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The effects of touristic elements in photographs on potential visitors' evaluations of a volcano

Introduction

As tourists cannot experience their destinations before their departure, they often choose their destinations based on images derived from information (Reich 1999). Among various forms of such information, photographs have been regarded as pivotal to offer visitors a virtual experience of a destination (Tussyadiah and Fesenmaire 2009). However, it is challenging to communicate the attractiveness of destinations to potential visitors within the limited coverage, particularly when the destinations incorporate mutually contradicting elements. Destinations with natural resources in crustal activity, such as volcanos, are the typical examples in that both their attractiveness and anxious factors for visitors can be attributed to their activities. It is thus crucial to picturize destinations with those active natural resources to communicate their inherent attractiveness to potential visitors while minimizing the risk that they may perceive.

This is part of a continuous study on the effects of touristic elements in photographs on potential visitors' evaluations of volcanos. This study focuses on the presence of a visitor and a man-made structure designed for visitors as touristic elements and the presence of the volcanic plume as the intensifier of senses attributed to the target volcano's crustal activities. Slide experiments based on past environmental psychological tourism studies are employed to elucidate the effects of environmental factors. This study aims to offer avenues for *Creative, Smart and Sustainable Destinations* that has measures to leverage their inherent nature as the attractiveness for visitors.

Literature Review

As Lee and Crompton (1992) claim, novelty that destinations offer visitors can not only be the major drive for visitors but also entail complexity and unpredictability for visitors. In this sense, the novelty of destinations can be the cause of both attractiveness and risk perceived by visitors. Lew (1987) also offers the cognitive perspective, which is a framework to classify the attractiveness of destinations based on the extent of risk and safety perceived by visitors, based on the assumptions that visitors' quest for the authenticity of destinations entails risk, and that every destination environment has elements of both security and risk.

Inextricable relationship between risk and inherent attractiveness of destinations can be observed particularly at natural tourism destinations, which are not designed originally for the convenience of visitors and can even be unfriendly to humans. Destinations with natural resources in continuous crustal activity, such as volcanos, are typical examples. Indeed, volcanos can be national or regional symbols (Fisher, Heiken, and Hulen 1997) and, due to their activities, destinations with volcanos can provide visitors with opportunities for the combination of recreation activities, such as skiing, hiking and bathing in a hot spring bath (Cooper-Erfurt and Cooper 2009). However, their crustal activities, such as eruptions, have risk of causing disasters, which can seriously discourage potential visits.

In order to diminish the perceived risk, the inclusion of the traits of destinations being contrived for visitors in tourism information may be worth considering because potential visitors may then perceive the photographed places to be safe enough to visit. Lew's (1987) cognitive perspective also includes contrived, tourism oriented, touristy, and organized as characteristics of destinations that are close to the security-end as opposed to the risk-end. Indeed, some tourism

studies of visitors' evaluation of built environments with use of slide experiments have pointed to the presence of other people (Araya, Naoi, and Iijima 2016; Ogawa, Naoi, and Iijima 2016) and commercialization, a type of human manipulation, (Araya et al. 2016), as elements that enhance the touristic sense of destinations. However, the same studies also imply that their presence may reduce the natural/inherent sense of the destinations. In the context of volcanic destinations also, touristic traits, such as the presence of visitors or man-made elements, may enhance the destinations' touristic sense and reduce the perceived risk while detracting from their inherent attractiveness.

The above observations have surfaced the necessity to elucidate the effects of elements whose inclusion in photographs of active natural destinations, such as volcanic destinations, may have potential visitors sense their inherent attractiveness and minimize the perceived risk. In view of the accurate presentation of target environments (Brown, Richards, Daniel, and King 1993), experimental methods, such as slide experiments, appear suitable to clearly assess the effects of those environmental factors. However, many past experimental studies on evaluations of natural resources, such as Tanokura's (1999), have focused on residents' evaluations of partly man-made resources, such as rice fields. Also, a past study on visitors' and tourism employees' perceptions of volcanos (Bird, Gisladottri, and Dominey-Howes 2010) have centered on residents' risk perception without considering their attractiveness as places to visit. Ishikawa (2016) investigated residents' image of Sakurajima, a volcano in Japan, using scales related to senses of grandness, transcendence, and fear/security for evaluation. Ishikawa investigated the attractiveness of a volcano as perceived by the residents, but did not examine visitors' image. To bridge the research gap, this study aims to elucidate the effects of the presence of a visitor and a man-made structure designed for visitors on potential visitors' evaluations of a volcano using slide experiments.

