Article

Determinants of Recreational Activities Choice in Protected Areas

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Abstract: Conciliating nature conservation and tourism development is an increasingly important task for authorities in charge of managing protected areas and requires an adequate knowledge of visitors' preferences and recreational behavior. In this light, we used data collected by means of a choice experiment to investigate recreational preferences at Dolomiti Bellunesi National Park, a protected area located in Northeastern Italy. More specifically, we analyzed the determinants of visitors' decisions to engage with different activities in the park. This is important information for park managers, as different recreational activities have both different impact on the natural heritage and different capability to generate revenue for nature conservation and for enhancing the quality of life of local communities. The findings of our study suggest that the choice of recreational activities is mainly driven by the features of recreational sites and by visitors' personal characteristics. Concerning park features, visitors' choices seem to be mostly driven by features directly related to each activity, such as thematic trails for hiking and climbing routes for rock climbing. Among visitors' characteristics, we found that both previous experience with the activity and socio-demographic characteristics had a significant effect on activity choice. Overall, the results of our study can help park authorities in developing management plans aimed specifically at attracting a larger number of visitors of a certain type, which is an important tool to foster the more sustainable forms of tourism.

Keywords: recreational demand; choice experiment; protected areas

1. Introduction

Protected areas provide a wide range of environmental, recreational and economic benefits to visitors and local communities. While the conservation of natural heritage and the preservation of ecosystem services are the primary aims of protected areas, the sustainable development of tourism and recreation is increasingly important [1]. Tourism in protected areas allows the generation of revenues for nature conservation, and can also contribute to the development of local communities [2,3]. The increasing demand for recreation opportunities and the need to conciliate such activities with nature conservation puts pressure on park authorities to develop effective sustainable management plans that can provide benefits to both natural heritage and tourism. The sustainability of tourism and recreation requires management actions that generate sufficient revenues to cover the costs of nature and biodiversity preservation while minimizing the negative impacts of tourism on such preservation [4]. As suggested by the literature [5,6], the design of management actions should be based on a systematic valuation of tourists' attitudes, preferences and behavior. Several studies [7,8] emphasize the need to understand tourists' preferences for recreation in protected areas to develop management plans capable of balancing the dual goals of conservation and tourism development. Knowledge and understanding of tourists'

preferences and expectations can lead to better tourism planning, as it can provide detailed insights into recreational demand and how to sustainably develop tourism [9].

The choice experiment (CE) approach has been extensively used worldwide to investigate tourists' preferences and recreational behavior. Examples of CE studies that focused on outdoor recreation in protected areas include [10] at Oulanka National Park in Finland, [11] at Kruger National Park in South Africa, [12] at National Park Hoge Kempen in Belgium, [3] at national and natural parks in Romania, [13] at Peñuelas Lake National Reserve in Chile, [14] at the Black-Faced Spoonbill Reserve and [15] at Shei-Pa National Park, both in Taiwan, [16] at Dachigam National Parkland in India, and [17] at birding and avitourism sites in Australia and the United Kingdom. The existing literature using CE to analyze tourism in protected areas has focused on several aspects of recreational demand, such as preferences for improvements to recreational features [18], ecotourism development [19], and willingness to financially support nature conservation [14] and land management under alternative uses [20]. While such studies provide a comprehensive picture of the drivers of preferences towards protected areas and their features, there is less information available in the literature about the determinants of decisions by tourists to practice specific activities. Among such studies, [21] carried out a CE study in Scotland to analyze how the choice to practice rock climbing is affected by the features of climbing sites. In [22], the focus was on fishing, specifically by analyzing how fishing sites characteristics affect anglers' choices in the Southeastern US. In [23], the focus was on hunting and snowmobiling in a national park in Maine (US), accounting for the effect of both site features and visitors' past experience with such activities. In [24], the question of how hiking choices are affected by the number of people met in trails was explored in a CE addressing visitors to Garibaldi Park in British Columbia.

A common trait of the above studies is that they focus on only one or few activities rather than simultaneously accounting for the plurality of activities than can practiced in parks. This is a relevant limitation of the existing literature, as the recognition of the portfolio of available activities is an important information for the sustainable management of protected areas, as different activities can have different impacts on natural heritage and different capabilities to generate revenue for its conservation and for the development of local communities. In addition, the possibility of complementarity among activity needs should be viewed as an enhancer to the demand for recreation, as subsets of activities may support one another in maintaining demand over time.

Given this background, the aim of our study is to analyze the drivers of the decision to engage with a plurality of recreational activities in protected areas. Specifically, our research questions relate to how the choice of activity is affected by: (i) recreational site features; (ii) visitors' characteristics, with specific focus on previous park experience and socio-demographic descriptors. Towards this purpose, and following the above literature [10,24], we used data collected by means of a choice experiment aimed at investigating recreational preferences at Dolomiti Bellunesi National Park, a national park located in Northeastern Italy. Respondents were presented with scenarios, including different recreational sites chosen from among those most visited in the park and different levels of improvement of the current recreational features, and were asked to choose which activities they would engage in at each site. The choice experiment (CE) survey also collected information about several individual characteristics related to recreational habits and previous experience with recreational activities. The analysis of such data enabled a detailed characterization of the determinants of activity choice, which in turn allowed us to produce suggestions on how to increase the flow of different visitor types (e.g., mountain bikers or hikers), which is crucial information for the development of sustainable tourism.

The reminder of the paper is structured as follows: Section 2 describes the study area, data collection, and analysis; Section 3 illustrates the results; and Section 4 discusses them and draws the conclusions of our study.

