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## Article

# An Investigation of Willingness to Pay for Geopark Management and Conservation: A Case Study of Geotourists in the Greater China Region

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**Abstract:** Willingness to pay (WTP) for geological protection is essential for market-based geopark conservation tactic formulations. Whether geotourists are willing to pay and how much they prefer to pay might be influenced by different determinants. The present study aims to (1) investigate the probability of paying and the payment amount for geopark conservation and (2) examine how factors influence the intention and amount to pay for the upkeep of geoparks. The results suggest that geotourists would contribute financially to geological conservation and geopark management. The findings also revealed that geotourists' intentions and payment for conservation were associated with educational background and monthly income level. In addition, geotourist attachment and satisfaction concerning visiting geoparks positively affected intention and payment. This study might provide empirical references for geopark management and conservation in the Greater China Region.

**Keywords:** willingness to pay; contingent valuation method; place attachment; satisfaction



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## 1. Introduction

Although visiting outdoor areas with outstanding landscapes is common, geopark and geological tourism have gained wide recognition in recent decades [1–3]. (Geoparks, along with geotourism, interprets geology through three components: form (landforms and landscapes), process (the origination of landforms), and time (the occurrent time and duration of the geological process), facilitating visitors with an understanding of earth science [1]. In the early 2010s, approximately 7.8 million geotourists were recorded as visiting geotourism destinations worldwide [4].

Geological resources suffer from the adverse impacts of excessive and intensive visitation to geoparks [1]. Unfortunately, public assets, such as protected areas and parks supporting ecotourism, have encountered decreased budgets for maintaining natural resources and amenities [5]. Taking national nature reserves in China as examples, Han et al. (2011) pointed out that national nature reserves where fund allocation exceeded local financial budgets were encouraged to seek new approaches to generate extra revenue to support protection and management [6]. Similarly, global geoparks in China have also encountered the exact circumstances regarding funding inadequacy. How do we create revenues to achieve conservation goals? Despite funds from the central government, common alternative sources for generating revenues include donations and entry fees [7–9]. Donations are seldom certain or sustainable; thus, imposing an entry fee system might be a feasible financial approach to generate revenue for improving management and conservation in

geoparks [10,11]. In contrast to Europe, where entrance fees are typically charged for museums and caves but not for geoparks, most geoparks in the Greater China Region do charge admission fees. For instance, in mainland China, the fees for geoparks usually range from RMB 80 to 200. Apart from that, facilities within the parks are also charged separately, such as cable cars, cruises, etc. However, the effectiveness and rationality of this fee system are often underestimated.

Neither geological resources and services nor geopark conservation have explicitly marketed prices, implying that it is practically impossible to directly charge visitors for their use [12]. As a result, the values of those non-market goods were disregarded or assigned inappropriate weightings [13]. One of the most encompassing approaches is investigating willingness to pay when attempting to monetize the economic importance of geological resources and geopark conservation. The contingent valuation method (CVM), a survey-based instrument, seeks to evaluate intangible issues by eliciting individuals' willingness to pay in a hypothetical market [14,15]. When the value of conservation projects is indicated in exact monetary terms, it provides more explicit references for administrators to levy optimum entry fees that help to achieve geopark management on a sustainable basis [16,17].

In this empirical study, the willingness to pay for conservation was investigated in the context of geotourism in the Greater China Region. The geoparks in this region are endeavoring to capitalize on the economic significance of conserving geological resources to counteract the existing financial deficiency in conservation. Four research questions are identified. First, how do visitors perceive and prioritize the management and conservation of geoparks, specifically in relation to geological resources? Second, what is the willingness of visitors to pay for geopark conservation, and how can this be measured using the contingent valuation method (CVM)? Third, what factors contribute to or influence visitors' willingness to pay for geopark conservation, and how can these factors be identified and analyzed? Fourth, how can the information gathered about visitors' willingness to pay contribute to determining optimal entry fees for geopark management and conservation?

With these thoughts in mind, three global geoparks in the Greater China Region were selected as the study sites to fulfill two research objectives: (1) to assess visitors' preferences and expectations regarding geopark management and conservation by utilizing the contingent valuation method (CVM). This includes eliciting their willingness to pay and estimating the specific amount visitors are willing to contribute for these purposes. (2) to identify and analyze the key factors influencing visitors' willingness to pay for geopark conservation. This examination aims to offer valuable insights for policy-makers engaged in empirical assessments, contributing to the formulation of effective administrative regulations.

## 2. Literature Review

### 2.1. Geopark and Geotourism in the Greater China Region

The present study defines the Greater China Region as the region that includes China, Hong Kong, and Taiwan. The area experiences the evolution of ancient plates that possess complex geological patterns. Diversified geological features and distinctive geomorphological landforms make this region an attractive destination for geotourism. The concept and management of geopark were first introduced in the early 1990s [3,18]. Currently, 41 geoparks in the Greater China Region are designated as UNESCO Global Geoparks (UGGPs), demonstrating their international recognition in terms of the contributions made by those geoparks in promoting geological importance and conserving geodiversity [1].

