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The economic impact of tourism on protected natural areas: examining the influence of physical activity intensity on visitors' spending levels

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Keywords: economic impact, physical activity intensity, MET, visitors' profile, hierarchical multiple regression

Abstract

In addition to being important tourism attractions that boost local economic development, protected areas also promote healthy habits through engagement in a variety of physical activities (PA). However, little is known about the extent to which PA intensity influences visitors' spending. Drawing on results from 500 questionnaires collected from visitors in the Alt Pirineu Natural Park, Spain, this study assesses the influence of PA intensity on spending after controlling for sociodemographic, visit, motivational and opinion descriptors to assess the connection between these two factors. Hierarchical regression analysis revealed that PA intensity had a marginal but potentially significant effect on respondents' expenditure during their visits. When looked at separately, the results indicated that trip and motivational descriptors explained the highest degree of variation in visitor spending. More research is necessary to confirm whether these findings are applicable broadly.

Profile

Protected area

Alt Pirineu Natural Park

Mountain range

Pyrenees

Country

Spain

Introduction

In addition to preserving biodiversity, protected natural areas (PNAs) are increasingly recognized as a driving force for economic regional development and the sociological prosperity of many adjacent local communities (Hammer et al.; 2012; Mayer et al. 2010; Mayer & Job 2014; McDonald & Wilks 1986; Lintzmeyer & Siegrist 2008; Pröbstl-Haider & Haider 2014; Reinius & Fredman 2007; Schirpke et al. 2018). They are also seen as promoting healthy lifestyles by offering engagement in a variety of physical activities (PA) (Bedimo-Rung et al. 2005; Cohen et al. 2014; Europarc-España 2013; Lemieux et al. 2012; Maller et al.2010; Stolton & Dudley 2010).

Attracting more than eight billion visits per year worldwide, terrestrial protected areas are an important factor in the growth of nature-based tourism globally (UNEF-WCMC & UICN). Among others, Eagles et al. (2000) show for the USA and Canada that nature-based tourists in national parks create an important economic impact for the park's peripheral regions. In the European context, it is estimated that visitors to Natura 2000 sites in the EU generate around EUR 50–85 billion / year (European Commission, 2013). In particular, a study on the economic impact of tourist spending in the six German national parks revealed spending ranging from 525 million to 1.9 million euros, depending on the national park (Mayer et al., 2010).

Several studies have shown that physical activity carried out in protected areas is generally of a higher level than exercise done at home, with correspondingly greater physical, psychological, spiritual and social benefits (Bird 2004; Giles-Corti et al. 2005; Godbey 2009; Godbey & Mowen 2010; Oftedal & Schneider 2013; Romgosa et al. 2015; Romagosa 2018). Furthermore, some studies examining characteristics of visitors to PNAs have demonstrated that the types of PA available in a PNA are a key pull factor for the decision to visit the area. Studies have also shown that differences in PA intensity may reflect varieties in visitors' sociodemographic profiles, behavioural characteristics, preferences and motivations (Arnberger et al. 2019; Barić et al. 2016a; Cordente-Rodríguez 2014; Broyles et al. 2011; Farías-Torbidoni 2011; Galloway 2002; Mowen et al. 2012) and, indeed, how much they are willing to spend (Schirpke et al. 2018). According to Jette et al. (1990), PA intensity is defined by its MET value, which is the ratio of an individual's working metabolic rate relative to their resting metabolic rate. MET is used to express the intensity and energy expenditure of activities in a way that allows comparisons among different physical activities. MET values are well documented in the Compendium of Physical Activities and include 4 basic PA intensities: sedentary, ≤ 1.5 METs; light intensity, 1.6 to 2.9 METs; moderate intensity, 3.0 to 5.9 METs; and vigorous intensity, ≥ 6 METs (Ainsworth et al. 2011).

However, in theoretical terms, PNAs and their managers experience various dilemmas in managing their territories and in constructing their development models, which are two increasingly recognized challenges (Leung et al. 2019). Finding a balance between protecting the ecological integrity of ecosystems and satisfying the necessities of growing tourism and recreation demand is increasingly complicated, especially in PNAs with limited financial and human resources. Knowledge of the possible relationship between PA intensity and visitors' levels of spending can provide valuable input data for developing effective and creative management measures to satisfy the increasing and varied demands placed on these kinds of area.

