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Chinese Tourists' Perceptions of Climate Change and Mitigation Behavior: An Application of Norm Activation Theory

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Abstract: It is well recognized that tourism development is a prominent contributor to climate change, but is also a "victim" of climate change. Therefore, to mitigate climate change is of great importance for the sustainability of tourism. Yet extant studies regarding tourism and climate change tend to be dominated by a supply-side stance, albeit the core role of the tourist in the tourism industry. While researchers are increasingly adopting a tourist perspective, few seek to understand the linkage between climate change and tourists' specific mitigation behaviors in a tourism context; this is especially so in China. This study investigates the impact of Chinese tourists' perceptions of climate change on their mitigation behaviors based on norm activation theory. Drawing on 557 self-administrated questionnaires collected in China, it finds that tourists' perceptions of climate change and perceived contribution of tourism to climate change both positively affect energy saving and carbon reduction behavior in tourism. Yet, compared with perceived contribution of tourism to climate change, tourists' perceptions of climate change are found to be a much stronger predictor for energy saving and carbon reduction behavior. Therefore, it suggests that tourists' perceptions of climate change in a general context is more strongly related to climate change mitigation behavior in tourism, calling for attention to go beyond the tourism context to alleviate the negative impacts of tourism on climate change.

Keywords: climate change; Chinese tourist; energy saving and carbon reduction behavior; norm activation theory

1. Introduction

Since the enforcement of the Reform and Opening-Up Policy in 1978, China has been embarking on a fast track of economic growth, which consequently increased the residents' annual income. In the meantime, the Chinese tourism industry has experienced over thirty years of continuous development with the exception of 1989 and 2003 [1], and tourism has become a pillar economy sector in the country [2]. In fact, China has become the largest and fastest-growing market for tourism [3]. In 2015, Chinese tourists made 4 billion domestic trips and 11.7 million outbound trips [4].

Climate change is caused by greenhouse gases (GHGs) emitted into the atmosphere and measured in terms of CO_2 emissions for simplicity [5]. Observed climate changes include global warming, snow and glaciers diminishing and sea level rising [6]. Modern climate change is dominated by anthropogenic influences, which surpass "the bounds of natural variability" [7] (p. 1719). Human-induced changes in atmospheric composition are identified as the main source of climate change globally, being caused by GHGs emissions primarily in connection with "energy use", while urbanization and land use changes are also important factors [7].

On the one hand, it has been well recognized among scholars and organizations that the development of the tourism industry has been exerting impacts on climate change [8–15]. It mostly adds to climate change through two types of activity: trips between the origin and the destination and consumption while at the destination. Whereas Gössling [16] identifies that both land use change induced by tourism development (e.g., accommodation, traffic infrastructure and leisure activities) and tourism energy consumption contribute to climate change, the focus is usually on the latter due to its much more profound impact on climate change [8,11,16,17]. In terms of tourism energy consumption, it can be divided into transport-related purposes and destination-related purposes excluding transports [11,16]. More recently, Gössling and Peeters [8] argued that tourism-related energy emissions should be collected from three major subsectors, namely transport to and from the destination (e.g., air travel), accommodation, and activities at destinations. Specifically, by 2050 the contribution of tourism to greenhouse gas (GHGs) emissions is expected to rise from its current three per cent to seven per cent globally [18], and according to The United Nations World Tourism Organization (UNWTO) [5], tourism sector-generated GHGs emissions are also predicted to grow 1.5 times between the years 2005 and 2035 if no countermeasures been taken.

On the other hand, tourism is a "victim" of climate change. The further global warming and long-lasting changes in the climate system increase the possibility of "severe, pervasive and irreversible impacts for people and ecosystems" [6] (p. 56). Specifically, when it comes to tourism, while it is possible that climate change, notably global warming, may lead to an extension of "beach seasons" and the development of "rural and seaside tourism", risks and challenges are more dominant, such as the submerging of coastal islands or regions, desertification, melting of snow and glaciers [10]. Those negative effects will finally make the tourism attractions and destinations largely reliant on attractive climate conditions less hospitable, ruin the tourism experience and even threaten their existence [19,20]. Researchers have demonstrated that climate change can affect tourism in multiple ways like recreation experience [21], destination attractiveness [22–25] and visitation pattern [26,27].