2. Methods

2.1. Study Area

The Dolomiti Bellunesi National Park was established in April 1990 and is located in the Northeastern Italian Alps (Figure 1). It is the only national park in the mountain area of this region, and encompasses around 32,000 hectares of medium and high mountain environments (https://www.dolomitipark.it/en/home-english/, accessed on 5 November 2021). The flora of the park includes around 1400 species, several of which are endemic. The large range of habitats enables animal species such as chamois, roebuck, deer and mouflons to find suitable life conditions. Overall, the park is habitat to 42 species of mammals, 14 of which are included in the annexes of the EU Habitat Directive. Among carnivores, bear, lynx and wolf—all rare species in Italy—are present in the park. Since 2009, the Dolomiti Bellunesi National Park was included in the UNESCO World Heritage list. The climate in the park varies substantially across its territory. In the valleys the average yearly temperature is around 12.5 °C, while at higher altitudes it is around 10 °C. The average yearly precipitation is between 800 mm and 1100 mm per year (ARPAV, regional agency for environmental protection) (https://dati.veneto.it/opendata/Dati_meteo_ARPAV_anni_19 94_2019_, accessed on 5 November 2021).
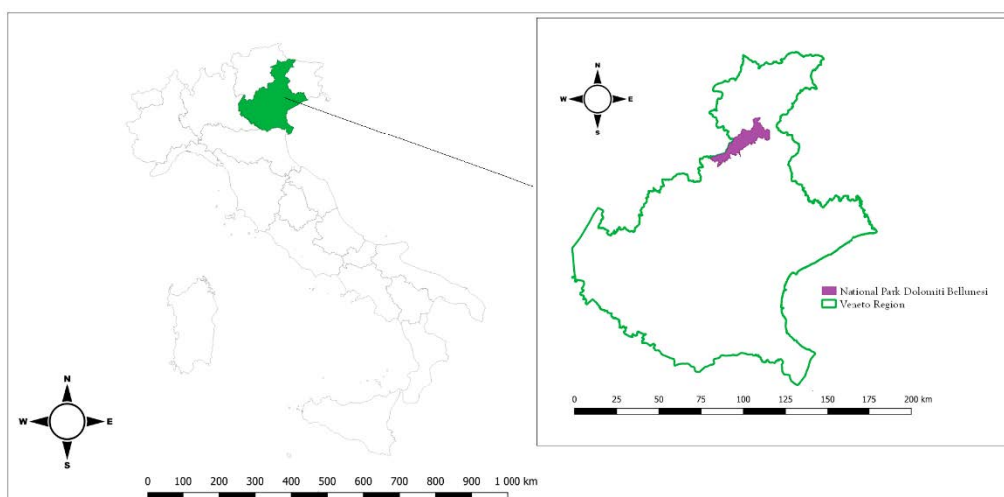

Figure 1. Dolomiti Bellunesi National Park location.

2.2. Survey and Data Collection

The data for our study was collected by means of a web-based survey carried out in spring 2018 which addressed a sample of residents of the Veneto region, as the park authority was interested in collecting information about both visitors and potential visitors. We used a random sample of households with individuals aged 18 or older and stratified by the main socio-demographics (gender, age, education, annual household income and place of living). The sample consisted of 1680 respondents provided by a market research firm. All questionnaires were used for the analysis and no personal data was collected during the survey.

The questionnaire was structured in six sections. The first section focused on recreational experience. Respondents were asked whether they visited Dolomiti Bellunesi National Park in the past and if so, which sites they visited (respondents who never visited the park before were not excluded from the remainder of the survey). They were also asked whether they visited other protected areas in the prior five years. The second section included questions related to recreational habits. Respondents were asked how many days they typically spend for visits at protected areas, where they usually stay during their visits (i.e., accommodation), with whom they visit parks, and in which season they make their trips. The third section concerned respondents' experience of park activities and collected information on the activities that respondents usually practice in parks and for how long

they have been practicing them. The fourth section included the choice experiment, which is described in detail in the section below. The fifth section included a set of attitudinal questions related to respondents' motivations for visiting parks and their constraints. The last section collected socio-demographic information.

2.3. The Choice Experiment

We implemented a labelled CE, with labels referring to the seven main recreational sites of the park. Among these, four are located in valleys (Val di Lamen, Val Canzoi, Val del Mis and Val dell'Ardo), one is a mountain pass (Passo Croce d'Aune) and two are sites located along one of the main roads crossing the park (Candaten and Val Cordevole).

The CE consisted of eleven attributes, which were defined (along with their levels) according to the suggestions of the park authority, which was interested in collecting information about a specific subset of services. Such suggestions were obtained during face-to-face meetings with the Park Director in winter 2017. Several attributes have site-specific levels, according to site-specific limitations (e.g., climbing routes are available only at certain sites). All attributes have a baseline level which reflects the current provisioning of recreational services in the park, while the other levels were realistic improvements that could be implemented in the future, defined according to the suggestions of park managers.

The first attribute related to bivouacs, which are facilities located at high altitude to provide shelter and refuge to hikers in inclement weather. Currently, they can be accessed upon request for the keys, whereas the proposed improvements are: (1) to always keep them open, and (2) to always be stocked with food and firewood. The second attribute described improvements to the safety of "via ferratas", which are trails equipped with iron cables to help visitors to reach mountain areas with difficult access. The levels described improvements in term of the length and features of the iron cables. The third attribute dealt with access to two most popular sites of the park: Val Canzoi and Val del Mis. Being popular sites, Val Canzoi and Val del Mis are currently subject to overcrowding issues; therefore, the park authority is interested in exploring how to best manage car access. Currently, both sites are always open to vehicular access (baseline), whereas the other two levels were (1) no car access on Sundays, and (2) no car access during the whole weekend. The fourth attribute was related to crowding, with four levels describing the number of people met during the recreation activities, namely, (1) less than 10 visitors, (2) 10–20 visitors, (3) 21–40 visitors, and (4) more than 40 visitors. The fifth attribute focused on the number of picnic areas available at sites, with levels ranging from none to seven. The sixth attribute dealt with wildlife sites, which are areas delimited by fences in which wild animals can be observed in their natural environment. This attribute had two levels related to the availability of such sites (available or not available). The seventh attribute described the number of climbing routes (levels: none, 10, 20, 30). The eighth attribute dealt with the number of thematic itineraries available in the park focusing on the flora, fauna and historic aspects of the park, with a range from one to three itineraries. Mountain bikers are an important element of tourism at the park; however, there are currently no trails dedicated specifically to this activity, and the park authority was interested in evaluating their creation. This was the ninth attribute, which had four levels (none, 1, 2 and 3). The last non-monetary attribute related to the presence of water spots for horses (levels: available or not available). At the time this study was undertaken, there was no entrance fee to access the park. However, the park authority was considering its introduction in light of decreasing public funding. As such, we used this attribute as a payment vehicle with four levels, namely, EUR 2, 5, 7 and 10.

