

Article

Tourists' Willingness to Pay for Eco-Compensation and Its Influencing Factors from the Perspective of Public Welfare: Evidence from Wuyishan National Park

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Abstract

Eco-compensation is not only an important supplementary source of funding for ecological conservation in national parks, but also an important mechanism through which ecological beneficiaries share the costs of national park conservation. In the context of the public welfare of national parks, free admission does not imply the absence of responsibility. Therefore, it is essential to strengthen tourists' awareness of ecological conservation for national park management. Taking Wuyishan National Park as the study area, this study employed a questionnaire survey, distributed 630 questionnaires in total, and obtained 582 valid responses. The contingent valuation method (CVM) and a multiple-bounded dichotomous choice (MBDC) design were used to examine tourists' willingness to pay (WTP) for eco-compensation and its influencing factors: (1) The tourists' estimated average WTP for eco-compensation in Wuyishan National Park is approximately ¥451.72, which is higher than the total cost of admission and basic experience activities in the park. It implies that tourists have a relatively high willingness to pay for eco-compensation in the national park. (2) Based on Value–Belief–Norm (VBN) theory, the hierarchical OLS regression results showed that personal norms ($\beta = 0.636, p < 0.01$), awareness of consequences ($\beta = 0.259, p < 0.01$), and ascription of responsibility ($\beta = 0.277, p < 0.01$) were positively associated with lnWTP. The strength of these associations varied across VBN dimensions, with personal norms showing the strongest positive association with tourists' WTP for eco-compensation. (3) Income differences have a clear effect on WTP. Higher-income tourists reported greater WTP, which was more strongly associated with awareness of consequences and personal norms, whereas lower-income tourists were more responsive to environmental values and ascription of responsibility. This study identifies an association between tourists' environmental responsibility and willingness to pay for eco-compensation in the context of national park tourism. The findings offer empirical support for policy measures to regulate tourist behavior, enhance national park revenue, and reinforce the public welfare function of national parks.

Keywords: national parks; public welfare; eco-compensation; tourists; willingness to pay



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1. Introduction

The concept of public welfare is a fundamental principle guiding the development of China's national parks. The Law of the People's Republic of China on National Parks

systematically incorporates the principle of public welfare throughout the entire process of national park establishment and boundary delineation, protection and management, participation, and benefit sharing [1,2]. Accordingly, the core connotation of public welfare is “collective ownership, development, and sharing for all citizens”. From a public goods perspective, national parks fall under public welfare, and all citizens have the right to access the park through tax subsidies. Therefore, in discussions of fee systems, such as ticket systems, many scholars argue that national parks should lower the entry threshold and return to their public welfare attributes [3,4]. However, in practice, opening national parks to tourists inevitably requires additional funding to mitigate the environmental impact of tourism activities, and most countries cannot provide national park services completely free of charge [5–7]. Government subsidies are often insufficient to offset the increased operating costs brought about by tourism growth [8], thus placing additional financial pressure on national parks. There are certain practical contradictions between public welfare and asset financing. How to balance public welfare goals with national park revenue remains a key issue that urgently needs to be addressed [9].

Eco-compensation (EC) is an effective approach to alleviating environmental pressure [10] and to protecting the ecological environment by readjusting the interests of beneficiaries and those who damage ecological resources [11]. It is widely recognized as an important instrument for ecological and environmental protection [12], and its conceptual essence is largely consistent with that of payments for ecosystem services (PES) [13]. Tourist ecological compensation behavior willingness (ECBW) is an environmentally responsible behavior that prompts tourists to voluntarily take compensatory measures (such as donations or prioritizing local services and products) when visiting nature tourism destinations to protect local ecosystems and residents [14]. As direct beneficiaries of ecosystem cultural services, national park tourists’ willingness to pay ecological compensation reflects their awareness of ecological protection responsibility and cost-sharing obligations. It is also a monetized expression of environmentally responsible behavior in the context of national park tourism. Existing research on national park ecological compensation (NPEC) mainly focuses on institutional construction and community compensation. Such mechanisms usually follow three basic principles: user pays, beneficiary pays, and protectors receive compensation [15,16]. At present, China’s eco-compensation policy for national parks relies primarily on public fiscal funding, which is insufficient to cover conservation and operational costs. Therefore, exploring market-oriented eco-compensation mechanisms may broaden funding sources for national parks and help reconcile the public welfare of national parks with the need for diversified financing.

Willingness to pay (WTP) is an important economic instrument in sustainable tourism management [17,18] and refers to the maximum price or service fee that individuals are willing to pay [19]. For eco-friendly products, WTP follows a contribution model [20] rather than a purchase model [21,22], reflecting support for public welfare programs [23,24]. Tourists’ WTP can serve as a key reference for setting eco-compensation quotas or standards [16] and can provide a sustainable source of funding for ecological conservation [25], as well as an important component of eco-compensation funds [26]. Tourists’ willingness to pay depends not only on market prices and product quality, but also on socio-psychological factors [27], including environmental attitudes, empathy, and trust in conservation management institutions [14,28]. Income, responsible behavior, tourism experience, tourist habits, visitation frequency, and educational level have also been identified as relevant factors [29–32]. Existing studies have largely focused on entrance fees or general conservation payments [33], while key psychological factors influencing public participation in nature conservation remain insufficiently understood [34]. They have also rarely examined the psychological mechanisms of harmonious human–nature coexistence or individual tourists’

behavioral decisions. Against this background, this study investigates tourists' willingness to pay ecological compensation for national parks when ecotourism experiences are their primary mode of resource utilization. To align with the tourism-based eco-compensation scenarios examined in the survey, this study defines national park tourists as individuals who temporarily and voluntarily leave their usual environment and enter a national park primarily for recreation, nature experience, environmental education, or related tourism activities [35,36]. Compared to the broader scope of visitors to nature reserves [37], this study focuses more on ecotourism activities.

This study addresses the following research questions: (1) Under the public welfare objectives of national park development, are tourists willing to pay for eco-compensation? (2) How are tourists' environmentally responsible behaviors associated with their willingness to pay? (3) How can tourists' willingness to pay be enhanced in light of their individual characteristics, and how can differentiated eco-compensation schemes be designed accordingly? By addressing these questions, this study seeks to explore a tourist eco-compensation mechanism that is consistent with national park management objectives and the principles of public welfare and ecological conservation priority.

2. Materials and Methods

2.1. Study Area

Wuyishan National Park is one of the first five national parks, spanning the provinces of Fujian and Jiangxi (Figure 1). Wuyishan contains the largest and best-preserved mid-subtropical primary forest ecosystem at the same latitude globally, serving as a representative example of this ecological system. Because of its natural and cultural significance, Wuyishan has been recognized as a World Heritage Site by the United Nations Educational, Scientific, and Cultural Organization [38].

