mackee, and Gajendran 2018; Ejeta, Ardalan, Paton, and Yaseri 2018; Terpstra 2011; Villeagas et al. 2013). However, many risk-perception studies have focused only on negative ASs and have overlooked the perceived appeal of attractions that entail risk. Altarawneh et al.'s (2018) study on flood-related risk perception classified ASs further into positive and negative ASs. They examined a model in which CSs and positive and negative ASs explain risk-reducing behaviors, and found

positive effects of CSs and ASs on avoidance behavioral intention. To the best of the authors' knowledge, DPM has been applied in only a few studies that examine visitors' risk perception and has not been used in research on volcanic destinations (Villeagas et al. 2013). Furthermore, there were no tourism studies focusing on both positive and negative ASs.

This study proposes a model that explains potential visitors' intentions to avoid visiting volcanic destinations which is termed here as Avoidance Intention (AI), and encompasses the following hypotheses:

H1: CRP has a positive effect on AI.
H2a: Negative ARP has a positive effect on AI.
H2b: Positive ARP has a negative effect on AI.
H3a: CRP has a positive effect on negative ARP.
H3b: CRP has a negative effect on positive ARP.

These hypotheses are supported in studies on perceived risk related to natural disasters (e.g., Altarawneh et al. 2018; Terpstra 2011).

In studies on risk-related information that employ SARF, indirect experiences of risk are considered a major risk-amplifying variable (Kasperson and Kasperson 1996), and the risk-amplifying effect of mass media is highlighted (Kasperson, Emel, Goble, Hohenemser, Kasperson, and Renn 1987). Thus, this study employed newspaper coverage, a type of media, as information that may amplify perceived risk. Research on information intervention includes tourism studies on the effect of information on natural disaster risk on visitor risk perception and behavioral intention (Matyas et al. 2011; Villeagas et al. 2013). These studies employed information on the characteristics of risks and hazards, such as the projected path of a hurricane (Matyas et al. 2011; Villeagas et al. 2013). Based on a definition of natural disasters as "events caused by natural forces that disrupt the communities that they strike" (Bell, Greece, Fisher, and Baum 2001, p.209), this study employed information on residents' lives after an eruption (IRL) as intervention information that may reduce perceived risk. Further, the risk-reducing effects of the perceived credibility of information senders have been empirically clarified in a study on food-related risk (Siegrist 2000). This study also investigated the effects of identifying the information sender.

Based on the preceding discussion, the following effects of information intervention are proposed:

H4a: Intervention of IRL has a negative effect on the CRP score.
H4b: Intervention of IRL has a negative effect on the negative ARP score.
H4c: Intervention of IRL has a positive effect on the positive ARP score.
H4d: Intervention of IRL has a negative effect on the AI score.
H5a: Identifying information senders has a negative effect on the CRP score.
H5b: Identifying information senders has a negative effect on the negative ARP score.
H5c: Identifying information senders has a positive effect on the positive ARP score.
H5d: Identifying information senders has a negative effect on the AI score.

Methodology

This study employed an empirical setting which is claimed as being desirable for investigating information intervention (Lepp, Gibson, and Lane 2011). Furthermore, even though tourism studies on perceived risk related to volcanos and tourism studies on the effect of information intervention on a model of visitors' intentions to avoid a visit appear limited, the number of past studies on risk perception provide sufficient background for these hypotheses. Therefore, a quantitative and hypothetical approach is used in the study, employing the following three conditions:

Condition A: Presenting only the newspaper coverage (risk-amplifying information)
Condition B: Presenting the newspaper coverage and IRL (risk-reducing information) without sender identification
Condition C: Presenting the newspaper coverage and IRL with sender identification

Sakurajima, an active volcano in Kagoshima City, Japan, was selected as the target volcano. The Japan Meteorological Agency offers guidelines on volcano risk, which comprise five levels (1=attention needed, 2=restricted entry to the crater, 3=restricted entry to the mountain, 4=preparation for evacuation needed, and 5=evacuation order). As residents in Sakurajima are advised to live their lives as usual until the level reaches 4, level 3 is considered the maximum level that is not judged by experts as potentially fatal.

The newspaper coverage presented to the subjects was designed as follows. First, newspaper articles for 6 years and 8 months until August 2018 were searched using the official online archives of Japan's four major newspapers; four level-3 eruptions of Sakurajima that were featured in the largest number of newspaper articles were selected. Based on the opinions of the NPO Sakurajima Museum, the eruption on February 5, 2016 was selected as the one that produced particular concerns among the general public.