Methodology

Sakurajima, an active volcano in Kagoshima City, Japan, was selected as the study site because of the booming volcanic tourism and its scientific significance represented by its designation as *decade volcano*, an object of special studies and monitoring through International Association of Volcanology and Chemistry of the Earth's Interior (Cooper-Erfurt 2015). Sixty-one university students (32 males, 29 females, the age between 18 and 24) from a university in Tokyo were recruited for the slide experiment. As none of them had resided in Kagoshima City, they were assumed to be able to rate photographed settings as visitors in that they would evaluate sites outside their usual environments. However, the students' past experiences of visiting Sakurajima may have varied. In addition, some of them might have been more familiar with volcanic activities than others through their life experiences, such as their education and previous disaster experiences. In order to understand the subjects' familiarity with the study sites and natural disasters in general, they were asked about their experiences of actually seeing Sakurajima, of witnessing the volcanic plume, of studying geophysics in high school or university, and of experiencing natural disasters, which were not necessarily limited to Sakurajima.

Three volcano-view sites, two open-air observatories and one promenade walk, were selected. At each of the three sites, researchers prepared eight photographs based on eight combinations of *with and without a visitor*, *with and without a man-made structure*, and *with and without a volcanic plume*, which resulted in 24 photographs in total. The volcanic plume was included as the intensifier of a sense attributed to the volcano's crustal activities. A decoy dressed as a visitor

with a backpack and a camera was employed and photographed from the back. In order for the students not to have a sense of closeness to the decoy, a middle-aged female was employed. The man-made structure for each observatory was a stone monument showing the name of the volcano, Sakurajima, and the structure for the remaining site was the promenade walk with a handrail. These man-made structures were selected so that comparable photographs of the same setting, both with and without the selected structure, could be prepared. That is, the man-made structures were selected according to their on-site availability. For the volcanic plume, composite photographs were made with a NPO Sakurajima Museum's official photograph of Sakurajima with a volcanic plume.

Seven bipolar word pairs related touristic and active senses were generated based on past environmental psychological studies on visitors' evaluations of destinations (Araya, et al. 2016; Naoi, Airey, Iijima, and Niininen 2006, 2007; Naoi, Airey, and Iijima 2009; Ogawa, et al. 2016), and fifteen bipolar word pairs related grandness, transcendence and fear/security were created based on the scales used in Ishikawa's (2016) study of residents' image of Sakurajima and the content analysis of tourism magazines and Kagoshima City's official tourist brochures. One more bipolar word pairs – *unfavorable* -*favorable* – was added to measure subjects' overall evaluations of the photographed setting. Altogether, 23 bipolar pairs were employed (see Table 1).

The 61 students rated each of the setting in the 24-slide presentation on the 23 SDSs. Each slide was shown for ten seconds. Each subject's evaluation was treated as a separate case as in Naoi et al. (2009), Araya et al (2016), and Ogawa et al. (2016). In other words, the size of the dataset used in the analyses was 1,464 (61 subjects * three sites * eight patterns).

Results

Among the 61 students, 49 had not actually seen Sakurajima previously while on a trip, nine of them had seen it once, and the remaining three had seen it twice. Of the 12 students who had seen Sakurajima, eight had witnessed it actually emitting plumes. As to their education at high school and university, 34 students had not taken geophysics, whereas 27 of them had. Further, 34 students had not experienced natural disasters, while 27 had. From the above, the subjects were considered not to have been influenced strongly by their direct experiences with Sakurajima, but may have been influenced by their life experiences.

A factor analysis (principal factor method, promax rotation) was performed on the SDS ratings, which did not include the scale for the overall evaluations. Three factors were obtained, with each factor having an eigenvalue greater than 1.0 (see Table 1). When the factor loading was positive, that factor positively related to the rating closer to the word on the right side of each word pair. The absolute value of the largest factor loading that each item shows was greater than .4 and thus found sufficient (Nunnally 1994). Cronbach's alphas of the 1st, 2nd, and 3rd factors were .931, .857, and .833, respectively, and thus exceeded the acceptable level of .7 or greater (Nunnally 1994). The distinctive items that loaded on the first factor related mainly to grandness and transcendence, and this factor was thus labeled *Transcendent Grandness*. The distinctive items that loaded on the second factor related to a touristic sense, and this factor was thus named *Touristic*. The third factor was relevant to a sense of security and was thus named *Security*.

Next, a stepwise multiple regression analysis was used to examine the impact of the three factors' scores on the overall evaluation rating. The results showed that all the three factors' scores had significant positive effects on the overall evaluation rating (see Table 2). Multicollinearity ($VIF \geq 5$) was not observed (O'Brien 2007).