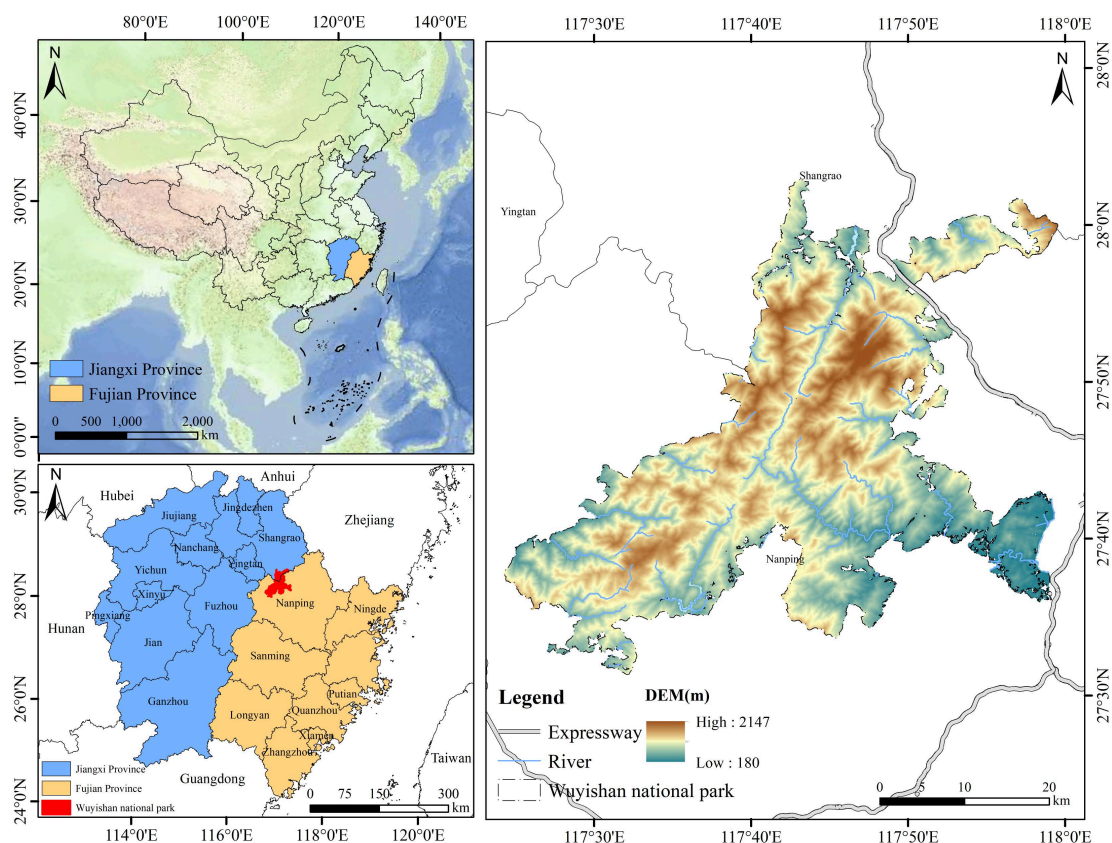


Figure 1. The location of the Wuyishan National Park.

Among the first batch of established national parks in China, Wuyishan National Park was formerly the Wuyishan Scenic and Historic Interest Area and has long maintained a well-established system of tourism pricing and management. Compared to other national parks, Wuyishan National Park implemented a generally standardized, scientific, and complete national park concession system relatively early, and the tourism concessions include tourism services, supervision, and management. The key concession projects include bamboo rafting on the Nine-Bend Stream and eco-friendly sightseeing buses. According to official information released by Wuyishan National Park, during the peak season, the entrance fee is ¥140 per person, compared with ¥120 in the off-season; a one-day sightseeing bus ticket costs ¥70 per person, and a bamboo rafting ticket costs ¥130 per person. For an average adult tourist, the total cost of a one-day visit with ecological experience consumption in Wuyishan during the peak season is approximately ¥340. To fully reflect the public welfare nature of China's national parks, Wuyishan National Park implements free admission policies for its core scenic area during multiple periods. Tourists can enter Wuyishan National Park for free, but ecological experiences require additional payment (such as bamboo rafting, sightseeing bus rides, etc.). Therefore, Wuyishan National Park provides a relatively ideal research environment, which helps to guide tourists to understand the difference between hypothetical ecological compensation payments and general ticket expenditures while weakening the interference of traditional ticket prices. At the same time, it deepens the understanding of the user-pays principle, thereby more accurately identifying tourists' true willingness to pay ecological compensation.

2.2. Theoretical Analysis Framework

Empirical studies based on value-belief-norm (VBN) theory have shown that awareness of consequences, ascription of responsibility, and personal norms are key factors in explaining individuals' environmentally responsible behavior [39–42], a finding also validated in the tourism research area [43]. In the context of the public-welfare development of national parks, tourists first form basic judgments about the relationship between humans and nature based on their ecological value orientations and, on this basis, recognize the ecological consequences that tourism activities may generate. When tourists further ascribe the relevant conservation responsibility to themselves, external requirements for ecological conservation may be transformed into internal moral obligations and manifested in stronger personal norms. Personal norms therefore become an important link between environmental responsibility cognition and WTP for eco-compensation. Accordingly, this study constructs a chain model linking values, beliefs, and personal norms to examine tourists' WTP for eco-compensation and its influencing factors in Wuyishan National Park (Figure 2).

In this mechanism model, the public welfare of national parks means that, while tourists enjoy the resource value of ecological public goods, they should also assume corresponding responsibilities for ecological conservation. Specifically, value-belief-norm (VBN) theory posits that people take action when they value something, perceive it as threatened, and believe that their actions can restore its value [44,45]. Personal values refer to the principles or motivations that propel individual behavior, such as pro-environmental behavior [41], and include altruistic values (AV), biospheric values (BV), and egoistic values (EV). Altruistic values (AV) are based on a deep concern for the well-being of others [46]. The moral satisfaction generated by tourists' payments for biodiversity conservation and environmental protection reflects altruistic behavior [47,48]. Biospheric values (BV) relate to care for other species and the overall environment and may also refer to the biosphere or non-living things [44,49]. Egoistic values (EV) concern self-interest, such as wealth, dominance, and influence over others [44]. The more individuals endorse egoistic values,

the more reluctant they are to adopt pro-environmental behaviors that are costly, effortful, or uncomfortable [39,50]. The beliefs in the VBN framework comprises three factors: the new ecological paradigm (NEP), awareness of consequences (AC), and ascription of responsibility (AR). Together, they capture the cognitive processes involved in forming pro-environmental attitudes and behaviors [51]. NEP addresses the overarching belief in the need to protect the environment and its universal values [52]. Awareness of consequences (AC) refers to individuals' understanding of the consequences of environmental harm [41,53]. Ascription of responsibility (AR) recognizes that human intervention can either mitigate or exacerbate potential environmental damage and emphasizes individuals' recognition of their personal responsibility in mitigating environmental damage [44]. Personal norms are defined as "feelings of moral obligation to perform or refrain from specific actions" [54]. VBN theory explains the formation of pro-environmental behavior through a theoretical framework in which personal values shape beliefs, leading to norms that guide behavior [55,56]. Based on the proposed theoretical framework, this study argues that tourists' environmental values, beliefs, and personal norms are associated with their stated WTP for eco-compensation.