The number of alternatives (i.e., sites) included in the choice scenarios varied across the experimental design, with a minimum of two and a maximum of seven. An opt-out option (i.e., not to visit PNDB) was always included in the scenarios. In each scenario, respondents were asked to indicate which sites they would choose if they were to visit the park. More than one site could be chosen in each scenario. Then, they were asked to indicate which activities they would practice at each of the selected sites. The proposed activities

were: (i) hiking; (ii) rock climbing; (iii) picnicking; (iv) horse riding; (v) mountain biking; (vi) sightseeing; (vii) snowshoeing; (viii) alpine skiing; and (ix) ice climbing. The last three activities were proposed only to respondents who indicated an interest in visiting protected areas during the winter. Some activities were not proposed at certain sites, according to their features and limitations. Furthermore, climbing was not included as an alternative when the level of the climbing routes attribute was zero. Overall, this resulted in a varying number of scenarios and alternatives for the different activities.. Finally, a time allocation task was presented to respondents in which they indicated how much time they would dedicate to the selected activities over the course of a day.

2.4. Data Analysis

In order to investigate the determinants of activity choice, we estimated a set of binary logit models, one for each activity. For the three winter activities, only a limited number of observations were available as most respondents (95%) stated that they never visit parks in winter. For this reason, we did not include these activities in the analysis. This resulted in a total of six binary logit models, one for each the following activities: (i) hiking; (ii) rock climbing; (iii) picnicking; (iv) mountain biking; (v) horse riding; and (vi) sightseeing. The models estimated the probability P_{ki} of individual i choosing to practice activity k as function of sites s, site features x (i.e., the CE attributes) and individual characteristics z, according to the formula

$$P_{ki} = \frac{\exp\left(H'_{sk} + \gamma'_k x'_k + \beta'_k Z'_i\right)}{1 + \exp\left(H'_{sk} + \gamma'_k x'_k + \beta'_k Z'_i\right)} \tag{1}$$

where H'_{sk} is a vector of site-specific constants and β'_k and γ'_k are vectors of the coefficients to be estimated. The full list of explanatory variables used in the models is reported in Table 1. In order to derive a direct measure of the effect of each explanatory variable on the activity choice probability, we estimated their average marginal effects.

Table 1. Variables used in the activity choice models.

Acronym	Variable
Sites (Baseline: Passo Croce d'Aune)	
lamen	Val di Lamen
canzoi	Val Canzoi
mis	Val del Mis
cordevole	Val Cordevole
candaten	Candaten
ardo	Val dell'Ardo
Sites Features (CE Attributes)	
acc1	Main sites always open (baseline)
acc2	Main sites closed on Sunday (access with shuttle service)
acc3	Main sites closed on weekends (access with shuttle service)
fee	Entrance fee
biv1	Bivouacs not available (baseline)
biv2	Bivouacs open upon request
biv3	Bivouacs always open
biv4	Bivouacs with food and firewood
crowd	Crowding (number of people)
pic_areas	Picnic areas (number)
wildlife	Wildlife spots (number)
ferr1	Via ferratas not available (baseline)
ferr2	Via ferratas with iron cable along part of the path
ferr3	Via ferratas with iron cable along the whole of the path
ferr4	Via ferratas with iron cable along the whole of the path and artificial holds

Table 1. *Cont.*

Acronym	Variable
climb	Climbing routes (number)
mtb_trails	Mountain biking trails (number)
them_trails	Thematic trails (number)
water	Water spots for horses available
	Individual Characteristics
freq_park	Number of past visits at Dolomiti Bellunesi National Park
sec_home	Accommodation when visiting park: second home (baseline)
hotel	Accommodation when visiting park: hotel
BB	Accommodation when visiting park: Bed & Breakfast
flat	Accommodation when visiting park: Rented flat
camping	Accommodation when visiting park: Camping
shelter	Accommodation when visiting park: Shelter
alone	Visiting park alone (baseline)
family	Visiting park with family
group	Visiting park in a group
couple	Visiting park with partner (couple)
hiker	Practiced hiking in the past
climber	Practiced rock climbing in the past
mtbiker	Practiced mountain biking in the past
rider	Practiced horse riding in the past
degree	Being graduated
female	Female
env_ass	Belonging to an environmental association
age_50	Age above 50 years old
high_income	Income over €30,000 per year
days	Duration of usual visits at natural parks (days)

3. Results

3.1. Sample Descriptive Statistics

Table 2 reports the descriptive statistics of our sample. The average age is 37 years old (standard deviation = 12), with a balanced gender representation (51.2% woman and 48.8% man). Concerning education, most of the sample is characterized by a secondary school level (54.9%), followed by graduated individuals (34.8%). Finally, the low–middle income classes are the most represented. Around 17% of respondents did not state their income. We assigned them to the median income class for the analysis.

3.2. Determinants of Activities Choice

Table 3 reports the aggregate choice frequencies for the nine activities, along with the number of choice scenarios in which they were available; this varied, as explained in Section 2.3. Hiking, picnicking and sightseeing were available in all scenarios, as they can be practiced during the entire year and do not require any specific park feature. These were all activities with high choice frequency, especially hiking, which was chosen in 61% of the scenarios; next were picnicking (51.6%) and sightseeing (44.8%). Rock climbing, on the other hand, has the lowest choice frequency among activities that can be practiced the whole year (13%), which is likely related to the higher requirements in terms of skill and physical effort that this activity calls for. The same seems to apply to winter activities, with snowshoeing being much more popular among people that visit parks in the winter (47.1%) compared to alpine skiing (15.6%) and ice climbing (4.8%).

Table 2. Descriptive statistics of the sample.

Age	
Mean	36.5
Standard deviation	12.1
Gender (%)	
Man	48.8
Woman	51.2
Education (%)	
Elementary school	1.1
Primary school	9.2
High school	54.9
Degree	34.8
Income (%)	
<€15,000	12.6
€15,001–€25,000	27.7
€25,001–€35,000	20.6
€35,001–€45,000	12.4
€45,000–€55,000	5.3
>€55,000	4.7
No answer	16.8

Table 3. Descriptive statistics of activities choice.