Noting the risks of climate change, international organizations and academia have called for the reduction of GHGs emissions and mitigation to climate change [5,6,19,28,29]. Being the consumers of tourism industry products and the users of the transportation and accommodation, tourists' perceptions of climate change and their mitigation behaviors are critical for the implementation of mitigation pathways. However, previous research regarding tourism and climate change appears to be dominated by a supply-side perspective. Moreover, among the relatively limited studies conducted from a tourist perspective, few were conducted in the Chinese context. This is problematic given the unprecedented development of tourism in China. There is also a strong pragmatic and instrumental perspective on nature to consider in contemporary China [30,31]. Simply put, for the Chinese, nature exists for the benefits of people. Last but not the least, the fact that tourism generally occurs in an unusual environment within a limited period of time is believed to contribute to a relinquishing of the responsibilities that are felt in daily life [32], thus making it difficult to motivate people to minimize the negative environmental impacts of their vacations [33,34]. As such, the question arises: Do Chinese tourists care about the global issue, that is, climate change? This study seeks to examine the impact of Chinese tourists' perceptions of climate change on their energy saving and carbon reduction behavior in tourism based on norm-activation theory (NAT).

2. Literature Review

In order to mitigate climate change, "substantial and sustained reductions" of GHG emissions and adaptions are required [6]. For this human-benefiting objective, an international accepted agenda and agreement have been achieved [6,35]; policies have been planned and implemented. And tourism can no doubt make a significant contribution to climate change mitigation if it is to become more sustainable, notably reducing its energy consumption. In this case, as a key part of tourism, the tourist's role is of critical importance.

Unfortunately, however, when it comes to climate change and tourism, most studies have focused on the impacts on the tourism industry [11,36–38], tourism destination [19,21,39], tourism resources [14,27,40,41], and tourism policies [17,28]. In short, studies in this aspect are dominated by a tourism supply perspective.

Yet increasing attention is being paid to the demand side (i.e., the tourist) in recent years; studies are mainly concerned with tourists' perceptions of climate change on their consumption behavior, notably travel decisions (e.g., [29,42–47]), and their attitude towards certain policies [33,48] or general environmental issues or behaviors [49]. Only a few go into details to explore tourists' specific climate change mitigation behaviors in tourism. For instance, Horng, Hu, Teng and Lin [15] examined the relation between tourists' perception of threats from tourism to environment and energy saving and carbon reduction behavior norm in the tourism context, yet a non-significant impact was found. Vaske et al. [50] found a significant linkage between Dutch residents' environmental knowledge and their use of transport to reduce carbon footprint while on holiday.

To establish the linkage between tourists' understanding of climate change and their mitigation behaviors in tourism, this study adopts norm activation theory as a point of departure. Initially, norm activation theory (NAT) was designed to investigate prosocial or altruistic intentions and behaviors [51]. Prosocial behavior is defined as, "any action that, as it happens, benefits others, or promotes harmonious relations with others, even if there is no sacrifice on the actor's part and even if there is some benefit to the actor" [52] (p. 349). Further, NAT is also employed to explain the pro-environmental behavior, notably in environmental psychology studies, as it is considered a special type of prosocial behavior for doing good for others in an indirect way [53–55]. The theory has also been adopted in tourism studies to examine tourists' pro-environmental/destination behaviors issues [56,57].