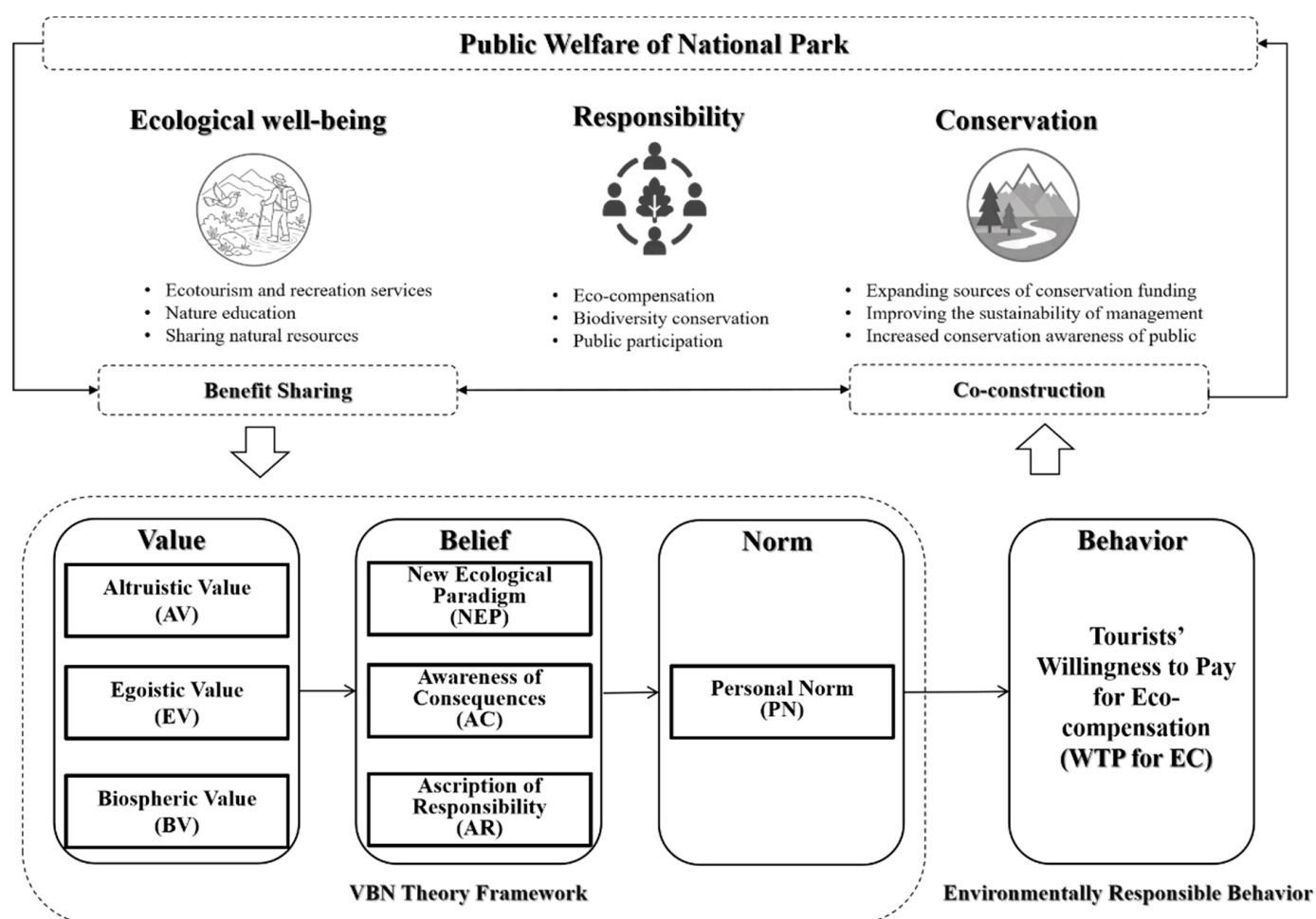


Figure 2. The structure of the theoretical mechanism framework.

2.3. Methods

The conservation value of public goods is commonly estimated using the contingent valuation method (CVM), which has been widely applied in the valuation of environmental goods and natural resources. The core logic of CVM is to describe a non-market good to respondents through a hypothetical scenario and then elicit their WTP for obtaining that

good, thereby estimating its economic value. Based on the principle of respondent utility maximization, CVM has been used for economic purposes such as environmental resource cost accounting and the transfer of use rights [57]. It has therefore been widely applied in the tourism field, particularly in evaluating the use value of national parks [6], nature reserves, and ecotourism projects. CVM usually evaluates consumer preferences by presenting hypothetical scenarios. Welsh and Poe [58] quantified this uncertainty by constructing an individual-preference distribution model and proposed the multiple bounded dichotomous choice (MBDC) method. Wang and He [59] further improved this framework and developed a two-stage estimation method. The MBDC format requires respondents to evaluate multiple bid levels and captures the degree of certainty of each bid response, enabling more comprehensive handling of preference uncertainty and producing more reliable valuation results. Previous research results confirm better estimation efficiency using MBDC data. Compared to the traditional dichotomous questionnaires used in CVM measurement, this approach effectively incorporates respondents' preference uncertainty and provides a more nuanced estimation of WTP.

2.4. Data Collection and Processing

This study designed the questionnaire based on the VBN theoretical framework and the MBDC format. Before completing the questionnaire, respondents were provided with a brief explanation of tourist eco-compensation and the temporary free admission policy implemented in Wuyishan National Park. First, respondents were asked whether they were willing to assume a certain degree of compensatory responsibility for the potential ecological pressure generated by tourism activities and for the costs of maintaining the national park ecosystem. Second, the MBDC format was used to collect data on eco-compensation payment amounts, with bid levels ranging from ¥0–¥1000, response options varying from “Definitely No” and “Probably No” to “Not Sure”, “Probably Yes” and “Definitely Yes”. Third, the constructs of the VBN framework were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Finally, basic characteristics of respondents were collected. The names, descriptions, and values of the variables are shown in Table 1. The items measuring the dimensions of the VBN theory were adapted from Stern et al. [44] and Kiatkawsin and Han [43]. The NEP was initially proposed by Dunlap et al. [52] and primarily focuses on the overall adverse effects of environmental degradation. The questionnaire was administered in Chinese, and the original items were translated and contextually adapted to national park tourism. General environmental statements were reformulated to refer to tourism-related pollution, wildlife habitat disturbance, inappropriate tourist behavior, and tourists' responsibility for the environmental impacts of tourism activities. Previous research found that factors such as age, income level, gender, and education level influence one's pro-environmental attitude and behaviors [60,61]. In particular, young people, the highly educated, and women were found to exhibit a positive attitude towards the environment [62–65]. These demographic variables help account for observable individual heterogeneity in tourists' WTP and provide a clearer estimate of the associations between the VBN variables and WTP. Therefore, this study uses VBN theory variables as the core explanatory variables and demographic characteristics as control variables to control for the potential effects of individual heterogeneity on tourists' WTP for eco-compensation.

Table 1. Definition and Assignment of Variables.

Type	Variable	Item	Measurement Scale
Dependent variable	Willingness to pay (WTP)	Would you support the eco-compensation scheme at each of the following payment levels? MBDC bid amounts: RMB 0(free)\30\50\100\150\200\300\500\800\1000	1 = Definitely No, 2 = Probably No, 3 = Not Sure, 4 = Probably Yes, 5 = Definitely Yes
Core Explanatory Variable (VBN)	Altruistic Value (AV)	I support the idea of equality, equal opportunity for all I support the idea of a world at peace, free of war and conflict I support the idea of social justice, care for the weak. I support the idea of being helpful and helping others	1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree
	Egoistic Value (EV)	Having social power, control over others and dominance Having wealth, material possessions and money Having authority, the right to lead or command Being influential, having an impact on people and events	
	Biospheric Value (BV)	Preventing pollution and conserving natural resources Respecting the earth and living in harmony with other species Unity with nature, living in harmony with nature	
	New Ecological Paradigm (NEP)	When humans interfere with nature, it often produces disastrous consequences Humans are severely abusing the environment Plants and animals have as much right as humans to exist Despite our special abilities, humans are still subject to the laws of nature The balance of nature is very delicate and easily upset Earth is like a spaceship with limited room and resources	
	Awareness of Consequences (AC)	Tourism activities can cause environmental pollution in national parks. Tourism activities can damage wildlife habitats in national parks. Tourists' inappropriate behaviors can harm the ecological environment of national parks.	
	Ascription of Responsibility (AR)	Every traveler is partly responsible for the environmental problems caused by the tourism industry Every traveler is jointly responsible for the environmental deterioration caused by traveling activities Every traveler must take responsibility for the environmental problems caused during their trips	
	Personal Norm (PN)	I feel an obligation to act environmentally by choosing eco-friendly activities while traveling in a group It is important to be environmentally friendly, reducing the harm to the community and its environment while traveling in National Park Behavior that damages the ecological environment of national parks would make me feel guilty.	
Control Variable	Gender	Male or Female	Male = 1, Female = 2
	Age (Years)	Years of Age (all respondents are adults aged 18 or older.)	18–29 = 1, 30–39 = 2, 40–49 = 3, 50–59 = 4, ≥60 = 5
	Monthly income	Monthly income of respondents (RMB per month)	≤2000 = 1, 2001–4000 = 2, 4001–6000 = 3, 6001–8000 = 4, ≥8001 = 5
	Education level	Respondents' Basic Educational Background	Elementary or junior high school = 1, High school = 2, Associate degree = 3, Bachelor's degree = 4, Postgraduate degree = 5

