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How Urban Residents Perceive Nature Education: A Survey from Eight Metropolises in China

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Abstract: "Nature education" has become a striking trend in the field of environmental and sustainable development education in mainland China in recent years, which is considered to be a powerful force to realize the 11th goal of the 2030 Agenda for Sustainable Development, namely, "Sustainable Cities and Communities". Chinese urban residents' perceptions of "nature education" are fundamental to the success of "nature education" but we still know very little about it. This study aims to gather insights on the awareness, attitudes, and behaviors towards nature and nature education. In this paper, online questionnaires and random sampling methods were used. An online questionnaire survey was conducted among urban residents in eight representative cities in China, namely, Beijing (n = 313), Shanghai (n = 314), Guangzhou (n = 307), Shenzhen (n = 308), Chengdu (n = 206), Xiamen (n = 207), Hangzhou (n = 203), and Wuhan (n = 206). This study implied that Chinese urban residents are willing to accept nature education. There is a strong sense among the Chinese public in cities that living in harmony with nature, improving wellbeing through healthy and sustainable actions, and enjoying and protecting nature are desirable actions. However, respondents were slightly less likely to consider the emotional benefits and the development of social and functional (technical) skills as important elements of participating in nature education. The results also confirm that Chinese urban residents' perceptions of nature education can be positively predicted by the individual's relationship with nature and the individual's experience related to nature education. These are important key messages for nature education organizations to communicate. The results of the study put forward some questions worthy of in-depth consideration for the development of China's nature education, which can provide a foundation and direction for the further development of nature education in China.

Keywords: nature education; urban residents; perception; survey

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1. Introduction

With the rapid development of China, about 64% of the Chinese people currently live in cities [1]. As a result, the understanding, views, attitudes, and associated environmental behaviors of urban residents increasingly pose challenges to China's environment and sustainable development. Therefore, educating urban residents on the environment and sustainable development will undoubtedly help improve the resilience and sustainability of cities and contribute to the realization of Goal 11 of the Sustainable Development Goals, "Sustainable Cities and Communities".

In recent years, "nature education" has become a striking trend in the field of environmental and sustainable development education in mainland China. According to incomplete statistics, since 2010, China's industry institution carrying out "nature education"-related activities have shown a trend of explosive development and have formed a market

that has begun to take shape, and there are more latecomers eagerly preparing to enter this field. Although there is no general consensus on "nature education", its advocates and practitioners believe that receiving "nature education" can help modern urban residents who lack direct contact with nature to improve their cognitive level [2], develop environmentally friendly attitudes [3], increase environmentally friendly behaviors [4], enhance physical fitness [5], and reinforce prosocial tendencies [6], so as to provide strong support for the grand visions of "ecological civilization", "green development", and "beautiful China".

Although the aforementioned studies and reports have pointed out that nature education can help establish nature connections and may play an important role in the construction of a sustainable society in China, the acceptability of the public must be seriously considered if the social significance of nature education is to be truly realized [7]. Are urban residents willing to receive nature education? What factors affect their acceptance of nature education? There is no clear research result for this concern at present. Urban residents are the main clients of nature education in China. Knowing their needs, expectations, preferences, intentions, etc., for "nature education" can help policy makers, nature education institutions, and practitioners provide them with targeted services. On the other hand, it can also help to make preliminary assessments on the potential role and development direction of nature education on nature protection and people's lives. Therefore, we carried out a quantitative study to understand urban residents' perceptions towards nature education. This study was motivated by two research questions: (a) what are Chinese urban residents' views on nature education and (b) what affects their views on nature education?

2. Literature Review

2.1. Urban Residents and Nature Connection

Previous studies have discussed urban residents' perceptions of nature from different perspectives. For example, Madureira et al. [8] explored residents' beliefs concerning the benefits of urban green spaces. Although the residents of the sample cities had mixed perceptions of the benefits of green spaces, the importance of urban green spaces for personal wellbeing and for human contact with nature was noted by the residents of all the four urban areas researched. Bonthoux et al. [9] investigated urban residents' perceptions of green streets in cities and found that people favored vegetated pavements over asphalt pavements, perceiving the former more beautiful and stimulating even though they are less frequently maintained. In addition, many scholars examine urban natural facilities, such as parks or public gardens. According to Xu [10] and Zhao et al. [11], returning to nature is one of the main motivations for urban residents choosing urban park recreation. Wang [12] suggests that natural scenery and psychological safety are the main factors influencing urban residents' satisfaction with recreation.

The impact of nature-related activities on urban residents has also been explored. In the research of Soga et al. [13], urban residents' (students from the University of Tokyo) perceptions of natural environments and biodiversity were assessed by a questionnaire survey. The results showed that a large number of natural experiences enhanced their emotional attachment to nature and also improved their positive perceptions of urban nature. Taylor et al. [14] studied the effects of nature on children's self-discipline in urban areas and found that girls living close to green spaces demonstrated better concentration and emotional regulation skills than boys and that children in greener environments had more outdoor playtime and showed greater creativity.