According to NAT, when one understands the "adverse consequence" faced by others or the environment (i.e., awareness of consequence [AC]) and "ascribes responsibility for that consequence to oneself" (i.e., ascription of responsibility [AR]); an activated corresponding personal norm (PN) will arise and prosocial/pro-environmental behavior will be enacted [58,59]. To put it simply, AC refers to one's perception or judgment of the probability of an adversity or threat and the severity of it; AR implies one's feeling of responsibility for the negative or harmful consequence if no action is being taken [15,60]. Yet AR is also interpreted as the extent to which a person believes that he or she can make a useful contribution to the problem's solution, which reflects perceived outcome efficacy [61–63]. Some researchers adopt both interpretations [56,60]. According to Cialdini and Trost [64] (p. 152), norms are "rules and standards that are understood by members of a group, and that guide and/or constrain social behavior without the force of laws". PN is the feeling of a moral obligation to engage in pro-social/pro-environmental behavior [60,65]. Based on NAT as well as previous similar studies (see Table 1), a conceptual framework is thus developed for the current study as shown in Figure 1. Tourists' perception of climate change and perceived contribution of tourism to climate change are expected to activate their climate change mitigation behavior norm, which in turn would encourage individual tourists to conduct the mitigation behavior. Consistent with the framework, the following six hypotheses are made:

Hypothesis 1 (H1). *As awareness of climate change increases, perceived contribution of tourism to climate change will increase.*

Hypothesis 2 (H2). *As awareness of climate change increases, mitigation behavior norm will increase.*

Hypothesis 3 (H3). *As perceived contribution of tourism to climate change increases, mitigation behavior norm will increase.*

Hypothesis 4 (H4). *As mitigation behavior norm increases, mitigation behavior intention will increase.*

Hypothesis 5 (H5). *Mitigation behavior norm will mediate the relationship between awareness of climate change and mitigation behavior intention.*

Hypothesis 6 (H6). *Mitigation behavior norm will mediate the relationship between perceived contribution of tourism to climate change, and mitigation behavior intention.*

Table 1. A summary of previous similar studies.

Title	Authors (Year)	Respondents	Related Findings
Tourists' environmentally responsible behavior in response to climate change and tourist experiences in nature-based tourism	[49]	Korean (N = 211) and Chinese tourists (N = 204) in Jeju Island, South Korea	Perceptions of climate change affect Korean tourists' environmentally responsible behavior intentions, whereas it poses a non-significant impact on Chinese tourists' behavior intention.
Carbon footprint mitigation on vacation: A norm activation model	[50]	General public in the Netherlands (N = 1144)	Awareness of general environmental consequences (AC) influences ascription of responsibility for the environment in general (AR). Norm salience partially mediated the influence of AR and AC on reported ecological behavior. As AR and AC increased, norm salience increased.
Energy saving and carbon reduction [ESCR] behaviors in tourism–A perception study of Asian visitors from a protection motivation theory perspective	[15]	Foreign tourists in Taiwan (N = 512)	Tourists' perception of threats from tourism to environment poses non-significant impacts on ESCR behavior intention in tourism.
Tourists' perceptions of responsibility: An application of norm-activation theory	[56]	Chinese tourists at Mount Danxia, China (N = 319)	Tourists' perceptions of the negative impacts of tourism positively affect their ascription of responsibility, which positively influences their perceptions of responsibility.

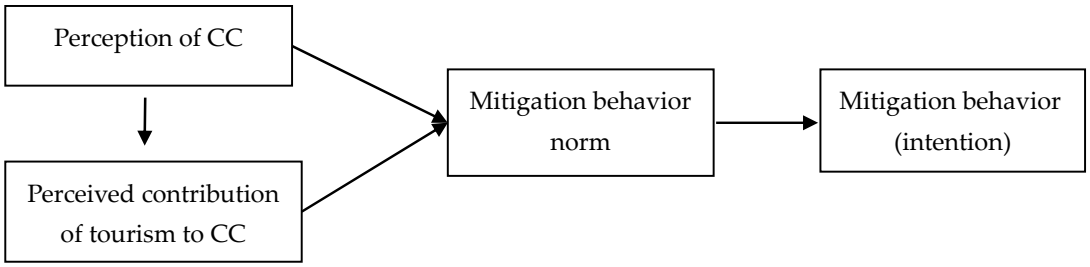

Figure 1. Conceptual framework (CC: Climate Change).

