Meta-Understanding of Environmental Perception in Tourism: Implications for China’s Tourist Attractions

Jinlian Shi 1 and Jing Sun 2,*,†

1 Business School, Beijing Technology and Business University, Beijing 100048, China; busystone@126.com
2 Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, Beijing 100081, China
* Correspondence: sunjing@caas.cn

Received: 10 January 2020; Accepted: 17 February 2020; Published: 22 February 2020

Abstract: Tourism is a global force in economic growth. To provide policy suggestions for advancing the tourism industry, we adopt a primary indicator, environmental perception, to examine tourism development. We conduct a nationwide meta-analysis to collect the environmental perceptions of residents and tourists in China, i.e., the satisfaction of an attraction’s environment. We analyze the collected information about the environmental perceptions, score the information, either negative (0) or positive (1), and sort these scores according to four socioeconomic classes (administrative units, attraction rating, ticket price, and attraction type). Our results show that residents’ and tourists’ degrees of satisfaction with environmental perception vary significantly among different classes and that unsatisfactory environmental perception indicates potential problems in the environment, products, and services provided by tourist attractions. Accordingly, we propose suggestions to address unsatisfactory environmental perceptions in each class, aiming to improve the degrees of satisfaction with environmental perception and to promote sustainability in tourism development.

Keywords: environmental perception; meta-analysis; China; tourist; resident

1. Introduction

Tourism plays a key role in global economic development, which contributes approximately 10% of the world’s GDP [1] and has become a dominant industry in many countries [2].

Environmental perception is among the central issues in tourism development, which refers to the comprehensive perception of humans towards the environment, products, and services as they relate to tourist attractions [3]. Since tourism is an environment-dependent industry, and its development also involves a series of socioeconomic factors, environmental perception serves as a primary indicator to diagnose the development of the tourism industry [4,5]. Moreover, environmental perception also reflects tourists’ recreational experiences and their revisit rates, as well as local residents’ livelihoods (residents hereafter refer to an attraction’s local residents) [6–8].

To advance tourism development, much research has been devoted to environmental perception studies [9–11]. A large collection of theories on environmental perception has been proposed, including social exchange theory [12,13], social representation [14,15], social carrying capacity [16,17], and the life-cycle theory of tourism destination [18,19]. Meanwhile, many studies have studied tourist perception in marine protected areas [7], forest protected areas [20], urban attraction [21], and resident perception in Hawaii, North Wales, and Istanbul [22]. Some studies have also adopted the environmental perception to assess destination management [23]. Most of these studies focus on the environmental perception of one or several tourist attractions, yet few of them have attempted to synthesize this information at a large scale, which can provide a more generalized understanding and wider policy implications.
Our goal in this analysis is to synthesize information about environmental perception at a large scale and then derive national understanding of environmental perception for policy-making in tourism development. To do so, we chose China as our study area. Being rich in tourism resources, China is one of the most visited countries in the world [24]. For example, China’s tourism industry contributed 11% of its GDP in 2017, totaling 794 billion USD [25]. Thus, a country-level understanding of environmental perception across China’s tourist attractions is needed, which provides holistic information for policy-makers and stakeholders regarding tourism management and planning.

Then, to achieve the above-mentioned goal, our objectives include (i) conducting a nationwide meta-analysis to collect information about environmental perception from both residents and tourists across China’s tourist attractions; (ii) classifying the collected environmental perception by major socioeconomic classes; and (iii) running a multivariate regression analysis on these classes to understand their impacts.

2. Method

We used keywords to search for topics and titles of publications in the China National Knowledge Infrastructure (also known as CNKI, the largest Chinese academic search engine), Web of Science, and Google Scholar. The search languages were Chinese and English, and the keywords included the following: resident, tourist, attraction, tourism, perception, attitude, environment, and satisfactory degree. We restricted our search to peer-reviewed papers, academic dissertations, and conference proceedings, and set the search years from 2000 to 2017 because the rapid increase of tourist visits in China began around 2000 [26]. We found 523 studies that met our criteria and recorded the environmental perceptions of residents (340 records) and tourists (359 records) in China (one study can record the information of both residents and tourists or of more than one attraction. Table S1).

