

# **The effect of destination source credibility on tourist environmentally responsible behavior: An application of stimulus-organism-response theory**

## **Abstract**

A lack of credibility in the tourism sector is becoming a social and environmental concern. This article argues that destination source credibility as a destination-level stimulus can have significant influences on tourist environmentally responsible behavior (TERB). Based on the stimulus-organism-response theory, this paper developed an integrated model of the relationship between destination source credibility and TERB, with destination image (cognitive and affective) and place attachment as mediators. Three sets of survey data were collected at a Chinese national wetland park ( $N=451$ ), a world heritage cultural landscape site ( $N=453$ ), and a world cultural heritage site ( $N=450$ ). The serial multiple mediation model was tested through combining bootstrapping and Bayesian approaches. Results indicated that destination source credibility enhanced tourists' cognitive and affective image, place attachment, and TERB. In addition, the effect of destination source credibility on TERB was partially and sequentially mediated by (cognitive and then affective) destination image and place attachment, among which place attachment emerged as the most powerful mediator. Robustness of these findings was confirmed across different destination types. Theoretical contribution and practical implication for sustainable destination management are discussed.

**Keywords:** Destination source credibility; Destination image; Place attachment; Tourist environmentally responsible behavior; Bayesian method.

## **1. Introduction**

Environmental protection in tourism destinations has been a key issue for sustainable tourism development. Increasing studies indicate that tourists can exert power through adopting environmentally responsible behaviors (e.g., Dolnicar et al., 2019; Lee et al., 2013). Due to its critical role in fostering sustainable tourism, tourist environmentally responsible behavior (hereafter, TERB) has become a major topic in tourism research. A special interest has been developed to understand the antecedents of TERB (e.g., Han, 2015; Li & Wu, 2019; Ramkissoon et al., 2013; Wang & Zhang, 2020). However, previous literature on TERB focuses relatively less on destination factors (e.g., destination marketing and branding practices) as the stimulus of TERB (e.g., Cheng et al., 2013; He et al., 2018).

The destination-level stimulus is important considering the asymmetric information between tourists and the destination (Su et al., 2020a). This information asymmetry exists primarily due to the unique feature of the tourism experience, i.e., transitorily being away from home in an unfamiliar destination usually for hedonic purposes (Li & Wu, 2019). What makes the examination of destination factors even more salient is the increasing report on negative tourism practices, such as the pitfalls of zero-fee (shopping) tours (Fu, 2010), false advertisement (Guan et al., 2017), unreasonable price (Liu et al., 2021), or other practices broadly termed as “tourist scams” (Xu et al., 2022). These deceptive activities can be easily disseminated online and socially amplified to impede the reputation of and trust toward a specific destination (Su et al., 2020b), induce tourists’ adverse destination perceptions (Zhang & Zhang, 2013), and result in their deviant behaviors, including unfriendly behaviors toward the destination environment (Fan et al., 2014). In other words, the information asymmetry characteristic of the tourism sector, its resultant tourism scams, and associated negative outcomes suggest that a lack of credibility in the tourism sector is becoming a social and environmental concern. This points to the need of examining the credibility issue in tourists’ reactions toward the destination. Along the line, this paper examines an emerging concept—destination source credibility—as a destination-level stimulus in tourists’ decision-making process, with a particular focus on its impact on TERB.

Destination source credibility is the application of credibility in tourism destinations

(Pike, 2005). Credibility is the extent to which an object is viewed as a reliable and truthful source of information (Tirole, 1988). Source credibility is the information receiver's perceived trust in the information source (Ohanian, 1990). Veasna et al. (2013) applied the concept of source credibility in tourism research and developed it into destination source credibility to represent a destination's ability in influencing people's beliefs on the validity of their marketing and communication assertions. Destination source credibility has been supported to exert a strong influence on tourists' overall attitudes toward destinations, tourist satisfaction, and their behavioral intentions (e.g., Kani et al., 2017; Kerstetter & Cho, 2004; Veasna et al., 2013; Vg et al., 2021). Despite the important role of credible information in people's pro-social and environmental behaviors (Halder et al., 2021) and the fact that the influence of credibility has been documented in various green consumerism settings (e.g., Carrete et al., 2012; Mansoor & Paul, 2022), surprisingly to the best of our awareness, there is no empirical study that explicitly examines the impact of destination source credibility on TERB, and the specific mechanisms that might explain the relationship.

To make salient the role of destination source credibility as the destination-level stimulus in TERB, we argue that, theoretically, credible information source from the destination could signal the valued attributes (i.e., being reliable and trustworthy) of that destination, which might further cue tourists to perceive that destination as being socially responsible toward all stakeholders (including tourists); this perception of destination social responsibility has been established to increase TERB (e.g., Su, & Swanson, 2017). In addition, we argue that credible destination sources would contribute to tourists' positive notion of the destination image, and are likely congruent with tourists' self-concept, thus being more likely to arouse tourists' identification with and emotional attachment (i.e., place attachment) to that destination, and promote TERB as a result.

Thus, this paper aims to empirically test the above-mentioned theoretical assumptions to determine (1) whether destination source credibility has a direct impact on TERB, (2) whether this impact might be sequentially mediated by destination image and place attachment, and (3) the relative importance of the proposed mediators on the relationship between destination source credibility and TERB. To this end, the current paper applied the stimulus-organism-response (SOR) theory (Mehrabian & Russell, 1974) as the overarching

framework, considering that destination source credibility functions as a stimulus, destination image and place attachment as the organism, and TERB as the behavioral response. By examining the proposed serial multiple mediation model, this paper makes an important theoretical contribution through linking together the separate literature on destination source credibility and TERB, and establishing their intermediate mechanisms.

The remaining paper is structured as follows: Section 2 provides a brief introduction of the SOR theory and a detailed explanation of the proposed hypotheses. Section 3 & 4 presents the method and results of Study 1 conducted in a nature-based tourism site. To explore whether the destination type might change the result pattern<sup>1</sup>, in Section 5, we replicated the study in two urban and cultural tourism sites (Study 2 & 3) to cross-validate the results. Section 6 concludes with a discussion of results, theoretical and practical implications, and potential limitations.

## **2. Literature review and hypothesis development**

### ***2.1. Stimulus-organism-response theory***

The stimulus-organism-response (hereafter, SOR) theory by Mehrabian and Russell (1974) proposes that when exposed to a stimulus (S), people will generate cognitive and affective internal states (O), which will in turn trigger their responses (R). That is, individuals' internal states mediate the impact of stimulus on their eventual behavioral responses (Lee et al., 2011). SOR offers a robust and parsimonious framework to integrate individuals' cognitions and emotions regarding external stimuli in explaining behaviors that are subsequently elicited (Su et al., 2020a). The validity of SOR has been verified in various settings, such as environmental psychology, consumer behavior, and also pro-environmental studies in the tourism context (e.g., Kim et al., 2020; Su & Swanson, 2017). The current paper applies the SOR theory to examine relationships between destination source credibility (as an extrinsic stimulus), destination image and place attachment (as the organism), and TERB (as the behavioral response).