Many studies have focused on the relationship between urban nature and residents' physical and mental health. Bennett [15] explored the relationship between urban residents visiting public gardens and stress reduction and found that urban residents reported less stress after visiting the gardens. It is believed that relaxing, stress relief, and inspiration drawing are the three main reasons for visiting gardens. In the study of Gubbels [16], more natural elements in the community helped lessen urban residents' symptoms of depression. In the study by Rostami et al. [17], the respondents indicated that their visit

to an urban garden was primarily driven by the natural environment and vegetation, and that recreation and nature observation were the most likely activities. In addition, residents realized that exposure to the natural environment contributed to health, reduced stress, relieved mental fatigue, enhanced concentration, increased neighborhood interactions, and promoted social connections. Cleary et al. [18] claim that mental health is associated with the perception of local urban green space. However, a study by Allard-Poesi et al. [19] found that compared with city parks or public gardens, residents sensed that undomesticated nature was more closely linked to wellbeing, suggesting that the degree of the domestication of the nature around residents is negatively related to their wellbeing. Rasidi et al. [20] surveyed urban residents' views on "how the design of urban green space affects their own social interactions" and the results indicated that the diversity of subspaces, such as vegetation density, animal populations, undulating topography, and water bodies, was a key factor for residents' social interaction behavior.

Additionally, scholars have also conducted retrospective research on urban residents and nature, discussing the long-term effects of natural activities on residents. For example, Hosaka et al. [21] examined the relationship between childhood nature play and adult nature recreation after the control of variables such as gender, age, and income, finding that the frequency of childhood play in green spaces was correlated positively with that of all nature-based recreational activities in adulthood. Through interviews with respondents, Cleary et al. [22] found that past childhood and the duration of current urban nature experiences at home and in the city are likely to have a significant influence on how connected these adults feel to nature. However, people lacking experience with nature during childhood can still develop a high sense of nature connection through experiencing nature in adulthood.

Moreover, extant studies have also explored the relationship between the cognition, emotions, willingness, and behaviors of urban residents. For example, Chen et al. [23] investigated how the perception of green space promoting health influences young urban residents' park-using volition and actual use. The results revealed that the perception of green space components (e.g., green space access, types, sizes, plants, water, sensory features, microclimate environments, and amenity facilities) for health promotion greatly impacted their willingness to use parks, while it remained less influential with respect to their actual park-use behavior (the frequency and duration). The findings of Bashan et al. [24] highlight that decreased opportunities to interact with nature undermine cognitive and affective relations to nature. Such reductions could affect the overall attachment to man–nature relationships, thereby weakening people's relationship values such as caring for nature and a sense of belonging, place, and identity, and could ultimately negatively impact both humans' wellbeing and environmental stewardship.

2.2. Urban Residents and Nature Education

Although the term "natural education" has been familiar to educators in mainland China since 2014, there is no clear and systematic data or literature to prove its historical origin and academic definition. Some scholars believe that "nature education" is a derivative form of environmental education [25]. Some scholars think that it is not consistent with the focus of environmental education. For example, it puts more emphasis on the concepts of the "natural", "ecological", and "harmonious development between man and nature" [11,26,27], emphasizes the accumulation and inheritance of "knowledge about nature" [28], and has unique Chinese cultural connotations [29]. The definition proposed by the "National Nature Education Network" [30], a non-governmental institution of Chinese nature education practitioners, emphasizes the two elements of nature education as the "connection between man and nature" and "activity in nature", representing the basic understanding of China's nature education field so far. The former one points out that the purpose of nature education is to rebuild and strengthen "the connection between man and nature", while the latter one indicates that the basic way to achieve this purpose is "activity in nature". This has also become the basis for Chinese nature education practitioners to

carry out nature education and the general public to understand nature education. Therefore, as long as there are related activities with these two elements, it can be considered "natural education".

From this perspective, the related research on "nature education" is vague and extensive, which shares many commonalities with "nature-based learning", "learning in nature", "nature study", "nature appreciation", "outdoor education", etc. Most previous studies have focused on the effect of urban residents receiving nature education (NE). According to Yılmaz [31], short-term NE has improved urban children's connectedness to nature and to animals, as well as biophilic tendencies. Ferreira [32] studied the implementation effects of NE. Taking the three-day nature learning experience project in Table Mountain National Park as an example, the researchers found that 13-year-old urban children have begun to notice environmental problems after the project, but there were still deficiencies in their basic attitudes and behaviors towards recycling, such as their reluctance in picking up litter at home and in school, unwillingness to join environmental clubs, and reluctance in raising funds to support the environmental cause. Gautheron [33] explored the effects of learning in a natural environment for junior high school students from the perspective of teachers. The interviewed teachers mentioned the benefits of nature-based learning, including promoting active engagement, more willingness to take risks, better enjoyment of school life, and more capable management of the natural environment. Meanwhile, the teachers also noticed an improvement in their attitudes and behaviors towards students in the natural environment, and a more harmonious teacher–student relationship.