Next, five newspaper articles were selected that reported the target eruption, were featured in national or metropolitan area editions (such as Tokyo), but did not report on local lives. Three photographs of the February 5 eruption of Sakurajima were offered by NPO Sakurajima Museum. Using a paper-based questionnaire survey in September 2018, 30 students (15 male and 15 female) of a university in Tokyo were asked to use a seven-point scale to rate the extent of risk they perceived while examining each article and photograph. Finally, the newspaper coverage to be used as the stimulus was designed by combining the article and photograph that achieved the highest ratings with minor corrections for better readability.

As the IRL, risk-reducing information, an article posted on the official homepage of NPO Sakurajima Museum that reported local residents were living their lives normally after the target eruption, was selected. Minor corrections were made for better readability. The information sender, NPO Sakurajima Museum, was identified only in Condition C.

The dissemination of the main questionnaire and data collection were conducted by a research company (Macromill, Inc.) in October 2018. A total of 208 subjects were randomly assigned to each of the three conditions of information intervention (A, B, and C), but, to minimize the effect of residual variables that were suggested in past studies as affecting risk perception, namely gender and age (e.g., Flynn, Slovic, and Mertz 1994), the percentages of each gender and age group were balanced across the three conditions. Through prescreening, subjects who had lived in Kagoshima Prefecture, those who claimed that they were not at all interested in visiting Sakurajima, and those

who claimed that they had detailed knowledge of the incident presented in the coverage were excluded. In all, 624 usable responses were collected with no missing values.

The following items were employed to measure the variables in the model. Three items related to CRP and four items related to negative ARP were taken from a study on perceived risk of a natural disaster (Trumbo, Peek, Meyer, Marlatt, Gruntfest, McNoldy, and Schubert 2016). Three items related to positive ARP were taken from a study on visitors' evaluation of adventure tourism (Prebensen and Xie 2017; Sato, Kim, Buning, and Harada 2018), as relevant items in a past study (Altarawneh et al. 2018) did not appear to suit the tourism context. Three items related to the intention to avoid visiting Sakurajima were created by rephrasing scale items that rated intention to choose environment-friendly hotels (Han, Hsu, and Sheu 2010). Items to rate the subjects' level of perceived knowledge of Sakurajima and to measure the perceived credibility of the IRL were added. Separate scales to measure the subjects' tendency to seek and avoid risk were also included. These items were measured using seven-point scales, where a higher score indicates the subject's stronger agreement with each item.

The subjects in condition A were asked to rate each of the above items after being shown only the newspaper coverage (as information); for conditions B and C, the subjects were shown the newspaper coverage and the IRL. For all conditions, the assumption was made that the same sort of eruption could occur. The subjects were asked to provide sociodemographic information, such as gender, age, place of birth, place of residence, and occupation. They were also asked to respond "Yes" or "No" to questions about whether they had ever resided in Kagoshima Prefecture, visited Sakurajima, or actually seen the Sakurajima eruption. They were also asked about their own and their acquaintances' experiences with natural disasters. As part of the prescreening process, they were also asked to rate their interest in visiting Sakurajima and their knowledge of the incident shown in the coverage using three-point scales.

Results

Due to space constraints, not all results are presented in full detail.

Most of the subjects had never actually seen Sakurajima (about three-fourths), and only 5.6% of them had witnessed its eruption. While 49.2% had experienced natural disasters, mostly earthquakes, 50.8% had never experienced a natural disaster. Therefore, most of the subjects had little experience with the eruption of Sakurajima, while there seems to be a fairly good balance between those with and without natural disaster experience. Furthermore, Fisher's exact test was performed to detect significant tendencies of the subjects in any of the three conditions in their degree of interest in visiting Sakurajima, their experiences of visiting Sakurajima and witnessing its eruption (none, only visiting, and both), as well as of the subjects and their acquaintances' experiences with natural disasters. The results were not significant. The results of a one-way ANOVA also show no significant differences among the three conditions in the subjects' ratings of their knowledge of the incident or their tendencies to seek and avoid risk. These results indicate that the residual effects of these variables can be considered as minimized.

Except PA2, which showed a floor effect (.798), no ceiling and floor effects were observed in the items shown in Figure 1. The skewness and kurtosis of all the items were within the allowable range (Kline 1998).