*Stimulus - Destination source credibility.* Stimulus in the SOR theory can include both object stimuli and social psychological stimuli (Lee et al., 2011). Destination source

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<sup>1</sup> We would like to thank the anonymous reviewer for this suggestion.

credibility is regarded as the stimulus, as per Veasna's et al. (2013) definition of it as "the believability that the destination management is willing and capable of delivering on its promises related to a specific destination" (p.512). Though being perceived by tourists, destination source credibility is an objective destination attribute that depends predominately on external cues (Vg et al., 2021). That is, destination source credibility captures the capability of tourism destinations in enhancing tourists' believability concerning the validity of their assertions (Ohanian, 1990; Veasna et al., 2013). Thus, destination source credibility is a combination of the external object stimulus and a social psychological stimulus (Jacoby, 2002), functioning as an initiating driver in our model.

*Organism - Destination image.* Organism in the SOR theory represents one's cognitive and affective internal states (Lee et al., 2011). In this paper, destination image can be properly treated as the organism. Destination image matters in tourists' destination choice, pre- and post-trip evaluation, decision-making and resultant behaviors (Stylos et al., 2016). In general, it is a set of impressions, beliefs, knowledge, and emotional feelings people have toward the tourism destination (Zhang et al., 2014). Destination image is a multifaceted concept, composed of cognitive and affective components (e.g., Chiu et al., 2014; Martin & Bosque, 2008). This research followed this two-dimensional view and divided destination image into cognitive and affective images. The cognitive component of destination image is an evaluation of the attributes or characteristics (e.g., physical properties like beautiful scenery) of a destination, which together form a cognitive schema of that place (Stylydis et al., 2017). The affective image, on the other hand, concerns an individual's subjective feelings about and emotional responses toward the destination (Baloglu & Brinberg, 1997). Recent research also mentions conative image as another dimension of destination image (Stylos et al., 2016). Conative image is "analogous to behavior since it is the intent or action component" (Pike & Ryan, 2004, p.334). Therefore, conative image is not included here as we are interested in TERB as the behavioral response.

*Organism - Place attachment.* Place attachment is "a positive affective bond between an individual and a specific place, the main characteristic of which is the tendency of the individual to maintain closeness to such a place" (Hidalgo & Hernandez, 2001, p.274). Thus, place attachment represents an affective internal state that is captured as the organism in the

SOR theory. Despite being a ubiquitous construct of people's connection to places, place attachment varies in terms of its conceptualization and measurement (Ramkissoon et al., 2012). Some studies measured place attachment with four dimensions: place identity, place dependence, place social bonding, and place affect (e.g., Jiang et al. 2017; Ramkissoon et al., 2013). This paper, however, only included place identity and place dependence as measures of place attachment. This is because these two dimensions (1) are the most classical conceptualization of place attachment (Vaske & Kobrin, 2001), (2) have been established as an abbreviated and effective measure of place attachment (Boley et al., 2021), and (3) have been validated as first-order factors generating place attachment (e.g., Hosany et al., 2017; Loureiro, 2014). To augment the parsimony and interpretability of the model with fewer parameters, this paper regarded place attachment as a second-order construct.

*Response - Tourist environmentally responsible behavior (TERB).* Response in the SOR theory is the final outcome of people's reactions (Lee et al., 2011). In our model, TERB as the response is the behavior that "harms the environment as little as possible, or even benefits the environment" (Steg & Vlek, 2009, p.309). Identifying approaches to increase TERB is of great importance to the cultural and ecological sustainability of destinations (Su et al., 2018). A number of theoretical frameworks, such as the theory of planned behavior, norm activation model, and value-belief-norm model, have been adopted to explain TERB (Wu et al., 2021). Researchers have also attempted to modify, extend, or merge these related theories to present more integrated and comprehensive models of TERB (e.g., Han, 2015). Despite these available theoretical frameworks, TERB is still perceived as an under-studied topic that requires more empirical research, particularly studies on the role of destination-level attributes as stimuli of TERB (He et al., 2018; Su, & Swanson, 2017).

Hence, to broaden the current understanding of the factors affecting TERB, this research employed the SOR framework to examine whether destination source credibility (i.e., the stimulus) might facilitate TERB (i.e., the virtuous behavioral response toward the destination) through engaging tourists' internal states of (cognitive and affective) destination image and place attachment (i.e., the organism). Detailed hypotheses of the relationships are as follows.

## ***2.2. Relationships between stimulus and organism***

Destination source credibility is the degree to which tourists perceive the claims of tourism

destination marketing practices as truthful and believable (Phau & Ong, 2007). Credible destination sources can lower tourists' information gathering and processing costs and their perceived risk/uncertainty (Veasna et al., 2013), thus serving as one of the central cues in tourists' decision-making process and influencing tourists' attitudes and their subsequent behaviors (Jiménez-Barreto et al., 2020). In this paper, we argue that reliable information from destination agencies (i.e., destination source credibility) can impact destination image. As per the definition, destination image is people' perceptions of and emotional responses toward the destination that are formed based on information processing from various sources (Zhang et al., 2014). According to the signaling theory, when people consider the information source from a destination as credible, this stimulating factor is likely to exert a persuasive influence on their favorable perceptions of destination image and emotional arousal of that destination image (Connelly et al., 2011). This rationale of the positive association between destination source credibility and destination image has been supported in previous studies (e.g., Kani et al., 2017; Veasna et al., 2013). However, these earlier studies either considered destination image as a cognitive image only or treated destination image as a unified latent variable, failing to test the influence of destination source credibility on affective image. Considering destination source credibility as the stimulus and a two-dimensional view of destination image, we hypothesize that:

*H<sub>1</sub>: Destination source credibility positively impacts tourists' cognitive image.*

*H<sub>2</sub>: Destination source credibility positively impacts tourists' affective image.*

Destination source credibility can also have an impact on tourists' place attachment toward the destination. Place attachment captures the bond (e.g., positive beliefs and emotional linkages) between tourists and the place. Specifically, the identity component of place attachment toward the destination reflects the degree to which tourists incorporate that destination in the self-concept (for example, "I identify strongly with this destination"); the dependence component of place attachment represents the emotionally functional connection of tourists toward the destination (for example, "I enjoy visiting this destination more than any other destination") (Vaske & Kobrin, 2001; Boley et al., 2021). The relationship between destination source credibility and place attachment can be explained by the theory of self-

congruity. The notion of self-congruity is to assess whether there is a (mis)match between people's perception of an object (tourism destination in this case) and themselves (Sirgy, 1985). Only when tourists view the destination sources as reliable, trustworthy, and credible, will they perceive a match between the destination and themselves and expand to include that destination in their self-concept (Reitsamer & Brunner-Sperdin, 2021). That means credible destination sources can prompt tourists to identify with and become emotionally attached to the destination (Shang & Luo, 2021; Veasna et al., 2013). Therefore, we posit that:

*H<sub>3</sub>: Destination source credibility positively impacts tourists' place attachment.*

### **2.3. Relationship between stimulus and response**

Credible information serves an important role in the decision-making of pro-social and environmental behavior (Halder et al., 2021). The influence of credibility has been documented in various green consumer settings. For example, Carrete et al. (2012) found that a lack of credibility was one of the key themes related to uncertainty in adopting green consumer behaviors. In a similar vein, Mansoor and Paul (2022) suggested that perceived green brand credibility was an effective predictor of consumer choice for green electronics. Also, Zhang et al. (2019) confirmed a positive and direct influence of source credibility on air travelers' purchase intention of aviation voluntary carbon offsetting.