The effects have also been reported in higher education. Magulod [34] explored the effect of nature experiential learning activities on improving college students' environmental attitudes. Respondents indicated that various experience-based learning activities were very intriguing, among which the tree planting campaign and the environmental film poster design were the most beneficial in arousing their learning interest. In Kras' study [35], through nature-based learning, the participation in an animal care-related project enabled the urban community college students to gain ideas and knowledge about future careers and to obtain happiness through interacting and learning with animals. Cheang et al. [36] studied the nature-based experiential learning program at the University of Hong Kong and found that participants perceived an enhancement in their knowledge and skills in certain fields and in environmental and nature awareness, which would facilitate their personal growth and future professional development.

Some scholars have studied the impact of a nature-based curriculum on urban residents. For example, a study by Supramaniam [37] found that a nature-based curriculum helped develop children's creativity, comprehension, and cognitive abilities. Experiencing and learning in the natural environment can further improve children's social and emotion-regulation skills. It is noted that children develop affection for nature only when they are engaged with nature.

Literature reviews help us recognize research gaps in prior research and help us build research hypotheses. Given all of the previous studies, participating in nature experience activities can help urban residents strengthen their nature connections and have a positive impact on urban residents in terms of physical, psychological, and social interactions. At the same time, previous studies have confirmed the beneficial effects of nature education on people of different ages and have also preliminarily discussed the influencing factors of urban residents' participation in nature education. However, there are very few related studies on Chinese urban residents' views on nature education and the factors that influence Chinese residents' views on nature education. Therefore, this study attempts to explore the current status of Chinese urban residents' views on nature education and the factors that influence Chinese residents' views on nature education. Based on prior research, this study proposes the following hypotheses:

H1. *Chinese urban residents possess a positive perception of nature education.*

H2. *Chinese urban residents' perceptions of nature education can be positively predicted by the individual's relationship with nature.*

H3. *Chinese urban residents' perceptions of nature education can be positively predicted by the individual's experience related to nature education.*

3. Materials and Methods

3.1. Research Design and Data Source

This study is quantitative research. Given the enormous size of China's population and the widespread urban distribution, there are obvious financial and administrative difficulties in conducting a large-scale survey. Therefore, this study adopted the method of purposeful sampling and selected 8 representative cities in China. A total of 4 tier-1 cities, or national central cities (Beijing, Shanghai, Guangzhou, and Shenzhen), and 4 tier-2 cities, or regional central cities (Chengdu, Xiamen, Hangzhou, and Wuhan), as the most representative cities with the densest population and the earlier start of nature education in China, were selected to be the sample cities (see Table 1).

Table 1. Sample cities.

Name		Population (Unit: 10,000)	Characteristics
Tier-1 cities (national central cities)	Beijing	2189.31	Capital of China; megacity in northern China
	Shanghai	2487.09	Biggest city in China; megacity in eastern China
	Guangzhou	1887.06	Capital of Guangdong province; megacity in southern China
	Shenzhen	1767.38	First special economic zone in China; megacity in southern China
Tier-2 cities (regional central cities)	Chengdu	2093.78	Capital of Sichuan province; megacity in southwest China
	Xiamen	516.40	Central city of the southeast coastal area in China
	Hangzhou	1220.40	Capital of Zhejiang province; megacity in eastern China
	Wuhan	1232.65	Capital of Hubei province; megacity in central China

In this study, a questionnaire survey and random sampling methods were used to collect data. We used a quantitative instrument developed by the China Nature Education Network (CNEN) in 2020 to measure the attitudes, values, and behaviors towards nature education of the general population in China. An online questionnaire survey was conducted among urban residents in eight cities with a large number of respondents: Beijing (n = 313), Shanghai (n = 314), Guangzhou (n = 307), Shenzhen (n = 308), Chengdu (n = 206), Xiamen (n = 207), Hangzhou (n = 203), and Wuhan (n = 206). A sample of n = 2064 Chinese adults were surveyed using a consumer panel provider. Respondents were targeted and screened for gender, age, education, and cities. The data constructed the research data of the current research. The majority of the respondents were married and half of them were with one child. Table 2 shows the demographic information of the participants.

The respondents came from eight cities in China, with each city accounting for 9.8–15.2%, showing a fairly even distribution. Of the 2064 respondents, 41.6% were male and 58.0% female. Regarding their marriage status, 63.4% were in a marriage and 36.6% were not (including unmarried, divorced, and widowed). In terms of age, nearly half of the respondents were aged from 18 to 30, a third of them from 31 to 40, and only 13.2% of them were aged above 40. Of the 2064 respondents, 75.4% had a bachelor's degree or above. Most families earned an average monthly income between 10,000 and 50,000 yuan (middle income in China), accounting for 68.1% of the total.

Table 2. Basic information of participants (n = 2064).