The main objectives of this exploratory research are therefore the following, organized in order of application:

1. analyse how much visitors spend per visit, including on accommodation, food and drink, and local products and services;
2. group visitors by reported physical activities, using corresponding MET values;
3. assess the influence of PA intensity on spending levels after controlling for sociodemographic, trip, motivational and opinion descriptors.

Literature review: economic impact of tourism and PA in PNAs

According to Watson et al. (2007), economic impact is defined as the net change in economic activity associated with an industry, event or policy in an existing regional economy. A variety of methods, ranging from pure guesswork to complex mathematical models, are used to estimate tourism's economic impacts (Job 2008; Mayer & Job 2014). Studies vary extensively in quality and accuracy, as well as in which aspects of tourism are included (Stynes 1997). According to Stynes (1999), the economic impact of visitor spending is typically estimated by the variation of three basic components: number of tourists, average spending per visitor and multiplier. However, in the case of PNAs, the simple consideration of the money visitors spend on food, accommodation and services during their visit to an area could be useful first to assess and then to track the economic impact of visitors on the region (Eagles 2002; Mayer et al. 2010; Carlsen & Wood 2004). Moreover, it is interesting to highlight the three advantages that Alegre and Pou (2004) noted with respect to microeconomic studies. Although macro- and microeconomic studies serve different purposes, these authors contend that microeconomics studies allow little deviation from theoretical economic consumer models, avoid bias when the analysis is based on aggregated data, and acknowledge the diversity and heterogeneity of consumer behaviours that are ignored in studies using highly aggregated data.

Previous research in the field of tourism impact in PNAs encompasses three main topics: i) the role of the PNA in tourism development and visitor affinity (Mayer et al. 2010; Pröbstl-Haider & Haider 2014; Reinius & Fredman 2007); ii) the amount of money that a PNA could generate in the region (Eagles 2002; Person et al. 2000; Zambrano-Monserrate et al. 2018); iii) the relationship between key visitor characteristics and visitors' spending levels (Flix & Loomis 1997; Fredman 2008; Hierpe & Kim 2007 McDonald & Wilks 1986).

Regarding the last topic, several authors have argued that differences in spending could vary according to the profile, needs and preferences of visitors (Mayer & Voght 2016; Mika et al. 2016; Stynes 1999; Wanga & Davidson 2010; Watson et al. 2007). Moreover, although they do not address economic impact directly, a number of visitor segmentation studies by specific PNAs have demonstrated that PA and its intensity greatly influence specific behavioural characteristics (i. e., type of accommodation, length of stay or party size) and are often responsible for the level of spending (Farías-Torbidoni & Monserrat 2014; Farías-Torbidoni et al. 2018; Mayer et al. 2010). For example, Barić et al. (2016b) and Farías-Torbidoni et al. (2005) demonstrated that visitors who were more physically dedicated and active preferred to stay longer at the chosen destination and visited it repeatedly. Their findings corroborated significantly those of Schirpke et al. (2018), who examined the profiles of visitors to ten Nature 2000 sites in Italy and found that higher-intensity activity visitors such as cyclists (M = 68.77 €) and mountaineers (M = 58.91 €) spent significantly more money per day compared to those who were engaged in lower-intensity PA such as hiking (M = 46.48 €) and picking mushrooms (M = 38.75 €). Including travel costs, this corresponds to a 10.70 € difference in visitors' average daily spend (48.56 €).

Research methodology

Study area

This study was carried out in the largest natural park in Catalonia, Spain, located in the Pyrenees. The Alt Pirineu Natural Park was established by the Catalan government in 2003. The definition and management of this protected natural area, which covers 69 850 ha (172 600 acres), is the responsibility of the Catalonia Region Government and is equivalent to the IUCN Protected Area Category V – Landscapes / Seascapes (Dudley 2008). It stretches over the administrative areas of Pallars Sobirà and Alt Urgell, and includes the highest peak in the Catalan Pyrenees. For managerial purposes, the park is divided into 5 zones and valleys: Valls d'Àneu, Vall de Cardós, Vall Ferrera, Vall de Santa Magdalena and Massís de l'Orri, four of which attract particularly high numbers of visitors. The number of park visits is 314 000 per year (data from the latest visitor report, Farías-Torbidoni & Morera 2017).