Although the significance of credibility is well recognized, the research team is not aware of any study that has explicitly examined the relationship between destination source credibility and TERB. In this paper, we assume that destination source credibility has positive influence on TERB. Based on the signaling theory, a signal can reflect valued attributes or characteristics of the signaler (Connelly et al., 2011). That is, credible sources of destination marketing and branding practices can cue tourists to perceive the destination as reliable and trustworthy and, by extension, view that destination as socially responsible to accommodate the needs of different stakeholders (including tourists as the guest). As reciprocal responses, tourists will perform virtuous behaviors (e.g., positive word-of-mouth or revisit) (e.g., Su et al., 2020b), including behaving in an environmentally responsible way during travel in that destination (Su & Swanson, 2017). Therefore, we hypothesize that:

*H<sub>4</sub>: Destination source credibility positively impacts TERB.*



#### ***2.4. Mediating role of the organism***

Based on the SOR framework, this paper further hypothesizes that the influence of destination source credibility on TERB will be mediated by the organism, i.e., (cognitive and affective) destination image and place attachment.

Destination image as a mediator has been explored in previous studies. For instance, Veasna et al. (2013) found that the effect of destination source credibility on place attachment is indirectly influenced via destination image. Their study, however, only assessed the mediating effect of the cognitive component of destination image while not examining the potential impact of affective image. Notably, the role of positive emotions toward the destination as a mediator of the link between destination-level stimulus and TERB was highlighted in a later study by Su and Swanson (2017). In this paper, we argue that (cognitive and affective) destination image will mediate the relationship between destination source credibility and TERB. As mentioned previously, destination image is formulated through information processing from various sources (Zhang et al., 2014). When tourists perceive the marketing source from a destination as true and believe in the promises delivered by that destination, they are more likely to have a positive evaluation of and be emotionally aroused by that destination image (e.g., Kani et al., 2017; Veasna et al., 2013). This favorable evaluation and emotions of the destination image would further strengthen the perceived match between tourists and that credible destination—a term called “signal fit” (Connelly et al., 2011)—such that tourists are more likely to engage in TERB as a virtuous reciprocal response to the signified characteristics (e.g., being reliable) of the destination. Thus, the following two hypotheses are proposed:

*H<sub>5</sub>: The positive impact of destination source credibility on TERB is mediated by tourists' cognitive image.*

*H<sub>6</sub>: The positive impact of destination source credibility on TERB is mediated by tourists' affective image.*

Place attachment is often identified as a mediator between exogenous and endogenous variables. In environmental studies, for example, Cheng et al. (2013) indicated that TERB was indirectly influenced by destination attractiveness via the mediation of place attachment.

Similarly, Fan et al. (2014) demonstrated that place attachment mediated the effect of destination image on TERB. In addition, Hosany et al. (2017) found that positive emotions were mediated by place attachment in forming TERB. In this paper, we propose that place attachment will mediate the effect of destination source credibility on TERB. The theoretical explanation for this assumption is clear. Due to the self-concept congruity effect (Sirgy, 1985), tourists are more likely to identify with and become emotionally attached to a destination that is perceived as reliable and trustful; this identification and attachment of that place would further lead to subsequent TERB (e.g., Cheng et al., 2013; Ramkissoon et al., 2013; Vaske & Kobrin, 2001) since the place (destination) is included as an extended part of the self-concept and serves to satisfy people's emotional and functional needs. This explanation is also aligned with the SOR framework; thus, we hypothesize that:

*H7: The positive impact of destination source credibility on TERB is mediated by tourists' place attachment.*

### **2.5. A serial multiple mediation model**

Building on the above-mentioned hypotheses, this paper goes further to predict that the impact of destination source credibility (as the stimulus and an initiating driver in the model) on TERB (the response) will be mediated, in sequence, by destination image and place attachment (the organism). Some paths of the serial mediation model have been supported in previous studies. For example, destination image mediated the relationship between destination source credibility and place attachment toward the destination (e.g., Veasna et al., 2013). Meanwhile, place attachment mediated the link between destination image and TERB (Fan et al., 2014). Drawing upon relationships between these key variables and adopting SOR as the theoretical foundation, we thus proposed a hypothesis with destination source credibility as the stimulus, cognitive image as the starting point of the mediation that induces affective image and place attachment, and eventually leads to TERB.

*H8: The positive impact of destination source credibility on TERB is sequentially mediated by tourists' cognitive image, affective image, and place attachment.*

Identifying differences among the multiple mediation paths is of great importance to unearth the critical mediator(s) that underpin the relationship between destination source

credibility and TERB. Accordingly, the proposed serial multiple mediation model (see Figure 1) can also be separated into additional three specific indirect paths: (1) cognitive image→ affective image mediation sequence; (2) cognitive image→ place attachment mediation sequence; (3) affective image→ place attachment mediation sequence. Theoretical arguments for each of these three hypotheses are articulated as follows.

Concerning the sequence of the cognition and affect/emotion component of destination image, we propose that cognitive image is a driver of affective image. According to the appraisal theory, things are cognitively appraised before engendering affective reactions (Keller et al., 2012), especially when there is an external stimulus. This means, when tourists are exposed to the stimulus of destination marketing sources, they develop cognitive evaluations (e.g., whether these information sources are credible) first before processing these sources to form a cognitive image of that destination; afterwards, favorable evaluation of cognitive image would give rise to affective responses toward the destination image, which then facilitate subsequent intentions or behaviors—a process in line with the “cognitive primacy” model (Lazarus, 1984). Thus, we hypothesize that:

*H<sub>9</sub>: The positive impact of destination source credibility on TERB is sequentially mediated by tourists' cognitive image and affective image.*

Regarding the mediation sequence between destination image and place attachment, previous studies suggest that the cognitive and affective components of destination image can separately trigger the formation of place attachment (e.g., Jiang et al., 2017; Prayag & Ryan, 2012; Veasna et al., 2013). In our case, when tourists perceive the signal that the given destination is believable in terms of the communicated information sources, they are likely to form a positive evaluation of cognitive destination image (e.g., Vg et al., 2021). On the basis of the self-congruity theory (Sirgy, 1985), they would probably then identify with the specific tourism destination (i.e., place identity) since the signal fit in with their (desired) self-concept, i.e., being reliable and trustworthy. This cognitive and identity path integrates the link between destination source credibility and TERB. Hence, we propose that:

*H<sub>10</sub>: The positive impact of destination source credibility on TERB is sequentially mediated by tourists' cognitive image and place attachment.*