In line with the literature relating to geoparks, this region has witnessed a booming visitation market [19]. By 2015, geoparks at the national and global level received 438 million visitors [20]. Moreover, visitor volume usually increases dramatically on official issued holidays, such as May Day and national holidays. The concentrated visitation influx within the short term might exceed the carrying capacity of the geoparks, putting pressure on the local facilities and degrading vulnerable geological resources [3]. Even-

tually, adverse impacts are not only visual eyesores that degrade experience quality but contribute to insecurity in terms of site visitation [21]. Therefore, one challenge facing park managers was to strike a balance between preventing the geopark from premature degradation and, at the same time, facilitating visitors with a pleasant geotourism experience. Global geoparks in the Greater China Region is an optimum study site for conducting surveys to investigate controversial issues concerning geoparks and geotourism.

### 2.2. Willingness to Pay (WTP)

Willingness to pay (WTP) presents payment intentions and measures the maximum amount individuals intend to pay [22]. The existing literature on WTP relating to natural areas is mainly concentrated on qualifying the economic value of (1) resources that are used as recreational attractions [10,23,24] and (2) the conservation of various natural areas (i.e., wetlands, beaches, forests) [14,25,26]. However, the importance of WTP analysis in the context of geological resources or geopark conservation needs to be considered. Only three previous studies have investigated WTP in the context of geotourism [19,27,28]. Thus, whether geotourists are willing to pay and how much they prefer to pay for geopark conservation might deserve more attention.

The contingent valuation method (CVM) provides theoretically correct and plausible information concerning individuals' WTP following the rational choice theory and utility maximization [5,29]. CVM is a stated preference approach that has been widely adopted in previous studies to estimate the economic value of non-marketed goods and services by creating hypothetical scenarios for individuals [5,30]. Although CVM might not be a perfect technique for obtaining individuals' preference information, it plays a significant role in policy formulation. It is a simple and direct valuation approach employed through the use of questionnaires [5,31]. In the past 50 years, the concentration of CVM has switched from the valuation of environmental damage to conservation [5,16]. Therefore, this study employs CVM to elicit the value that visitors attached to the upkeep of geoparks by asking them whether they were willing to pay and how much they preferred to pay.

### 2.3. Determinants of Willingness to Pay

WTP is a complicated psychological process that differs across individuals [32,33]. Therefore, it is crucial and necessary to investigate the visitor-related factors underlying this monetary valuation of natural resource protection [34], which improves WTP estimation efficiency and achieves geopark management and conservation. First, previous studies examined the influences of demographic variables (i.e., age, income) on WTP in the context of resource conservation in ecotourism and geotourism [12,25,26]. However, existing surveys exhibit contradictory results in terms of explaining those relationships. For instance, Ezebilo [12] indicated no significant relationships between age and WTP for ecotourism resource conservation, whilst a statistical coefficient of age was found to have positive effects on WTP in terms of protecting natural resources [5]. Income level was one of the most widely recognized predictors of WTP for nature conservation [17,35]; nonetheless, Patti [31] reported that income was irrelevant to WTP for environment protection in ecotourism. These inconclusive results might be due to heterogeneity in different societies [36]. Therefore, the present study investigates the relationships between socio-indicators (gender, age, educational level, and monthly income) and respondents' WTP with the case studies of global geoparks in the Greater China Region.

In addition to various socioeconomic variables, place attachment, an emotional bond humans share with inanimate target objects (i.e., products and places) [32,37], has aroused scholarly attention. Understanding how visitors attach meaning to specific environmental settings profoundly contributes to nature conservation [38]. Previous studies regarding relationships between place attachment and WTP were mainly in the environmental conservation field instead of geopark protection [33,37]. For instance, Nielsen-Pincus et al. [39] and Wang [40] suggested that an individual's attachment significantly predicted the willingness to engage in environmental conservation. Li et al. [33] found that residents were

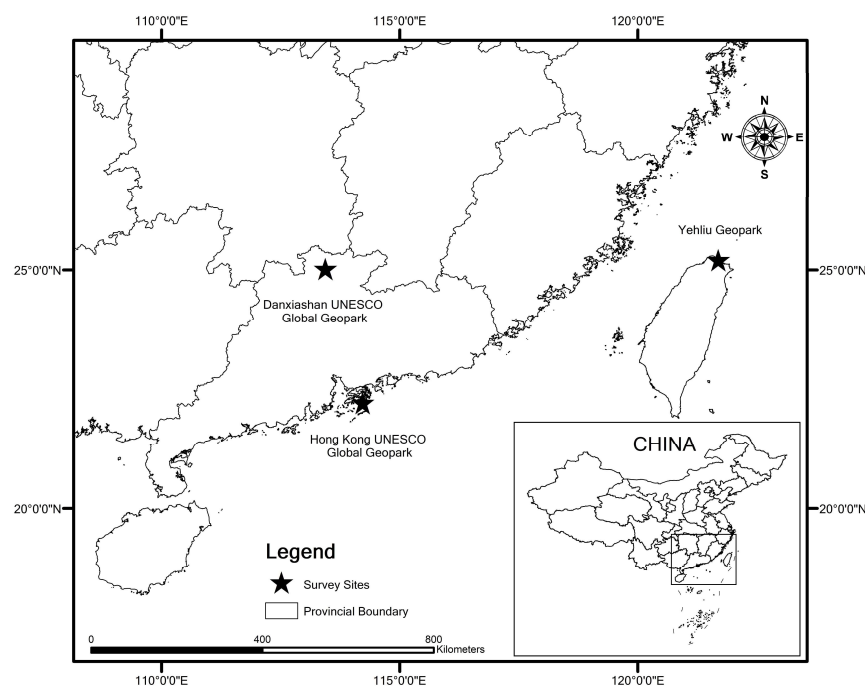
more willing to pay for ecosystem conservation than tourism operators because of their stronger local identity and attachment. Based on the results summarized from previous research, this study hypothesized that geotourists with a stronger attachment to geoparks might have a stronger intention to pay and will pay more for geopark management and conservation.

