

Inspiring awe through tourism and its consequence

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ARTICLE INFO

Associate editor: Araña Jorge

Keywords:

Tourism

Awe

Environmentally responsible behaviour

Small-self-perception

ABSTRACT

Awe is a positive emotion of particular relevance for tourism, although thorough studies of its behavioural outcomes are rare. This research investigated the experience of awe accessed through tourism and its influence on environmentally responsible behaviour (ERB). Three studies, including an on-site survey and two experimental studies across different populations, were conducted to test our theory and proposed hypotheses. Our results show that by diminishing the emphasis on the individual self, evoking awe through tourism experiences may encourage people to conduct ERB. The robustness of the results was verified through multiple methods. Finally, theoretical contributions and managerial implications are discussed along with recommendations for future research.

Introduction

Research on awe has burgeoned in the last twenty years. Psychologists depict awe as a positive emotion with two key features (Keltner & Haidt, 2003). First, awe arises when one encounters something strikingly vast in size, scope, complexity, ability, or number (Shiota, Keltner, & Mossman, 2007). Second, awe alters one's understanding of the world and stimulates new mental schemas (Rudd, Vohs, & Aaker, 2012; Shiota, Campos, & Keltner, 2003). Awe can be inspired by many stimuli, such as wonderful natural phenomena, immense historical sites, revered religious deities and elegant art (Farber & Hall, 2007; Powell, Brownlee, Kellert, & Ham, 2012). In modern society, people suffer from a chronic lack of awe (Rudd et al., 2012). Experiences of awe rarely come from daily responsibilities and mundane tasks. Travel experiences can be an excellent source of awe because many tourist attractions involve magnificent scenery, valuable heritage and unique cultural experiences. Indeed, the experience of awe in religious tourism, nature-based tourism and cultural tourism has been acknowledged in the literature (e.g., Ballantyne, Packer, & Sutherland, 2011; Ryan, Hughes, & Chirgwin, 2000; Schanzel & McIntosh, 2000). In addition, awe has been identified as a desired experiential accolade from tourists (Powell et al., 2012). It is thus clear that awe is of particular relevance for tourism. Unfortunately, studies of the awe experience and its consequences in the tourism context have been largely absent (Coghlan, Buckley, & Weaver, 2012).

Recently, the implications of experiencing awe for promoting environmentally responsible behaviour (ERB) has received academic attention. The linkage of awe with ERB is based upon the premise that positive emotions can stimulate prosocial behaviour (Fredrickson, 2000). Several studies have reported the influence of awe on prosocial tendencies, including generosity, ethical decision making, helping behaviour, volunteering activities, devotion, reverence and consideration of community interests (Bai et al., 2017; Griskevicius, Shiota, & Neufeld, 2010; Piff, Dietze, Feinberg, Stancato, & Keltner, 2015; Rudd et al., 2012). Emerging evidence highlights the possibility that awe could impact environmental engagement and cooperative behaviour (Davis, 2016; Ibanez, Moureau, & Roussel, 2017). Although few studies in tourism have directly examined the effect of awe on ERB, we speculate that awe

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inspired through tourism may affect ERB.

Therefore, this research explores the experience of awe in the tourism context and its impact on ERB. In particular, there are four objectives for this study: (1) to explore the effect of awe inspired by tourism on ERB intention; (2) to further understand the process underlying this effect by examining the mediating role of small-self-perception; (3) to examine the link between awe and ERB intention by adding an experimental manipulation that speaks to causal direction more directly; and (4) to confirm the impact of awe on real ERB. The findings from this research can deepen our understanding of the concept of awe and its psychological and behavioural outcomes in tourism. The results may have important implications for improving tourists' level of morality and promoting the harmonious development of tourism.

Theory background and hypotheses

Awe, as a powerful positive emotion (Shiota et al., 2003), has long been a subject of inquiry in philosophy and sociology (Burke, 1990; Kant, 1790). Early contributions on awe from psychology focused on its functional attributes in religious experiences, but empirical studies were few (Hall, 1897; Leuba, 1906). Over the past decade, the study of awe in the field of psychology has been revived. Focusing on the scientific meaning of awe, Keltner and Haidt (2003) offer a prototype model of awe consisting of two key features: perceived vastness and a need for accommodation. "Perceived vastness" means that the object of awe should be vast relative to people's habitual cognitive reference system. "A need for accommodation" means that people need to adapt to awe and change their existing beliefs to make sense of it. Studies on the elicitation of awe show that natural objects, art, music, and human achievement tend to be the most effective sources of awe-based experiences (Farber & Hall, 2007; Keltner & Haidt, 2003; Shiota et al., 2007). All of these findings suggest that some tourism experience or tourism sites could be triggers of awe.

Research on the subjective and physiological experience of awe is consistent with the prototype model of awe. By employing interpretative phenomenological analysis, ten thematic elements of the awe experience have been identified: profoundness, connectedness, fear, vastness, numinous existential awareness, openness and acceptance, ineffable wonder, presence, and heightened perceptions (Bonner & Friedman, 2011). Compared with pride, awe is found to trigger significantly greater feelings of rapture, love, feeling that the self is small or insignificant, sensing the presence of something greater than the self, being unaware of normal day-to-day concerns, feeling connected with the surrounding world, and wanting to prolong the experience as long as possible (Shiota et al., 2007). In terms of physiological and expressive aspects of the awe experience, goosebumps are commonly associated with the experience of awe (Maruskin, Thrash, & Elliot, 2012). Facial displays of awe include raised inner eyebrows, widened eyes, and the slight dropping of the jaw (Shiota et al., 2003).