A similar logic applies to the affective image and place attachment in the relationship between destination source credibility and TERB. Specifically, tourists would build up favorable emotional feelings toward the destination image when they think of communicated information sources from that destination are creditable (e.g., Veasna et al., 2013). This affective destination image would be subsequently integrated to cultivate an emotional bond between the tourist and the given destination (e.g., Jiang et al., 2017). That is, the signal of a destination being reliable and credible can cue tourists to develop positive subjective feelings toward the destination and be emotionally attached to the destination (e.g., Prayag & Ryan, 2012); this emotional path further prompts tourists to engage in TERB as the behavioral result. Therefore, we hypothesize that:

*H<sub>11</sub>: The positive impact of destination source credibility on TERB is sequentially mediated by tourists' affective image and place attachment.*

[Insert Figure 1 here]

### **3. Methods**

#### ***3.1. Measurement of constructs***

Validated scales from previous research were modified to measure our variables (see Appendix 1 for detailed information). Specifically, six items were adopted from Veasna et al. (2013) to measure destination source credibility. Cognitive image was evaluated using five items from Baloglu and McCleary (1999) and Prayag and Ryan (2012). Four items from Styliadis et al. (2017) and Stylos et al. (2016) were used to measure affective image. Place attachment was considered as a two-dimensional concept: place dependence and place identity. Place dependence was measured by four items adapted from Ramkissoon et al. (2013) and Tsai (2012); place identity was assessed via four items from Tonge et al. (2015) and Xu and Zhang (2016). For TERB, this study considers it a one-dimensional construct measured through four items from the work of Fan et al. (2014), which was later validated by Qiu (2017) and Xu et al. (2018). All the items were measured based on a 5-point Likert scale (1, *strongly disagree*; 5, *strongly agree*), except for affective image that used a five-point semantic differential scale.

### ***3.2. Pretest of measures***

Translation and back-translation between English and Chinese were used to enhance the survey quality. Prior to the formal data collection, a pre-test of the measurement items was conducted. Three tourism researchers and five experienced tourists formed an expert panel to check the content validity of the survey. In addition, a pilot test was performed with a convenience sample of 60 tourists who visited Xixi Wetland National Park in February 2017. They were invited to respond to all indicators and provide feedback regarding any issues with the scale(s). Results of Cronbach's alpha (all > 0.70) and standard factor loadings (all > 0.50) indicated acceptable reliability and validity, respectively.

### ***3.3. Data collection and respondent characteristics***

Three sets of data were collected in three tourism destinations in Hangzhou, China. The first set of survey data was done in Xixi National Wetland Park in March and June 2017. It was used to test the conceptual model. The second and third sets of data were collected in West Lake (a world heritage cultural landscape site) and China's Grand Canal (Hangzhou Section) (a world cultural heritage site) from August to November 2021 under the request of reviewers' comments to cross-validate the model. All three destinations are open access to tourists without fee-charging to the majority sites. They thus attract millions of diversified tourists every year. The three destinations share commonality in terms of being environmentally sensitive and requiring TERB.

A convenient sampling was used in all sessions of data collection. Four trained research assistants from a local university helped administer the survey at the exists of the wetland park or key gathering points of tourists. Only domestic tourists and those who were willing to participate were given the self-administered questionnaire. The process was closely supervised and monitored by the principal researcher. Questionnaires were distributed to five hundred participants with 451 valid ones subsequently identified. To ensure the quality of robustness test, 453 and 450 copies of valid surveys were collected in the second and third study sites, respectively. Appendix 2 presents the participant profile.

Prior to the formal data analysis, the three datasets were assessed for normality. The skewness and kurtosis values of all indicators varied within from -1 to +1, indicating that the data met normality requirements (Hair et al., 2009). The Henze-Zirkler multivariate normality

test was applied to determine if there was a normal distribution (Henze & Zirkler, 1990). The three datasets were multivariate normal ( $HZ_{\text{Study 1-3}} = [1.002, 1.017]$ ,  $p_{\text{Study 1-3}} = [0.493, 0.499]$ ), thus being appropriate for further analysis in AMOS. In the following, the results from study 1 will be presented first, followed by the robustness-test using the second and third sets of data.

## **4. Results from the Xixi Wetland Park (Study 1)**

### ***4.1. Common method variance test***

Two statistical analyses were performed to ensure that common method variance (CMV) was not a major concern. Harman's single-factor test was used to evaluate the possible occurrence of CMV. Exploratory factor analysis indicated the existence of a multi-factor structure. The variance for the first factor (40.3%) was below the threshold of 50%, indicating that CMV did not appear to be a severe issue (Podsakoff & Organ, 1986). Confirmatory factor analysis was employed to verify whether a common latent factor accounted for all of the variance in the data. The proposed measurement model fit significantly better than the common factor model ( $\Delta\chi^2(12) = 1942.086$ ,  $p < 0.001$ ), showing that CMV was not an issue for the current research.

### ***4.2. Measurement model test***

Before testing the proposed hypotheses, confirmatory factor analysis was conducted to assess reliability and validity of the constructs and to evaluate the model fit for the measurement model. Model fit indices (TLI=0.926, CFI=0.934, SRMR=0.050, and RMSEA=0.057) suggested that the measurement model was a good fit to the data. Cronbach's alpha of each construct ranged from 0.827 to 0.895 (Table 1), indicating the internal reliability of the measurement model was acceptable. In addition, two types of construct validity measures, including convergent and discriminant validity, were assessed. Place attachment was regarded as a second-order construct (e.g., Hosany et al., 2017), including place dependence ( $\beta=0.791$ ,  $p < 0.001$ ) and place identity ( $\beta=0.887$ ,  $p < 0.001$ ). The composite reliability values ranged from 0.827 to 0.896 (Table 1). The values of standard factor loadings, average variance extracted (AVE) and composite reliability of each construct suggested high convergent validity (Hair et al., 2009). Discriminant validity was calculated by comparing the square root of each

construct's AVE with the correlations between pairs of latent variables (Hair et al. 2009). Strong evidence of discriminant validity was observed (Table 2). These results revealed that the measurement model was both reliable and valid. Further hypothesis testing of the structural model was then justified.

[Insert Tables 1 & 2 here]

#### **4.3. Structural model test**

The hypothesized relationships were evaluated using SEM. Table 3 and Figure 2 present the standardized coefficient estimates and corresponding *t*-values. The values of the analysis showed that the goodness-of-fit indices of the structural model fit the data well. The findings provided support for all hypothesized direct relationships. The explanatory power of the model is estimated by the  $R^2$  of its major endogenous variables.  $R^2$  values of 0.25, 0.09, and 0.01 are the threshold values to indicate large, medium, and small effects, respectively (Cohen, 1988). The findings from the squared multiple correlations showed that the structural model explained 39.9%, 48.7%, 57.1%, and 54.9% of the variance for cognitive image, affective image, place attachment, and TERB, respectively. These results revealed that the model possessed sufficient explanatory power with large effects.