3. Methodology

Data used in the study were collected via a tourist survey at popular tourist attractions in three Chinese cities, including The West Lake in Hangzhou, Shichahai in Beijing and The West Lake Park in Fuzhou. These locations were selected for data collection because of the following reasons: (a) These attractions are among the most visited sites in popular Chinese tourism cities; (b) These attractions are nature-based or related sites, which enables tourists to build up a connection with climate change; (c) For the authors, these sites have good accessibility and convenience.

The questionnaire comprised five parts, namely perception of climate change, perception of tourism's contribution to, energy saving and carbon reduction behavior norm in tourism, energy saving and carbon reduction behavior intention and social-demographic information. The questionnaire was first pilot-tested with five Chinese students. Minor alterations were made with regard to rewording of some items after their feedback.

The Occurrence and Anthropogenic Causation Scale developed by Brownlee and Verbos (2015) is adopted to measure tourists' perceptions of climate change, which consists of two sub-scales:

(a) Occurrence (belief that climate change is currently happening), and (b) Anthropogenic Causation (belief that climate change results from human activities). The items to measure the perceived contribution of tourism to climate change are adapted from [15,56], which includes the responsibility of tourism development for climate change as well as the tourist's agency to act towards climate change. For the measurement of energy saving and carbon reduction behavior norm and intention in the tourism context, the items are adapted from the energy saving and carbon reduction behavior scale used by Horng, Hu, Teng, and Lin (2014), but are reworded with regard to norm and intention [15,50,56]. For instance, the item "tourists should reuse towels in hotel" is used to measure norm, whereas the item "I will reuse towels in hotel" is to measure personal intention. All the scales show acceptable reliability: Occurrence (0.836), Anthropogenic causation (0.718), Contribution of tourism to climate change (0.616), energy saving and carbon reduction (ESCR) behavior norm (0.736) and ESCR behavior intention (0.776). The scale perception of tourism's contribution to climate change has the lowest Cronbach's α value (0.616), which can be attributed to its small numbers of items [66]. All the items are measured on a seven-point scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The details of the items are listed in Table 3 in Section 4.1. Personal information gathered from respondents included gender, generation (age), current living environment, education level, household annual income, and travel mode.

In April and May 2017, the tourist survey was conducted through convenience sampling, and 557 valid questionnaires were obtained. Table 2 presents the demographic profile of the sample. The sample was balanced in terms of gender (48.3% male, 51.7%, female), but a majority were younger visitors from cities with a relatively high level of education yet with average annual household income (82.2% from the Social Reform generation; 65.9% living in cities; 51.2% holding a college degree or above; 63.1% having average annual household income). SPSS 18.0 was employed to conduct descriptive and statistical analysis of the data.

Table 2. Demographic profile of the respondents (N = 557).

Variables		Frequency	Percentage (%)
Gender	Male	269	48.3
	Female	288	51.7
Generation	Republican (born in 1950 or before)	12	2.2
	Consolidation (1951–1960)	20	3.6
	Cultural Revolution (1961–1970)	67	12.0
	Social Reform (born after 1970)	458	82.2
	Post-1970s	118	21.2
	Post-1980s	171	30.7
	Post-1990s	169	30.3
Education	Middle school or lower	68	12.2
	High school or Technical School	173	31.1
	College or Bachelor's degree	241	43.3
	Master's or higher	64	11.5
	Not specified	11	2.0
Place of residence	City	367	65.9
	Town	144	25.9
	Countryside	46	8.3
Annual household income	Significantly below average	24	4.3
	Below average	68	12.2
	Average	285	51.2
	Above average	110	19.7
	Significantly above average	15	2.7
	Not specified	55	9.9