Awe experience in tourism

Recognizing the paucity of research on awe in tourism, Coghlan et al. (2012) develops a framework for analysing awe in tourism based on a qualitative study. From a temporal perspective, tourist experiences of awe consist of an immediate physiological response (e.g., shock, breath-taking), comparison with past experiences (e.g., unique, unusual) and a future-oriented, schema-changing component (change making, humbling). According to Powell et al.'s (2012) study in the context of the Antarctic tourism experience, awe includes five sub-dimensions: nature-human relationship, spiritual connection, transformative experience, goal clarification, and humility. Using the case of Tibetan tourism, Tian, Lu, and Wu (2015) find that awe exerts a significant positive influence on loyalty through tourist satisfaction. Pearce, Stricklandmunro, and Moore (2016) explore the antecedents of awe in the natural tourism experience. Based on interview data, five distinct antecedents are highlighted: marine fauna, aesthetics, ecological phenomena, vast geological landscapes and reflective/perspective moments. Overall, awe in tourism experiences is not as well researched as other emotions, such as pleasure and relaxation (Goossens, 2000; Loureiro, Almeida, & Rita, 2013). Existing research tends to focus on describing awe-inspiring experiences using qualitative methods. The antecedents and outcomes of awe in the tourism context thus remain poorly studied. Although awe is an emotion closely related to the human-environmental relationship, little attention has been devoted to the influence of experiences of awe in the tourism context on environmentally responsible behaviour.

Awe and ERB

ERBs are actions that avoid damage to the environment (Iwata, 2001). Because tourism has been identified as having critical environmental impacts, promoting ERBs among tourists has become an important issue in both the tourism industry and academia. Many researchers have developed scales for measuring ERB (Chao & Lam, 2011; Kaiser, 1998; Smith-Sebasto & D'costa, 1995). For example, Lee, Jan, and Yang (2013) measure ERB from the perspective of community-based tourists. Seven dimensions are developed in their conceptualization: civil action, financial action, physical action, persuasive action, sustainable behaviour, pro-environmental behaviour, and environmentally friendly behaviour. A considerable body of literature on the determinants of tourists' ERB has emerged. Environmental attitude has been considered a crucial factor in determining an individual's environmental behaviour, and much attention has thus been drawn to the attitude-behaviour model (Vaske & Donnelly, 1999). However, the link between attitude and behaviour is debated. For example, Lee (2007) shows that people's environmental attitude is influenced by their behaviour. In addition, several studies suggest other determinants of ERB, such as outdoor recreation experience, place attachment, and destination image (Ballantyne et al., 2011; Chiu, Lee, & Chen, 2014; Halpenny, 2010). However, studies examining the effect of specific emotions aroused in travel experiences on tourists' ERB are still lacking.

In recent years, the role of the experience of awe in environmental decision making has received increased attention, as emotion

has become one of the central research topics in environmental psychology. The impact of awe on ERB is based upon the premise that positive emotions can promote prosocial behaviour (Fredrickson, 2000). Indeed, one study conducted by Piff et al. (2015) shows that the influence of awe on prosocial tendencies (e.g., generosity, ethical decision making, and helping behaviour) persists across different awe conditions (positive vs. negative experiences through nature vs. non-nature exposures). Rudd et al. (2012) show that priming with an awe-inspiring commercial, compared to a happiness-inducing commercial, results in an increased desire to spend time doing volunteer activities. Moreover, awe has been found to promote solemnity, heightened analytical ability, devotion, reverence and consideration of community interests (Bai et al., 2017; Griskevicius et al., 2010). More recently, research has begun to link awe directly to environmental engagement and cooperative environmental behaviour. For instance, Davis (2016) finds that awe is the most prominent emotion in a nature-based transcendent experience and is positively related to general environmental behaviours such as energy, food, and recycling/waste behaviours. Relying on an experimental approach using the dictator game to test individual generosity, Ibanez et al. (2017) reveals that awe can increase the amount donated to pro-environmental causes. Therefore, we hypothesize the following:

H1. The experience of awe in tourism will increase ERB.

Most studies on the influence of tourist experiences on ERB employ self-report questionnaires, which raises the issue of social desirability bias in the response (King & Bruner, 2000). Behavioural intention refers to the perceived likelihood that a person will carry out a particular type of behaviour (Ajzen & Fishbein, 1980). The theory of planned behaviour proposes that behavioural intention is a key antecedent of actual behaviour and may therefore serve as a proxy for actual behaviour where such measures are difficult to obtain. Although a number of meta-analyses confirm the power of behavioural intention in predicting actual behaviour (e.g., Sheeran & Orbell, 2000), behavioural intention is often imperfectly turned into actual behaviour due to various obstacles (Jang, Bai, Hu, & Wu, 2009). An increasing amount of research confirms that emotion not only influences action tendency (Lowe & Ziemke, 2011) but also effectively predicts actual behaviour (Dalenberg, Gutjar, Horst, Graaf, & Jager, 2014). Therefore, we believe that the influence of awe will extend to actual behaviour. Hence, we further propose the following hypotheses:

H1a. The experience of awe in tourism will increase ERB intention.

H1b. The experience of awe in tourism will increase actual ERB.