[Insert Table 3 & Figure 2 here]

#### **4.4. Mediating effects test**

The relationship between destination source credibility and TERB was hypothesized to be partially mediated by cognitive image, affective image, and place attachment. To test the significance of indirect effects, a combination of bootstrapping and Bayesian approaches was used. While it is common to employ *p*-values in tourism research, recent studies suggest using bootstrapping and Bayesian approaches (Assaf & Tsionas, 2018). Bootstrapping is a powerful statistical approach (MacKinnon et al., 2004), which is especially suitable to test intervening variable effects as it does not impose the normality assumption of the sampling distribution (Preacher & Hayes, 2008). The Bayesian method for analyzing mediation effects has similar advantages as those for bootstrapping (Yuan & MacKinnon, 2009). Using both bootstrapping and Bayesian approaches to test for mediating effects is a type of methodological triangulation, which ensures the validity of the analysis.

The number of bootstrap samples was set to 5,000, using both percentile and bias-

corrected confidence intervals of 95% (hereafter, PCI and BCI). The bootstrapping approach was run to test the specific indirect effects. In bootstrapping analysis, the mediation effect is significant if the confidence interval for the indirect effect does not contain zero. Hence, a significant specific indirect effect was identified for destination source credibility on TERB via place attachment (PCI: [0.089, 0.268]; BCI: [0.093, 0.277]), providing support for H<sub>7</sub>. Similarly, H<sub>8</sub>, H<sub>10</sub>, and H<sub>11</sub> were confirmed. However, the mediating effect of CI between destination source credibility and TERB was not significant (PCI: [-0.020, 0.145]; BCI: [-0.021, 0.143]), thus not supporting H<sub>5</sub>. Likewise, H<sub>6</sub> and H<sub>9</sub> were not supported. The custom-estimands option in the Bayesian estimation procedure with Markov chain Monte Carlo simulation techniques in AMOS was also undertaken to test the mediating effect. The analysis produced identical results to the bootstrapping approach (see Table 4).

[Insert Table 4 here]

To further explore the relative importance of the significant indirect effects between destination source credibility and TERB, pairwise contrasts of these effects were conducted. The magnitude of the DSC→PA→TERB path was significantly different from the DSC→CI→PA→TERB path (PCI: [-0.224, -0.023]; BCI: [-0.233, -0.028]; Bayesian: [-0.221, -0.03]). Likewise, the DSC→PA→TERB path and the DSC→CI→AI→PA→TERB path had significant differences. Similarly, the DSC→PA→TERB path was significantly stronger than the DSC→AI→PA→TERB path. However, by comparing the paths among the DSC→CI→→PA→TERB path, the DSC→CI→AI→PA→TERB path, and the DSC→AI→PA→TERB path, there were no significant differences due to the 95% confidence intervals including zero (see Appendix 4 for detailed results).

### **5. Robustness test in the West Lake (Study 2) and China's Grand Canal (Study 3):**

To cross-validate our results and also explore whether the destination type might alter the results of destination source credibility on TERB, we conducted similar analyses with the second and third sets of data collected at West Lake (*N*=453) and China's Grand Canal (*N*=450). Though representing diverse tourism destinations for the cross-validation purpose, these three tourism sites are all environmentally fragile and require TERB. The conceptual model passed through both reliability and validity tests (Appendix 3). In addition to structural



model assessment (Figures 3 & 4), specific mediation analysis was examined via bootstrapping and Bayesian approaches (Tables 4 & Appendix 4). Overall, the cross-validation test of all the proposed hypotheses generated highly consistent findings between the three samples, which indicated that the findings withstood the change of the destination type and were thus robust.

[Insert Figures 3 & 4 here]

## **6. Discussion, conclusions and implications**

### ***6.1. Discussion and conclusions***

The contribution of TERB to a destination's sustainability and the necessity to understand its antecedents provided the motivation for this research. Stimulus-organism-response (SOR) theory was adopted to develop a conceptual framework, delineating the direct and indirect antecedents of TERB. Three sets of survey data were conducted to examine a serial multiple mediation model through a combination of bootstrapping and Bayesian method. The results (being consistent among the three studies) supported the majority of the research hypotheses.

In line with the prior literature (Veasna et al., 2013), this paper provided tenable support for the viewpoint that cognitive image can be driven by destination source credibility ( $H_1$ ). This is likely explained by reasoning that destination source credibility serves as an important signal for the formation of cognitive image as per signaling theory (Connelly et al., 2011). Unlike the previous studies focusing only on cognitive image, this paper makes a pioneering effort to shed light on the link between destination source credibility and affective image. It was found that the positive effect in the above association was also identified ( $H_2$ ). Once tourists regard destination information source is believable, positive emotions toward a specific destination will be enhanced. That is, perceived credible information source, not only helps facilitates cognitive image, but also relates to favorable affective image.

In support of the self-congruity theory (Sirgy, 1985) and previous research findings (e.g., Shang & Luo, 2021; Veasna et al., 2013), the results demonstrated that destination source credibility significantly enhanced place attachment ( $H_3$ ). It means that credible information source can augment their self-concept toward a particular destination to shape deep bonds between individuals and the place. Similar to the past findings in the area of

green consumerism (e.g., Carrete et al., 2012; Mansoor & Paul, 2022), the results of this paper showed that destination source credibility was an important trigger of TERB (H<sub>4</sub>). These findings thus highlight the importance of destination source credibility as an important foundation for two-dimensional image, place attachment, and TERB. Contrary to Wang's et al. (2020) results that affective attitude mediated the impact of cognitive attitude on TERB, this paper found that there would be a superior role of cognition in explaining TERB when an external stimulus was salient. Specific to this paper, when tourists were exposed to the destination stimulus (i.e., destination source credibility), they first formed cognitive image as a precursor of affective image in the link to TERB. This result highlights the critical role of external stimulus in shaping and even changing the primacy of cognition or emotion in tourists' pro-environmental decision-making.

This paper supported four specific indirect relationships: DSC→PA→TERB (H<sub>7</sub>), DSC→CI→AI→PA→TERB (H<sub>8</sub>), DSC→CI→PA→TERB (H<sub>10</sub>), and DSC→AI→PA→TERB (H<sub>11</sub>) (see Table 4). However, the other three proposed indirect relationships were not supported: DSC→CI→TERB (H<sub>5</sub>), DSC→AI→TERB (H<sub>6</sub>), and DSC→CI→AI→TERB (H<sub>9</sub>). The findings implied that unless place attachment is formed, neither cognitive nor affective images will increase TERB. A pairwise contrast of the specific significant indirect effects was conducted and provided evidence of the importance of place attachment. This paper indicated that place attachment, when compared to cognitive and affective images, was the most important mediating variable between destination source credibility and TERB. This result can be explained as follows. It was commonly recognized that compared to cognitive factors, affection plays a more important role in pro-environmental behavior (Wang & Wu, 2015). Affective image is dynamic and subject to change in different time periods, i.e., it is an immediate and temporary emotion toward a specific destination (Fan et al., 2014). Compared to affective image, place attachment is showing better explanatory power in predicting TERB. This result is in congruence with Qiu's (2017) finding. One explanation may be that attachment is understood as a deep and lasting affective bonding between individuals across time and space. Once place attachment is formed, it will lead to TERB. The emotional tie elicits empathy toward destination which further altruistically provoke the attitude toward destination protection; tourists with stronger

place attachment are inclined to place more affection on the particular destination and generate TERB thereby (Qu et al., 2019).