Throughout 2024, the park adopted a full ticket exemption policy, charging only for bamboo rafting and sightseeing bus services, while ecological self-driving activities along Scenic Route No. 1 were also free. Against this background of ticket exemption, this study investigates tourists' WTP for eco-compensation in Wuyishan National Park. The survey was conducted in September 2024, using a combination of on-site and online questionnaires to broaden respondent coverage and increase the sample size. Respondents were adult tourists in Wuyishan National Park during the free admission period in 2024. The on-site survey employed convenience sampling at major recreation nodes (entrance, tourist center, Huxiao Rock, Nine-Bend Stream, Da Hong Pao, etc.), where trained investigators

approached eligible tourists and invited them to participate voluntarily. The online questionnaire was distributed via the online platform Wenjuanxing in China to facilitate more tourists responding at a convenient time. A total of 630 questionnaires were distributed, including 400 on-site and 230 online. Of these, 358 on-site and 224 online questionnaires were valid. Overall, 582 valid questionnaires were retained, yielding a valid response rate of 92.38%.

In contingent valuation surveys, some respondents refuse to pay for ecological compensation. Such protest responses are usually excluded because they do not reflect true preferences [66]. During the investigation, we interviewed tourists to understand why they refused to pay and analyzed these reasons separately in subsequent studies. Accordingly, 40 refusal-to-pay responses were excluded during the on-site survey process. In addition, following the MBDC data processing procedure proposed by Wang et al. [67], the questionnaires were further screened for validity. We removed five questionnaires exhibiting invariant payment likelihoods across all bid levels and three questionnaires with incomplete responses. The final sample included 582 valid responses (Table 2). Among them, females accounted for 52.41% and males accounted for 47.59%. The respondents were mainly young and middle-aged, with the 18–29 age group accounting for the highest proportion (35.05%), followed by the 30–39 age group (23.20%) and the 40–49 age group (23.02%), while those aged 60 and above accounted for 4.47%. Monthly income was mainly concentrated in the middle range, with 2001–4000 (26.63%) and 4001–6000 (23.37%) as the largest groups, and 12.37% earning above 8000. Most respondents had a relatively high level of education, with bachelor’s degrees (42.10%) and associate degrees (21.31%) being the most common, and 16.67% holding postgraduate degrees. In addition, descriptive comparisons further showed broadly similar demographic distributions between the on-site and online subsamples, suggesting that the two survey modes covered generally similar groups of tourists.

Table 2. Socio-demographic characteristics of the tourists.

Demographic Variable	Item	On-Site (<i>n</i> = 358)		Online (<i>n</i> = 224)		Total (<i>n</i> = 582)	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Gender	Male	171	47.77%	106	47.32%	277	47.59%
	Female	187	52.23%	118	52.68%	305	52.41%
Age	18–29	136	37.99%	68	30.36%	204	35.05%
	30–39	73	20.39%	62	27.68%	135	23.20%
	40–49	88	24.58%	46	20.54%	134	23.02%
	50–59	41	11.45%	42	18.75%	83	14.26%
	≥60	20	5.59%	6	2.68%	26	4.47%
Monthly income (RMB per month)	≤2000	63	17.60%	46	20.54%	109	18.73%
	2001–4000	102	28.49%	53	23.66%	155	26.63%
	4001–6000	74	20.67%	62	27.68%	136	23.37%
	6001–8000	79	22.07%	31	13.84%	110	18.90%
	≥8001	40	11.17%	32	14.29%	72	12.37%
Education level	Elementary or junior high school	26	7.26%	9	4.02%	35	6.01%
	High school	41	11.45%	40	17.86%	81	13.92%
	Associate degree	85	23.74%	39	17.41%	124	21.31%
	Bachelor’s degree	141	39.39%	104	46.43%	245	42.10%
	Postgraduate degree	65	18.16%	32	14.29%	97	16.67%

In Table 3, descriptive statistics showed that altruistic values, ecological environmental beliefs, and personal norms had relatively high mean scores of 4.04, 4.01, and 3.98,

respectively, indicating that the surveyed tourists generally possessed strong ecological conservation awareness and a pronounced sense of environmental responsibility. The mean score for biospheric values was 3.91, while awareness of consequences and ascription of responsibility had mean scores of 3.88 and 3.78, respectively, both of which were also at relatively high levels. By contrast, the mean score for egoistic values was 2.954, which was substantially lower than those of the other dimensions. This suggests that, in the context of eco-compensation in national parks, tourists' judgments were not primarily driven by self-interest but were more likely influenced by environmental values, ecological beliefs, and moral norms. The Cronbach's alpha coefficients for all VBN dimensions exceeded the recommended threshold of 0.70, demonstrating acceptable internal consistency. The KMO value was 0.859, and Bartlett's test of sphericity was significant, $\chi^2(325) = 2909.068$, $p < 0.001$, indicating that the questionnaire data were suitable for factor analysis.

Table 3. Descriptive Statistics and Reliability Test Results for the VBN Variables.

Dimension	Variables	Items	Mean	SD	Cronbach's α
Value	Altruistic Value (AV)	4	4.04	0.43	0.768
	Egoistic Value (EV)	4	2.95	0.61	0.734
	Biospheric Value (BV)	3	3.91	0.65	0.733
Belief	New Ecological Paradigm (NEP)	6	4.01	0.45	0.769
	Awareness of Consequences (AC)	3	3.88	0.58	0.761
	Ascription of Responsibility (AR)	3	3.78	0.63	0.817
Norm	Personal Norm (PN)	3	3.98	0.67	0.722

2.5. Measurement

2.5.1. Estimation Model for Tourists' Willingness to Pay for Eco-Compensation

This study adopts the Wang and He two-step approach to estimate tourists' WTP by deriving the individual cumulative distribution function and the corresponding bid prices. When estimating individual WTP, redundant bid points were removed for each respondent. Specifically, lower bid levels preceding the last "Definitely Yes" response were deleted, as were higher bid levels following the first "Definitely No" response. Within the MBDC format, respondents' uncertainty is transformed into subjective probabilities. The five response categories, i.e., "Definitely No" "Probably No" "Not Sure" "Probably Yes" and "Definitely", assigned acceptance probabilities of 0.01, 0.25, 0.50, 0.75, and 0.99, respectively. It should be noted that the zero-bid option represents the probability that respondents would accept the eco-compensation scheme in the absence of any additional eco-compensation payment. Based on the MBDC data obtained from the survey, these probability assignments allow the construction of an individual-level WTP distribution. The model then uses this information to estimate the acceptance of different bid levels and to derive the corresponding WTP measures.