The small-self-perception as the mediator between awe and ERB

Past work on the influence of awe on social cognition has found that awe could induce a perception of a small self, which refers to “a relative diminishment of the individual self and its interests vis-à-vis something perceived to be more vast and powerful than oneself” (Piff et al., 2015). Experiment-based research shows that lab-elicited feelings of awe can cause participants to feel small relative to the environment (Campos, Shiota, Keltner, Gonzaga, & Goetz, 2013), to perceive something greater than themselves, to feel less significant and less focused on personal concerns (Shiota et al., 2007), and to feel less entitlement (Piff et al., 2015). Bai et al. (2017) observe the small-self effect of awe across Western European and East Asian cultures. The phenomenology of awe also lends support to the view that it might diminish perceptions of self. Experiences of awe, such as spiritual experiences in religious rituals (Van Cappellen & Saroglou, 2012) and outdoor adventures (Powell et al., 2012), often direct attention away from personal concerns and goals and towards vaster entities and more collective dimensions of personal identity. Taken together, these studies suggest that awe may subordinate individual's own self-interest and prioritize the interests of others, which is vital to prosocial tendencies.

Previous studies provide some evidence that a small-self-perception can increase prosocial tendencies. Researchers have found that people who feel decreased self-importance donate more to a collective resource (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004). Similarly, people with self-transcendence values, which emphasize placing less importance on the self, tend to report higher levels of prosociality and empathy (Caprara, Alessandri, & Eisenberg, 2012). Piff et al. (2015) provide evidence for the mediating role of feelings of a small self (a diminished sense of self) between awe and prosociality. Bai et al. (2017) further validate the influence of daily, in vivo, and lab experiences of awe in collective engagement on the diminished sense of self. Based on the foregoing discussion, we hypothesize the following:

H2. The small-self-perception mediates the impact of awe on ERB.

Study methods

This research contains three empirical studies: one field survey and two experiments. We will introduce the methods and results of each study separately, followed by a general discussion.

Study 1

In this study, we collected data at tourism destinations to examine the effect of awe on ERB intention. Existing research has shown that tourists are likely to feel awe when travelling to national parks such as Yosemite National Park in the U.S. (Bai et al., 2017). National scenic areas in China, which have a status equivalent to that of national parks in the U.S., are considered to be among the most awe-inspiring places in China. Therefore, we predicted that visiting national scenic areas can elicit awe and thus increase

visitors' intention to engage in ERB (H1a). More importantly, we attempted to further examine the underlying mechanism of the impact of awe on ERB (H2).

Method

Survey instrument

All measures were adopted or developed from existing research. All measures were first prepared in English and then translated into Chinese. A research assistant bilingual in English and Chinese translated the measure. The measures were then back-translated into English by a second research assistant. Translation discrepancies were resolved through discussion with the translators and the authors.

The questionnaire consisted of four parts (see Appendix B). In the first section, participants were asked to recall what they saw in the scenic area and to write down the three most impressive scenes. Then, they were asked to indicate the extent to which they felt awe during their visit to the scenic area. Existing research on awe mainly use experimental methods to activate this specific emotion (e.g., Bai et al., 2017; Griskevicius et al., 2010; Keltner & Haidt, 2003; Piff et al., 2015; Rudd et al., 2012; Van Cappellen & Saroglou, 2012); only one item was used to examine whether stimuli elicit this specific emotion (e.g., participants reported the degree to which they felt awe). By considering our aims in this study to identify correlation, we created four items to measure awe based on the definition of awe from Keltner and Haidt (2003) and Shiota et al. (2007), (e.g., To what extent do you think the attractions in this scenic area are grand? To what extent do you think the attractions in this scenic area evoke awe?) on a 7-point Likert scale (1 = not at all, 7 = very much).

In the second section, respondents were asked about their intention to engage in twenty-four ERBs in the future on a 7-point Likert scale (1 = not at all, 7 = very much). Lee et al.'s (2013) ERB scale was used because it includes a range of pro-environmental behaviours from seven dimensions: civic action, financial action, physical action, persuasion action, sustainable behaviour, pro-environmental behaviour and environmentally friendly behaviour. Sample items include the following: I would be willing to pay much higher taxes to protect the environment; I buy products packaged in containers that can be either reused or recycled or are made of recycled materials.

In the third section, we measured the underlying process of through which awe impacts ERB: small-self-perception. Visitors rated their agreement on a 7-point Likert scale (1 = not true at all, 7 = very true) with four statements related to experiencing the scenes they had just described. Sample items include the following: I felt small or insignificant; I felt the presence of something greater than myself (Piff et al., 2015; Shiota et al., 2007).

In the last section, individual dispositional awe and basic demographic data were collected. The subscale of the Dispositional Positive Emotion Scale questionnaire was used (Shiota, Kelter, & John, 2006). Sample items include the following: I often feel awe; I see beauty all around me.

Sample and data collection

An on-site survey was conducted in two national scenic areas in China. The two national scenic areas were Yellow Mountain (a nature-based scenic area) and Three Gorges Dam (a culture-based scenic area featuring the largest hydroelectric project in the world) (see photos in Appendix A). These two types of scenic areas were used to examine the robustness of the effect of awe, assuming that the impact of awe on ERB is not restricted by a specific type of attraction. In addition, it is useful to examine whether a man-made landscape can produce the same level of awe as a natural landscape. Convenience sampling was used to select the respondents. A self-administered questionnaire was distributed to those respondents who agreed to participate in the study.