## ***6.2. Theoretical contributions***

This paper extends the existing literature in four notable ways, generating unique theoretical implications. First, this paper represents the first attempt to assess the effects of destination source credibility as the destination-level stimulus on TERB. This is important considering that previous literature on TERB concentrates relatively less on destination factors as the stimulus of TERB (Cheng et al., 2013; He et al., 2018; Su et al., 2020a). The empirical support for a significant impact of destination source credibility on TERB advances studies on source credibility and environmentally responsible behavior (e.g., Carrete et al., 2012; Halder et al., 2021; Mansoor & Paul, 2022) through its application to tourism destinations as the non-residential context.

Second, this paper adds to the current literature by examining destination image and place attachment as mediators of the impact of destination source credibility on TERB. To the researchers' best knowledge, no previous studies have considered the link between destination source credibility and TERB, nor is there empirical evidence for the mediating variables in the association. Therefore, this study is innovative and contributes to the existing body of knowledge in two aspects. On one hand, it supported the indirect effects of destination source credibility on TERB via destination image and place attachment (DSC→CI→AI→PA→TERB). This mediating sequence provides insights into the underlying relationship between destination source credibility and TERB, making a useful addition to the existing literature. On the other hand, benchmarking the influences of cognitive image, affective image, and place attachment within the relationship between destination source credibility and TERB is insightful. The comparative importance of the four significant indirect paths is explained in a serial multiple mediator model, providing a comprehensive view for a better theoretical understanding of the role of destination source credibility in the TERB decision-making process.

Third, the selection of three differentiated study settings offers many opportunities to validate the proposed framework beyond a single destination and across different types of tourism destinations. A cross-validation method was conducted to examine the robustness of

the conceptual model in different contexts. The results of all three studies demonstrated that consistent findings between the three samples were established. It means that our proposed model could be generalized to different destination types, not only in nature-based tourism contexts, but also in urban and cultural tourism contexts.

Lastly, this research offers a methodological contribution to the current tourism literature by combining the bootstrapping and Bayesian approaches for the mediation analysis. The past few years have witnessed an increasing number of tourism studies employing the bootstrapping method for testing mediation effects (e.g., Hosany et al., 2017). However, the Bayesian approach has not been used to its full advantage (Assaf et al., 2018). This paper responded to previous calls for using the Bayesian approach in tourism studies (Assaf & Tsionas, 2018). The results of the Bayesian test for indirect effects were in line with the results of the bootstrapping test. Such a combination of methods strengthens validity by comparing the respective results and makes a methodological advancement by performing specific mediation analysis via multiple methods.

### ***6.3. Practical implications***

The findings are potentially meaningful for sustainable destination management. The results pinpointed the critical role of destination source credibility in predicting cognitive and affective images, place attachment, and TERB. Our results lend empirical evidence against tourist scams, as these deceptive activities can also have negative environmental potential, impeding tourists' environmental actions. In this sense, destination management organizations (DMOs) should pay special attention to the credibility of the communicated information sources by creating and delivering trustworthy information. For example, Xixi National Wetland Park takes various strategies to enhance tourists' perceived credibility. In this destination, the prices for all the services and souvenirs are clearly marked. Besides, tourist flow information is shared with on-site (and potential) visitors through smart technologies so that they might view the destination source as transparent and reliable. In so doing, destination managers can facilitate tourists' positive evaluation of destination image and evoke their emotional resonance with the destination—a process that not only plays a role in tourists' destination choice but also their virtuous behavior toward the destination. This is important because destination managers can, to some extent, encourage TERB simply

by doing their in-role job in affirming the reliability and trustfulness of their marketing and communication practices. Another benefit of communicating credible information sources is supported by our results. Specifically, place attachment functions as the most powerful mediator in the link between destination source credibility and TERB. That is, when the information sources tourists receive from destination agencies are deemed trustful, they are likely to enhance their identification with and emotional attachment to the destination, and then behave in a responsible way to protect the natural environment. This result might be especially interesting to destination managers who are struggling to promote tourists' attachment to the destination or who are unsure about the power of credible information sources in eliciting TERB. In sum, our results suggest that destination managers might make better use of credible information sources in destination marketing and branding practices in a way that also benefits the natural environment.

#### ***6.4. Limitations and future research directions***

This paper had limitations that must be acknowledged. First, this study uses self-reported behaviors, which may have potential biases. Future research can conduct observations of actual TERB, or people's evaluations of others' TERB, to minimize potential biases. Second, the proposed theoretical model based on SOR is open to extension. Additional constructs can be included to extend the theoretical framework. For instance, TERB may differ based on the types of destination information sources used by tourists. Examining how different information sources might drive TERB will thus be interesting and meaningful. Additionally, the difficulty of performing TERB varies with the specific behavioral types. Future research should focus on the sub-types of TERB to explore the differences in the decision-making process. Finally, given that TERB can be explained by multiple implementation paths with equivalent results, fuzzy-set qualitative comparative analysis can be adopted to explore the sufficient causal configurations that result in TERB. A combination of these approaches might help open the "black-box" of TERB in a more holistic and systematic way.

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## Figure

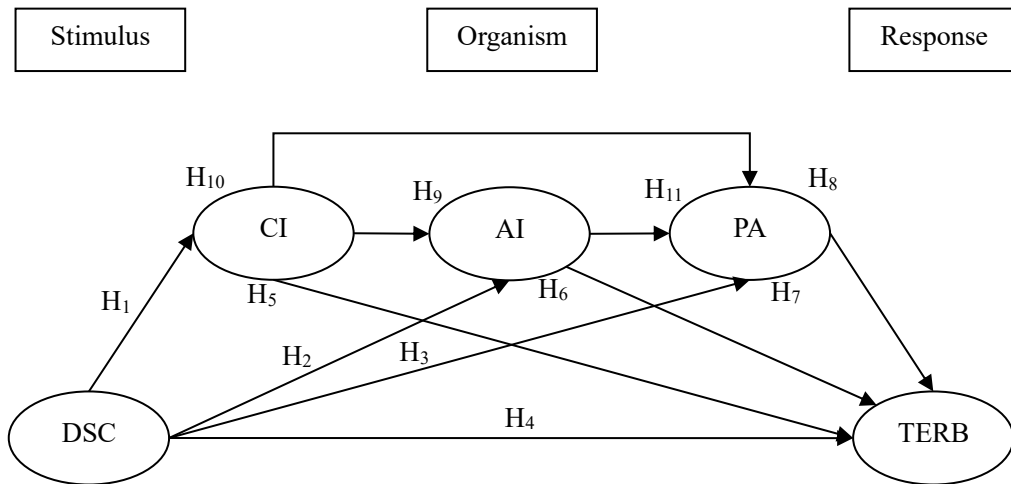


Figure 1. Conceptual model

*Note:* H<sub>1</sub>= DSC→CI, H<sub>2</sub>= DSC→AI, H<sub>3</sub>= DSC→PA, H<sub>4</sub>= DSC→TERB, H<sub>5</sub>= DSC→CI→TERB, H<sub>6</sub>= DSC→AI→TERB, H<sub>7</sub>= DSC→PA→TERB, H<sub>8</sub>= DSC→CI→AI→PA→TERB, H<sub>9</sub>= DSC→CI→AI→TERB, H<sub>10</sub>= DSC→CI→PA→TERB, H<sub>11</sub>= DSC→AI→PA→TERB; DSC=destination source credibility, CI=cognitive image, AI=affective image, PA=place attachment, TERB=tourist environmentally responsible behavior.