Assume that the acceptable eco-compensation for tourist i in a national park is V_i , which is a random variable with a cumulative distribution function $F(t)$. The mean value of V_i is μ_i , and the standard deviation is σ_i , and σ reflects the degree of dispersion or uncertainty in the change in an individual's acceptance probability across different bid levels. The WTP model of tourist i can be written as follows,

$$V_i = \mu_i + \varepsilon_i \quad (1)$$

where ε_i is a random term with a mean of zero. The i represents different tourists; the j represents different bid values (different prices). The t_{ij} is the independent variable, corresponding to the various bid values presented in the questionnaire; it is also a continuous

variable. P_{ij} is the dependent variable, representing the response of the i th tourist to the j th bid value; it is a continuous variable taking values between 0 and 1, reflecting the probability that tourist i is willing to pay when the price increases to j . Its value can be derived by converting the results of a MBDC model into numerical probability estimates. When given a price t_{ij} for which the subscript j denotes the j th bid level given in the MBDC matrix, the probability of the tourist i choosing “yes” to the offered t_{ij} will be P_{ij} , the formula is:

$$P_{ij} = \text{prob}(V_i > t_{ij}) = 1 - F(t_{ij}) + \lambda_i \quad (2)$$

where λ_i is an error term with a mean of 0 and a variance of δ^2 . The δ can be constant for respondent i but will be different for different respondents. If a specific functional form for $F(t)$ is assumed with a normal distribution, a mean μ_i and a standard deviation σ_i , i.e., $F(t_{ij}) = \Phi\left(\frac{t_{ij} - \mu_i}{\sigma_i}\right)$, then the model (2) becomes,

$$P_{ij} = 1 - \Phi\left(\frac{t_{ij} - \mu_i}{\sigma_i}\right) + \lambda_i \quad (3)$$

The primary purpose of this model is to estimate and analyze μ_i and σ_i , which is explained by a function of personal characteristics. Two potential approaches can be used to estimate Equation. Assuming that λ_i follows a Logistic distribution, the two-stage approach is applied to perform the following equation.

First step: Estimate Equation (3) for each tourist i . To estimate the outcome for each tourist, assuming λ_i has a normal distribution. Then, $\frac{P_{ij} - 1 + \Phi\left(\frac{t_{ij} - \mu_i}{\sigma_i}\right)}{\delta} \sim N(0, 1)$, the log-likelihood function is:

$$\log L_i = \sum_{j=1}^J \log \varnothing \left(\frac{P_{ij} - 1 + \Phi\left(\frac{r_{ij} - \mu_i}{\sigma_i}\right)}{\delta} \right) \quad (4)$$

where $\Phi(\cdot)$ is a standard normal distribution probability density function. This function is equivalent to a least squares nonlinear estimation, and δ has no influence on the estimation if the distribution is normal.

Second step: With the log-likelihood function (4), μ_i and σ_i can be estimated for each tourist i . Analyze the determinants of μ_i and σ_i . Once μ_i and σ_i are obtained for each tourist, models can be constructed to analyze their determinants. One simple example is to use the following linear functional forms:

$$\mu_i = \beta_0 + x_i' \beta + e_{1i} \quad (5)$$

$$\sigma_i = V_0 + z_i' V + e_{2i} \quad (6)$$

where x_i and z_i are individual specific characteristics; β and v are coefficients to be estimated; and e_1 and e_2 are random errors.

2.5.2. Analysis of Factors Influencing Tourists' Willingness to Pay

To examine the determinants of tourists' WTP for eco-compensation, this study employed a hierarchical OLS regression approach based on the VBN framework, with $\ln WTP$ as the dependent variable, to test the incremental explanatory power of different groups of variables on tourists' WTP for eco-compensation. Here, $\ln WTP$ denotes the individual log willingness-to-pay parameter estimated from the MBDC model. For each respondent, the individual willingness-to-pay distribution was estimated on the basis of certainty responses

across different bid levels, and the estimated μ_i was then used as $\ln WTP$ in the regression model. First, demographic variables, including gender, age, income, and education level, were entered into the baseline model as control variables. Subsequently, variables were introduced sequentially according to the chained progression of values, beliefs, and norms in the VBN framework, in order to assess the incremental explanatory power of variables at different theoretical levels for tourists' WTP for eco-compensation. Specifically, the values dimension included altruistic values (AV), egoistic values (EV), and biospheric values (BV); the beliefs dimension included the New Ecological Paradigm (NEP), awareness of consequences (AC), and ascription of responsibility (AR); and the norms dimension included personal norms (PN).

$$\ln(WTP_i) = \beta_0 + \beta_1 V_i + \beta_2 B_i + \beta_3 N_i + \gamma X_i + \varepsilon_i \quad (7)$$

In the model, WTP_i represents tourist (i)'s WTP for eco-compensation, which was estimated using the Wang–He two-stage approach. Because relatively high or low bid level in the MBDC format could affect the accuracy of the estimates, WTP was log-transformed to reduce the potential influence of heteroskedasticity. VBN denotes the variables corresponding to each dimension of the VBN framework. X_i represents the control variables, including demographic and socioeconomic characteristics. β_0 is the constant term, while $\beta_0, \beta_1, \beta_2, \beta_3$, and γ are the parameters to be estimated, ε_i is the random error term.

3. Results

3.1. WTP Estimation and Analysis

Table 4 summarizes the statistical data from the MBDC questionnaire survey and the distribution of likelihood responses. In the context of national park ecotourism, tourists' WTP for eco-compensation showed a declining trend as the proposed payment increased. Tourists' stated acceptance of the eco-compensation scheme declined as the proposed payment increased. As the eco-compensation payment level rose from ¥30 to ¥1000, the proportion of tourists selecting "definitely yes" gradually declined from 74.57% to 0.00%, whereas the proportion selecting "definitely no" steadily increased from 0.00% to 51.37%. At the same time, the middle bid range exhibited a pronounced degree of uncertainty. The proportion of "not sure" responses increased from 22.16% at ¥100 to 28.87% at ¥150, reached a peak of 32.30% at ¥200, and remained relatively high at 30.93% at ¥300. This indicates that tourists did not shift directly from willingness to refusal at a single fixed price point; rather, they displayed substantial hesitation and probabilistic judgment within the ¥150–¥300 range.

Table 4. Statistics of likelihood responses (%).

Price	Definitely No	Probably No	Not Sure	Probably Yes	Definitely Yes	Total
0	0.00	0.00	0.00	2.06	97.94	100.00
30	0.00	0.34	5.50	19.59	74.57	100.00
50	0.00	1.89	13.23	29.73	55.15	100.00
100	0.17	4.98	22.16	32.82	39.86	100.00
150	2.06	11.68	28.87	30.07	27.32	100.00
200	4.30	20.45	32.30	26.46	16.49	100.00
300	10.82	29.21	30.93	21.82	7.22	100.00
500	23.37	31.10	28.87	14.43	2.23	100.00
800	36.94	30.58	25.43	6.87	0.17	100.00
1000	51.37	29.55	15.98	3.09	0.00	100.00

According to Formulas (5) and (6), the results of μ indicate that the mean WTP is ¥451.72, with a standard deviation of ¥359.20 (Table 5). The median is ¥353.74. The adjusted Fisher–Pearson coefficient of skewness was 1.45, confirming a pronounced positively skewed distribution. This suggests that most tourists’ willingness to pay was concentrated at a moderate level, while a small proportion of respondents with relatively high WTP raised the overall mean. The results of σ indicate a considerable degree of uncertainty in tourists’ payment intentions. Its mean was ¥405.97 and the median was ¥368.09. These findings suggest that, when faced with non-market goods such as environmental public goods or eco-compensation, tourists’ judgments regarding eco-compensation payment amounts exhibit strong interval-based and probabilistic characteristics, and that some tourists have not formed a stable and clear valuation of eco-compensation payments.