Figure 1 shows the 6 main entrances considered in the fieldwork. One of the park's most important features for this study is that it has an extensive provision of trails and managed areas for outdoor activities such as hiking, mountain biking, snow activities, and off-road activities. There are 3 different snow areas and more than 170 trails (permitting off-road driving) and paths inside the park, 94 of which are signposted. Thus, this area is representative of PNAs in Spain generally and of other countries in Europe. Detailed descriptions of the main characteristics of the entrances are provided in Table 1.

Data collection

Fieldwork was conducted from June 2017 to December 2017. The sampling days were one weekend day monthly during the entire period and one weekday

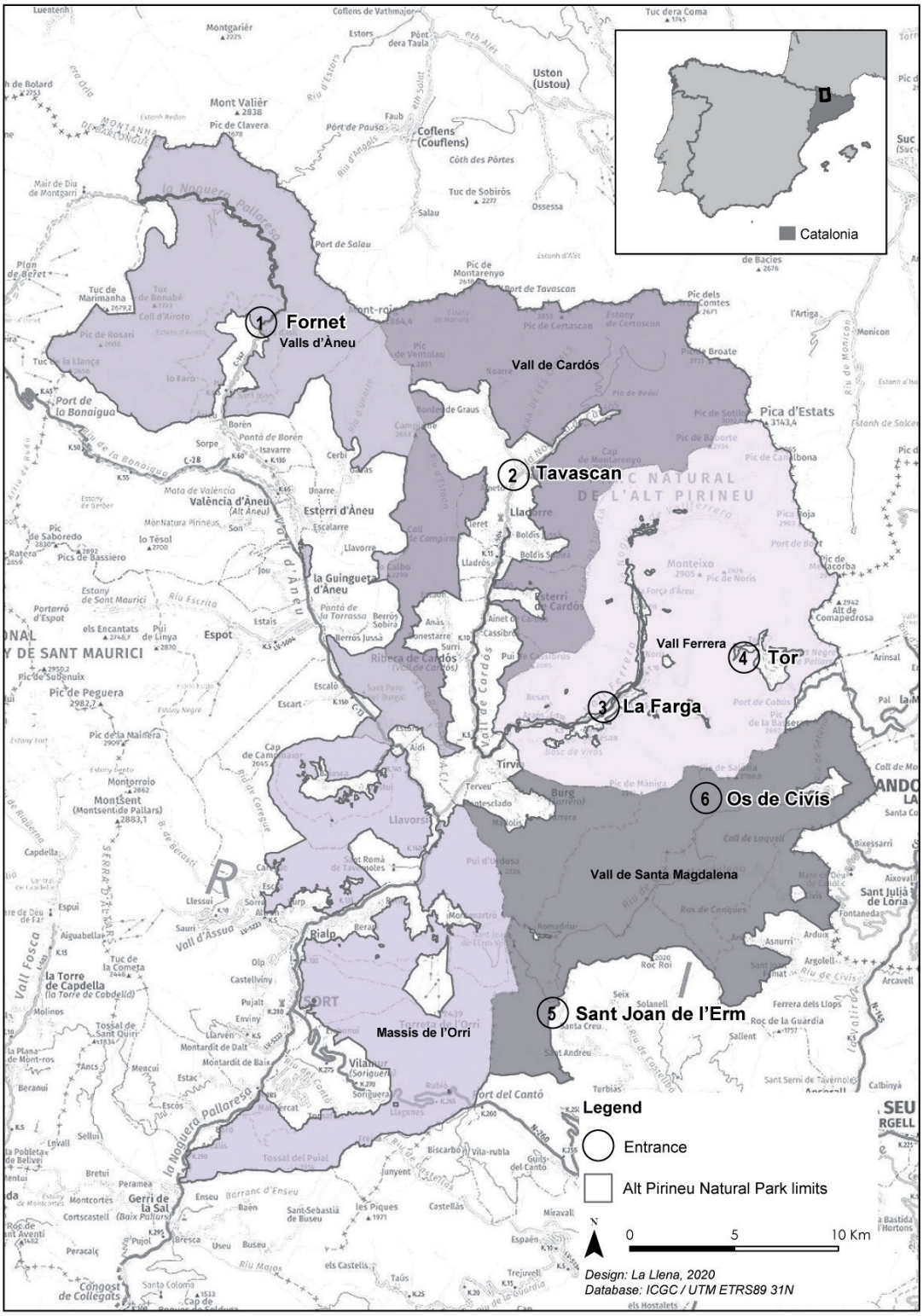

Figure 1 – Alt Pirineu Natural Park. The different shades of grey distinguish the Park's main valleys.