We interpreted environmental perception based on four classes: administrative units in China, attraction rating (NA-A, 1A, 2A, 3A, 4A, and 5A, where 5A was the best rating according to the evaluation of Ministry of Culture and Tourism of China. The evaluation criteria of the attraction rating include quality and management factors like ease of transportation links, site safety, and cleanliness, and also take into account the uniqueness and recognition of the sightseeing offering), ticket price (we categorized price into six divisions: 0–50, 50–100, 100–150, 150–200, 200–250, and 250–300 yuan), and attraction type (natural and man-made attractions) (Table 1). These four classes (administrative unit, attraction rating, ticket price, and attraction type) are major socioeconomic classes, which are important concerns in tourism development and planning. For example, understanding and comparing environmental perception in different administrative units could help central and local governments to target and solve problems and to allocate and update attraction resources and facilities. We carefully examined the results of each study from the collected data and set the value of positive environmental perception as 1 and negative as 0. Thus, the average score of environmental perception in each class was between 0 and 1. To assist our analysis, we set the critical value to 0.6 and defined a class with an average environmental perception score ≥ 0.6 as a satisfactory perception for both residents and tourists, and < 0.6 as an unsatisfactory perception. Logically, the critical value 0.6 is a value for the acceptable level and is widely used in ecological and geographical studies, such as the percolation theory in landscape ecology [27].
Table 1. Classes used for the interpretation of environmental perception, their summary, and corresponding variables used in multivariate regression.

| Class          | Summary                                                                 | Variable Value |
|----------------|-------------------------------------------------------------------------|----------------|
| Administrative unit * | 30 provinces (autonomous regions and municipalities were treated as provinces. Taiwan, Hong Kong, and Macau were not included due to data availability) * | per capita GDP of each province † |
| Attraction rating | NA-A, 1A, 2A, 3A, 4A, 5A (5A is the best rating) (1, 2, 3, 4, 5, 6) |                |
| Ticket price     | [0, 50], [50, 100], [100, 150], [150, 200], [200, 250], [250, 300]) (Unit: Chinese yuan, 1 USD = 6.642 RMB in 2016) (1, 2, 3, 4, 5, 6) |                |
| Attraction type  | Natural attraction and man-made attraction (natural: 0, man-made: 1)     |                |

* Two municipalities (Beijing and Tianjin) were treated as one administrative unit, as their areas were small and spatially connected (see Table S2 in Supporting Information for the names and initials of the 30 provinces). † Per capita GDP of each province was calculated based on the 2000–2017 average.

To further understand the impacts of the above-mentioned classes on environmental perception, we performed a multivariate regression on the environmental perceptions of both residents and tourists, and adopted the variance inflation factor (VIF < 10) to manage collinearity [28]. Specifically, we used the per capita GDP (2000–2017 average) of each province to represent an administrative unit class, a categorical value (1, 2, 3, 4, 5, 6) to represent attraction rating (NA-A, 1A, 2A, 3A, 4A, 5A), a categorical value (1, 2, 3, 4, 5, 6) to represent ticket price ([0, 50], [50, 100], [100, 150], [150, 200], [200, 250], [250, 300]), and a categorical value (0, 1) to represent attraction type (natural attraction for 0 and man-made attraction for 1) classes (Table 1).

3. Results

The average environmental perception score with respect to residents and tourists varied significantly between different socioeconomic classes in China (Figure 1). For the administrative unit class, 22 out of 30 provinces had an average resident environmental perception score above 0.6, i.e., residents in those provinces were satisfied with the attraction’s environment, products, and services in those provinces, whereas 27 out of 29 provinces had an average tourist environmental perception score above 0.6, i.e., tourists in those provinces were satisfied with the attraction’s environment, products, and services (Figure 1a; one province, XZ, had no records on tourist environmental perception). Although 22 provinces had satisfactory environmental perceptions from both residents and tourists, residents in eight provinces (CQ, HEN, SH, BJ(TJ), HEB, XZ, SD, and XJ) and tourists in two provinces (CQ and SD) were not satisfied with the attraction’s environment, products, and services. Note that both CQ and SD had unsatisfactory perceptions from residents and tourists.