Moreover, satisfaction, the sensations or feelings that are generated from natural resources in terms of cognition and emotion, is another significant determinant of WTP for the improvement and conservation of environmental settings [16,41,42]. López-Mosquera and Sánchez [42] pointed out that the more satisfaction that visitors felt with a natural park, the greater their willingness to pay for the improvement and conservation of the park. However, other arguments emerged, indicating that the effects of satisfaction on WTP for conservation might depend on its specific objects [43] or be mediated by some variables, such as the commitment to the environment [44]. Togridou et al. [43] unveiled the negative relationship between satisfaction with infrastructure and WTP in terms of supporting conservation, while visitors who were more satisfied with services and price had a greater willingness to pay more. Moreover, Assefa et al. [14] and Lamsal et al. [45] suggested that satisfaction with the current status negatively influenced WTP in relation to conservation. Compared with studies focused on the context of environmental conservation, the effects of satisfaction on the willingness to pay for protecting geoparks were underestimated. Therefore, this study examined whether geotourists with higher satisfaction could have a stronger intention and pay more for geopark management and conservation.

### 3. Methodology

#### 3.1. Study Sites

The Danxiashan UNESCO Global Geopark (DXGP) in the southern part of China, the Hong Kong UNESCO Global Geopark (HKGP) in the New Territories of Hong Kong, and the Yehliu Geopark (YLGP) on the northern coast of Taiwan were selected as the study sites (Figure 1). The extraordinary aesthetic and remarkable scientific qualities in the geology and geomorphology of these sites made them officially established as geotourism destinations in the early 2000s (DXGP in 2004; HKGP in 2009; and YLGP in 2003) [46–48].



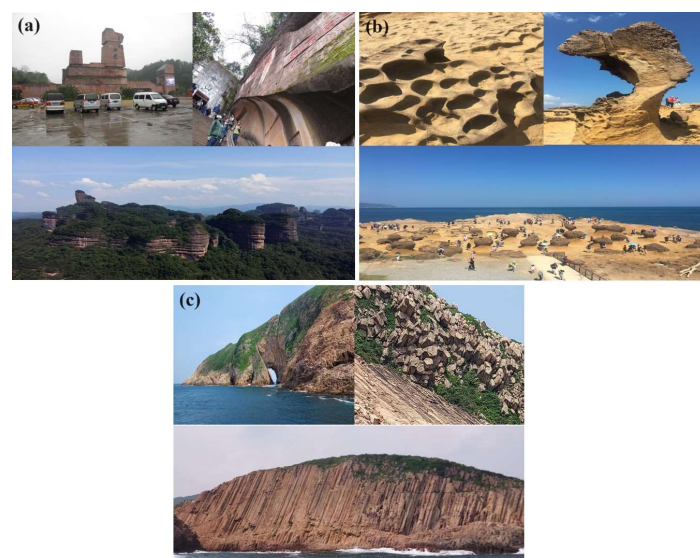
**Figure 1.** Map of the three studied geoparks namely Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

DXGP is specifically located northeast of Shaoguan, a city in Guangdong Province. It is positioned in the Danxia Basin, extending to an area of 292 km<sup>2</sup>, whose dominant bedrock is red conglomerates and sandstones [46]. Well-developed Cretaceous-Period reddish beds were first raised and then dissected by faulting and jointing during the Himalayan orogenic cycle. Finally, escarpments formed together due to water erosion and weathering, which characterize the unique regional geomorphology (i.e., canyons, prominent cliffs) that is directly named after the park: Danxia landforms [46,49]. Being a great example of the geodynamics of South China during the late Mesozoic era, the DXGP is an ideal location to study geodiversity and geoheritage, and also serves as a center for learning about the Danxia landscape in the humid subtropical climate of China [46].

The HKGP comprises two adjoining regions, namely the Sai Kung Volcanic Rock Region (e.g., High Island Geo-area) and the Northeast New Territories Sedimentary Rock Region (e.g., Tung Ping Chau Geo-Area), with an area of about 150 km<sup>2</sup> [47]. The magnificent geological treasure in Sai Kung Volcanic Rock Region is in its well-outcropped acidic volcanic hexagonal rock columns whose diameters are about 1.2 m due to unusual folding and faulting related to tectonic forces [19,50]. On the other hand, New Territories' sedimentary showcases formed from the Devonian to the Paleogene, displaying over a 400-million-year geological history [47]. Remarkable geological features along the coastal line arouse the desire to experience the stunning scenery and highlight the importance of geoconservation.

The YLGP is positioned at a sandstone peninsula formed in the Daliao Miocene with an area of 4.57 km<sup>2</sup> (Length is 1.7 km while width ranges from 0.05 km to 0.25 km); specifically, 0.53 km<sup>2</sup> is land while the sea area covers about 4.04 km<sup>2</sup> [21,51]. Constant internal (crustal uplift) and external (waves and wind) forces have chiseled sandstone beds, creating a series of protrusions and potholes (i.e., typical cuesta and sea erosion platforms) that possess high-geological significance [52,53]. In addition to its rare geological value, the YLGP is also home to diverse intertidal and marine life, making it an ideal geotourism destination.