4. Results

4.1. Descriptive Analysis

As shown in Table 3, all the skewness coefficients are smaller than 3 and all kurtosis coefficients are smaller than 10, indicating that the data is normally distributed [67]. In terms of energy saving and carbon reduction behavior norm in tourism, the relatively low score of the construct (M = 4.82, SD = 0.785) suggests that, overall, such norms are not well acknowledged by the tourists. More specifically, among the nine norms, only two (Tourists should save energy and water in hotels; tourists should keep the environment as clean as it was before visiting) are generally accepted (M > 5). The item "Tourists should bring reusable dining utensils" scores the lowest out of the 9 (M = 3.88, SD = −1.464), which echoes the previous finding that convenience matters with regard to energy saving and carbon reduction behavior in tourism [15]. Overall, tourists believe climate change is happening (M = 5.35, SD = 0.798) and that it has much to do with human activities (M = 5.31, SD = 0.806). This is consistent with Packer, Ballantyne and Hughes' (2014) finding that, compared with Australian tourists, Chinese tourists are more likely to be alarmed about the impacts of global warming [68]. Yet, it is worth noting that airplane travel is considered as the weakest contributor to climate change (M = 4.72, SD = 1.293), indicating a relatively low awareness of the linkage between climate change and air travel, despite the fact that "tourism's increasing contribution to climate change, especially through the use of air travel, is now acknowledged" by academics [33] (p. 351). The limited awareness of the linkage between tourism and climate change is further illustrated by the lowest score of "Contribution of tourism to climate change" among all the constructs (M = 4.44, SD = 1.076), which is, to some extent, consistent with previous findings that tourists generally do not believe that tourism can cause much damage to the environment [15]. Compared with their acknowledgement level of the energy saving and carbon reduction behavior norm in tourism, the tourists, however, show a higher level of intention to practice these behaviors while travelling (M = 5.12, SD = 0.784). Nevertheless, these behaviors, such as "bringing reusable dining utensils" (M = 4.62, SD = 1.364) and "bringing my own toiletries" (M = 4.89, SD = 1.362), are least likely to happen, possibly due to their greater inconvenience compared to other behaviors.

Table 3. Descriptive analysis.

Items & Constructs	Mean	SD	Skewness	Kurtosis
ESCR behavior norm	4.82	0.785	−0.536	2.508
Tourists should bring their own toiletries	4.59	1.615	−0.399	−0.617
Tourists should bring reusable dining utensils	3.88	1.464	−0.077	−0.414
Tourists should choose locally produced and seasonal foods	4.84	1.334	−0.479	0.372
Tourists should take public transport	4.62	1.313	−0.386	0.015
Tourists should bring reusable shopping bags	4.63	1.409	−0.234	−0.423
Tourists should reuse towels in hotel	4.19	1.487	−0.098	−0.692
Tourists should save energy and water in hotels	5.55	1.308	−0.898	0.425
If buying souvenirs, tourists should choose locally produced souvenirs	4.99	1.340	−0.345	−0.033
Tourists should keep the environment as clean as it was before visiting	6.04	1.156	−1.514	3.076
Occurrence	5.35	0.798	−0.401	0.492
The temperature of the ocean is increasing	5.37	1.107	−0.550	0.407
The areas affected by drought are increasing	5.06	1.182	−0.455	0.047
Air temperature is increasing	5.43	1.177	−0.563	0.040
Permanently frozen snow in the arctic is now thawing	5.35	1.166	−0.535	−0.026
Mountain environments are losing snow	5.35	1.188	−0.503	−0.127
The number of flooding events is increasing	5.30	1.255	−0.453	−0.439
Sea level is rising	5.43	1.187	−0.557	0.021
The amount of ocean ice is decreasing	5.54	1.088	−0.435	−0.117
Anthropogenic causation	5.31	0.806	−0.319	0.979
Clear cutting of forests	5.63	1.140	−0.794	0.970
Driving gas-powered automobiles	5.49	1.221	−0.836	0.749
Burning fossil fuels, such as oil and coal	5.36	1.289	−0.622	0.019
Airplane travel	4.72	1.293	−0.142	−0.076
Pollution from factories	5.50	1.197	−0.508	−0.347
Clearing land for human use	5.15	1.357	−0.498	−0.365