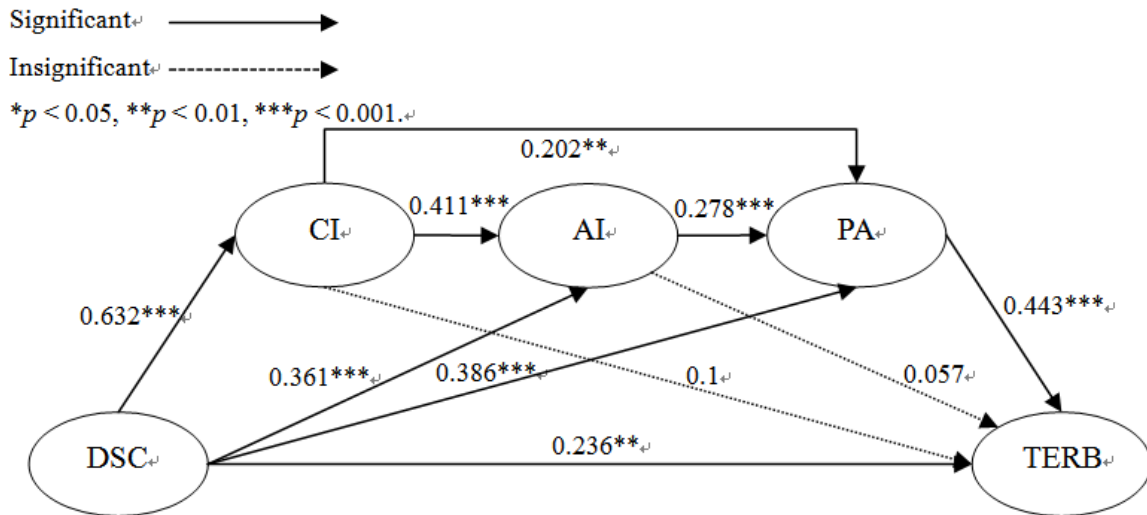


Figure 2. Results of hypothetical model (Study 1).

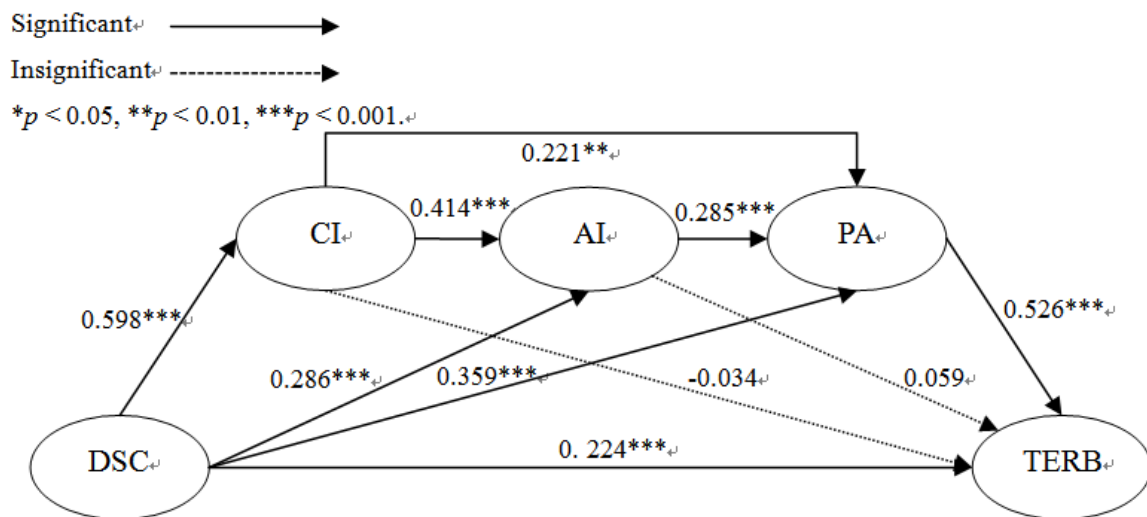


Figure 3. Results of hypothetical model (Study 2).

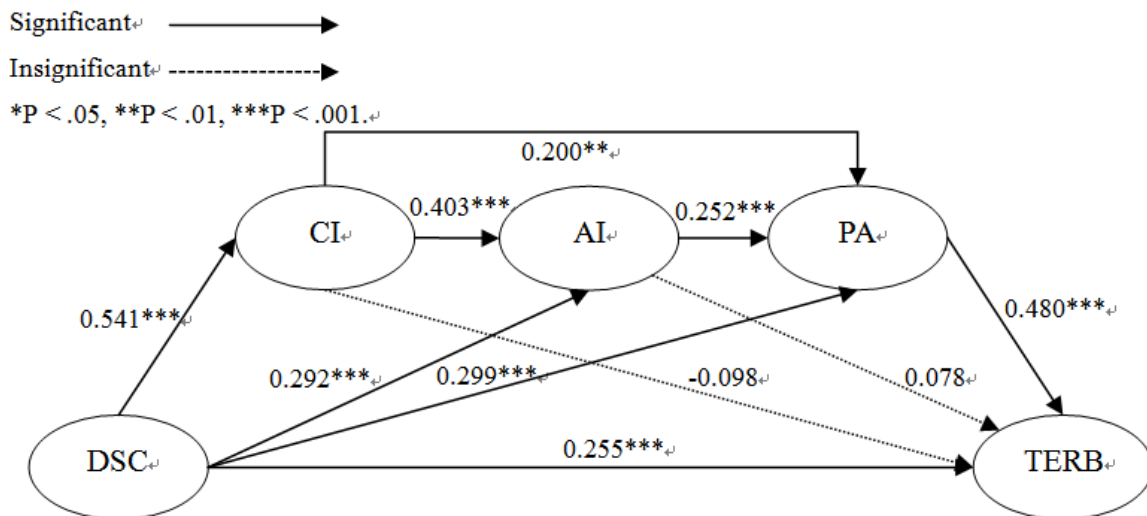


Figure 4. Results of hypothetical model (Study 3).

## Table

Table 1. Assessment of measurement model (Study 1).