Activity	Number of Scenarios in which Available	Chosen when Available (%)
Hiking	10,026	61.02
Rock climbing	8910	13.00
Picnic	10,026	51.57
Horse riding	9288	20.59
Mountain biking	9288	27.89
Sightseeing	10,026	44.80
Snowshoeing	738	47.05
Alpine skiing	722	15.58
Ice climbing	474	4.80

Table 4 reports the results for the six binary logit models, while Figures 2–7 illustrate the statistically significant average marginal effects. Notably, two variables have a consistent effect across all activities: entrance fee and duration of visit. The first is always associated with a negative sign, thereby implying—consistent with classical economic theory—that the higher the cost of visiting the park, the lower the probability that individuals choose to practice any given activity in its territory. It is also interesting to note how the smallest marginal effects were retrieved for climbing and horse riding, the two most "specialized" activities. Duration of visit, on the other hand, has a positive coefficient for all activities, suggesting that all activities are more likely to be practiced by visitors who spend several days at the park.

Table 4. Binary logit model estimates.

	Hiking	Rock Climbing	Picnic	Horse Riding	Mountain Biking	Sightseeing
Intercept	−2.361 ***	−3.673 ***	−2.806 ***	−3.142 ***	−2.81 ***	−2.764 ***
Sites (baseline: Passo Croce d'Aune)						
Val di Lamen	−0.042	0.030	−0.113	0.018	−0.069	−0.067
Val Canzoi	−0.011	-	0.039	0.250 *	−0.145	0.034
Val del Mis	0.015	−0.238	0.007	0.363	−0.072	−0.008
Val Cordevole	−0.076	−0.082	−0.028	0.278	0.023	−0.018
Candaten	−0.167 **	-	−0.201	-	-	−0.233 **
Val dell'Ardo	−0.159 **	0.056	−0.204 ***	0.131	−0.113	−0.167 **
Sites features						
Main sites closed on Sunday	0.057	0.160	0.049 *	−0.184	0.062	0.102 *
Main sites closed on weekends	0.097	0.010	0.102	−0.140	−0.031	0.045
Entrance fee	−0.028 ***	−0.017 *	−0.025 ***	−0.018 **	−0.025 ***	−0.022 ***
Bivouacs open upon request (baseline: not available)	0.008	0.121	0.032	0.126	0.036	0.069
Bivouacs always open (baseline: not available)	0.026	−0.021	−0.018	−0.034	0.046	0.004
Bivouacs w/ food & firewood (baseline: not available)	0.001	0.029	0.023	0.105	0.036	−0.002
Crowding	0.001	0.001	0.001	−0.002 *	0.001	0.001
Picnic areas	−0.010	−0.001	−0.011	−0.007	0.030	−0.017
Wildlife spots	0.001 *	−0.088	0.006	0.002	−0.111	−0.038
Via ferratas: cable part of path (base: not available)	0.009	0.169	0.116	−0.111	−0.070	0.097
Via ferratas: cable whole path (base: not available)	−0.027	0.118	0.101	−0.057	−0.094	0.058
Via ferratas: cable & holds (base: not available)	−0.036	0.085	0.058	0.024	−0.091	0.005
Climbing routes	0.001	0.006 *	0.001	0.002	0.001	0.001
MTB trails	0.007	0.063 *	0.013	0.087 **	0.037 *	−0.007
Thematic trails	0.013 ***	0.032	0.002	0.009	0.032 *	0.010
Water spots	−0.001	−0.005	−0.01	0.092 *	0.005	0.007
Individual characteristics						
Past visits at PNDB	−0.008	−0.011	−0.006	−0.072 ***	0.021 *	−0.018 *
Hotel (baseline: second home)	0.118 ***	0.154 *	0.028	−0.037	0.020	0.126 ***
Bed&Breakfast (baseline: second home)	0.170 ***	0.152 *	0.152 ***	0.129	0.111	0.195 ***
Rented flat (baseline: second home)	0.137 ***	−0.082	0.070	−0.113	−0.015	−0.042
Camping (baseline: second home)	0.098 **	0.123	0.138 ***	−0.185 **	0.141 **	0.050
Shelter (baseline: second home)	0.195 ***	−0.039	0.112	−0.079 **	−0.190 ***	−0.031
Visit with family (baseline: visit alone)	0.080 **	−0.046	0.242 ***	−0.063	−0.046	0.106 **
Visit in group (baseline: visit alone)	0.123 ***	0.177 *	0.103 ***	−0.003	0.165 ***	0.121 ***
Visit in couple (baseline: visit alone)	0.128 ***	−0.106	0.137 ***	−0.021	−0.049	0.059 *
Hiker	0.346 ***	−0.394 ***	0.334 ***	−0.389 ***	−0.273 ***	0.188 ***
Rock climber	−0.021	1.222 ***	0.009	0.405	0.308	0.148 ***
Mountain biker	−0.050 *	0.311	0.074 *	0.124	1.057 ***	0.029
Horse rider	−0.064 *	0.244	0.218 ***	1.326 ***	0.219	0.272 ***
Degree	0.043 *	−0.070	−0.066 *	−0.205 ***	−0.226 ***	0.009
Female	0.031	0.028	0.168 ***	0.195 ***	−0.276 ***	0.254 ***

Table 4. *Cont.*

	Hiking	Rock Climbing	Picnic	Horse Riding	Mountain Biking	Sightseeing
Environmental association	0.049	0.655 ***	−0.086 *	0.287 ***	0.042	0.072 *
Age above 50 years old	0.283 ***	−0.812 ***	−0.075 *	−0.478 ***	−0.288 ***	−0.026
High income	0.091	−0.020	0.145 ***	−0.140	−0.009	0.070*
Number of visit days	0.259 ***	0.321 ***	0.341 ***	0.272 ***	0.287 ***	0.310 ***
Observations	45,117	22,792	45,117	35,878	35,853	45,117
Log-likelihood	−23,514.26	−48,24.81	−21,473.58	−10,487.96	−10,627.17	−19,368.74