Next, exploratory factor analyses (principal factor method, promax rotation) were performed separately on CRP, positive ARP, negative ARP, and AI, and the factor loadings suggested the relationships between observable variables (items) and each latent variable (factor) as illustrated in Figure 1. The Kaiser-Meyer-Olkin scores were all higher than .6, and all Cronbach's alphas were higher than .7.

Next, based on the aforementioned hypotheses, the model shown in Figure 1 was subjected to structural equation modeling (SEM) to test Hypotheses 1, 2a, 2b, 3a, and 3b. SEM was used as it analyzes the covariances between error variables, which allows the examination of the commonality, except the hypothesized latent variables (factors), which lies behind the observable variables, and the goodness of fit which shows the extent to which the model accords with the relationships between variables as indicated by the data. Thus, SEM was considered as suitable to test the appropriateness of the employment of variables and the hypothesized relationships between the variables in the model in a rigid manner.

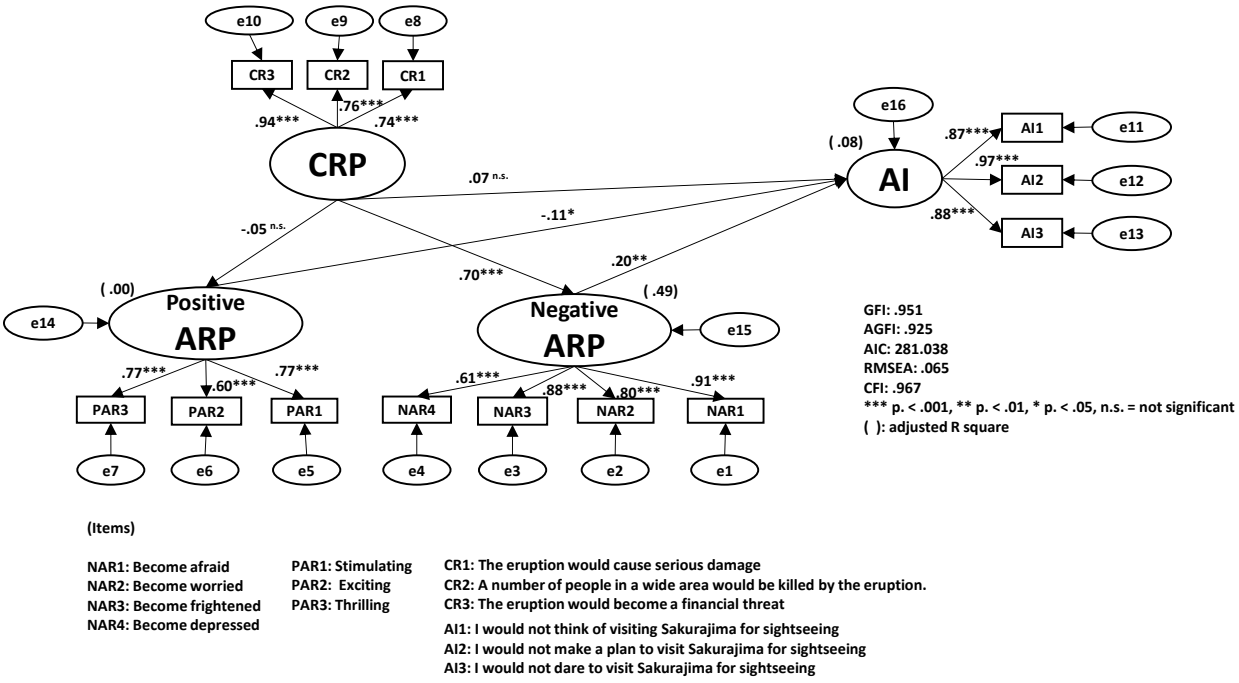

Figure 1. Model of Potential Visitors' Intentions to Avoid Visiting Sakurajima

Except the Chi-square probability, which is often influenced by a large sample size, all fit indices appear acceptable. Next, the model was subject to multiple group SEM (MGSEM), employing the three conditions as groups. The results show that acceptable fit indices were obtained for each condition, as well as for the combination of the three conditions. Configural invariance was also confirmed as the model in which equality constraints on item loadings was applied showed acceptable fit indices. Finally, the significance of the differences in the pass coefficients between the three conditions were tested, and only the path from CRP to negative ARP for Condition C showed a significantly higher value (.52) than Condition B (.42) at the 5% significance level. As a whole, applying this model to each condition and the homogeneity of the model across conditions were confirmed as appropriate.