Geotourists have flocked to the three parks because of their fascinating geological features and remarkable landforms (Figure 2). Since 2010, each of them has recorded 1.5 million visitors annually, which is continuously increasing [21,47,54]. However, the increase in visitors has also resulted in the depletion of geological resources, leading to unsightly areas and unsafe conditions for travelers [21]. This study focuses on the DXGP, HKGP, and YLGP, which are excellent locations to explore constructive solutions to maintain geopark conservation while promoting recreation in the Greater China Region, whose unique geological resources are especially threatened by increasing visitation volume.



**Figure 2.** Photos of three geoparks. (a) Danxiashan UNESCO Global Geopark (Mainland China); (b) Yehliu Geopark (Taiwan); and (c) Hong Kong UNESCO Global Geopark (Hong Kong).

### 3.2. Questionnaire Design

The questionnaire of this study was composed of four sections. The first two parts investigated geotourists' place attachment (PA) and satisfaction (SA) through the employment of a five-point Likert scale, ranging from "strongly disagree" (score 1) to "strongly agree" (score 5). Specifically, the first part consisted of seventeen statements that captured an individual's attachment to the geopark. Questions regarding PA in the present studies were derived from previous studies [32,37,55], and some were revised to fit the local context. The second section examined the satisfaction level of geopark visitors through the application of sixteen items referring to existing studies on tourist satisfaction [16,42,56], and some of them were mainly designed for geopark adaptations.

In the third part, geotourists' willingness to pay for geopark management and conservation was estimated by adopting the contingent valuation method [42,56,57]. In the valuation scenario, the respondents were asked to indicate their willingness to financially support geopark management and conservation if the authorities used these charged admission fees as conservation funds. They were asked to answer the actual valuation question if they indicated a positive willingness to pay (WTP). This study aimed to determine the specific payment amounts (WTP in USD) by using an open-ended (OE) question approach rather than the dichotomous bidding (DB) or payment card (PC) approach. Although DB is the most explicit format, it has controversies as it limits the understanding of the actual preference and has issues related to the starting point [19]. On the other hand, PC is useful for constructing hypothetical transactions quickly [58], but it is not applicable to this study. This is because Mainland China, Hong Kong, and Taiwan have different core value quotas, payment spaces, or maximum values, which could create range bias or centering bias [59]. Therefore, despite the potential difficulty in terms of respondents comprehending the OE format, it was adopted to minimize bias and ensure that the WTP estimates are as accurate as possible. Moreover, if they were unwilling to pay and selected the no protest reason, their corresponding WTP (in USD) was treated as USD 0 [60]. Finally, the demographic profiles of the geotourists, including gender, age, educational background, and monthly income, were recorded in the fourth section.

### 3.3. Questionnaire Survey and Data Analysis

Generally, the visitation season of the Greater China Region typically runs from March through to August, coinciding with officially issued holidays (i.e., Ching Ming Festival and May Day) and summer vacation. During the peak season, geoparks may suffer from excessive visitation pressure, which could impact this study. Therefore, on-site questionnaire surveys were conducted every weekend from early March to July 2019 (DXGP: early March; HKGP: from May to June; YLGP: from June to July), guaranteeing an adequate number of respondents at each studied geopark. However, conducting an on-site survey within the restricted selection period may result in an incomplete understanding of visitation to the studied geopark. Additionally, the self-reported questionnaire used in the survey might lead to the collection of subjective data.

Twenty school students were trained as research assistants to distribute the paper-formed questionnaires at the rest areas or gathering spots near the exits. Geotourists who completed the whole geotour were randomly chosen to participate in the survey independently. Generally, only geotourists above the age of 18 (ranging from 18 to above 65 years old) were interviewed. It took an average of fifteen minutes to complete the questionnaire, and explanations were provided by the research assistants if necessary. In total, 894 geotourists were approached at three studied sites, and 880 questionnaires were valid, indicating a response rate of 98.4%.

All of the valid questionnaire data were input to SPSS version 25.0 for descriptive and parametric statistical analyses. First, the central tendency (mean) was calculated to indicate the general characteristics of WTP and the WTP (in USD) of geotourists in the Greater China Region. Then, one-way analysis of variance (ANOVA) and Welch's analysis of variance (Welch's ANOVA) tests were performed to compare the differences in WTP (in

USD), PA, and SA exiting among the three studied geoparks. Furthermore, the influences of geotourists' demographic characteristics, PA, and SA on WTP and WTP (in USD) were further investigated through the use of Spearman's correlation tests.

## 4. Results

### 4.1. Sociodemographic Characteristics

Table 1 shows that out of the 879 geotourists, 458 were female (52.1%) and 421 were male (47.9%). The percentages of females in the YLGP, DXGP, and HKGP were 52.7%, 52.0%, and 51.7%, respectively. The survey results show that the majority of the respondents were young adults aged between 18–25 (307, 35.0%) and 26–35 (267, 30.4%). Only a small number of respondents were aged 56–65 (41, 4.7%) and over 65 years old (14, 1.6%). Among the geotourists, the largest proportion (114, 37.7%) at the HKGP were aged 26–35, while most visitors at the YLGP (92, 33.0%) and DXGP (141, 47.6%) were aged 18–25. At the HKGP, the second largest age group was 18–25 (74, 24.5%), while at the DXGP, the second largest group was aged 26–35 (88, 29.7%). For the YLGP, the respondents were evenly distributed between the age groups of 26–35 (65, 23.3%) and 36–45 (60, 21.5%).