Characteristics		Value (%)
Gender	Male	41.8
	Female	58.2
Marriage	Married	63.4
	Not married	36.6
Age	18–30	49.2
	31–40	37.5
	41–50	10.0
	>50	3.2
Education	High school or below	7.5
	Junior college	17.1
	Bachelor	65.8
	Master or above	9.6
Average monthly household income (yuan) (1 yuan ≅ 0.14 euro)	<5000	7.8
	5000–10,000	19.4
	10,000–20,000	43.0
	20,000–50,000	25.1
	50,000–100,000	2.7
	>100,000	1.9

3.2. Variables

The dependent variables: "knowledge of nature education" (Z1) and "understanding of the role of nature education" (Z2) were the two dependent variables used to describe and explore the perceptions and attitudes of Chinese urban residents towards nature education.

The independent variables: There were two categories for the independent variables. One was the "individual's relationship with nature" (X) and the other was the "individual's experience related to nature education" (Y). The former could be divided into 4 independent variables, namely, "knowledge of nature" (X1), "emphasis on nature" (X2), "understanding of role of nature" (X3), and the "frequency of exposure to nature" (X4). The latter could be divided into 2 independent variables, namely, "involved types of nature education activities" (Y1) and "satisfaction with involved nature education activities" (Y2).

The control variables: the control variables included the city of residence, age, gender, educational background, marital status, number of underage children, and average monthly household income.

The hypothetical relationship between the dependent variables and the independent variables is shown in Figure 1.

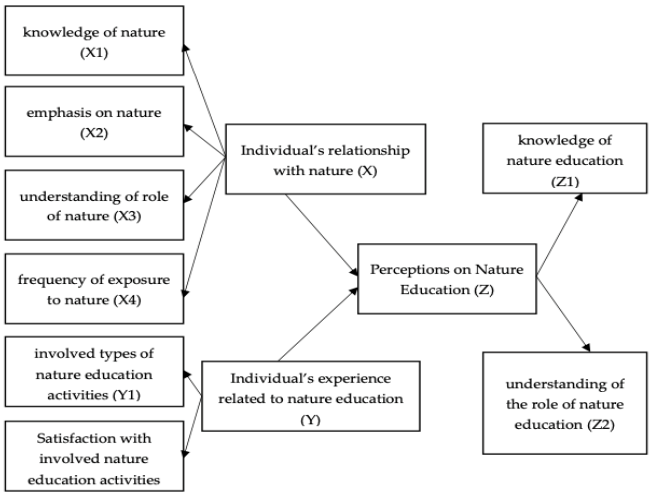

Figure 1. Hypothetical relationship between dependent and independent variables.

3.3. Questionnaire

This study adopted the paradigm of quantitative research. An online questionnaire was developed to explore Chinese urban residents' views on nature and nature education. The questionnaire consisted of five parts: basic information, perceptions of nature education, participation in nature education activities, motivations for participation, and the tendency to participate in the future. The questionnaire for the survey, with a total of 28 items, was approximately 10 min in length. Data were collected between 31 March and 13 April 2021. 8 items composed the part of the basic information while 7 items were in the part of the perceptions of nature education, 5 items were in the part of the participation in nature education activities, 2 items were in the part of motivations for participation, and 6 items were in the part of the tendency to participate in the future.

The basic information included the respondents' city of residence (Beijing, Shanghai, Guangzhou, Chengdu, Xiamen, Shenzhen, Hangzhou, or Wuhan), age, gender (0 = male, 1 = female), educational background (1 = high school degree or below, 2 = junior college degree, 3 = Bachelor's degree, 4 = Master's degree or above), marital status (1 = in a marriage, 0 = not in a marriage), number of underage children, and average monthly household income.

The self-assessment scale was used to examine the respondents' perception and attitude towards nature. The degree to which nature is valued is reflected in the response to the question "How important is it to you to spend time in nature?" The degree of the knowledge of nature is reflected in "How would you rate your knowledge of nature?" Both questions were self-rated on a scale from 0 to 10, with a higher score indicating a deeper understanding of nature.

The scale of nature cognition included 14 items in total, such as "I recognize and prectice the idea of human living in harmony with nature" and "I enjoy being in nature." Respondents could choose from five dimensions: 1 = strongly disagree, 2 = somewhat disagree, 3 = indifferent, 4 = somewhat agree, and 5 = strongly agree. A higher score indicates a stronger identification with nature.

The measurement of the perceptions and attitudes towards NE included a single-choice question with a scale from 1 to 5 ("How would you rate your knowledge of nature education?") and a multiple-choice question consisting of 11 choices and one open answer ("Please select from the list below all the areas where you feel that participating in nature education activities will help you or your child develop or improve.").

The motives for participation in NE were explored through a ranking question ("Which are the reasons do you think most motivating for you or your child to participate in nature education activities?"), inviting the respondents to select the five most important items from all the lists and rank them, with 1 being the first and 5 being the fifth.

The tendency to partake in NE activities in the future was investigated via another ranking question ("Which type of nature education activities interests you or your child most?"), requiring the respondents to choose three out of seven items and rank them.