For the attraction ratings class, attractions had satisfactory environmental perceptions from both residents and tourists in most rating divisions, except for tourists in attraction 1A and residents in attraction 3A (Figure 1b). For the ticket prices class, residents in the [150–200], [200–250], and [250–300] divisions, i.e., the high ticket price divisions, were not satisfied with the attractions, while tourists were satisfied with the attractions’ environment, products, and services in all divisions (Figure 1c). Nationally, residents and tourists were satisfied with the environment, products, and services in both natural and man-made attractions, where the average score of tourists’ environmental perceptions was slightly higher than that of residents’ environmental perceptions, i.e., tourists were more satisfied (Figure 1d).

The coefficient and p value (*p ≤ 0.1) in the regression analysis indicated that ticket price was the most significant factor negatively affecting residents’ environmental perceptions, i.e., a high ticket price led to residents’ negative environmental perception. In contrast, attraction rating was the most significant factor positively affecting tourists’ environmental perceptions, i.e., a higher attraction rating led to tourists’ positive environmental perception (Table 2). VIF values of all variables were below 10, indicating no significant collinearity problem in our regression analysis [28].
Figure 1. Average score of environmental perception in four socioeconomic classes in China (see Table S2 in Supporting Information for the names and initials of the provinces). (a). Average score of environmental perception in the different provinces of China (province initials on the horizontal line were ordered alphabetically). (b). Average score of environmental perception in different attraction rating divisions. (c). Average score of environmental perception in different ticket price divisions. (d). Average score of environmental perception in natural and man-made attractions. The vertical axis of subfigures (a–d) was the average score of environmental perception in each class. We marked the horizontal dashed line, average score = 0.6, on subfigures (a–d) to assist with visual interpretation. NA indicated no record in the average score of tourists’ environmental perception of XZ in subfigure (a). See Table S3 in Supporting Information for the number of records in each class. Abbreviations: Anhui (AH), Beijing Tianjin (BJ(TJ)), Chongqing (CQ), Fujian (FJ), Guangdong (GD), Gansu (GS), Guangxi (GX), Guizhou (GZ), Hainan (HAN), Hebei (HEB), Henan (HENAN), Heilongjiang (Hlj), Hubei (HUB), Hunan (HUN), Jilin (JL), Jiangsu (JS), Jiangxi (JX), Liaoning (LN), Neimenggu (NMG), Ningxia (NX), Qinghai (QH), Shaanxi (SAX), Sichuan (SC), Shandong (SD), Shanxi (SX), Xinjiang (XJ), Xizang (XZ), Yunnan (YN), and Zhejiang (ZJ).

Table 2. Results of multivariate regression on the environmental perceptions of residents and tourists, including variable names, coefficients, p values, and variance inflation factors (VIFs).

| Variables        | Residents ($R^2 = 0.39$) |          |          |          |          |          |         |          |          | Tourists ($R^2 = 0.41$) |          |          |          |         |          |
|------------------|---------------------------|----------|----------|----------|----------|----------|----------|----------|----------|--------------------------|----------|----------|----------|----------|----------|
|                  | Coefficient | p Value   | VIF      | Coefficient | p Value   | VIF      | Coefficient  | p Value   | VIF      |
| Per capita GDP   | < 0.001      | 0.164     | 1.282    | < 0.001    | 0.158     | 1.452    | < 0.001    | 0.158     | 1.452    |
| Attraction rating| 0.003        | 0.833     | 2.048    | 0.201      | 0.032 *   | 1.462    | 0.032 *    | 0.310     | 1.658    |
| Ticket price     | −0.186       | 0.011 *   | 1.787    | < 0.001    | 0.310     | 1.658    | < 0.001    | 0.310     | 1.658    |
| Attraction type  | 0.047        | 0.361     | 1.107    | −0.012     | 0.760     | 1.211    | −0.012     | 0.760     | 1.211    |

* We excluded interaction terms because they did not improve the model interpretation.