Table 3. *Cont.*

Items & Constructs	Mean	SD	Skewness	Kurtosis
Contribution of tourism to CC	4.44	1.076	−0.122	0.268
Tourism development contributes to CC	4.12	1.544	−0.312	−0.445
Tourist activities affect CC	4.59	1.381	−0.339	−0.088
Tourist behavior change can mitigate CC	4.61	1.360	−0.287	−0.253
ESCR behavior intention	5.12	0.784	−0.509	1.483
I will reuse towels in hotel	4.94	1.327	−0.482	0.216
I will save energy and water in hotels	5.38	1.327	−0.637	−0.156
I will bring my own toiletries	4.89	1.362	−0.159	−0.580
I will bring reusable dining utensils	4.62	1.364	−0.133	−0.336
I will choose locally produced and seasonal foods	5.12	1.265	−0.370	−0.161
If I'm to buy souvenirs, I will choose locally produced souvenirs	5.03	1.287	−0.382	−0.096
I will bring reusable shopping bags	5.09	1.303	−0.289	−0.268
I will take public transport	5.07	1.274	−0.379	−0.134
I will keep the environment as clean as it was after visiting	5.95	1.259	−1.432	2.119

4.2. Linear Regression Analysis

Linear regression analysis was adopted to investigate the relationship among different constructs. As shown in Table 4, five regression analyses were conducted. It must be pointed out that previous studies have found the impact of social-demographic factors environmental attitude and behavior, including age/generation, gender, education level and living environment [69–72], despite inconsistent findings across studies. Consequently, to control the possible interventions of these variables, they were all put into the regression models. All the five models are significant. The values of variance of inflation factor (VIF) and tolerance for each variable all indicate that there is no multi-collinearity within the independent variables (VIF values < 10.0, the values of tolerance > 0.1). Also, the Durbin–Watson statistic values suggest that there is no residual correlation in the models.

Table 4. Linear regression analysis.

Predictor	Dependent Variable				
	Contribution of Tourism to CC (Model 1)	**Norm (Model 2)**	**BI (Model 3)**	**BI (Model 4)**	**BI (Model 5)**
Norm			**0.572** ***		**0.454** ***
Occurrence	−0.017	**0.294** ***		**0.334** ***	**0.194** ***
Anthropogenic Causation	**0.246** ***	**0.219** ***		**0.106** *	0.012
Contribution of tourism to CC		**0.198** ***		**0.188** ***	**0.095** *
Living environment (city = 0, rural and town = 1)	−0.020	0.025	**−0.089** *	**−0.080** *	**−0.097** **
Education (high = 0, low = 1)	0.043	0.011	0.052	0.046	0.047
Gender (male = 0, female = 1)	0.000	0.038	−0.066	−0.052	**−0.076** *
Generation cohorts (dummies, 0 = Social Reform gen)					
Republican and Consolidation	0.017	−0.054	**−0.082** *	**−0.096** *	**−0.075** *
Cultural Revolution	−0.004	−0.062	0.035	−0.011	0.015
Model statistics	R^2 = 0.059 Adj.R^2 = 0.047 F(7533) = **4.770** *** D–W stat = 1.598	R^2 = 0.282 Adj.R^2 = 0.271 F(8529) = **25.980** *** D–W stat = 1.888	R^2 = 0.344 Adj.R^2 = 0.336 F(6535) = **46.661** *** D–W stat = 1.216	R^2 = 0.229 Adj.R^2 = 0.217 F(8531) = **19.660** *** D–W stat = 1.373	R^2 = 0.376 Adj.R^2 = 0.365 F(9527) = **35.265** *** D–W stat = 1.269

The values appearing in bold are significant (* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$); "middle school or lower" and "high school or technical school" are recoded into low education level, "college or bachelor's degree" and "master's or higher" are recoded into high education level; due to the very small sample of Republican generation (N = 12) and Consolidation generation (N = 20), these two were recoded into one group; D–W stat refers to Durbin–Watson statistic value.