The likelihood of future participation was measured through the question "How likely will you participate in nature education activities within the next 12 months?" (1 = very unlikely, 2 = relatively unlikely, 3 = uncertain, 4 = relatively likely, and 5 = very likely).

3.4. Analysis

To attain the goal of exploring the views and attitudes of Chinese urban habitants towards nature and NE, descriptive statistics were used to describe the status quo of the respondents' understanding of nature and NE and their potential to engage in relevant activities in the future. The figures in the charts and tables in this report are expressed in percentages unless otherwise noted. The total percentages may not add to 100 because of rounding. SPSS 26 software was used to analyze the data statistically. A *t*-test was adopted to further measure the variances in the views of the respondents with different genders and marital statuses. Additionally, an analysis of variance (ANOVA) was utilized to examine the differences in attitudes among the participants with different ages, education levels, and

family incomes. In addition, the residents' motivation and preferences for nature education were analyzed to display a fuller picture of Chinese urban dwellers' perspectives on nature education (see Table 3). Finally, an Ordinary Least Square regression (OLS) was used to explore relevant factors that affect urban residents' understanding of nature education. The effects of the factors related to nature and nature education on their perceptions on nature education were analyzed separately.

Table 3. *t*-test and ANOVA of Chinese urban dwellers' perspectives on NE.

	M *	**SD ***	**Min ***	**Max ***	**T/F ***	**Sign ***
How important is it to you to spend time in nature?	7.63	1.50	1	10		
Male	7.61	1.55			0.51	0.61
Female	7.65	1.45				
Married	7.35	1.40			−6.36	0.000
Not married	7.79	1.59				
Age					5.85	0.000
Education					4.31	0.005
Income					7.29	0.000
How would you rate your knowledge of nature?	6.59	1.72	1	10		
Male	6.77	1.70			−3.94	0.000
Female	6.46	1.72				
In a marriage	7.79	1.41			−8.01	0.000
Not in a marriage	7.35	1.59				
Age					6.83	0.000
Education					3.94	0.005
Income					7.18	0.000
How much do you know about nature education?	6.52	1.82	1	10		
Gender						
Male	6.71	1.82			−4.01	0.000
Female	6.39	1.81				
Married						
Not married	6.10	1.94				
Not in a marriage	6.75	1.72			−7.75	
Age					6.31	0.000
Education					2.58	0.052
Income					5.12	0.000
How likely will you participate in nature education activities within the next 12 months?	3.99	0.98	1	5		
Male	4.06	1.00			−2.75	0.006
Female	3.94	0.96				
Married	4.18	0.88			−12.02	0.000
Not married	3.65	1.06				
Age					13.91	0.000
Education					20.42	0.000
Income					19.89	0.000

* SD = standard deviation; * Min = minimum; * Max = maximum; * T/F = significance test; * Sign = significance test.

4. Results

We will now present the results from the different analyses of the data. The results include the results of the descriptive statistics and a linear regression analysis.

4.1. Resuts of Descriptive Statistics

4.1.1. Most City Dwellers Possess a Positive Attitude towards "Nature" and "Contact with Nature"

Shown in Table 3, the average score for knowledge of nature was 6.59 (SD = 1.72). Male respondents showed a deeper understanding of nature than female ones. Residents in a marriage indicated a richer knowledge of nature than those not in a marriage. The degree of knowledge also differed among groups of different ages, education backgrounds, and family income. The vast majority of the respondents believed in the significance of exposure to nature, with an average score of 7.63 (SD = 1.49). There was no gender difference in the value of the connection with nature, but there was a difference across marital status, age, education level, and household income.

Table 4 also indicates that the vast majority of individuals tended to engage in nature. A total of 92.1% of people recognized and practiced the concept of harmony between man and nature, 89.9% of people enjoyed being in nature, and 85.4% of people felt joy while being in nature. A total of 90.4% of residents tried to minimize their negative impact on nature and about 82% of respondents supported actions that benefit the environment, trying their best to protect nature and the environment. Except for "Spend your spare time with family and friends", the other options were pro-nature behaviors, on which all the respondents scored high with an average score of 3.4 (SD = 0.5, on a scale of 1–5).

Table 4. Attitudes towards nature and self.

Items	Disagree	Neutral	Agree	Total
Recognize/practice the concept of harmony between man and nature	2.2	5.7	92.1	100.0
Enjoy being in nature	2.5	7.6	89.9	100.0
Support actions aimed at addressing environmental issues	3.3	14.8	81.9	100.0
Reduce your negative impacts on the environment/nature	2.3	7.3	90.4	100.0
Try your best to protect the environment/nature	3.6	14.4	82.0	100.0
Improve the health and environment of yourself and your family	2.7	12.0	85.3	100.0
Spare more free time in nature	28.0	37.1	34.9	100.0
Do exercise to maintain physical and mental health	13.8	20.6	65.6	100.0
Enjoy being in nature	4.0	10.6	85.4	100.0
Challenge yourself/try new things in nature	9.3	26.6	64.2	100.0
Prioritize outdoor activities for yourself and your family in spare time	16.4	24.6	59.0	100.0