Subsequently, a factorial analysis of variance was performed to examine the effects of the presence of a visitor, a man-made structure, and a volcanic plume in the photographs on the three factors' scores, using the three variables as the fixed variables and each factor's score as the dependent variable. As shown in Table 3, regarding all the three factors, the significant main effects of the man-made structure were found. In addition, the significant main effects of the volcanic plume regarding Transcendent Grandness and Security, and the significant main effects of the visitor regarding Touristic and Security were observed. The score of Security was significantly lower when the volcanic plume was included in the photograph than when it was excluded. Except for that, the factors' scores were significantly higher when the visitor, the man-made structure or the volcanic plume was included than when they were excluded. Moreover, there was a significant interaction between the visitor and the man-made structure regarding Transcendent Grandness.

Also, as seen in Table 4 and Figure 1, in both the cases of *with a visitor* and *without a visitor*, the significant simple main effects of the man-made structure regarding Transcendent Grandness were observed with the significant higher factor's scores when the visitor was featured in the photographs than the same scores when the visitor was not included. Furthermore, the presence of the man-made structure increased the score of Transcendent Grandness more steeply when the visitor was not featured than when the visitor was included. No significant simple main effects of the visitor were revealed.

Table 1. Results of a Factor Analysis

Items	Factor		
	Transcendent Grandness	Touristic	Security
Not Grand - Grand	.896	-.072	.127
Not Powerful - Powerful	.868	.019	.018
Weak - Strong	.848	-.015	.041
Small Scale - Large Scale	.844	-.052	.109
Not Stately - Stately	.820	.008	.151
Not Divine - Divine	.750	-.029	-.050
Ordinary - Mysterious	.728	-.006	-.143
Inanimate - Vivid	.681	.037	.164
Common - Sacred	.678	-.087	-.050
Usual - Amazing	.566	-.009	-.321
Static - Dynamic	.477	.138	-.228
Like daily life - Unlike daily life	.445	.027	-.304
Not Touristic - Touristic	-.012	.892	.019
Nor for Tourists - For Tourists	-.023	.860	.074
Minor Attraction - Major Attraction	.049	.827	-.033
Deserted - Inhabited	-.185	.539	.070
Dangerous - Safe	-.220	-.024	.755
Unstable - Stable	-.082	-.009	.743
Unapproachable - Approachable	.079	.193	.694
Terrible - Not Terrible	-.274	-.042	.676
Cold - Warm	.191	.151	.522
Gloomy - cheerful	.290	.178	.478
Variance explained (%)	35.599	21.949	5.260
Accumulated variance explained (%)	35.599	57.549	62.808
Eigenvalue	7.832	4.829	1.157

(Principal Factor Method, Promax Rotation, KMO = .936)

Table 2. Results of a Stepwise Multiple Regression Analysis

	<i>B</i>	<i>SE B</i>	β	<i>t</i> -value	<i>p</i>	Collinearity Statistics	
						Tolerance	VIF
(Factor Scores)	3.251	.022		150.495	.000		
Factor 1: Transcendent Grandness	.436	.030	.384	14.369	.000	.535	1.868
Factor 2: Touristic	.299	.034	.259	8.893	.000	.452	2.215
Factor 3: Security	.449	.033	.384	13.473	.000	.472	2.120

 $F(3,1460)=383.459$, $p < .01$; $R = .664$, $R^2 = .441$, Adjusted $R^2 = .440$

Table 3. Results of a Factorial Analysis of Variance

Factors' Scores	Main Effects					
	Fixed Variabels	<i>df</i>	<i>F</i> -value	Comparison of Means		<i>p</i>
Factor 1: Transcendent Grandness	Volcanic Plume	1	263.795	With	> Without	.000
	Man-made Structure	1	24.993	With	> Without	.000
Factor 2: Touristic	Visitor	1	91.479	With	> Without	.000
	Man-made Structure	1	361.066	With	> Without	.000
Factor 3: Security	Volcanic Plume	1	392.771	Without	> With	.000
	Visitor	1	54.167	With	> Without	.000
	Man-made Structure	1	91.230	With	> Without	.000
Factors' Scores	Interactions					
	Variables			<i>df</i>	<i>F</i> -value	<i>p</i>
Factor 1: Transcendent Grandness	Visitor	*	Man-made Structure	1	4.201	.041

Table 4. Results of a Test of the Simple Effects on Transcendent Grandness

Interaction	Simple Main Effects					
	Variables	Level		<i>df</i>	<i>F</i> -value	<i>p</i>
Visitor * Man-made Structure	Visitor	Man-made Structure	Without	1	1.502	.221
			With	1	2.799	.095
	Man-made Structure	Visitor	Without	1	4.350	.037
			With	1	24.844	.000