The sample size of this study was determined by power analysis (Paul, Erdelder, Buchner, & Lang, 2009). The correlation between awe and behaviour in previous research is approximately 0.2 (e.g., Piff et al., 2015). Therefore, to examine the correlational relationship between awe and behaviour using an on-site survey, the required sample size should be approximately 150 (based on $\beta = 0.80$). In addition, considering the number of items in this survey ($N = 40$), the required sample size should at least be 5 times the number of items (Hair, Black, Babin, & Anderson, 2010). Thus, we aimed to collect 200 samples. Although we did not expect the different types of landscape to matter, we felt it safe to collect 200 samples at each site. A total of 422 completed questionnaires were collected (206 at Yellow Mountain, 216 at the Three Gorges Dam). Among the respondents, 46.90% were male, and the mean age was 32.96 years ($SD = 10.64$, range = 16–70). The majority of the respondents (77.00%) had received an undergraduate or postgraduate degree, 4.0% had received secondary-level education, 26.6% had received postsecondary or college education, and 2.4% had received primary education or below.

Results

Awe

Four items assessing awe were reliable ($\alpha = 0.90$). A composite score for awe was generated by averaging the item means. A high score reflects that the scenic areas elicited a high level of awe. An independent *t*-test showed that awe did not differ by type of scenic area ($M_{\text{Huang shan Mountain}} = 5.59$, $SD = 1.44$; $M_{\text{Three Gorges Dam}} = 5.48$, $SD = 1.29$; $t(420) = 0.85$, $p = .39$), which suggests that both man-made and natural resources can elicit awe.

ERB

First, exploratory factor analysis was conducted to determine whether our measure of ERB reflects the seven dimensions of the

Table 1
Results of confirmatory factor analysis.

	Component						
	CA ($\alpha = 0.81$)	FA ($\alpha = 0.78$)	PHA ($\alpha = 0.70$)	PA ($\alpha = 0.84$)	SB ($\alpha = 0.85$)	PB ($\alpha = 0.75$)	EFB ($\alpha = 0.62$)
ERB1	0.711						
ERB2	0.788						
ERB3	0.737						
ERB4	0.669						
ERB5		0.666					
ERB6		0.662					
ERB7		0.720					
ERB8		0.711					
ERB9			0.627				
ERB10			0.816				
ERB11			0.687				
ERB12				0.749			
ERB13				0.816			
ERB14				0.776			
ERB15					0.735		
ERB16					0.837		
ERB17					0.836		
ERB18							
ERB19						0.774	
ERB20						0.805	
ERB21						0.581	
ERB22							0.547
ERB23							0.767
ERB24							0.613

Notes: CV = civic action, FA = financial action, PHA = physical action, PA = persuasive action, SB = sustainable behaviour, PB = pro-environmental behaviour, EFB = environmentally friendly behaviour.

original ERB scale. The principal component method was employed to identify seven factors ($KMO = 0.87$, Bartlett's test of sphericity $\chi^2(253) = 4581.49$, $p < .001$), which explained 70.40% of the variance. The loading of each item was acceptable, and further reliability analysis showed that the seven dimensions were highly reliable (see Table 1). The item ERB 18 (I pick up (encourage others to pick up) litter left by other people) was deleted due to a cross-loading issue. The remaining 23 items were combined to generate a composite ERB score, which was also highly reliable ($\alpha = 0.90$).

Small-self-perception

The four items that assessed the perception of the small self were reliable ($\alpha = 0.76$) and were thus averaged to obtain a composite score of the small self.

Dispositional awe

Six items to measure individual differences in awe were reliable ($\alpha = 0.81$) and were thus averaged to form a composite score of dispositional awe.

Table 2
Inter-correlations and descriptive statistics for the study variables.

	M	SD	DA	FA	SS	CA	FA	PHA	PA	SB	PB	EB	EBR
DA	5.55	1.05	1										
FA	5.54	1.37	0.41***	1									
SS	5.54	1.24	0.41***	0.39***	1								
CA	4.80	1.50	0.54***	0.41***	0.30***	1							
FA	5.68	1.10	0.49***	0.25***	0.32***	0.48***	1						
PHA	6.13	0.96	0.32***	0.19***	0.31***	0.17***	0.49***	1					
PA	4.96	1.56	0.39***	0.24***	0.21***	0.48***	0.42***	0.32***	1				
SB	5.10	1.52	0.46***	0.26***	0.16***	0.49***	0.40***	0.25***	0.51***	1			
PB	5.93	1.06	0.43***	0.18***	0.34***	0.38***	0.49***	0.44***	0.35***	0.35***	1		
EB	6.12	0.93	0.44***	0.21***	0.30***	0.24***	0.45***	0.52***	0.28***	0.33***	0.50***	1	
EBR	5.51	0.87	0.64***	0.38***	0.38***	0.75***	0.76***	0.58***	0.73***	0.72***	0.68***	0.61***	1

Note: 1) DA = Dispositional Awe, FA = Feeling of Awe, SS = The Small Self, CA = Civic Action, FA = Financial Action, PHA = Physical Action, PA = Persuasion Action, SB = Sustainable Behaviour, PB = Pro-environmental Behaviour, EBR = Environmentally Responsible Behaviour.

2) *** $p < .001$.

The effect of awe on ERB

As shown in Table 2, awe was positively related to all dimensions of ERB. Thus, the composite ERB was used to perform the regression analysis. Individuals differ in dispositional tendency towards experiencing awe. To confirm that awe activated by national park visits had unique power in predicting ERB, we controlled for individuals' disposition to experience awe in the regression analysis. We found that dispositional awe was positively related to ERB ($b = 0.48$, $SE = 0.03$, $t(419) = 14.47$, $p < .001$). Controlling for dispositional awe, we also found that awe positively predicted ERB ($b = 0.09$, $SE = 0.03$, $t(419) = 3.43$, $p = .001$). In addition, the coefficient for the impact of awe on ERB was significant regardless of the type of scenic areas ($b_{\text{Huang shan Mountain}} = 0.18$, $p < .001$; $b_{\text{Three Gorges Dam}} = 0.31$, $p < .001$), which further confirmed the robustness of the impact of awe on ERB. Next, demographic variables (age and gender) were included in the regression functions. The results showed that females had a marginally higher ERB intention than males ($b = 0.14$, $p = .08$). Age was not related to ERB intention ($p = .18$). Even including these demographic variables, the positive impact of awe on ERB was still significant ($p < .001$).