4.1.2. Most City Dwellers Believe They Had a Basic Understanding of "NE"

Tables 3 and 4 also show that the average score of the respondents' understanding of NE was 6.5 points (SD = 1.8). Only 6.5% of the respondents thought that they had no knowledge of NE, while 53.7% of the respondents felt satisfactory about their understanding of NE. Male respondents (M = 6.71, SD = 1.82) reported better knowledge of NE than female ones (M = 6.39, SD = 1.81), and residents not in a marriage reported better knowledge than those in a marriage. In addition, significant differences were noticed in the understanding of NE among city dwellers across age, educational level, and family income. However, among people with different education backgrounds, there existed no significant differences. In terms of age, compared with people aged 18–25, those aged 26–40 showed a more

solid understanding of NE, but there was no significant difference between people aged 40–60 and people aged 18–25. Families with a lower monthly income (3000–5000 yuan) demonstrated significantly less understanding of NE compared with higher-income families (20,000–100,000 yuan).

4.1.3. Most City Dwellers Participated in NE Activities out of Concern for "Self-Development"

Table 5 shows that the respondents' motivation for participating in NE activities could be divided into two categories: self-development motivation and social interaction motivation. Many respondents considered meeting self-growth needs the main reason for their engagement in NE activities. Comparatively, only a few respondents suggested their main purpose of participation in NE activities was to satisfy the needs of social interaction, such as increasing opportunities to interact with other peers, strengthening community connections, promoting community development, supporting diverse groups, and experiencing a safe and supportive environment.

Table 5. Motivations for city dwellers' participation in NE.

Self-development	Enhance human–nature connect and respect nature (48.8%) Learn scientific knowledge related to nature (48.6%) Know oneself in nature (39.6%) Relax in nature and entertain (31.3%) Develop habits conducive to long-term individual growth (30.9%) Learn derived skills (29.2%) Generate pro-nature behaviors (19.6%) Foster curiosity and interest in nature (18.9%) Supplement schooling/expand channels for self-growth (7.5%) Partake in stimulating, adventurous activities (2.1%)
Social interaction	Obtain an opportunity to interact with peers (9.3%) Strengthen community connections and promote community development (6.6%) Experience a safe and supportive environment (4.9%) Support diverse communities (3.1%)

Overall, respondents' engagement in NE activities was mainly driven by their self-growth demands, anticipating the acquisition of relevant knowledge and skills, the generation of habits and behaviors conducive to the environment, and personal development.

4.1.4. Most City Dwellers Displayed Strongest Interest in Nature Experience NE Activities

According to Table 6, the most popular NE activities included nature experience, natural history, environmental protection and popular science, farming, outdoor exploration, travel for studies, project-based learning, and handicraft, among which activities related to natural experience accounted for the highest proportion (78.8%). Obviously, most people yearned for contact with nature. This was followed by the study of natural history, environmental protection, and popular science, accounting for 48.3%. The third one was ecological farming activities. There existed no significant gender difference in terms of the favored NE activities, but males preferred natural history science, project-based research, and outdoor adventure, whereas women demonstrated more interest in farming and crafting.

A total of 77.5% of the respondents mentioned the possibility to partake in NE activities in the future, of which 42.6% were very likely to participate. Only 9.4% showed unwillingness and the remaining 13.1% reported uncertainty. The overall score was 3.99 (full score = 5), indicating a high possibility, with male respondents displaying a significantly higher possibility than female ones on average. The average score of the male respondents was 4.06 (SD = 1), while that of the female respondents was 3.94 (SD = 0.96). People not in a marriage (M = 4.18) were less likely to participate than those in a marriage (M = 3.65).

Table 6. NE activities most attractive to Chinese city residents.

Activities	Total (%)	Male (%)	Female (%)
Nature experience	78.8	54.2	54.1
Farming	48.3	15.6	16.9
Natural history, environmental protection, and popular science	62.9	18.6	16.5
Project-based learning	21.0	2.6	2.4
Outdoor exploration	28.4	4.9	3.3
Travel for studies	39.1	3.5	4.2
Handicraft	21.5	0.6	2.5

4.2. Results of Linear Regression Analysis

4.2.1. Most Independent Variables Can Positively Predict the Residents' Knowledge of Nature Education

Table 7 shows the linear regression of the factors of "individual's relationship with nature" (X) and "individual's experience related to nature education" (Y) on the residents' self-assessed "knowledge of nature education" (Z1). Model 2, Model 3, Model 4, and Model 5, respectively, represent the influence of X factors on Z1, the influence of Y factors on Z1, the influence of X and Y factors on Z1, and the influence of various factors on Z1 after controlling the control variables. The "knowledge of nature" (X1), "emphasis on nature" (X2), and "frequency of exposure to nature" (X4) were positively correlated with Z1. However, understanding of role of nature (X3) was negatively correlated with Z1. This is an interesting phenomenon. One possible reason is that those who think they have a full understanding of the role of nature are no longer willing to participate in nature education activities. Of course, this needs further exploration.