Table 4 shows that social-demographic factors have very limited impacts on the dependent variables across the five regression models. Model 1 indicates that Anthropogenic Causation positively affects tourists' perceived contribution of tourism to climate change, whereas Occurrence has no significant impact on it. This means that only these tourists, who believe climate change is related to human activities, are likely to recognize the contribution of tourism to climate change. Yet the value of R^2 of model 1 (0.059) suggests that the impact of Anthropogenic Causation on perceived contribution of tourism to climate change is very limited [73]. Models 2 and 3 suggest that tourists' perception of climate change (CC) (i.e., Occurrence and Anthropogenic Causation) and perceived contribution of tourism to CC are significant predictors for energy saving and carbon reduction behavior norm, which, in turn, exerts the strongest influence on energy saving and carbon reduction behavior intention.

According to Baron and Kenny [74], to establish mediation using regression analyses, four criteria should be met: There must be a direct relationship between (a) the independent variable (perception of climate change, perceived contribution of tourism to climate change) and the mediator (norm), (b) the independent variable (perception of climate change, perceived contribution of tourism to climate change) and the dependent variable (behavior intention), and (c) the mediator (norm) and the dependent variable (behavior intention); in addition, (d) the direct effect of the independent variable (perception of climate change, perceived contribution of tourism to climate change) should weaken substantially or even disappear when the mediator is included into the model. Therefore, to examine the mediation effect of norm (Hypotheses 5 and 6), model 4 and model 5 were conducted. When norm was included into model 5, the standardized coefficient of Occurrence decreased from 0.334 *** in model 4 to 0.194 ***, and that of perceived contribution of tourism to climate change decreased from 0.188 *** to 0.095 *, whereas the impact of Anthropogenic Causation on intention became non-significant (0.106 * to 0.012). The results indicate that norm partly mediates the relationship between Occurrence and intention, and the relationship between perceived contribution of tourism to climate change and intention, while it totally mediates the relationship between Anthropogenic Causation and intention.

While Occurrence and contribution of tourism to climate change can directly and indirectly exert a positive impact on tourists' energy saving and carbon reduction behavior intention, the former is a much stronger predictor: In model 5 the standardized coefficient β of the former was also much larger (0.194 vis-à-vis 0.095), meaning a stronger direct impact; it is also the case in model 2 (0.294 vis-à-vis 0.198), indicating a stronger indirect impact on intention via norm. Also, despite having no direct impact on intention, Anthropogenic Causation appears to have a larger indirect effect on intention via norm than that of perceived contribution of tourism to climate change (0.219 vis-à-vis 0.198). Therefore, overall, tourists' perception of climate change seems to be considerably powerful in affecting energy saving and carbon reduction behavior intention in tourism, compared to their perceived contribution of tourism to climate change.

5. Discussion and Conclusions

The current study investigates the linkage between Chinese tourists' perception of climate change and their specific mitigation behaviors in tourism. It suggests that tourists' perception of climate change (including Occurrence and Anthropogenic Causation) and perceived contribution of tourism to climate change positively affect energy saving and carbon reduction behavior norm in tourism, which then increases their intention to adopt such behaviors (see Table 5). Yet nuanced analysis indicates that differences exist among these predictors: Those tourists, who believe that climate change is currently happening (i.e., Occurrence), are most likely to acknowledge energy saving and carbon reduction behavior norm and thus adopt related behaviors; while the belief that climate change is caused by humans (i.e., Anthropogenic Causation) has a very limited impact on perceived contribution of tourism to climate change, it can indirectly affect energy saving and carbon reduction behavior intention in tourism via norm; in general, while tourists are aware of climate change, there is limited awareness of tourism's contribution to climate change, which can hinder the adoption of energy saving and carbon reduction behavior in tourism as it positively impacts on both the norm and intention.

Table 5. Summary of hypotheses testing.