**Table 1.** Geotourists' socioeconomic demographic characteristics of the Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

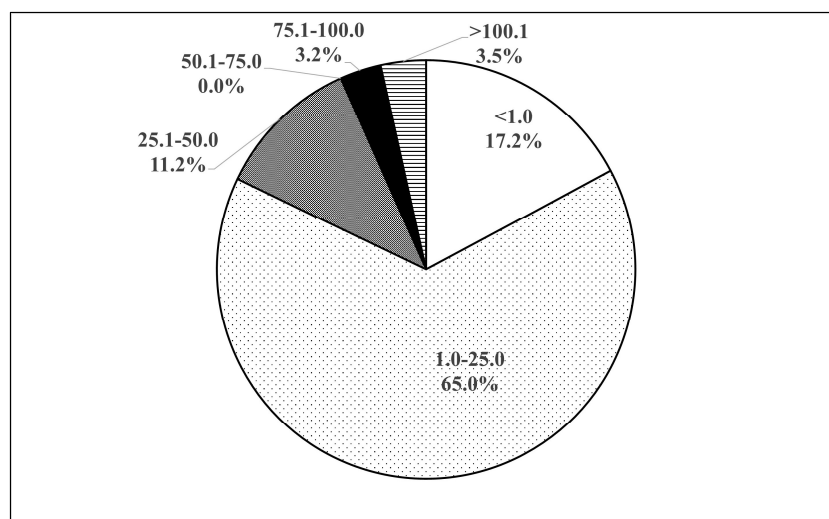
	HKGP		YLGP		DXGP		Overall	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Gender								
Male	146	48.3	132	47.3	143	48.0	421	47.9
Female	156	51.7	147	52.7	155	52.0	458	52.1
Age								
18–25	74	24.5	92	33.0	141	47.6	307	35.0
26–35	114	37.7	65	23.3	88	29.7	267	30.4
36–45	60	19.9	60	21.5	31	10.5	151	17.2
46–55	37	12.3	35	12.5	25	8.4	97	11.0
56–65	15	5.0	20	7.2	6	2.0	41	4.7
Over 65	2	0.7	7	2.5	5	1.7	14	1.6
Educational background								
Primary school	4	1.3	2	0.7	7	2.4	13	1.5
Secondary school	42	13.9	52	18.7	26	8.8	120	13.7
Post-secondary	71	23.5	72	25.9	67	22.8	210	24.0
Undergraduate	146	48.3	108	38.8	167	56.8	421	48.2
Postgraduate & above	39	12.9	44	15.8	27	9.2	110	12.6
Monthly income								
No salary	77	25.5	99	37.4	109	36.8	285	33.0
Low level	50	16.6	31	11.7	40	13.5	121	14.0
Middle level	89	29.4	45	17	57	19.3	191	22.1
High level	86	28.5	90	34	90	30.4	266	30.8

Furthermore, a large proportion of geopark visitors possessed an undergraduate degree (421, 48.2%) or master's or higher (110, 12.6%), while 15.2% (133) of the respondents only completed secondary education or below. The findings indicated that geotourists in the Greater China region were well-educated; mainly, the percentage of geotourists with a bachelor's degree or above at the DXGP (194, 66.0%) and the HKGP (185, 61.2%) was more than at the YLGP (152, 54.6%). Concerning monthly income, 30.8% (266) and 22.1% (191) of the respondents reached the high and middle levels, respectively. Only 14.0% (121) fell into the low monthly income group. Notably, respondents with no salary accounted for 33.0% (285). Notably, the most significant percentage of geotourists at the YLGP (99, 37.4%) and DXGP (109, 36.8%) earned no salary, followed by the group with the high income level. The monthly income level of visitors at HKGP was evenly distributed into four grades.



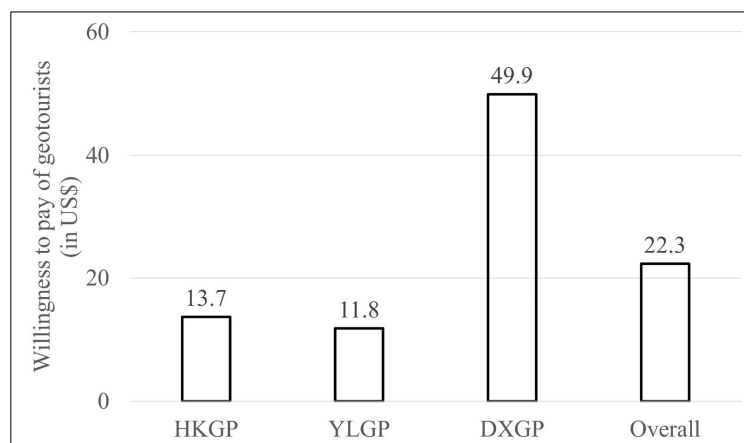
#### 4.2. Willingness to Pay for Geopark Management and Conservation

In this study, 64.2% (565) of the respondents were willing to pay (WTP) for geopark conservation. Regarding the specific amount (WTP in USD), the mean value was USD 22.3, ranging from 0 to USD 1449.3. Figure 3 shows that the majority of geotourists (65.0%) stated a WTP (in USD) of USD 1.0–USD 25.0, followed by 11.2% reporting a WTP (in USD) of USD 25.1–USD 50.0. Only 3.2% and 3.5% of respondents were willing to pay USD 50.1–USD 100.0 and more than USD 100.1. Notably, 17.2% of visitors indicated their WTP; however, they presented a WTP (in USD) less than USD 1.0.