Table 7. OLS of residents' self-assessment of their understanding of nature education.

	Model 1	Model 2	Model 3	Model 4	Model 5
Knowledge of nature		0.658 **		0.584 **	0.585 **
Emphasis on nature		0.250 **		0.237 **	0.241 **
Understanding of the role of nature		−0.204 **		−0.228 **	−0.218 **
Frequency of exposure to nature		0.074 **		0.0424 *	0.0379 *
Involved types of nature education activities			0.468 **	0.195 **	0.185 **
Satisfaction with involved nature education activities			0.437**	0.115 **	0.1212 **
City (Beijing)					
Shanghai	−0.09				−0.0002
Guangzhou	−0.163				0.097
Chengdu	0.037				0.043
Xiamen	−0.195				0.137
Shenzhen	−0.321 *				−0.119
Hangzhou	−0.120				0.108
Wuhan	−0.456				−0.118
Age	−0.1176 **				−0.059 *

Table 7. *Cont.*

	Model 1	Model 2	Model 3	Model 4	Model 5
Education (high school or below)					
Junior college	0.211				−0.110
Bachelor	0.318 +				−0.211 +
Master or above	0.200				−0.240 +
Marriage (married)	0.485 **				0.086
Gender (female)	−0.346 **				−0.123 *
Income	0.012				−0.005
Number of kids	0.357 **				0.021
Constant	6.077 **	0.667 *	4.208 **	0.829 **	1.141 **
Observations	1789	1789	1789	1789	1789
F	8.69	663.17	149.66	356.19	110.74
R-squared	0.066	0.572	0.152	0.559	0.566

Robust standard errors in parentheses. ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

For residents who have participated in nature education activities, the more types of nature education activities they participated in, the more their knowledge of nature education; the higher their satisfaction with nature education activities, the more their knowledge of nature education. The table also shows that the younger the age, the higher the understanding of nature education. Compared with women, men had a higher understanding of nature education.

4.2.2. Most Independent Variables Can Also Positively Predict Residents' Understanding of the Role of Nature Education

Table 8 shows the linear regression of urban residents' "understanding of the role of nature education" (Z2). As noted, Model 2, Model 3, Model 4, and Model 5, respectively, represent the influence of X factors on Z2, the influence of Y factors on Z2, the influence of X and Y factors on Z2, and the influence of various factors on Z2 after controlling the control variables. The results show that after controlling for all the variables, X1 had little effect on Z2, but X2 and X3 were positively correlated with Z2. Additionally, the more Y1, the more Z2, although the growth was little. The unmarried residents were more aware of the role of nature education than the married residents, and women were more aware than men.

Table 8. OLS of residents' understanding of the role of nature education.

	Model 1	Model 2	Model 3	Model 4	Model 5
Knowledge of nature		−0.067		−0.089 +	−0.090 +
Emphasis on nature		0.173 **		0.140 *	0.135 *
Understanding of the role of nature		1.258 **		1.192 **	1.144 **
Frequency of exposure to nature		0.088 *		0.023	0.061
Involved types of nature education activities			0.858 **	0.852 **	0.864 **
Satisfaction with involved nature education activities			0.124	0.0181	0.009

Table 8. *Cont.*

	Model 1	Model 2	Model 3	Model 4	Model 5
City (Beijing)					
Shanghai	−0.284				−0.094
Guangzhou	−0.734 **				−0.574 **
Chengdu	−0.107				−0.186
Xiamen	−0.152				0.031
Shenzhen	−0.244				0.015
Hangzhou	−0.341				−0.337
Wuhan	−0.340				−0.209
Age	0.014				0.070
Education (High school or below)					
Junior college					0.360
Bachelor					0.222
Master or above					0.050
Marriage (married)	−0.591 **				−0.710 **
Gender (female)	0.407 **				0.331 **
Income	−0.096				−0.156
Number of kids	0.186				0.116
Constant	5.400	−1.339 *	3.548 **	−1.038	−1.212 *
Observations	1789	1789	1789	1789	1789
F	3.03	23.47	108.57	45.34	18.36
R-squared	0.015	0.085	0.126	0.188	0.212

Robust standard errors in parentheses. ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