each month during the summer season (i.e., from 1 July to 31 August), resulting in 54 fieldwork days in total for the 6 entrances combined. In total, 706 questionnaires were collected through on-site structured interviews, carried out at each of the 6 entrances, of which 500 were considered usable as 206 respondents were permanent residents within the park borders and were therefore excluded. Table 2 shows the total sampling days at each entrance and the total number of questionnaires finally considered in the study.

Data were collected from 10 a.m. until sunset. Respondents were approached on their way out of the Park through the main entrances because most of the questions referred to the experience they had just had (e.g., place visited, activity practised, length of visit, etc.).

Table 1 – The six main entrances of Alt Pirineu Natural Park[a].

Main entrances	Fornet	Tavascan	La Farga	Tor	Sant Joan	Os Civís
Physical activity areas						
Path: low difficulty		1	2		3	1
Path: intermediate	1	2	2		1	2
Path: high difficulty	1	5	4	1	1	3
Specific MTB trails	1			1	3	1
Cross-Park routes	2	3	3			1
Iconic peaks	3	3	5	2	1	1
Others PA areas*	1					
Winter activity areas		2			2	
Total	9	16	16	4	11	9
Supporting areas						
Parking areas	1	3	4		1	1
Information points	1	1			1	1
Picnic areas	1	2	1		2	1
Shelters		2	1		1	
Signposts	1	1	1		1	1
Viewpoints		2	1	1	1	1
Total	4	11	8	1	7	5
Recreational and physical activities						
Hiking	Yes	Yes	Yes	Yes	Yes	Yes
Picking mushrooms					Yes	
Mountaineering	Yes	Yes	Yes	Yes	Yes	Yes
Mountain biking	Yes	Yes	Yes	Yes	Yes	Yes
Fishing	Yes					
Off-road driving	Yes			Yes	Yes	Yes
Downhill skiing		Yes				
Snow activities**		Yes			Yes	
Total	6	6	4	5	7	4

[a] The list of PAs and supporting areas is based on the sectorial maps included on the official web page, http://parcsnaturals.gencat.cat/es/alt-pirineu/visiteu-nos/guia-visita/planol/

* For instance, rivers for fishing

** Snowshoeing, snow mountaineering, cross-country skiing.

The survey was conducted with the assistance of 12 people trained in field survey techniques. The response rate was 95%, and the representativeness of the whole sample included an error of ±5%.

Survey Instrument

The survey consisted of four sections. In the first section, questions were devoted to basic sociodemographic and trip characteristics (e.g., place of residence, age, frequency of visiting). Five age groups were included: 18–25 years, 26–36 years, 37–47 years, 48–58 years, and older than 58. In the second section, visitors were asked to select from a predefined list the one recreational activity perceived as the most important for their visit. When the type of activity selected had some associated element of doubt (for instance, slow or brisk walking), the interviewer continued with complementary questions related to the itinerary followed and time spent on the visit, finally allowing the respondent's foremost activity to be identified correctly. The list of activities was developed in accordance with park regulations and observations made by the main author of the present study. The activities were then related to those listed in the Compendium of PA (Ainsworth et al. 2011). Activities in the study area included: activities at the entrances (such as picnics), vehicle touring, recreational hiking (slow walking), hiking (brisk walking), picking mushrooms (a variation of slow walking), off-road motocross, snow activities (snowshoeing, cross-country skiing, downhill skiing, snow mountaineering), mountaineering (scaling a peak), mountain biking, and trail running. In the third section, individuals were asked to rate the importance of 12 motivation statements, drawn from Farías-Torbidoni (2011), for their visit. The statements were operationalized on a five-point Likert scale, ranging from 1 (very unimportant) to 5 (very important). The fourth section aimed to assess how much visitors spent during their visit. Here, three open-ended questions were asked to gather information on how much individuals spent (in euros) on accommodation, food and drink, and services / products available in the area.