Finally, a one–way ANOVA and multiple comparisons were conducted to test hypotheses H4a, b, c, and d and H5a, b, c, and d by analyzing the significance of the differences in the factor scores of CRP, negative ARP, positive ARP, and AI among the three conditions. The results showed that Condition A had significantly higher scores than Conditions B and C in CRP and negative ARP, and a significantly higher score than Condition B for AI (Table 2).

Table 2. The Results of One-way ANOVA

Dependent Variables	Mean Factor Scores			Homoscedasticity		One-way ANOVA		
	Condition A (n=208)	Condition B (n=208)	Condition C (n=208)	*F*-value	*p*	*df*	*F*-value	*p*
Positive ARP	3.505	3.171	3.134	0.733	n.s.	2	12.131	***
Negative ARP	2.289	2.400	2.384	0.694	n.s.	2	.570	n.s.
CRP	4.808	4.340	4.370	1.784	n.s.	2	8.652	***
AI	4.065	3.574	3.830	3.032	*	2	6.239	**

***$p < .001$, **$p < .01$, *$p < .05$, n.s. = not significant

Table 3. The Results of Multiple Comparisons

Dependent Variables	Multiple Comparison	*p*	Test Used
Negative ARP	Condition A > Condition B	***	Tukey[T]
	Condition A > Condition C	***	
CRP	Condition A > Condition B	**	
	Condition A > Condition C	**	
AI	Condition A > Condition B	**	Games-Howell [A]

***$p < .001$, **$p < .01$

Hypotheses H1, H2a, b, H3a, and H4a, b, and d were supported while H3b, H4c, and H5a, b, c, and d were rejected. The rejection of H3b may suggest that CRP and positive ARP can be independent of each other. As a result of the rejection of H5a, b, c, and d, an independent t test was conducted to test the difference in the information credibility ratings between Conditions B and C, but no significant results were observed. Therefore, identifying the sender of the information might not have affected the variables as it did not affect credibility.

Conclusion and Discussion

This study employed an experimental study and applied knowledge of research on risk perception, particularly SARF and DPM, to elucidate the effect of information intervention on a model of potential visitors' intentions to avoid visiting volcanic destinations, an area of research overlooked by tourism studies. This attempt is believed to be novel both in tourism studies on risk perception and in risk perception studies in general. In accordance with previous studies on risk perception, CRP was found to affect AI through negative ARP. Furthermore, the three variables (CRP, negative ARP, and AI) were weakened by intervention using information on the residents' lives (Conditions B and C). This highlights the possible usefulness of information intervention by

providing information on the residents' usual lives to minimize the effect of risk amplifying information. Next, the hypothesis that CRP affects positive ARP was rejected. This may raise a question about the inextricable relationship between risk and appeal of attractions (Lew 1987), and instead imply that negative and positive ARP are both influential for AI. However, these are very different variables.

In terms of practical contributions, the fact that this study indicated that IRL is an effective way to suppress the intent to avoid visiting a tourism site that has a volcano as a major tourism resource provides a beneficial methodology for use in the promotion of tourism at similar tourism sites. Similar measures may be effective when used on tourism sites at which the main tourist attraction is another type of resource that entails risks, such as riverside tourism sites, which involve the risk of flooding. Further, the results of the one-way ANOVA and multiple comparisons also suggest that positive ARP may not be affected by IRL. Therefore, to increase positive emotions such as "stimulating," "exciting," and "thrilling," other strategies, such as promotions and word-of-mouth measures that communicate the attractiveness of a tourism site may be required in addition to information that serves to reduce potential visitors' perceptions of risk. In the future, the effects of other types of information on positive ARP such as web word-of-mouth between visitors or promotions may need to be tested.

As with most research, this study has limitations. First, only limited stimuli were used, namely artificial newspaper coverage as the risk-amplifying information and information on local lives as the risk-reducing information. The lack of investigation on the effects of detailed features of information, such as the difference between a day-view and night-view of the volcano, is another limitation. The limited coverage of the different types of variables might have also led to overlooking possible effects of the seriousness of a hazard or the timing of its occurrence. The small value of the adjusted R^2 for AI points to the effects of other personal variables such as the destination image and risk management experiences. The insignificant differences between Conditions B and C in the one-way ANOVA also necessitates further studies on information features that may affect credibility and perceived risk. The authors hope that the results of this study can be a springboard for investigations of such variables in the future, which may eventually help suggest risk-reducing measures for a wider range of risky destinations.

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