Significance levels: 99% = ***; 95% = **; 90% = *.
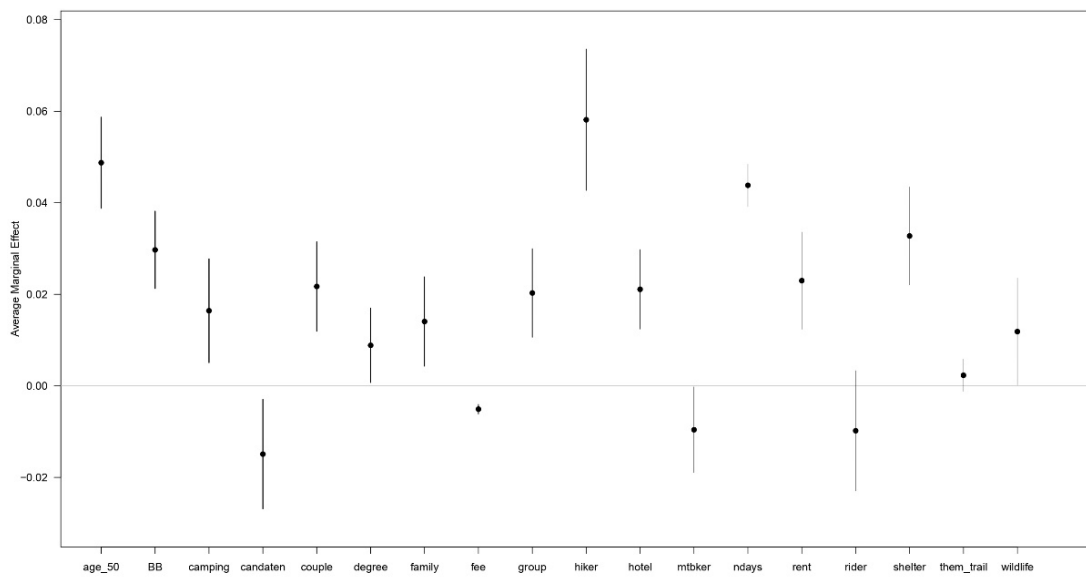
Figure 2. Marginal effects for hiking probability.
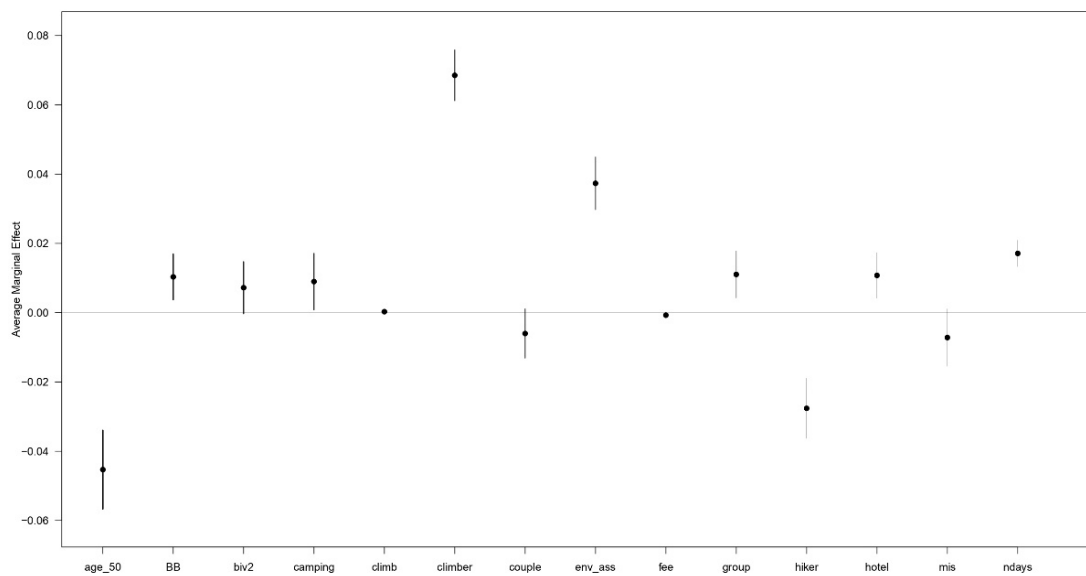
Figure 3. Marginal effects for rock climbing probability.
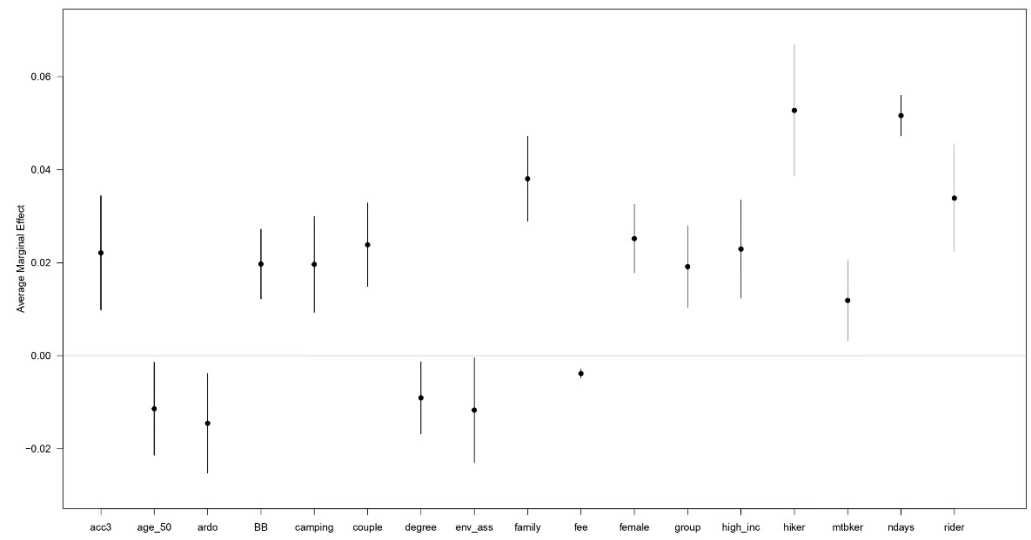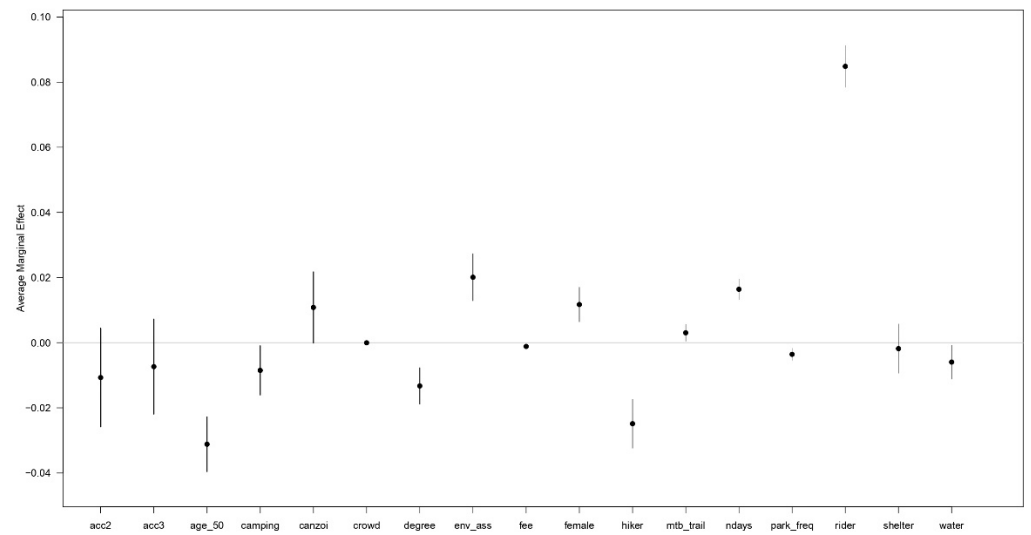
Figure 4. Marginal effects for picnic probability.