Mediation by perceived small-self-perception

To test the mediation effect of small-self-perception ($\alpha = 0.76$; $M = 5.54$, $SD = 1.26$) on the influence of awe on ERB intention, we used bootstrapping to test the indirect effect $a \times b$ (Hayes, 2013), where “a” represents the effect of awe on small-self-perception, and “b” represents the effect of small-self-perception on ERB. To ensure that awe has a unique effect, we included individual differences in feeling awe (dispositional awe) as a covariant in all regressions.

With 5000 replications, we found that the mean indirect effect was positive and significant ($a \times b = 0.02(0.01)$, 95% CI [0.005, 0.04]). Awe was positively related to small-self-perception ($a = 0.24(0.04)$; $t(419) = 5.64$, $p < .001$, 95% CI [0.16, 0.32]). Furthermore, small-self-perception positively predicted ERB ($b = 0.08(0.03)$, $t(418) = 2.86$, $p = .005$; 95% CI [0.03, 0.14]), and the direct effect of awe on ERB was reduced when controlling for small-self-perception ($c' = 0.07(0.03)$, $t(418) = 2.58$, $p = .01$; 95% CI [0.02, 0.12]; see Fig. 1). Thus, in support of H2, small-self-perception mediated the effect of awe on ERB.

Study 2

The purpose of Study 2 was fourfold. The first objective was to examine whether the impact of awe on ERB was robust for different cultural backgrounds. Because participants in Study 1 were from an Eastern culture, we recruited participants from a Western culture in this study. Second, and most importantly, we aimed to determine whether the impact of awe on ERB is causal in nature. Although the results from Study 1 provided evidence for our theory and hypotheses, the observed relationship is correlational in nature. Third, we aimed to examine whether merely seeing a promotional video of tourist spots could activate awe and further influence ERB intention, which might have important and practical managerial implications. The last objective was to further confirm that the impact of awe on ERB was mediated by small-self-perception.

Method

Given that awe is an important positive emotion (Shiota et al., 2003), researchers have identified several experimental ways to activate awe, such as viewing videos of nature (Keltner & Haidt, 2003; Rudd et al., 2012), engaging in a writing task (Van Cappellen & Saroglou, 2012), reading an awe-related story (Griskevicius et al., 2010) or a naturalistic induction of awe using an the on-site view (Piff et al., 2015). The method we used in Study 1 uses the naturalistic induction of the awe method, which is not experimentally oriented. In the current study, we attempted to use promotional tourism videos to activate awe.

Participants

In this experiment, based on power analysis (Paul et al., 2009) and existing research results measuring the effect size of awe on behaviour, we estimated a required sample size ranging between 90 and 204 (the existing experimental effect of awe on behaviour ranges from 0.35 to 0.53; e.g., Piff et al., 2015; Rudd et al., 2012). According to Cochran's (1963) sample size calculation formula, we used planned standard deviations ranging between 1.20 and 1.40—estimated from a published paper (Piff et al., 2015; Rudd et al., 2012)—and a margin of error of 0.2 (on a 7-point scale) at a 95% confidence level, which estimated that the required sample size should be between 138 and 188. In addition, considering the total number of items measured in the study ($N = 14$ measures and 1 manipulation of awe), based on Hair et al.'s (2010) recommendation that the sample size should be 5 to 10 times the number of items measured, 75–150 participants would be needed. We recruited participants in the United States from an online survey panel (Amazon

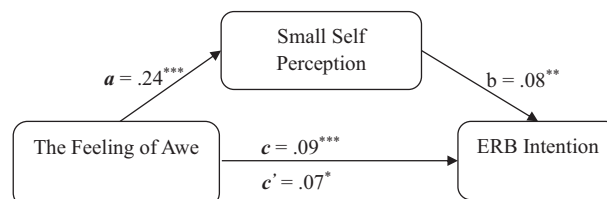


Fig. 1. The mediating role of small self-perception on the effect of awe on ERB intention (Study 1).

Mechanical Turk; mturk.com), which is widely used by researchers and recognized as a valid mode of data collection (Paolacci, Chandler, & Ipeirotis, 2010). Two hundred and two participants successfully completed the survey. After excluding those who were not able to watch the video in full (7 participants), 195 participants remained ($N_{\text{control}} = 101$, $N_{\text{awe}} = 94$) (46.70% female; $M_{\text{age}} = 36.65$, $SD = 11.14$). Participants were randomly assigned to two experimental conditions: the awe condition or the control condition.

Procedure

The first part of the task was a video-watching task in which participants watched a 2-minute promotional tourism video and completed a series of questionnaires (see Appendix C for the experimental materials). After giving consent, participants put on headphones and watched a short video to ensure that the sound and video on their computers worked and then were randomly assigned to the awe or control condition. Yosemite National Park is generally acknowledged to be a travel destination that may activate awe (Bai et al., 2017); thus, a video about Yosemite National Park (from <https://www.youtube.com/watch?v=9fJEFi3ccwI&t=108s>; the experiment used a section from second 19 to second 108) was selected as the elicitor of awe, and a video about Hawaii's Big Island (from <https://www.youtube.com/watch?v=XhHwGolzQmg&t=178s>, the experiment used a section from second 80 to second 178) was selected as the control condition. We edited the two videos to be the same length. After watching the videos, participants were asked to answer several questions regarding the quality of the video. Four statements (1 = not at all true, 7 = very true) identical to those used in Study 1 were used to check whether participants in the awe condition indeed had a stronger feeling of awe than participants in the control condition. In addition, to rule out other potential emotions activated by the video that could also explain our effect, we measured other emotions, such as happiness, boredom and sadness (revised from Mayer & Gaschke, 1988).