**Figure 3.** Overall distribution of the willingness to pay (in USD) of the geotourists in the Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

Regarding the WTP and WTP (in USD) recorded by each geopark, 75.9% of the visitors in the YLGP exhibited a WTP that was remarkably larger than the visitors of the HKGP (65.6%) and DXGP (48.5%). The results of the one-way ANOVA suggest significant differences in WTP (in USD) among the three parks ( $F = 10.796, p < 0.001$ ) (Table 2). The amount that visitors in DXGP (USD 49.9) would like to pay was statistically higher than the visitors of the HKGP (USD 13.7) and YLGP (USD 11.8) (Figure 4). In addition, the proportion of respondents who had a WTP but indicated a WTP (in USD) of 0 in the YLGP (20.8%) and DXGP (16.7%) was conspicuously higher than the visitors of the HKGP (6.3%).



**Figure 4.** Mean willingness to pay (in USD) of the geotourists in the Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

**Table 2.** ANOVA results of WTP (in USD), place attachment, and satisfaction of geotourists in the Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

Construct	Studied Site	Mean	Std. Deviation	F	Sig
WTP (in USD)	HKGP	13.67	28.09	10.796 <sup>1</sup>	0.000 ***
	YLGP	49.92	148.89		
	DXGP	11.76	50.09		
Place attachment	HKGP	3.59	0.55	0.141 <sup>2</sup>	0.869
	YLGP	3.61	0.60		
	DXGP	3.58	0.69		
Satisfaction	HKGP	3.68	0.59	21.808 <sup>2</sup>	0.000 ***
	YLGP	4.01	0.62		
	DXGP	3.85	0.71		

<sup>1</sup> outputs of one-way ANOVA analysis; <sup>2</sup> outputs of Welch's ANOVA analysis. \*\*\* Statistically significant at the 0.001 level (2-tailed).

In this study, 35.8% (315) of the respondents were unwilling to pay, represented by a WTP of 0, and four reasons explaining their negative approach are summarized in Table 3. Approximately a third of the geotourists (32.3%) treated geoparks as public assets (Reason 1), and thus, payment is unnecessary. Furthermore, 27.6% and 25.9% of the visitors took the costly admission fees (Reason 4) and governmental responsibility (Reason 3) as the reason for non-WTP, respectively. Regarding explanations for the negative attitudes towards WTP, they varied with different parks. More than half of the geotourists at the DXGP (53.7%) ascribed their unwillingness to pay to Reason 4, while 52.1% in the HKGP indicated Reason 1. Furthermore, geotourists of the YLGP thought that all four of these statements presented the same importance in explicating their unwillingness to pay for geopark management and conservation.

**Table 3.** Protest responses stated by geotourists in the Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

	Statement	Overall (%)	HKGP (%)	YLGP (%)	DXGP (%)
1	This environment should be publicly owned, I don't think we need to pay.	32.3	52.1	23.6	16.5
2	I don't think this geopark is worth paying for a visit.	9.1	9.1	20.0	4.1
3	The government should pay for us.	25.9	33.9	23.6	19.0
4	I don't want to pay because the admission ticket is unacceptably expensive.	27.6	4.1	21.8	53.7
5	Other reasons	5.1	0.8	10.9	6.6

#### 4.3. Place Attachment and Satisfaction of Geotourists

The internal consistencies of the items indicating place attachment (PA) and satisfaction (SA) were first tested. Cronbach's  $\alpha$  values of PA (0.897) and SA (0.931) were higher than 0.6; therefore, the mean values were reliable in terms of interpreting PA and SA [61]. The PA of the overall geotourists had a mean score of 3.59, suggesting that the geopark visitors of the Greater China Region had a relatively stronger attachment to the geopark they visited. Regarding PA, as indicated in each studied geopark, Welch's ANOVA reported that there were no significant differences in PA between the HKGP (3.59), YLGP (3.60), or DXGP (3.58) ( $F = 0.141$ ,  $p = 0.869$ ) (Table 2). The overall mean score of SA was 3.85, indicating that the respondents were satisfied with their visitations to geoparks in the Greater China Region. Furthermore, the significant results of Welch's ANOVA suggested that the three studied

geoparks expressed a statistical difference in terms of SA ( $F = 21.808, p < 0.001$ ) (Table 2). Geotourists in the YLGP (4.01) showed significantly higher levels of SA than those in the DXGP (3.85) ( $p < 0.05$ ) and HKGP (3.68) ( $p < 0.001$ ).