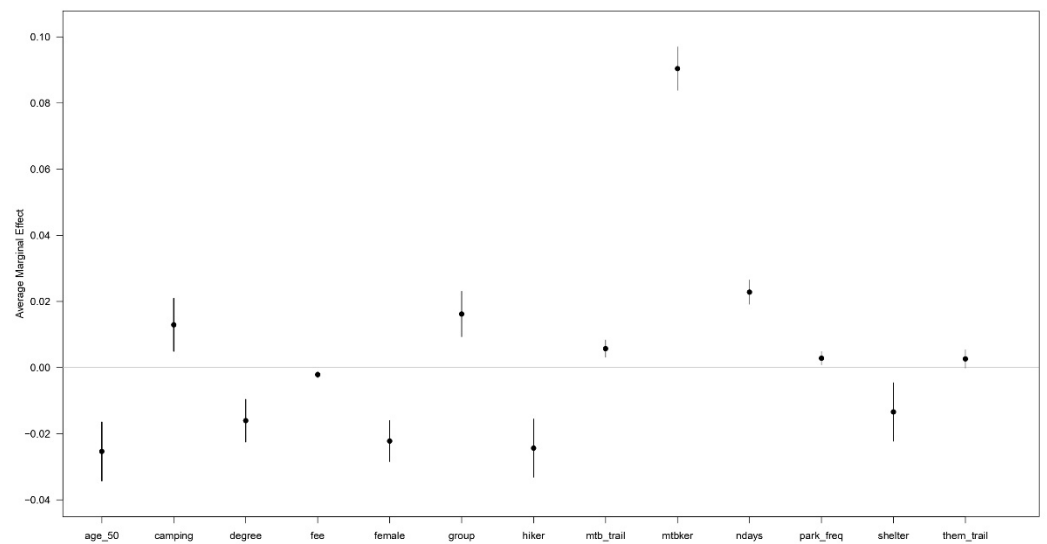**Figure 5.** Marginal effects for horse riding probability.

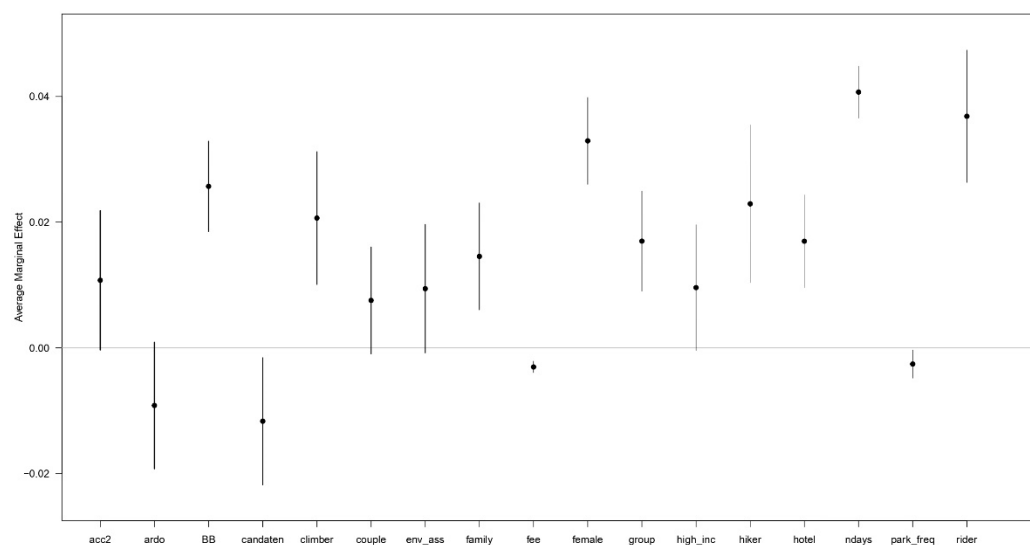**Figure 6.** Marginal effects for mountain biking probability.

Figure 7. Marginal effects for sightseeing probability.