We next used a different ERB scale to further confirm that our findings from Study 1 were robust. Participants were asked to indicate, using a 7-point Likert scale (1 = very unlikely, 7 = extremely likely) (developed based on Vaske & Kobrin, 2001; Deng, Liang, & Mao, 2016), the extent to which they would be likely to engage in the following behaviours: 1) If I see someone destroying the environment here, I will report it to the scenic management person or department; 2) If there are pro-environmental activities in this scenic area, I will attend; 3) I will pick up litter when I see it in this scenic area.

Before measuring the demographic variables, small-self-perception was also measured using the same items as in Study 1.

Results

Manipulation check

Four items assessing participants' feelings of awe after watching the video were averaged to generate a composite score ($\alpha = 0.93$). An independent *t*-test showed that participants in the awe condition had a significantly higher score for awe ($M = 6.14$, $SD = 1.09$) than did participants in the control condition ($M = 5.72$, $SD = 1.93$; $t(193) = 2.81$, $p = .006$, $d = 0.40$), which suggests that using scenic films can effectively activate awe. In addition, the results showed that there was no significant difference in negative emotions (average of sad and bored, $r = 0.82$, $p < .001$) and positive emotions across the two conditions (all $ps > 0.48$).

ERB intention

The three items assessing ERB were reliable ($\alpha = 0.67$) and thus were averaged to form a composite ERB index. An independent *t*-test showed a significant main effect of awe ($t(193) = 2.39$, $p = .018$, $d = 0.34$), meaning that participants in the awe condition had a higher likelihood of engaging in ERB ($M = 5.81$, $SD = 0.90$) than did participants in the control condition ($M = 5.44$, $SD = 1.23$). In addition, even after controlling for demographic variables (such as age and gender) and emotions (positive and negative emotions), the main effect of awe on ERB was significant ($F(1,189) = 6.11$, $p = .014$; $\eta_p^2 = 0.03$).

Mediation by small-self-perception

To test whether small-self-perception ($\alpha = 0.83$; $M = 4.33$, $SD = 1.54$) mediated the effect of awe on ERB, we used bootstrapping to test the indirect effect $a \times b$ (Hayes, 2013), where “a” represents the effect of awe on small-self-perception, and “b” represents the effect of small-self-perception on ERB. With 5000 replications, we found that the mean indirect effect was positive and significant ($a \times b = 0.15(0.07)$, 95% CI [0.04, 0.32]). Participants in the awe condition had a stronger small-self-perception ($M = 4.64$, $SD = 1.48$) than participants in the control condition ($M = 4.03$, $SD = 1.54$; $a = 0.61(0.22)$; $t(193) = 2.79$, $p = .006$, 95% CI [0.18, 1.03]). Furthermore, small-self-perception positively predicted ERB ($b = 0.25(0.05)$, $t(192) = 5.12$, $p < .001$; 95% CI [0.15, 0.34]),

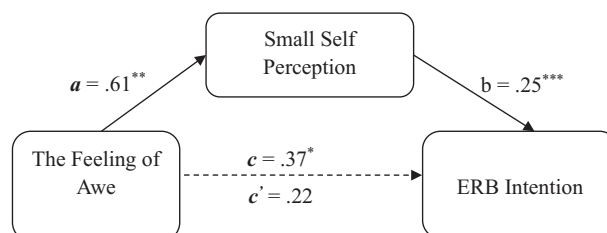


Fig. 2. The mediating role of small self-perception on the effect of awe on site-specific ERB intention (Study 2).

and the direct effect of awe on ERB was not significant when controlling for small-self-perception ($c' = 0.22(0.15)$, $t(192) = 1.48$, $p = .14$; 95% CI $[-0.07, 0.51]$; see Fig. 2).

Study 3

Study 3 attempts to use a lab study and student sample to further examine the impact of awe on real ERB (H1b). Not littering is often regarded as an important ERB (Steg & Vlek, 2009). In areas with appealing attractions and high concentrations of tourist activities, littering is a serious problem. The littering behaviour of Chinese tourists has also led to criticism from many overseas tourism destinations (Kollmuss & Agyeman, 2002). Thus, this study examines whether awe can influence littering.

Method

Participants

Using Cochran's (1963) sample size calculation formula to obtain a desired power of 0.80 at an alpha level of $p = .05$ and moderate effect sizes (see Meyvis & van Osselaer, 2018), we estimated a required sample size of approximately 196 with a margin of error of 0.07 at the 95% confidence level because the dependent variable in this study was categorical scales (Yes/No). We requested 200 subject slots in our behaviour lab, and 183 subjects showed up and completed the study ($N_{\text{control}} = 91$, $N_{\text{awe}} = 92$). Undergraduate students from a large public university located in southeast China participated in the study in exchange for monetary compensation (70.50% female; mean = 20.57, $SD = 1.97$). Traditional lab studies have used students as a valid participant pool (Druckman & Kam, 2011). Participants were randomly assigned to two experimental conditions: awe condition or control condition.