Construct and item	Mean	SD	Std. factor loading	<i>t</i> values	CR	AVE	alpha
DSC					0.896	0.590	0.895
DSC1	3.579	0.667	0.757	15.138			
DSC2	3.696	0.679	0.769	15.358			
DSC3	3.670	0.649	0.790	15.758			
DSC4	3.721	0.661	0.845	16.783			
DSC5	3.721	0.675	0.733	14.658			
DSC6	3.674	0.668	0.707	—			
CI					0.866	0.563	0.863
CI1	3.896	0.703	0.738	14.092			
CI2	3.812	0.701	0.789	14.927			
CI3	3.860	0.690	0.795	15.034			
CI4	3.712	0.725	0.734	14.015			
CI5	3.594	0.731	0.692	—			
AI					0.857	0.601	0.858
AI1	3.809	0.724	0.707	15.714			
AI2	3.883	0.722	0.736	16.502			
AI3	3.643	0.777	0.833	19.096			
AI4	3.645	0.793	0.818	—			
PA					0.827	0.706	0.892
PD			0.791	11.219	0.891	0.671	0.890
PD1	3.106	0.900	0.808	19.170			
PD2	3.228	0.874	0.816	19.405			
PD3	3.073	0.936	0.835	20.000			
PD4	3.027	0.901	0.817	—			
PI			0.887	—	0.832	0.554	0.831
PI1	3.386	0.747	0.763	14.671			
PI2	3.501	0.737	0.772	14.813			
PI3	3.370	0.776	0.724	13.981			
PI4	3.295	0.830	0.716	—			
TERB					0.828	0.547	0.827
TERB1	3.552	0.702	0.780	14.615			
TERB2	3.585	0.656	0.668	12.759			
TERB3	3.455	0.745	0.796	14.854			
TERB4	3.648	0.648	0.706	—			

*Note:* DSC=destination source credibility; CI=cognitive image; AI=affective image; PA=place attachment; PD=place dependence; PI=place identity; TERB=tourist environmentally responsible behavior; CR=composite reliability; AVE=average variance extracted.

Table 2. Discriminant validity assessment.

Case	Construct	DSC	CI	AI	PA	TERB
Study 1	DSC	<b>0.768</b>				
	CI	0.632	<b>0.751</b>			
	AI	0.621	0.639	<b>0.775</b>		
	PA	0.686	0.624	0.647	<b>0.840</b>	
	TERB	0.638	0.561	0.553	0.704	<b>0.739</b>
Study 2	DSC	<b>0.820</b>				
	CI	0.598	<b>0.787</b>			
	AI	0.534	0.585	<b>0.813</b>		
	PA	0.643	0.602	0.606	<b>0.769</b>	
	TERB	0.573	0.451	0.477	0.685	<b>0.796</b>
Study 3	DSC	<b>0.785</b>				
	CI	0.541	<b>0.766</b>			
	AI	0.510	0.560	<b>0.801</b>		
	PA	0.536	0.503	0.517	<b>0.796</b>	
	TERB	0.499	0.325	0.401	0.608	<b>0.754</b>

Table 3. Structural model assessment.

Case	Hypotheses	paths	Standardized coefficient	t-value	Results
Study 1	H <sub>1</sub>	DSC→CI	0.632***	10.198	Supported
	H <sub>2</sub>	DSC→AI	0.361***	5.867	Supported
	H <sub>3</sub>	DSC→PA	0.386***	5.423	Supported
	H <sub>4</sub>	DSC→TERB	0.236**	3.213	Supported
$\chi^2/df = 2.467$ , TLI=0.926, CFI=0.934, SRMR=0.050, RMSEA=0.057					
Study 2	H <sub>1</sub>	DSC→CI	0.598***	11.451	Supported
	H <sub>2</sub>	DSC→AI	0.286***	5.003	Supported
	H <sub>3</sub>	DSC→PA	0.359***	5.490	Supported
	H <sub>4</sub>	DSC→TERB	0.224***	3.330	Supported
$\chi^2/df = 2.955$ , TLI=0.925, CFI=0.933, SRMR=0.044, RMSEA=0.066					
Study 3	H <sub>1</sub>	DSC→CI	0.541***	10.098	Supported
	H <sub>2</sub>	DSC→AI	0.292***	5.134	Supported
	H <sub>3</sub>	DSC→PA	0.299***	4.655	Supported
	H <sub>4</sub>	DSC→TERB	0.255***	3.901	Supported
$\chi^2/df = 2.594$ , TLI=0.930, CFI=0.938, SRMR=0.043, RMSEA=0.060					

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



Table 4. Specific mediation analysis through bootstrapping and Bayesian approaches.

Hypotheses	Specific indirect path	Case	Point estimate	Product of coefficients		Bootstrap				Bayesian		Results
				SE	Z	PCI		BCI		95% Lower	95% Upper	
						Lower	Upper	Lower	Upper			
H <sub>5</sub>	DSC→CI→TERB	Study 1	0.061	0.042	1.452	-0.020	0.145	-0.021	0.143	-0.024	0.150	Not supported
		Study 2	-0.018	0.037	-0.486	-0.093	0.052	-0.092	0.054	-0.090	0.050	Not supported
		Study 3	-0.050	0.037	-1.351	-0.130	0.016	-0.127	0.016	-0.121	0.015	Not supported
H <sub>6</sub>	DSC→AI→TERB	Study 1	0.020	0.027	0.741	-0.031	0.077	-0.027	0.081	-0.030	0.074	Not supported
		Study 2	0.015	0.018	0.833	-0.022	0.049	-0.017	0.052	-0.019	0.051	Not supported
		Study 3	0.022	0.02	1.100	-0.016	0.063	-0.014	0.064	-0.014	0.061	Not supported
H <sub>7</sub>	DSC→PA→TERB	Study 1	0.166	0.046	3.609	0.089	0.268	0.093	0.277	0.089	0.272	Supported
		Study 2	0.165	0.041	4.024	0.097	0.258	0.096	0.257	0.091	0.259	Supported
		Study 3	0.136	0.038	3.579	0.069	0.217	0.074	0.222	0.071	0.223	Supported
H <sub>8</sub>	DSC→CI→AI→PA→TERB	Study 1	0.031	0.014	2.214	0.011	0.064	0.012	0.068	0.013	0.059	Supported
		Study 2	0.032	0.012	2.667	0.014	0.060	0.015	0.063	0.015	0.059	Supported
		Study 3	0.025	0.010	2.500	0.010	0.047	0.011	0.050	0.011	0.045	Supported
H <sub>9</sub>	DSC→CI→AI→TERB	Study 1	0.014	0.019	0.737	-0.025	0.052	-0.021	0.056	-0.021	0.053	Not supported
		Study 2	0.013	0.016	0.813	-0.018	0.045	-0.016	0.047	-0.016	0.044	Not supported
		Study 3	0.016	0.015	1.067	-0.012	0.046	-0.011	0.047	-0.01	0.047	Not supported
H <sub>10</sub>	DSC→CI→PA→TERB	Study 1	0.055	0.026	2.115	0.013	0.114	0.015	0.120	0.016	0.108	Supported
		Study 2	0.061	0.023	2.652	0.021	0.114	0.023	0.117	0.021	0.113	Supported
		Study 3	0.049	0.02	2.450	0.015	0.093	0.017	0.097	0.015	0.093	Supported
H <sub>11</sub>	DSC→AI→PA→TERB	Study 1	0.043	0.017	2.529	0.016	0.083	0.017	0.089	0.017	0.081	Supported
		Study 2	0.038	0.014	2.714	0.016	0.069	0.018	0.074	0.016	0.071	Supported
		Study 3	0.034	0.012	2.833	0.013	0.061	0.015	0.067	0.014	0.061	Supported