Here, we review each model in detail in the order presented above. For hiking, two of the site-specific constants have a statistically significant effect, those for Candaten and Val dell'Ardo. In both cases the sign is negative, which suggests that Passo Croce d'Aune (the baseline site) is more attractive for hiking compared to the other two sites. This was an expected result, as Candaten is a site focused on providing facilities for picnics and Val dell'Ardo is a less popular site than Passo Croce d'Aune based on the information on visitors flows provided by the park authority. As for site features, as the number of thematic trails and wildlife sites grows, this affects the probability of choosing to practice this activity. In both cases the effect is positive, suggesting that those two features increase hiking probability. More specifically, the probability of practicing this activity increases by around 0.2% for each additional thematic trail and by around 1% for each additional wildlife site (Figure 2). The effects of individual characteristics see all accommodations (compared to the baseline second home) associated with a statistically significant and positive coefficient. Among these, the highest marginal effect is found for shelter: individuals staying in such facilities have a 3% higher probability of practicing hiking compared to those staying in their second home. This can be explained by the fact that shelters are situated at high altitude and are usually reached by hiking. Thus, people visiting parks with others have a higher probability of choosing to practice hiking compared to those who visit parks alone. The marginal effects are similar for the three variables (family, group and couple), with couples having a slightly higher effect (around 2%). As expected, people who usually hike in parks are more likely to choose this activity than other people. This variable has the highest marginal effect among all those included in the model, with hikers being 6% more likely to choose this activity compared to individuals who usually do not practice it. Those who usually practice mountain biking are less likely to choose hiking. Finally, older individuals (more than 50 years old) are more likely to choose to practice hiking (marginal effect around 5%), and the same holds for graduates (marginal effect around 1%). The other sociodemographic variables do not seem to affect hiking probability.

The probability of practicing rock climbing, on the other hand, does not seem to be affected by sites. Among site features, it can be noticed that, as expected, the number of climbing routes has a significant and positive effect, although the marginal effect is rather small. The other feature significantly affecting rock climbing probability is the number of mountain biking trails, with a positive effect. This activity seems to be more likely to be practiced in group compared to the other options (alone, with family and with a partner). More specifically, being in a group increases the rock climbing probability by around 1.5%. As expected, those who already practiced rock climbing in the past are more likely to choose this activity. As in the previous model, this variable is associated with the highest

marginal effect: experienced climbers are 7% more likely to choose this activity. Being a hiker, by contrast, decreases the rock climbing probability (marginal effect around 2.5%). Age also seems to have a substantial effect, with younger individuals being more likely to choose rock climbing (marginal effect around 4.5%) than older ones. A slightly smaller effect was retrieved for those who belong to environmental associations, which are 4% more likely to practice this activity.

Picnic probability, similarly to hiking, is negatively affected by Val dell′Ardo, which is a site mainly dedicated to high altitude hikes and has limited picnic facilities. Concerning site features, it is notable that the number of picnic areas has a non-significant effect. This may suggest that the current provisioning of picnic areas is considered adequate by visitors and increasing them would not increase the probability of choosing to practice this activity. The only site feature with a significant effect is the closure to vehicular access of the main sites on Sunday, with a positive effect. Specifically, it seems that introducing this park management action would increase the picnicking probability by around 2%. A possible interpretation for this result is that people interested in this activity may prefer not to be disturbed by traffic while practicing it. It should also be considered that Sunday is the day on which picnicking is most commonly practiced in the park. Moving to the role of individual characteristics, staying in camping or a bed and breakfast has a positive effect, with similar marginal effects (around 2%). Visiting the park alone is associated with the lowest picnicking probability among the four group types, which is an expected result considering that this is usually a social activity. Family has the highest marginal effect among the four options (around 4%), followed by couple and group. A significant and positive effect was found for hikers, rock climbers and horse riders. As such, it seems that picnicking attracts people practicing various types of activities and can be seen as an example of complementarity between different activities. All of the socio-demographic variables influence probability of practicing this activity. Those more likely to choose it are non-graduated individuals, older people, woman and those with high income. Belonging to an environmental association, however, has a negative effect.

Horse riding probability is positively affected by Val di Canzoi, one of the two most popular sites in the park (the other being Val del Mis). The park feature most directly related to this activity, water spots, has a significant and positive effect, as expected. Specifically, the availability of water spots increases the probability of practicing horse riding by 1%. Similarly to picnicking, closing access to vehicles increases the probability of practicing this activity. In this case, however, both levels (closing on Sunday and closing both Sunday and Saturday) have a significant effect (marginal effect around 1% in both cases). It seems reasonable that horse riders prefer to avoid traffic during their activity. A low number of people encountered during the visit also seems to positively affect this activity, as suggested by the significant and negative sign for crowding. Finally, mountain biking trails have a positive effect as well. Again, the interpretation may be similar to that for the two previous features, in that dedicated mountain biking routes would decrease the number of mountain bikers met during horse riding activity. Moving to individual characteristics, it is interesting to notice how—differently from the previous activities—the number of past visits at the park has a significant effect. Specifically, it seems that a low number of previous visits increases the probability of practicing horse riding, i.e., new visitors may be more attracted by this activity than experienced ones. As concerns the impact of accommodations, staying in camping or shelter has a significant and negative effect. For shelter, the negative relation is easily explainable considering that horse riding is typically practiced in the valleys and not at high altitude, where such facilities are located. Another difference compared to the previous models is that this activity is not influenced by whom respondents usually visit parks with. Consistent with the previous activities, experienced horse riders are more likely to choose this activity than those who never practiced it. The marginal effect (around 8%) is the largest among all variables, similar to the other cases. Finally, all socio-demographics affect the probability of choosing this activity, with the exception of income. Specifically,

it seems to be preferred by young, women and non-graduated visitors. Belonging to an environmental association has a positive effect as well.

Turning our attention to mountain biking, its choice probability is not affected by any site. Among site features, once again the activity-specific feature (i.e., mountain biking trails) has a significant and positive effect. Specifically, one additional mountain park trail increases choice probability by 0.5%. The other feature with significant (and positive) effect is the number of thematic trails. The number of past visits has a significant and positive effect, which suggests that those who frequently visited the park in the past are more likely to choose this activity. Staying in a shelter has a negative effect. As with horse riding, this is consistent with mountain biking being typically practiced in the valleys. Those who usually visit parks in groups are around 2% more likely to choose this activity compared to those visiting on their own. Having experience with mountain biking has a substantial positive effect (a marginal effect around 9%), consistent with the results of the previous models. Finally, concerning socio-demographics, being a man, non-graduated and younger makes choosing this activity more likely, with a marginal effect ranging from 2% to 3%.