Procedure

Participants were told that they would be taking part in several unrelated tasks for different professors and that they should just follow the instructions to finish the task. They were also informed that as a way to show appreciation for their attendance, some snacks and candies would be provided for them and that they could enjoy them during the whole experiment. A trash bin was placed next to each participant's seat.

The first part was a promotional tourism video-watching task in which participants watched a 2-minute video and completed a series of questionnaires using the same measure as in Study 2. After giving consent, participants put on headphones to increase their focus when watching the video and were randomly assigned to the awe or control condition. A video about Yellow Mountain (available at https://v.youku.com/v_show/id_XMjY1MTcxNTU2OA==.html?spm=a2h3j.8428770.3416059.1) was selected as the elicitor of awe, and a video about a river town on the southern Yangtze River (available at https://v.youku.com/v_show/id_XMjY1MTcxNTU2OA==.html?spm=a2h3j.8428770.3416059.1) was selected as the control condition (these films were pretested in advance). We edited the two videos to be the same length. We muted the background music to control other confounding factors affecting the dependent variable. After watching the videos, participants were asked to answer several questions about topics, including the quality of the video. Four statements (1 = not at all true, 7 = very true) identical to those used in Study 2 were used to check whether participants in the awe condition indeed had a stronger feeling of awe than the participants in the control condition.

The participants were next asked to attend to unrelated tasks that allowed them sufficient time to enjoy the snacks and candies. Twenty minutes later, basic demographic data were collected, and then participants left the lab. Four trained research assistants who were blind to the experimental condition and the research purpose were asked to code 1) whether participants ate the snacks and candy (0 = no, 1 = yes) and 2) whether the participants dropped the trash in the trash bin (0 = no, 1 = yes; cases where participants took the trash with them and did not leave it on the desk were also coded as 1).

Results

Manipulation check

Four items assessing participants' feelings of awe after watching the video were averaged to generate a composite score ($\alpha = 0.94$). An independent t -test showed that participants in the awe condition had a significantly higher score for awe ($M = 5.36$, $SD = 1.28$) than did participants in the control condition ($M = 3.19$, $SD = 1.25$; $t(181) = 11.59$, $p < .001$, $d = 1.72$), which suggests that using promotional tourism videos can effectively activate awe.

Real littering behaviour

Among the 183 participants, only 148 ate the candies and snacks (80.87%). We first examined whether awe influenced participants' candy and snack eating behaviour. A logistic regression showed that awe did not influence candy and snack eating behaviour ($b = 0.51$, $\chi^2(1) = 1.81$, $p = .179$). Therefore, when we examined actual littering behaviour, we considered only those participants who ate the snacks. The results showed that the participants in the awe condition who ate the snacks were more likely to put the trash in the trash bin (91.03%) than participants in the control condition (75.71%, $\chi^2(1) = 5.93$; $p = .015$). In addition, when we examined the littering behaviour among all participants regardless of eating or not eating, we also found that the participants in the awe condition were more likely to put the trash in the trash bin (82.60%) than participants in the control condition (65.90%, $\chi^2(1) = 6.47$; $p = .011$). Taken together, these analyses convincingly show that awe significantly influences consumers' littering behaviour.

General discussion

While some studies have investigated tourists' psychological and behavioural outcomes associated with travel experiences, few have explored the potential of discrete emotions aroused in travel-related experiences to influence ethical behaviour. The current research preliminarily showed that the elicitation of awe through travel is associated with increased ERB and makes important theoretical contributions to the literature on awe and ERBs.

First, this study enhanced our understanding of the source and receiver of awe in the tourism context. Prior research has suggested that the experience of awe can occur in outdoor adventure, nature-based tourism, and religious tourism (Pearce et al., 2016; Powell et al., 2012; Tian et al., 2015). When we controlled for individual differences in disposition towards awe, the results of Study 1 supported previous research that awe can be triggered by vast, iconic, stunning, and unique nature-based attractions such as Yellow Mountain. Study 1 also expanded previous research by providing evidence that modern large-scale constructions such as the Three Gorges Dam featuring physical vastness and advanced technologies can also inspire awe. From the receiver's perspective, the tourist gaze concept suggests that tourists are “directed to features of the landscape that separate them off from everyday experience. Such aspects are viewed because they are taken to be in some sense out of the ordinary” (Urry, 2002, p132). When travelling, individuals have a greater desire and opportunity to see, discover, and speculate on aspects beyond their daily experiences (Urry & Larsen, 2011). Therefore, travel can be an effective strategy for increasing experiences of awe.

Second, this study explored the behavioural outcomes of awe. The results of Study 1 showed that awe elicited in the tourism setting can have a strong and positive impact on the ERB intentions exhibited by Chinese tourists. Leisure travelling has been strongly associated with hedonic wellbeing (Filep, 2014; Gilbert & Abdullah, 2004). Some studies suggest that striving for hedonic wellbeing through travel might be negatively related to ERB intention, which might bring about a loss in convenience or choice (Barr, Shaw, Coles, & Prillwitz, 2010; Budeanu, 2007). In contrast, our research shows that travel experience can increase ERB intention by evoking awe. Furthermore, we suggest that this positive effect of awe is produced via the perception of a small self. This finding is in line with previous studies (Bai et al., 2017; Piff et al., 2015; Shiota et al., 2007). Diminished self-awareness is believed to be central to other-oriented social behaviours (Keltner, Kogan, Piff, & Saturn, 2014). That is, awe may influence one's understanding of one's place within the broader scheme of things, like a camera zooming out to reveal a broader view (Halstead & Halstead, 2004).