Table 5. Results of WTP estimation.

WTP Mean	N. Obs	Percentile	Centile	[95% Conf. Interval]
Distribution of μ	582	P0	15.00	[15.00, 15.00]
		P10	107.49	[95.03, 115.19]
Sample mean of μ : 451.72		P20	141.35	[132.24, 156.83]
		P30	185.56	[173.66, 202.44]
Sample std. deviation of μ : 359.20		P40	243.06	[218.41, 294.67]
		P50	353.74	[321.74, 404.29]
		P60	470.01	[418.20, 512.49]
Sample median of μ : 353.74		P70	585.65	[525.05, 649.66]
		P80	759.04	[712.44, 817.27]
		P90	910.04	[858.92, 915.11]
		P100	2292.45	[2292.45, 2292.45]
WTP Std. Deviation	Obs	Percentile	Centile	[95% Conf. Interval]
Distribution of σ	582	P0	4.85	[4.85, 4.85]
		P10	90.54	[85.63, 100.19]
Sample mean of σ : 405.97		P20	126.47	[119.40, 136.84]
		P30	160.04	[144.73, 191.79]
Sample std. deviation of σ : 316.06		P40	253.66	[211.00, 295.75]
		P50	368.09	[324.72, 407.40]
		P60	445.95	[416.73, 477.72]
Sample median of σ : 368.09		P70	503.49	[490.96, 528.96]
		P80	613.15	[572.03, 635.91]
		P90	807.64	[724.37, 827.14]
		P100	2201.15	[2201.15, 2201.15]

3.2. Analysis of Influencing Factors

Based on the regression model (7), four nested OLS models were further constructed by sequentially introducing control variables, value variables, belief and responsibility cognition variables, and personal norm variables. The results are reported in Table 6. Column (1) of Table 6 includes only demographic variables. The results show that among the control variables, income has a positive effect in all models, indicating that payment capacity is an important factor affecting tourists’ level of eco-compensation payment. Age is weakly and positively associated with $\ln WTP$, whereas gender has no significant effect. Education is significant in the baseline model, but becomes insignificant after NEP, AC, and AR are included, suggesting that the relationship between education and WTP may be attenuated by factors from VBN theory. Columns (2) to (4) of Table 6 progressively incorpo-

rate value variables, belief variables, and norm variables. Overall, the three dimensions of the VBN framework positively influence tourists' WTP for eco-compensation.

Table 6. Regression analysis results.

Variable	(1) Controls	(2) Values	(3) Beliefs	(4) Norms
Gender	−0.141 (0.087)	−0.117 (0.085)	−0.110 (0.071)	−0.107 (0.066)
Age	0.103 * (0.055)	0.100 * (0.054)	0.079 * (0.047)	0.075 * (0.045)
Income	0.653 *** (0.041)	0.630 *** (0.041)	0.663 *** (0.038)	0.656 *** (0.036)
Education	0.130 *** (0.033)	0.109 *** (0.033)	0.022 (0.031)	0.023 (0.027)
Altruistic value (AV)		−0.244 *** (0.086)	−0.008 (0.038)	−0.152 *** (0.057)
Egoistic value (EV)		0.110 * (0.066)	0.018 (0.052)	−0.019 (0.048)
Biospheric value (BV)		0.452 *** (0.082)	0.010 (0.083)	−0.030 (0.076)
New ecological paradigm (NEP)			0.210 *** (0.079)	0.133 * (0.071)
Awareness of consequences (AC)			0.422 *** (0.100)	0.259 *** (0.098)
Ascription of responsibility (AR)			0.572 *** (0.076)	0.277 *** (0.066)
Personal norm (PN)				0.636 *** (0.052)
Constant	5.850 *** (0.192)	4.718 *** (0.489)	1.982 *** (0.404)	1.911 *** (0.360)
(N)	582	582	582	582
R ²	0.441	0.47	0.633	0.692
Adjusted R ²	0.437	0.463	0.627	0.686
ΔR ²		0.029	0.163	0.059
F-statistic	94.68 ***	63.39 ***	75.52 ***	93.77 ***

Note: Standard errors in parentheses. *** $p < 0.01$, * $p < 0.1$.

As VBN variables were added one by one, the explanatory power of the model improved, with the R² value increasing from 0.441 to 0.692, indicating that VBN variables have a strong explanatory power for tourists' willingness to pay for ecological compensation. Among the VBN variables, when only value variables were included, BV had a significant positive impact on lnWTP; however, after further adding NEP, AC, and AR, this effect became insignificant, indicating that BV has a relatively significant direct impact on WTP. NEP, AC, and AR all have positive effects on lnWTP, and AC and AR remain significant in the full model, indicating that awareness of consequences and ascription of responsibility constitute important psychological foundations for the formation of tourists' WTP for eco-compensation. PN has a positive effect in the full model and shows a relatively large coefficient among the VBN variables measured on the same scale, suggesting that PN exhibits comparatively strong explanatory power within the VBN framework. At the same time, AV has a negative coefficient in all models. This may be because AV is located at the front end of the VBN theoretical chain, and its effect may share explanatory variance with subsequent variables such as ecological beliefs, responsibility cognition, and personal norms. Pearson correlation analysis shows that the correlation coefficients among the explanatory variables are all below 0.70. All VIF values are below 2, which indicates that the models do not suffer from serious multicollinearity. Among the variables, NEP, AC, AR, and PN are moderately positively correlated, which is consistent with the progressive logic of the VBN framework.

3.3. Robustness Check

Considering that high or low reported values of WTP may distort mean estimates in OLS regression, this study employed quantile regression at the median ($q = 0.5$) as a robustness check [68]. The results show that (Table 7), in the median regression analysis, the coefficients for personal norms (PN), awareness of consequences (AC), ascription of responsibility (AR), and the New Ecological Paradigm (NEP) remained consistent with the original OLS results in both direction and statistical significance. AV also remained significantly negative in the median regression. This consistency suggests that the esti-

mated relationships were not driven by outliers. Therefore, the model demonstrates good robustness, and the main conclusions remain stable across different estimation methods.

Table 7. Robustness analysis results.

Variables	β	t-Value
Altruistic Value (AV)	−0.16 *** (0.054)	−2.981
Egoistic Value (EV)	−0.034 (0.041)	−0.831
Biospheric Value (BV)	0.051 (0.056)	0.899
New Ecological Paradigm (NEP)	0.189 *** (0.061)	3.117
Awareness of Consequences (AC)	0.192 *** (0.05)	3.872
Ascription of Responsibility (AR)	0.157 *** (0.048)	3.251
Personal Norm (PN)	0.569 *** (0.044)	12.802
Gender	−0.026 (0.045)	−0.577
Age	−0.002 (0.019)	−0.123
Income	0.578 *** (0.019)	29.911
Education	0.016 (0.022)	0.746
Constant	2.619 *** (0.348)	7.518
(N)	582	582

Note: Standard errors in parentheses. *** $p < 0.01$.