Table 2 – Distribution of questionnaires administered at the main entrances.

Entrance	Total fieldwork days	Number of questionnaires	Visitors who spent money during their visit to the park
Fornet	9	115	79
Tavascan	9	204	172
La Farga	9	112	77
Tor	9	53	40
Sant Joan de l'Erm	9	147	90
Os de Civís	9	75	42
Total	54	706	500

Data analysis

The data collected were transformed and coded using the Statistical Package for the Social Sciences 18.0 (SPSS). Descriptive statistics including frequencies, mean values and standard deviations were applied to assess the basic sample information. An updated version of the Compendium of Physical Activities' Relative Metabolic Intensity (MET) consumption values (Ainsworth et al. 2011) was used to identify respondents' PA intensity (light, moderate or vigorous). To uncover the underlying dimensions, 12 motivational statements were factor-analysed using principal component analysis (PCA) with Varimax rotation. Reliability was established using the Cronbach alpha internal consistency measure, with values between 0.70 and 0.79 regarded as adequate, values from 0.60 to 0.69 as moderate, and values less than 0.60 as minimal. Convergent validity was assessed through a minimum adequate factor loading of 0.50 (Hair et al. 2006). The following equation was used to calculate the average value of individual spending during the visit:

Table 3 – Descriptive analysis: Visitor sociodemographics and travel characteristics (n = 500).

Sample characteristics	M	SD	%
Sociodemographics			
Place of residence			
Barcelona			54.6
Lleida			16
Tarragona			58
Girona			3
Other provinces			7.2
Foreign countries			8.4
Gender			
Male			67.2
Female			32.8
Age			
18–25			4.7
26–36			21.5
37–47			34.4
48–58			24.4
Over 58			15
Age	46	12.36	
Education level			
No university degree			46.4
University degree			53.6
Trip characteristics			
Park entrance points			
Fornet			15.8
Tavascan			34.4
La Farga			15.4
Tor			8
Saint Joan de l'Erm			18
Os de Civís			8.4
Number of visits in last 2 years	3	6.71	
Visit duration (days)	3.5	5.57	
Spending on accommodation (in €)	238.9	403.02	
Spending on food (in €)	81.3	151.83	
Spending on services and products (in €)	12.6	33.95	
Total spending per visit (in €)	111	149.16	
Total spending per day (in €)	31.7	49.72	

Total Sp = Sp_1 + Sp_2 + Sp_3

Sp_1 – Spending on accommodation

Sp_2 – Spending on food and drink

Sp_3 – Spending on services and products

A one-way analysis of variance (ANOVA) with a post-hoc Tukey procedure was performed to explore the differences in visitor spending as related to entrance points to the park. After controlling for the effects of sociodemographic, travel and motivational characteristics, a four-step hierarchical multiple regression analysis was run to examine the relationship between the independent variable, PA intensity in which visitors participated (METs), and the dependent variable (individual expenditure during the visit). All polytomous independent variables were previously re-coded as dummy variables. Assumptions for normality, singularity and multicollinearity were checked (Cohen et al. 2003). The assumption of normality was assessed by examining the skewness (1.96) and kurtosis values (2.56) and visual observation of the Q-Q plot. Log transformation was performed to reduce a positive skew of dependent variables. The assumption of singularity was assessed by conducting a Pearson correlation analysis to uncover the possible existence of correlations between the independent variable above 0.7. The tolerance (values less than 0.10) and variation inflation factor (VIF; values above 10) were assessed to avoid multicollinearity among the predictor variables.

Results

Descriptive analysis

The total sample showed that more than two-thirds of the visitors were from Catalonia, of whom the majority were residents of the city of Barcelona (54.6%). Male respondents (67.2%) were twice as numerous as female respondents (32.8%). This proportion is not exceptional if we take into consideration the latest results obtained in the national context (Farías et al. 2018; Luque-Gil et al. 2018; Romagosa 2018) or indeed the European context (Shirpke et al. 2018). This kind of area is visited more by men than by women. Most visitors were in the age range of 37–58 years (56.8%); 21.5% were 26 to 36; and 15% were aged over 58. Only 4.7% were aged 18 to 25. The mean age was 46. More than half of the respondents had a university degree (53.6%). Tavascan was the most frequent entrance point (34.4%), followed by Sant Joan de l'Erm (18%). On average, respondents had visited the park three times in the last two years, usually staying three and a half days. 111 euros per visit was the (average) total spend registered by visitors, including accommodation, food, drink, services and products, corresponding to 31 euros per day. (See Table 3.)