#### 4.4. Association between Geotourists' Willingness to Pay and Demographic Variables, Place Attachment, and Satisfaction

Table 4 suggests that educational background ( $\tau = 0.074, p < 0.01$ ) and monthly salary ( $\tau = 0.094, p < 0.01$ ) exhibited positive correlations with WTP. However, WTP (in USD) was only associated with educational background ( $\tau = 0.088, p < 0.01$ ) other than monthly income level ( $\tau = 0.052, p > 0.05$ ). Furthermore, neither gender nor age group were reported to have significant correlations with WTP or WTP (USD). Regarding the influences of PA and SA, geotourists' attachment (PA,  $\tau = 0.133, p < 0.01$ ) and satisfaction (SA,  $\tau = 0.138, p < 0.01$ ) were reported to have significant positive coefficients in predicting WTP. In addition, PA ( $\tau = 0.122, p < 0.01$ ) and SA ( $\tau = 0.105, p < 0.01$ ) were also positively correlated with WTP (in USD).

**Table 4.** Spearman's correlation for WTP, demographic variables, place attachment, and satisfaction of the geotourists in the Danxiashan UNESCO Global Geopark (Mainland China), Yehliu Geopark (Taiwan), and Hong Kong UNESCO Global Geopark (Hong Kong).

	Willingness to Pay	Willingness to Pay (in USD)
Demographic variables		
Gender	−0.016	−0.016
Age	0.035	0.08
Educational background	0.074 **	0.088 **
Monthly income	0.094 **	0.052
Place attachment	0.133 **	0.112 **
Satisfaction	0.138 **	0.105 **

\*\* Statistically significant at the 0.01 level (2-tailed).

## 5. Discussion

### 5.1. Characteristics of Geotourists' WTP in the Greater China Region

A considerable proportion of geotourists in the Greater China Region have a positive-attitude toward administrators' initiatives to raise funds for geological preservation and geopark management, which is consistent with previous surveys conducted by Cheung et al. [19] at UNESCO global geoparks in Hong Kong and Han et al. [6] in nature reserves in China. This finding reinforces that visitors in the Greater China Region likely recognize the paramount value of geological resources and that the economic values of geopark conservation could be monetized. This could be achieved through the public promotion of the iconic geological features (i.e., the Danxia landforms in the DXGP, hexagonal rock columns in the HKGP, and the Queen's Head in the YLGP) by park authorities or local governments. The widespread promotion of publicity might arouse public interest in protecting those vulnerable but precious geological treasures [62,63], which might help bridge conservation awareness with their willingness to provide financial support. In addition, supportive facilities (i.e., museums, visitor centers) and interactive activities (i.e., workshops, sharing seminars) provided by UNESCO Global Geoparks in the Greater China Region not only serve educational functions but facilitate geotourism experiences [64,65], triggering visitors' willingness to pay for geological conservation to maintain high visitation quality.

In addition to the sizeable proportion of visitors indicating their WTP, the present study reported that the average WTP (in USD) for the upkeep of geoparks in the Greater China Region was USD 22.3. These results are compatible with those found in previous studies. For instance, Rahman et al. [28] unveiled that visitors to Langkawi Global Geopark, Malaysia, would like to pay USD 19.59 for geo-heritage conservation. Furthermore, geotourists were willing to pay USD 23.76 to preserve geological attractions at Gullies of Kondoa District, Central Tanzania [27]. Noticeably, compared to the average WTP (in USD)

of ecotourists who were willing to conserve reefs and beaches (less than USD 15) [66] or forests and mangroves (less than USD 10) [26], geotourists would have higher WTP (in USD) (i.e.,  $\geq$ USD 20). Moreover, ecotourism is a new market, and the locations of geoparks are usually far from urban centers, and due to its novelty and remoteness, visitors might be willing to pay more [67,68].

Furthermore, the average WTP (in USD) reported in the DXGP was significantly higher than the other two geoparks, which might be ascribed to its extensive grounds. Compared to the HKGP (150 km<sup>2</sup>) and YLGP (4.57 km<sup>2</sup>), the visitation area of the DXGP (292 km<sup>2</sup>) is vastly more spacious. Geotourists might consider it costly to preserve geological resources distributed across such an extensive region; therefore, they will likely pay more to achieve the conservation goals of larger parks. In addition, geotourists in mainland China might find geotourism increasingly affordable because of economic development, which might be another reason for them to indicate a higher level of WTP (in USD) [60].

### 5.2. Predictors of Willingness to Pay

Several predictors might affect geotourists' intention to pay for conservation and the specific amount they would like to pay. The outputs of Spearman's correlation indicated that education status was positively correlated with WTP and WTP (in USD). The findings are compatible with previous studies that suggested visitors with higher educational levels indicated greater intentions to pay for nature reserve conservation [5], biodiversity conservation [69], and natural resource restoration [70]. This is a rational conclusion. Tourists with higher education status might have adequate knowledge of geological resources and conservation issues that elevate their levels of protective awareness [71]. Moreover, the result suggested that increased educational levels might increase WTP (in USD), which is consistent with previous studies [65]. In this case, well-educated geotourists are more likely to possess an interest in research, which might increase their knowledge and induce positive impacts on their behavior, such as WTP (in USD) [69].