4. Discussion and Conclusions

Our results provide critical information to assist tourism planning and management in China and have strong policy implications for helping accurately increase the degree of satisfaction on
environmental perceptions for both residents and tourists. Specifically, for the administrative unit class in our meta-analysis, our results highlight that CQ and SD had unsatisfactory perceptions from both residents and tourists, which suggests that governmental agencies (e.g., tourism administrations) should investigate and address related problems in the tourist attractions of these two provinces, i.e., thoroughly examine the environment, products, and services of their tourist attractions. Our results also show that more provinces had positive tourist environmental perceptions (eight provinces) than positive resident environmental perceptions (two provinces), which partially indicates that tourism development has more adverse impacts on residents near tourist attractions. Potential reasons may include traffic congestion, crowded public spaces, and social insecurity due to the increasing tourist visits, which could lower residents’ environmental perceptions [29].

For the attraction rating class, attractions with higher ratings had better tourism resources, infrastructure, accessibility, and other auxiliary facilities, which all increased tourists’ environmental perceptions. Tourists’ environmental perceptions of a 1A rating attraction were extremely negative, with an average score of less than 0.1 (Figure 1b). For the ticket price class, residents’ environmental perceptions were rather negative in the higher price divisions. A potential reason is that many attractions with higher ticket prices in China dominate the local industry but do not economically benefit residents [30]. To effectively increase the average environmental perception score of residents, more attention should be paid to the residents near attractions with higher ticket prices, such as offering job opportunities to residents in tourism programs to improve their income and incorporating them into tourism planning. Moreover, our regression analysis also highlights the substantial effects of ticket price and attraction rating on environmental perception (the negative effect of ticket price on residents’ environmental perceptions and the positive effect of attraction rating on tourists’ environmental perceptions). Thus, to improve environmental perception, we suggest that lowering ticket prices may, alternatively, increase residents’ environmental perceptions.

The results from our study confirm the importance of the synthesized understanding of environmental perceptions on the large scale, which provides important scientific values and policy implications for the establishment of National Parks in China. These results are important for a variety of policy-makers, tourists, residents, and other stakeholders in China and many other countries. In particular, policy-makers from governmental sectors and stakeholders can borrow our methods and learn from our results to effectively promote tourism development.

The data used here cannot cover all attractions in China, but we consider that the most important attractions have been incorporated into our meta-analysis and can represent informative general information. Furthermore, the data from our meta-analysis were from published literature, where environmental perception was mainly acquired from surveys, i.e., subjective understanding about tourist attractions from residents and tourists. However, the actual environmental dynamics, such as vegetation coverage, landscape connectivity, biodiversity, and air and water quality of tourist attractions, need equipment and scientific methods to be measured. To better analyze the environmental dynamics of tourist attractions, we are currently working on a new study, which includes both the environmental perception of residents and tourists of each attraction and an associated objective environmental measurement (such as a vegetation index derived from satellite data) to set up practical methods for improving environmental perceptions and to promote the sustainability of tourism development.

In this analysis, we chose China as the study area and analyzed environmental perceptions of both tourists and residents in tourist attractions at the national scale using meta-analysis. Such synthesized information indicates that residents’ and tourists’ degrees of satisfaction with environmental perception vary significantly among provinces, attraction ratings, ticket prices, and attraction types in China’s tourist attractions. Particularly, ticket price (higher ticket price leading to residents’ negative environmental perception) and attraction rating (higher attraction rating leading to tourists’ positive environmental perception) are two significant factors affecting environmental perception, which can be used to address unsatisfactory environmental perceptions and to promote sustainability in tourism development of China and many other countries.
Supplementary Materials: The following are available online at http://www.mdpi.com/2071-1050/12/4/1658/s1: Table S1. Literature used in meta-analysis. Table S2. Province name in China and its initial, Table S3. Number of records in each class.

Author Contributions: Writing—original draft, Jing Sun; Writing—review and editing, Jinlian Shi. All authors have read and agreed to the published version of the manuscript.

Funding: The research reported here was supported by the National Natural Science Foundation of China (No.31470518).

Conflicts of Interest: The authors declare no conflict of interest.

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