5. Discussion

The sample size of this study was limited and data were only collected online, so there is a certain sampling bias. However, the results of this study still raise some questions worthy of further consideration for the development of nature education in China. The results confirm the previous hypothesis that Chinese urban residents are willing to accept nature education and that Chinese urban residents' perceptions of nature education can be positively predicted by the individual's relationship with nature and the individual's experience related to nature education. This study shows that Chinese urban residents have positive attitudes towards "nature" and "contact with nature" and are willing to engage in pro-nature behaviors. Additionally, urban residents in China attach great importance to the opportunity for themselves and their children to get in touch with nature, and the vast majority believe that exposure to nature is very important for both individuals and children. However, previous surveys have shown that children in Chinese cities very much lack opportunities to get in contact with nature and that the times and the frequency of contact with nature are not ideal. It seems to reflect the contrast between strong will and less action. Why is the strong desire to "contact nature" rarely translated into the actual action of "experience nature"? What role can nature education play in this? These questions need to be answered by good follow-up research. This study also reveals that Chinese urban residents are more aware of nature education. Most of the respondents indicated that they had a good understanding of nature education and there was little difference between

cities. The concept of "nature education" has only been popular in China for a few years, and it has gained a relatively broad and uniform understanding. It can be seen that Chinese society has formed a good atmosphere that pays attention to "environmentally friendly", "ecological", "green", and other concepts, which will be an important ideological basis for China to promote the realization of the UN's Sustainable Development Goals. However, how can one turn the foundation of thought into practical action? Could nature education play a role in this process? Researchers of Chinese nature education may need more detailed research to make nature education truly become an effective bridge to connect "will" with "action". Notably, the findings also report differences in the perceptions of nature and nature education among urban residents of different socioeconomic statuses. People with different income levels have different degrees of an understanding of nature and different understandings of contact with nature. Additionally, families with lower monthly incomes are significantly less aware of nature education than families with higher incomes. This seems to validate the view held by several scholars that socioeconomic status is positively correlated with educational achievement [38]. It is also difficult to separate education from socioeconomic contexts in the conceptualization of urban education [12].

Research has also shown that self-developmental motivations dominate when it comes to motivation to participate in nature education activities. Acquiring the knowledge and skills to facilitate individuals to change their environmental behavior has become the main purpose of an individual's natural education. It can support the utility of nature education in individual development. These findings provide encouraging evidence for advocates of nature education. However, we must also see that nature education also has many social development effects. Why have these effects not become the driving force for most urban residents to participate in nature education activities? It is probably worthy of reflection by the organizers of nature education.

Most Chinese urban residents are most interested in nature education activities such as nature experience, and they also indicate that they may participate in nature education activities in the future. This also shows that, judging from a wide range of practical cases in China, "the connection between man and nature" and "activity in nature" are indeed the fundamental characteristics of nature education. However, how does "activity in nature" in pursuit of the "connection between man and nature" become a part of education? How do they serve educational goals? These are also the problems that China's nature education must solve in the future.

6. Conclusions

This study found that Chinese urban residents have good attitudes towards "nature" and "contact with nature", and most of the respondents already have a basic understanding of nature education. Whether motivated by self-development or social interaction, most Chinese urban residents have expectations for long-term participation in nature education and are highly interested in nature experience activities. This is a good start and foundation. The residents of big cities place a high degree of importance on spending time in nature for themselves and their children. The respondents felt positively connected to several attitudinal and behavioral statements relating to their relationship with nature, wellbeing, and environmental attitudes. A majority of those surveyed said they and their children have participated in a nature education program in the past. Nearly all the respondents said they were at least somewhat likely to participate in nature education in the next 12 months, with nearly half saying they were "very likely" to participate. Overall, the main benefits and motivations of participating in nature education for oneself or one's children were the sense of feeling harmonious with nature and developing a sense of responsibility to nature and the planet.

The general public in China may not fully understand the definition of nature education and/or what nature education is comprised. The sector could benefit by developing a clear definition of what nature education is and what it is not. This can help to better define and position the types of activities organized by nature education organizations. For

example, finding opportunities to better formalize the sector could help the public better understand what nature education is and the benefits associated with it.

There is a strong sense among the Chinese public in cities that living in harmony with nature, improving wellbeing through healthy and sustainable actions, and enjoying and protecting nature are desirable actions. These are important key messages for nature education organizations to communicate. However, respondents were slightly less likely to consider the emotional benefits and the development of social and functional (technical) skills as important elements of participating in nature education. These may be important messages that are being missed by the public.

How to combine education for sustainable development with the current school education is an important topic of the Education 2030 Framework for Action. Some cases have shown that nature education can integrate some elements of sustainable development education into the education system through thematic activities, curriculum resource development, comprehensive practical activities, etc. The United Nations' 2030 Agenda for Sustainable Development (2015), UNESCO's Education 2030 Framework for Action (2015), and the Chinese Government's National Plan for the Implementation of the 2030 Agenda for Sustainable Development provide a solid governance and normative foundation for promoting nature education under the framework of sustainable development education. This has pointed out the development direction for promoting the development of China's nature education, and even promotes the transformation of education and society towards ecological civilization.

This study provided a foundation for understanding nature education in China. It can be expected that in the near future, China's nature education will develop rapidly and with high quality. The data in this study only reflect the perceptions of residents in eight major cities in China, and the national data cannot be randomly sampled. However, China has a vast territory and uneven regional development. There may be huge regional differences in Chinese residents' understandings and perceptions of nature education. Future research can conduct an in-depth exploration through more comprehensive data. Additionally, a comparative study of urban and rural conditions is possible, and interesting findings are sure to be found.

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