Hypotheses	Result
H1: Perception of CC→Perceived contribution of tourism to climate change [CC]	Partly supported. Only Anthropogenic Causation positively affects perceived contribution of tourism to CC, while Occurrence has a non-significant impact on it.
H2: Perception of CC→Mitigation behavior norm [norm]	Supported
H3: Perceived contribution of tourism to CC→norm	Supported
H4: Mitigation behavior norm→Mitigation behavior intention [intention]	Supported
H5: Perception of CC→norm→intention	Supported. Norm is a partial mediator between Occurrence and intention, but a full mediator between Anthropogenic Causation and intention.
H6: Perceived contribution of tourism to CC→norm→intention	Supported. Norm is a partial mediator between perceived contribution of tourism to CC and intention.

Previous studies on pro-environment/destination behavior issues in tourism are often too focused on the tourism context itself, such as impacts/problems of tourism [15,56] or tourism experience [75–77], to explore the impacts of general environmental awareness on such behaviors. This study thus helps fill such a gap by linking perception of climate change in a global context to energy saving and carbon reduction behavior in tourism. While previous research shows that problem awareness has no significant or a very limited impact on pro-environment/destination behavior issues in the tourism context (e.g., [15,56,78]), the current study suggests that it is the strongest predictor for norm and also a strong predictor for intention. The different finding might be attributed to the different interpretations of problem/consequence awareness: The previous studies focus on problems in the tourism context (i.e., negative impacts of tourism), whereas the current study goes beyond tourism to everyday society (i.e., climate change in a general context). More importantly, the present finding shows that, compared to their perceived contribution of tourism to climate change, tourists' perceptions of climate change in a wider context is more strongly related to energy saving and carbon reduction behavior in tourism, somewhat echoing "the de-differentiation of tourism in current tourism scholarship" [79] (p. 24). In other words, tourism, often being considered as an escape from the everyday life, is inherently linked to the mundane life [79]. This research illustrates that what concerns people in mundane society is likely to concern people on holiday.

Based on the research findings, several practical implications can be made with respect to promotion of tourism energy saving and carbon reduction. Firstly, given the general low awareness of tourism's contribution to climate change, efforts should be made regarding the provision of information on the linkage between tourism and climate change, such as providing tourism energy consumption and carbon emission data of specific tourism activities (e.g., air travel). Secondly, in addition to informing them regarding the facts about tourism's impact on climate change, materials about what tourists can do to make a difference are also critical and helpful. Last, but not least, it is not enough to educate tourists about the impacts of tourism on climate change and their capability in mitigating climate change, further efforts should go beyond tourism impacts to incorporate the environmental issues (e.g., climate change) of mundane society to raise awareness of climate change (e.g., facts about climate change phenomenon, its linkage with human society).

This study makes several important contributions to the existing research on mitigation of climate change in tourism. It draws attention to Chinese tourists' perspective on climate change and mitigation behavior, an under-researched yet increasingly important area. It calls for attention to go beyond the tourism context itself to mitigate the negative impacts of tourism on climate change. Nevertheless, the study has some limitations. Firstly, the data were collected via self-administered questionnaires, hence the influence of social desirability is possible [80]. Researchers might adopt different methods (e.g., experimentation, observation) to re-examine the current findings. Secondly, there is often

an attitude–behavior gap [81,82]. It is the actual behavior that really matters in the end, but this study fails to explore the actual behaviors in tourism. As such, future studies might use this research as a point of departure to investigate the intention—actual behavior gap to offer new insights, such as an identity perspective on why people behave irresponsibly when away from home [83]. Last, but not least, while the current research contributes to the extant tourism and climate change studies that are dominated by a supply-side perspective, it nevertheless falls into the dominant paradigm of "ABC" (attitude, behavior, and choice) in contemporary environmental policy worldwide, emphasizing individual behavior change to mitigate climate change [84]. Yet it appears that the current scholarship is calling for more effective "structural" changes (e.g., government-led interventions, the targeted delivery of public services or upstream solutions) [84]. Therefore, it is expected that future research may go beyond individual behavior change to explore more fundamental changes for mitigating climate change.

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