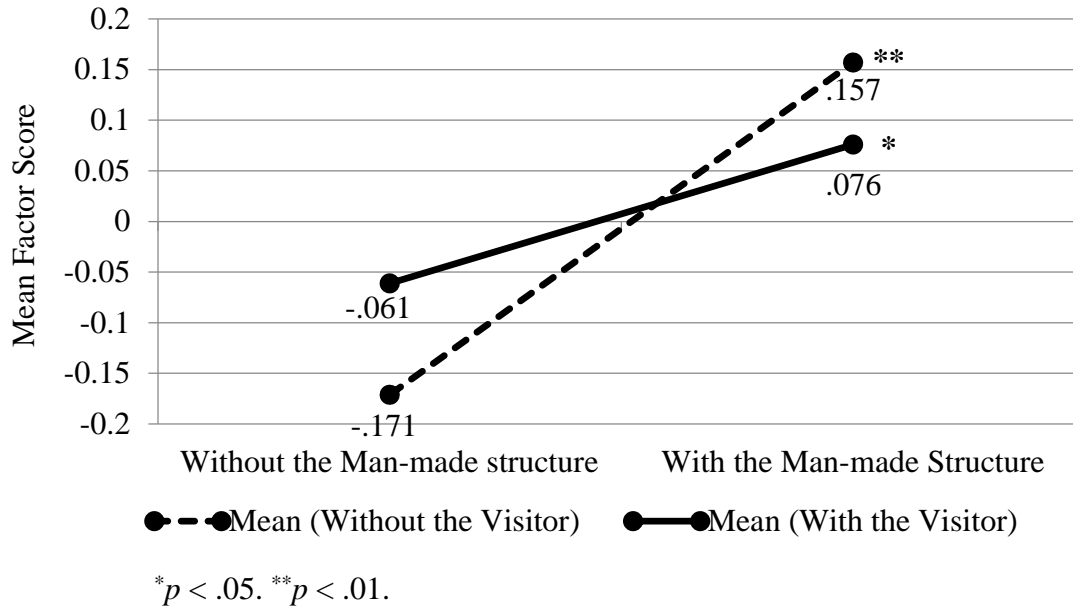


Figure 1. Effects of the Man-made Structure on Transcendent Grandness

Table 5. The Summary of the Results

Variables\Factors	Factor 1: Transcendent Grandness	Factor 2: Touristic	Factor 3: Security
Volcanic plume	Enhance	—	Reduce
Visitor	—	Enhance	Enhance
Man-made Structure	Enhance	Enhance	Enhance

Conclusion and Discussion

Due to space limitation, the interpretations of the results centered on the results regarding elements that can make photographs effective in communicating volcanos' inherent attractiveness to potential visitors while minimizing their perception of risks.

The results of the stepwise multiple regression analysis pointed out the significant positive effects of all the three variables: Transcendent Grandness, Touristic, and Security, on the overall evaluation rating. On top of that, the results of the factorial analysis of variance imply that the sense of Transcendent Grandness was increased by the volcanic plume and the man-made structure while Touristic sense was enhanced by the presence of the visitor and the man-made structure. As for the sense of Security, the volcanic plume was found to act as the detractor while the role of the visitor and the man-made structure as the enhancers was implied (see the summary of the above results in Table 5). Furthermore, the factorial analysis of variance further revealed that the visitor could weaken the enhancing effects of the man-made structure on the sense of Transcendent Grandness.

Overall, the touristic elements, which are the visitor and the man-made structure, are implied to have risk-cushioning effects as assumed based on the literature review. However, running

counter to the pre-research assumption, the man-made structure is suggested to enhance the sense of Transcendent Grandness, which is the inherent attractiveness of the volcano. One possible reason is that the man-made structure might have been regarded as what MacCannell (1976) calls *marker*, which represents the inherent nature of the volcano, rather than the trait of touristic manipulations. Anyhow, the inclusion of the man-made structure for visitors may be an effective measure to communicate their inherent sense of transcendent grandness to potential visitors while increasing the perceived sense of safety, which the volcanic plume may detract from.

Despite these drawbacks attributed to the small university sample, the methods used in this study are believed to elucidate the effects of specific characteristics of tourism destinations on potential visitors' evaluations. By doing so, this study has provided a clue for the promotion of nature-based destinations where its inherent attractiveness and risk are in inextricable relationship and has offered a conceptual and methodological perspective to studies of visitors' evaluations of destinations. These clues and perspectives can be verified by the accumulation of the studies that focus on specific aspects of destinations with subjects with different profiles. As argued earlier, there could also be differences even among the student subjects in their personal characteristics, such as their knowledge of crustal activities or their past experiences of natural disasters. The investigation of the effects of these characteristics could offer avenues for more generalizable implications and will thus be the next step of this continuous study.

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