Using a promotional tourism video to activate awe, Study 2 provides experimental evidence that the effect of awe on ERB intention is causal. The robustness of this effect was demonstrated by using a different ERB measure and a different population. Furthermore, we replicated the finding that small-self-perception drives the positive impact of awe. Study 3 took a step further, examining the impact of the experience of awe on real ERB behaviour in the lab. This confirmed that awe have a powerful influence on littering. Previous research on the relationship between travel experience and ERB has tended to focus on the attitude-behaviour model (Han, Hsu, & Sheu, 2010). However, attitude typically explains only 10 to 20% of the variance in behaviour, suggesting that other factors may also play important roles in affecting an individual's behaviour (Tarrant & Green, 1999). Few studies have assessed the relationship between awe, ERB intention and actual ERB. Our study highlights the role of positive emotions such as awe in enhancing tourists' ERB intention and real ERB. Thus, our study contributes knowledge to the tourism field.

Practical implications

The findings from this study hold important practical implications. To increase opportunities for people to experience awe as a potentially powerful and beneficial emotion, the two features of prototypical awe should be incorporated in destination design and development. For instance, a sense of scale, perspective, repetitive use of an object, and reference size are critical in creating a sense of vastness, a spiritual connection, and a feeling of humility. In light of a need for accommodation, creating an unexpected element (e.g., striking views or new knowledge) into the tourist experience may also stimulate awe. Destination design should not always follow the same pattern and omit unique features or originality, as this is unlikely to provide a transformative experience that requires cognitive accommodation. Professional interpretation services that offer charming illustrations of a destination's geological and cultural history, along with up-to-date information and the best tourist activities and options, are also essential for inspiring awe. In addition, balancing the relationship among authenticity, development, and commercialization has a major influence on the elicitation of awe among tourists. Mount Emei, Shaolin Temple and other religious shrines in China have suffered from many incidents of fraud, such as tourists being persuaded to buy “blessed” treasures, which has negatively impacted tourists' awe experiences. Practitioners should be aware that various social factors may affect experiences of awe in the tourism destination.

Notably, while mass tourism in China is developing rapidly, Chinese tourists' environmental awareness and responsible behaviour are still lagging behind (Chang, 2016). This has led to increasing environmental pressure at popular tourist attractions such as Yellow Mountain. Whereas emphasizing external-oriented strategies that reinforce ethical travel are often effective in the short term, little evidence shows that these gains continue when oversight mechanisms are absent. Responsible travel behaviour relies on self-control and self-guidance rather than compliance with rules. The finding that awe can increase the sense of the small self suggests that tourism managers focus on developing internally oriented strategies to motivate pro-environmental behaviour. Currently, this kind of effort mainly emphasizes increasing tourists' empathy, guilt, and shame. Managers can also develop intervention programmes to cultivate awe. For example, an awe-inspiring walk can be designed in either a natural setting, such as a tree-lined trail, or a cultural setting, such as a museum. It may also be important to publicize information about the availability and benefits of awe-inspiring destinations. Emotion-based place recommendation systems can be developed with online reviews. Our research suggests that experiencing awe through video practice is another effective way to boost awe. Therefore, tourism media may feature awe-inducing videos for people to watch and appreciate before their trips.

Conclusion

Investigating the role that positive emotions play in shaping tourist experiences and post-trip thoughts, memories, and behaviours constitutes a fascinating research agenda for tourism-related positive psychology. The phenomenon of awe has proven to be an elusive concept for those tourism researchers who examine it through qualitative approaches. The quantitative analysis employed in this study, with both a survey and experimental employed in this study, with both a survey and experimental designs, proved successful in exploring tourists' awe experience and its potential functions. Our investigation indicates that by diminishing the emphasis on the individual self, awe may encourage people to improve the environment.

It must be noted that the results of this research have been limited to the efforts of a small number of empirical studies. Potential future directions are many. Future research should build on these initial findings to further uncover different cognitive processes in which awe influences ERB. For example, some studies have suggested that awe may shift people's attention to the present moment and increase people's perception of time availability (Rudd et al., 2012; Vohs & Schmeichel, 2003), which can increase their willingness to volunteer. Prior studies also indicate that awe may encourage novel thoughts and openness to learning (Rudd & Vohs, 2015). Additionally, a previous investigation indicated that awe is often fleeting (Piff et al., 2015). An interesting future research question may be how awe unfolds over time as tourists' current cognitive schema is updated. This study has emphasized the outcome of awe. However, there is much to learn about the process with which awe is elicited in tourism in the first place. This study compared only two different tourism sites for their effectiveness in eliciting awe (natural vs. man-made). Future research could examine the emotional experience of awe in other settings, such as religious tourism sites or high-tech tourism sites. In addition, although the experimental method is the best for examining the causal relationship between emotion and behaviours (Shadish, Cook, & Campbell, 2000), the research on emotion cannot make the experimental and control condition perfectly parallel, especially when employing video clips to activate a specific emotion. This is also a limitation in our research. We do our best to match the experimental condition and control condition in the speaking voice and background music in the video of Study 2, and we mute the sound in study 3, but it remains possible that there were other confounding effects. Future research scholars could cooperate with tourism professionals to conduct an A/B test based on varied types of promotional video to examine the effect of different videos, which could make experimental and control conditions more comparable.

Acknowledgment

This research was supported by grants from the National Natural Science Foundation of China (Grant No. 71572179) awarded to the first author, and by funding from National Natural Science Foundation of China (Grant No. 71302061) and Natural Science Foundation of Zhejiang Province (Grant No. LQ13G020002) awarded to the second author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.annals.2019.05.005>.

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