Finally, sightseeing is less likely to be chosen when the site is Candaten and Val dell'Ardo (compared to Passo Croce d'Aune). The interpretation may be the same as illustrated for hiking, for which the same result was found. Having the main sites closed to vehicular access on Sundays has a significant and positive effect (1% increase in choice probability). None of the other features has a significant effect, which may be due to sightseeing being a generic activity which is not specifically related to any feature. On the other hand, most individual characteristics affect the probability of choosing this activity. Park frequency has a negative effect, i.e., people who rarely (or never) visited the park in the past are more likely to be willing to engage with sightseeing. It is reasonable that people with limited experience with the park would be more interested in acquiring knowledge about the territory. This result is in line with that related to accommodation, for which we found that people staying in a hotel or bed and breakfast (who are usually tourists) are more likely to engage in sightseeing than people having a second home in the park. The marginal effects are around 3% for bed and breakfast and 2% for hotel. This activity is more likely to be practiced by individuals who visit parks with other people, compared to those who visit on their own. The highest marginal effect was estimated for groups, at around 1.5%. As for the other of the two most generic activities (picnicking), having previous experience with hiking, climbing and horse riding has a significant and positive effect, which is consistent with sightseeing being practiced alongside other activities. As concerns socio-demographics, sightseeing is more likely to be engaged in by women and wealthier individuals.

4. Discussion

The findings of our study suggest how the choice of recreational activities in protected areas is influenced by sites and their features as well as by visitors' characteristics. Specifically, concerning our first research question, i.e., how is activity choice affected by park features, visitors' choices seem to be mostly driven by features directly related to each activity, such as thematic trails for hiking, climbing routes for rock climbing and water spots for horse riding. Such results are consistent with those of previous studies, such us [21], which found the choice of practicing climbing to be affected by quality of climb and scenic quality of the route, [22], which highlighted how anglers' choices are affected by the number of fish caught in different sites, and [24], in which hiking choices were significantly affected by crowding of trails. Other studies which dealt more generally with the role of recreational features on tourists' preferences without focusing on specific activities found similar results. For example, [13] found visitors' preferences to be affected by flora and fauna, [16] by biodiversity levels and educational opportunities, and [19] by the presence of ecotourism attractions, such as waterfalls and caves.

The only exception we found in our study is picnicking, which does not seem to be influenced by potential improvements of the dedicated areas currently available.

As concerns the second research question, i.e., the effect of visitors′ characteristics, most of those included in our models were found to significantly affect choices. Previous experience with an activity was found to have the highest marginal effect in all models. This is consistent with previous studies, such as [19], which found visitors who have experience with hunting and snowmobiling to have a stronger preference for park management plans allowing such activities when compared to those with no previous experience. In [25], the findings suggested that being a fisherman increased the probability of choosing to visit the Kenting Coral Reef area in Taiwan. The number of past visits to the park was found to be negatively related with horse riding and sightseeing. This suggests that focusing on features and facilities related to such activities (e.g., visitor centers for sightseeing) may attract new visitors, thereby increasing park revenues. The type of accommodation used for staying at the park was also found to influence activity choice, with shelters being negatively related to activities usually practiced in valleys (horse riding and mountain biking) and hotel and bed and breakfast being positively related to most activities. Concerning age, younger individuals were found to be more likely than older ones to choose to practice activities requiring intense physical effort, such as rock climbing and mountain biking. The opposite was found for hiking, which typically requires less physical effort, at least when practiced in the form of short walks in the valleys. Gender also seems to play a significant role in decisions related to activities, with women more likely to be interested in engaging with picnicking, horse riding, and sightseeing, and men more likely to practice mountain biking. Belonging to an environmental association positively influences those activities that are more closely related to nature, such as rock climbing and horse riding, while those without such associations are more likely to be interested in picnicking. Overall, such results are consistent with previous studies which highlighted how visitors' preferences and choices are affected by their sociodemographic characteristics. For example, [25] found that income and education affect tourists′ decision to visit the Kenting Coral Reef area in Taiwan; [26] showed that that gender, income, level of education and first-time visit affect visitors′ preferences towards biodiversity conservation in the Yankari game reserve in Nigeria; and [27] found that older visitors were willing to pay more to support conservation of seamounts at the Galapagos Marine Reserve in Ecuador compared to younger ones, although gender was found to have a non-significant effect. In a study focusing on nature conservation programs in the Austrian Alps, [28], highlighted how visitors′ preferences are affected by income and family size. In [29], it was found that age, place of residence, education, income and number of past visits affected the recreational behavior of visitors to Wielkopolski National Park in Poland. Finally, duration of visit has a positive effect on the probability of practicing all activities, likely due to the additional time available to engage with them.

5. Conclusions

Fostering sustainable tourism is a task of increasing importance for park authorities and requires detailed information on visitors′ preferences and behavior.

Our findings highlight how the choice of which activities to practice in protected areas is affected by both park features and visitors′ sociodemographic characteristics, as well as how the effects of such variables differ substantially across activities.

This suggests that it may be difficult for the park authority to develop a "one for all" services improvement plan to increase all the different forms of tourism. On the other hand, this may be advantageous, as it could allow selective prioritization in the increase in the number of visitors dedicated to those activities which can generate the highest revenues for nature conservation while minimizing the impact of tourism on the natural heritage of the park

Overall, our results highlight the potential insights that can be provided by models that account specifically for the determinants of activity choice, rather than focusing more generally on the decision to visit a given protected area. Results from such models can help park authorities in developing management plans aimed specifically at attracting a larger

number of visitors of a certain type (e.g., hikers or rock climbers), which is an important tool for fostering the more sustainable forms of tourism.

A final remark concerns the limitations of our study. First, our models did not account for possible correlation/substitution patterns among different activities. This will be explored in future developments of the study, along with the analysis of time allocation across different activities. Another limitation is the lack of analysis concerning winter activities, which may be addressed in the future by sampling a larger number of individuals who usually engage in such activities.

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