Besides education status, the present study found that monthly income level was positively related to WTP, indicating that geotourists with higher income levels would be more inclined to pay for geopark conservation. This result conforms to the general economic theory, meaning that people with more robust economic bases were more willing to pay [72], which is consistent with previous studies [5,12]. On the other hand, monthly income level was an insignificant predictor of WTP (in USD), suggesting that the specific payment amount was not significantly influenced by income. Although this finding is incompatible with previous studies [73], it is sensible in the Greater China Region. About 60% of the visitors stated that geoparks should be publicly owned, for which the government has obligations to pay instead of visitors (Table 3); therefore, it is rational that the amount geotourists earn is irrelevant to the specific payment amount provided for geopark conservation. Moreover, the admission fee in the Greater China Region is higher (i.e., ranging from USD 8.07 to USD 61.29) than the majority of global geoparks in other countries where no admission fee is required [19]. Therefore, geotourists in the Greater China Region might consider that they have already paid adequate amounts for geopark visits, which might contribute to their unwillingness to pay more. However, they possess higher monthly income levels.

In addition to socioeconomic factors, place attachment significantly predicted WTP and WTP (in USD). Consistent results were obtained in previous studies that examined willingness to pay for natural area management [37] and state park conservation [74]. Attachment reflects the special emotional ties between visitors and the destination [32]. Increased place attachment might increase geotourists' willingness to allocate emotional, cognitive, and behavioral resources toward geoparks [38]. Consequently, visitors who possess a higher level of attachment might have stronger commitments to conserving geological landscapes [37], which might arouse greater economic incentives to support geopark conservation [74].

Moreover, this study suggested that satisfaction was another significant predictor of WTP and WTP (in USD) for the upkeep of geoparks, and this finding is compatible with previous studies [24,45,57]. The satisfaction obtained from their visiting experience might increase their intention to pay for the protection of the intangible resources (i.e., marine resources, wetlands) that support ecotourism [14,73]. On the other hand, the negative emotions of visitors might be diminished once their expectations are satisfied [42]. As a result, the more geotourists felt fulfilled during their geopark visitation, the greater their monetary valuation on the protection of geological resources catering to their demands. Therefore, satisfaction should be regarded as a benchmark to measure visitors' monetary valuation of the protection and improvement of geoparks in the Greater China Region [16,41].

### 5.3. Management Implications

The results of this study reveal that a significant proportion of geotourists are amenable to paying for the preservation and management of geoparks. This study affirms the practicality of implementing entry fee systems in the Greater China Region. An entry fee should be imposed for small geoparks, such as the YLGP, which is located on a peninsula. For other geoparks in mainland China that have vast areas without clearly defined boundaries, fees could be introduced only for the use of specific attractions. Meanwhile, it is important to consider how to make pricing more reasonable. Concerning the statements that indicated the reasons for visitor unwillingness to pay, park authorities should recognize that the fee should be evidence-informed instead of solely on their notions [9]. Administrators should reference monthly income and individual payments when instituting visitation pricing at geoparks due to the fact that regardless of whether geotourists care about geological conservation, as long as they cannot afford to pay, they will resist any fee proposals [8].

In addition, the influence of education on nature conservation was profound [65]. It is suggested that park authorities promote educational programs that comprehend the significance of geodiversity and its benefits for geotourists, which might increase geotourists' knowledge in terms of geological resource conservation [12,65]. Specifically, educational amenities (i.e., exhibitions) and interpretative services (i.e., accredited geoguided tours) might not only bring more revenues to geoparks but help cultivate geopark visitors' willingness to pay for geopark conservation [17,75].

Furthermore, strategies that build attachment and increase satisfaction deserve special attention because they might motivate geological conservation behaviors [76]. Specifically, it is recommended that communication platforms between park managers and geotourists should be built, which would help ensure that the provision of facilities and services is in line with the multiple expectations and demands of visitors [39]. By fulfilling their desires, place attachment and satisfaction would be enhanced, contributing to increasing willingness to raise funds for the improvement and upkeep of geological resources in geoparks [37,42].

Last, it is important to acknowledge that the present study has limitations. First, on-site surveys were conducted within a specific period, and the study relied on self-reported questionnaires, which could have led to some bias in the results. For instance, visitation patterns throughout the year may not be accurately captured. Therefore, future studies should focus on the potential limitations of the data collection method. Second, the questionnaire only examined the sociodemographic profiles of the respondents. However, information related to visitation characteristics (i.e., is this the first visit to a geopark? Do you recognize heritage values as an important tourist attraction?) is also crucial to understanding willingness to pay (WTP). Therefore, in future studies, it will be necessary to broaden the scope of the questionnaire to include a more comprehensive range of factors that may influence WTP. Third, the on-site survey was conducted in 2019, which only represents the circumstances and opinions related to willingness to pay (WTP) before the COVID-19 pandemic. It is highly recommended that a future study is conducted to identify any significant differences in WTP or WTP (USD) between the pre- and post-pandemic period.

## 6. Conclusions

In conclusion, the present study investigated the WTP (in USD), place attachment, and satisfaction of geotourists in the Greater China Region and the relationships among these variables. On the one hand, most geotourists in the Greater China Region exhibit positive WTP and WTP (in USD). On the other hand, socioeconomic profile (i.e., educational background, monthly income level), place attachment, and satisfaction exhibit significant influences on WTP and WTP (in USD) for the upkeep of geopark in the Greater China Region. These significant findings imply the feasibility of imposing entry fee systems at geoparks in the Greater China Region, which will ultimately generate funds for conservation while offsetting budgetary constraints. In addition, other geoparks in the Greater China Region can probably take reference from these findings to increase place attachment and satisfaction, which are relevant to increasing intentions and payments relating to the upkeep of geoparks.

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