3.4. Heterogeneity Analysis

In relevant research on WTP, income significantly influences how much tourists are willing to pay [69]. This study also verifies this conclusion. Given that income was the only demographic characteristic exhibiting a statistically significant association with WTP in the regression model, it was selected as the grouping variable for the subsequent heterogeneity analysis. To examine whether the effects of VBN variables on tourists' WTP for eco-compensation varies across income groups, the sample was divided into high-income and low-income groups based on the median income level, and separate regression analyses were conducted for each group. The results are presented in Table 8. In the high-income group, PN had a significantly positive effect on $\ln WTP$, and AC also showed a significantly positive effect. AR was significant at the 10% level, whereas the NEP was not significant. In the low-income group, PN, NEP, and AR all had significantly positive effects on $\ln WTP$, while EV, AC was significant at the 10% level. AV showed a significantly negative effect, which is consistent with the main regression results. The findings suggest that the psychological drivers of WTP differ substantially across income groups. Specifically, the WTP of high-income tourists is more strongly influenced by AC and PN, whereas low-income tourists are more likely to be driven by the NEP and AR.

Table 8. Heterogeneity analysis results.

Variables	High-Income β	Low-Income β
Gender	0.046 (0.073)	−0.116 * (0.065)
Age	0.001 (0.061)	0.008 (0.026)
Education	−0.006 (0.036)	0.033 (0.032)
Altruistic Value (AV)	−0.016 (0.087)	−0.219 *** (0.078)
Egoistic Value (EV)	−0.022 (0.063)	0.298 * (0.090)
Biospheric Value (BV)	0.038 (0.090)	0.088 (0.082)
New Ecological Paradigm (NEP)	0.038 (0.099)	0.276 *** (0.089)
Awareness of Consequences (AC)	0.198 ** (0.077)	0.136 * (0.073)
Ascription of Responsibility (AR)	0.143 * (0.081)	0.184 *** (0.069)
Personal Norm (PN)	0.562 *** (0.168)	0.538 *** (0.162)
Constant	5.179 *** (1.547)	2.917 *** (0.880)
(N)	182	400
R ²	0.541	0.51

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.5. Analysis of Tourist Refusal to Pay for Eco-Compensation

In previous WTP surveys, some respondents may provide protest responses rather than true value assessments. When applying the MBDC approach, it is important to identify the behavioral motivations underlying uncertain responses and to distinguish between genuine preference uncertainty and protest responses [70]. During the survey, 40 respondents refused to pay for eco-compensation, and their questionnaires were excluded from the final analysis. To gain a deeper understanding of tourists' WTP, respondents who exhibited protest responses were further asked to explain their reasons for refusing to pay. National parks are considered part of the public goods, and all citizens have the right to access them through tax-supported funding [71]. The protests raised by respondents are consistent with this public goods perspective, and their representative reasons are summarized in Table 9. In terms of motivational structure, the responses mainly reflect a lack of interest in environmental issues or the belief that ecological compensation will not benefit individuals, as well as perceptions of double-charging, distrust of the use of funds, disputes over attribution of responsibility, and concerns about the fairness of access to public resources.

Table 9. Reasons for tourists' refusal to pay for eco-compensation.

No.	Reason	Frequency	Percent
1	My financial capacity is limited.	7	17.50%
2	I am not interested in environmental issues.	5	12.50%
3	Visiting national parks is not an essential expense for me.	2	5.00%
4	There is no unified standard for eco-compensation amounts.	2	5.00%
5	Natural resources are public goods and public access should not be restricted through additional charges.	3	7.50%
6	Tea growers can generate income through tea sales, which can serve as a form of eco-compensation.	4	10.00%
7	I do not believe that eco-compensation programs can be effectively implemented.	4	10.00%
8	I do not trust the management of funds or the transparency of their use.	5	12.50%
9	The responsibility for national park conservation should be borne by the government.	3	7.50%
10	The final outcomes of eco-compensation cannot be tracked.	3	7.50%
11	Paying additional fees does not enhance the tourism experience or provide corresponding services.	2	5.00%

4. Discussion

4.1. Relatively High Tourists' Willingness to Pay for Eco-Compensation

The results showed that tourists' average willingness to pay for eco-compensation was estimated at ¥451.72, while the total basic tourism cost during the peak season in Wuyishan National Park was approximately ¥340, calculated as the sum of the prices published on the official Wuyishan National Park mini-program and the entrance-ticket price displayed at the park's main entrance. Under the assumed payment scenario, the surveyed tourists showed a high stated willingness to pay for ecological compensation. Tourist payments for ecological compensation can supplement public financial investment, providing more diversified funding sources for national park ecological protection. Furthermore, by encouraging tourists to participate in cost-sharing, it promotes coordination between public welfare attributes and market-based ecological compensation mechanisms, enabling Wuyishan National Park to gradually establish an incentive-compatible financing system that supports both ecological protection and public access. However, the high standard deviation parameter σ indicates significant uncertainty in the respondents' payment decisions. This uncertainty may stem from insufficient information, cognitive limitations, or the hypothetical nature of the valuation scenario. Therefore, the ecological compensation

mechanism for national parks should fully consider the needs of ecological protection and tourists' affordability, designing different compensation schemes to minimize the uncertainty of tourists' decision-making.

4.2. Differential Associations Between VBN Dimensions and Tourists' WTP

The results indicate that the VBN dimensions were differently associated with tourists' WTP. First, personal norms (PN) showed the strongest positive association with WTP. This finding is consistent with previous studies showing that normative appeals can effectively induce behavioral change [72,73] and that personal norms directly influence tourists' environmentally responsible behavior [74]. When tourists realize that their tourism activities may damage the ecosystem of national parks and believe they should bear some responsibility for ecological protection, they are more willing to pay ecological compensation fees. Second, altruistic values (AV) have a negative effect on WTP, which is contrary to the general findings of previous studies. This phenomenon arises because tourists with altruistic tendencies may not perceive monetary payments as the best way to fulfill their ecological responsibilities. Instead, they may prefer non-monetary forms of environmental action, such as volunteering, advocacy, and reducing wasteful consumption, which could decrease their willingness to pay for eco-compensation. Third, biospheric values (BV) do not have a significant effect on increasing WTP for eco-compensation. Existing studies suggest that biospheric values (BV) may promote environmentally responsible behavior, but the underlying mechanisms remain unclear [75]. One possible reason is that some tourists still approach national parks from a hedonic tourism perspective and are more inclined to seek entertainment and novel experiences, making it difficult for them to recognize the existence value and ecological functions of ecosystems [14]. This suggests that, even in national parks, many tourists still retain conventional perceptions of tourism. Observations made during the survey also show that most tourists still perceive Wuyishan National Park as a general natural scenic area and lack a strict understanding of its ecological conservation function. As a result, it is difficult for BV perceptions alone to directly translate into WTP for eco-compensation.

4.3. Differences in Willingness to Pay Exist Between High-Income and Low-Income Groups

Among the demographic characteristics examined, only income level was associated with tourists' willingness to pay. For the high-income group, personal norms (PN) and awareness of consequences (AC) have significant positive effects, which suggests that high-income tourists rely more on moral obligation and specific environmental awareness in shaping payment decisions. For the low-income group, personal norm (PN), new ecological paradigm (NEP) and ascription of responsibility (AR) all have strong positive effects. This indicates that low-income tourists are more influenced by general environmental values and perceived responsibility. These findings suggest that for high-income groups, communication strategies should emphasize the ecological damage caused by inappropriate tourism, helping them gain a deeper understanding of the crisis faced by national park biodiversity after its destruction. For low-income groups, greater emphasis should be placed on enhancing their ecological responsibility through nature education. Simultaneously, considering the differences in affordability among different income groups, a tiered system of ecological compensation payments should be established to ensure that more groups can participate in the protection and development of national parks.

4.4. Limitations

Although the research design was adjusted to suit the specific context of Wuyishan National Park, certain limitations remain. First, the convenience sampling method limits the representativeness of the sample and the general applicability of the conclusions. The

study is also based on cross-sectional self-reported data, and respondents' responses may be influenced by recall bias and social desirability bias, which may lead to extreme values. While WTP in a payment context is assumed to reflect the relative strength of tourists' environmentally responsible behavior and support for ecological protection, this has not been verified through actual payment behavior. Previous studies have also shown that a gap may exist between stated WTP under hypothetical scenarios and actual payment behavior, with respondents typically reporting higher WTP than the amounts they would actually pay [76]. Tourists' environmentally responsible behavior can be reinforced by emphasizing the positive environmental outcomes achieved [77]. In this study, the causal direction and feedback reinforcement relationship between environmental norms and willingness to pay also remain unconfirmed. In addition, the negative association of altruistic values in this study requires further empirical testing. Second, Wuyishan National Park had operated as a mature scenic area for many years before its establishment, with a relatively complete tourism reception and pricing system. However, its payment mechanism remains under development, with no finalized fee schedule and continued debate over charges such as parking and admission. With the establishment of more national parks, differences may exist among them in resource endowment, tourism development foundation, tourist structure, management conditions, and conservation funding needs. Therefore, the applicability of this study's conclusions to national parks with lower tourism development levels or different management conditions requires further verification.

Future research should further address the shortcomings of existing studies. Methodologically, the sample size can be expanded, and longitudinal and repeated cross-sectional surveys can be used to compare willingness to pay across different seasons and policy stages, reducing biases caused by cross-sectional design and the impact of extreme values. The same group of tourists can also be tracked before and after their visit, and after receiving information about conservation achievements, to analyze how tourist experiences and feedback influence payment preferences. Furthermore, stated willingness to pay and actual payment behavior can be compared under actual payment conditions to examine the two-way relationship between environmental norms and willingness to pay. In terms of variable measurement, future research should develop more targeted scales to examine volunteer service, environmental advocacy, charitable donations, and other forms of non-monetary participation to clarify the impact of altruistic motivations on tourists' ecological compensation preferences and behaviors. Regarding case selection, the scope of national park research should be expanded to examine the applicability of the research conclusions under different ecological conditions, tourism development stages, and institutional backgrounds through cross-case comparisons and longitudinal tracking.

5. Practical Implications

5.1. Clarifying Eco-Compensation Programs to Reduce Payment Uncertainty

When tourists evaluate environmentally friendly products, adequate information disclosure can reduce perceived uncertainty and thereby increase their willingness to pay [78]. The MBDC results indicate a relatively high level of uncertainty in tourists' payment decisions. National park authorities should therefore strengthen communication regarding eco-compensation projects and clearly explain the use of funds and the resulting conservation outcomes, enabling tourists to understand their implementation and practical value. In practice, information disclosure can be integrated throughout the journey. Eco-compensation information and conservation outcomes should be regularly reported through QR codes, official websites, or quarterly reports, allowing tourists to directly perceive the connection between their payments and ecological improvements. After the visit, continued feedback may be provided through digital certificates, compensation records,

and updates on ecological restoration progress. These measures can strengthen tourists' understanding of the significance and ecological value of their contributions, and continuously stimulate and enhance their willingness to participate in conservation. Greater attention should also be paid to tourists' reasons for refusing to pay. Some tourists have limited understanding of eco-compensation and national park functions and fail to distinguish national parks from conventional tourist attractions. National park authorities should therefore strengthen public communication and clearly differentiate eco-compensation from entrance fees and tourism service charges, and enhance tourists' ecological responsibility and WTP.

5.2. Strengthening Tourists' Conservation Responsibility and WTP by Key Psychological Factors

Tourists' payment of eco-compensation in national parks reflects their sense of environmental responsibility. Such payments are influenced not only by the consumption of recreational services but also by perceptions of ecological value, environmental responsibility, and personal norms. Personal norms have been shown to significantly influence WTP, while behavioral interventions can promote changes in pro-environmental behavior [79]. Marketing interventions can also effectively influence tourists' behavioral patterns [80]. Therefore, the significant factors identified in the empirical analysis, including personal norms, awareness of consequences, and ascription of responsibility, should be translated into specific management actions to enhance tourists' WTP for eco-compensation. In practice, on-site interpretation, nature education, experiential learning, and immersive exhibitions can be used to strengthen tourists' understanding of ecosystem services, biodiversity conservation, and the public value of national parks. Visual materials, including images, videos, and representative cases, can be presented through payment interfaces and tourist centers to illustrate the effects of inappropriate tourism behavior on habitats, biodiversity, and ecosystems, explain how tourists' payments support ecological restoration and species conservation, and thereby strengthen awareness of consequences and ascription of responsibility.

5.3. Designing Inclusive Payment Options Consistent with Public Welfare Objectives

The results indicate that the associations between tourists' individual characteristics and WTP vary, with income showing a particularly pronounced effect. National park managers should therefore consider differences in tourists' payment capacity and WTP when designing flexible, diversified, and tiered eco-compensation schemes. Such schemes should lower participation barriers for tourists with limited payment capacity while providing higher payment options for those with greater capacity and willingness, thereby broadening participation in eco-compensation. At the same time, all payment tiers should support the same public ecological conservation objectives and should not be linked to differentiated tourism services or privileges, so as to avoid discrimination based on service levels. This approach can help tourists recognize that the public welfare of national parks is reflected not only in free admission and equitable access to shared natural resources, but also in public co-construction and benefit-sharing. Eco-compensation payments can thus be understood as a means of assuming conservation responsibility and participating in the transition toward sustainable tourism, rather than merely as tourism expenditure. In this way, the user-pays principle for ecological resource use can be aligned with the public-welfare objectives of national parks, while tourists' eco-compensation payments can serve as an important entry point for expanding market-based conservation financing.

6. Conclusions

This study examined tourists' WTP for eco-compensation in Wuyishan National Park and its influencing factors from the perspective of the public welfare of national parks, based on the VBN framework. It further examines how environmentally responsible behavior is associated with WTP for eco-compensation. Taking Wuyishan National Park as a study area in the hypothetical payment scenario, this study draws the following conclusions. First, under the hypothetical eco-compensation scenario, the estimated mean WTP for eco-compensation exceeded the current cost of basic one-day tourism activities in Wuyishan National Park. Second, WTP was associated with multiple psychological factors of VBN theory, particularly personal norms, awareness of consequences, and ascription of responsibility. Third, income shaped both the level of WTP and the psychological mechanisms underlying payment preferences. Tourists' relatively high WTP for eco-compensation suggests their willingness to share responsibility for ecological conservation, aligning with public participation in the protection, construction, and development of national parks under the public welfare goals of China's National Park. Building on these findings, management practices should draw on the mechanisms through which tourists' psychological factors influence WTP to guide and strengthen their environmentally responsible behavior. By leveraging tourists' eco-compensation payments as a supplementary funding source, national parks can explore more diversified market-based eco-compensation mechanisms and generate broader social support for achieving their public-welfare objectives.

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Abbreviations

The following abbreviations are used in this manuscript:

WTP	Willingness to pay
MBDC	Multiple Bounded Dichotomous Choice
CVM	Contingent Valuation Method
VBN	Value–Belief–Norm
AV	Altruistic Value
EV	Egoistic Value
BV	Biospheric Value
NEP	New Ecological Paradigm
AC	Awareness of Consequences
AR	Ascription of Responsibility
PN	Personal Norm

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