Visitor spending according to entrance point

A one-way between-groups analysis of variance (ANOVA) showed statistically significant differences in spending with regards to the entrance points: F (5.494) = 6.148, $p < 0.001$ (Table 4). Subsequently, post-hoc comparisons using the Tukey HSD test indicated that the mean spending for Tavascan ($M = 147.39$, $SD = 187.05$) differed from the mean for Saint and Os de Civís at a significance level of $p < 0.001$. Visitors who entered the park through La Farga spent significantly more money than those who entered through Sant Joan de l'Erm ($p < 0.01$).

Grouping procedure

Using the updated version of the Compendium of Physical Activities' Relative Metabolic Intensity (MET) consumption values (Ainsworth et al. 2000), respondent-reported activities were classified into three distinct PA intensity groups (Table 5). The first group accounted for 21.6% of the sample and comprised those visitors who participated in activities with metabolic consumption between 1.5 and 3 METs (e.g., light PA intensity). The second (largest) group included 57.8% of respondents, who carried out mod-

Table 4 – ANOVA results: Visitors' spending with respect to entrance points (n = 500).

Entrance points	n	M	SD	F5.494
a) Fornet	79	116.75	123.05	6.148*
b) Tavascan	172	147.39[e,f]	187.05	
c) La Farga	77	130[a]	192.20	
d) Tor	40	105.27	97.37	
e) Saint Joan de l'Erm	90	53.5[b,c]	48.97	
f) Os de Civís	42	59.5[b]	65	

*Note: $p < 0.001$; post-hoc significant differences (Tukey HSD) are shown as indexes.
For example, spending by visitors who entered via Tavascan (listed as letter b) differed significantly only from those visitors who entered via Saint Joan de l'Erm (listed as e) and Os de Civís (listed as b). Spending by those who entered via Fornet did not differ significantly from that of other visitor groups.

Table 5 – Grouping procedure according to the PA Compendium and corresponding MET consumption [a] (n = 500).

Reported activities	Total sample		Code	MET	Grouping category
	N	%			
Activities at the entrance	92	18.4	09100	1.8	Light (21.6%)
Vehicle touring	16	3.2	09105	2	
Recreational hiking (slow walking)	129	25.8	17090	3.3	Moderate (57.8%)
Hiking (brisk walking)	130	26	17082	5.3	
Picking mushrooms	1	0.2	08246	3.5	
Off-road motocross	9	1.8	15470	4	
Snow activities	20	4.0	19190	5.3	
Mountaineering	49	9.8	17040	7.3	Vigorous (17.6%)
Mountain bike	37	7.4	01009	8.5	
Trail running	2	0.4	12140	9	
Unclear answers	15	3	--	--	--

erate PA intensity, in the range 3–6 METs. The third group (17.3%) included those individuals who were engaged in vigorous recreational activities with METs above 6. Those respondents who did not report their recreational activities (i. e., other; 1.7%) were excluded from the grouping procedure.

Visitors' motivations: factor analysis

A principal component analysis (PCA) with Varimax rotation was performed on 12 motivational variables to reveal underlying motivation factors. First, a series of basic measures was inspected to justify empirically whether the set of variables fitted the proposed statistical technique. Following convention, only items with no cross-loadings and with loadings of 0.50 or greater were retained for further analyses (Hair et al. 2006). Using this criterion, the initial list was shortened to nine items (Table 6). The Bartlett test of sphericity was then carried out on the remaining items; the value reached a statistical significance of $p < 0.001$, and the Kaiser-Meyer-Olkin value was 0.45. Therefore, the data revealed a reasonable fit for the proposed statistical procedure for factor analysis. Three factors, all of which had eigenvalues equal to or greater than 1.0, explained 62.69% of the total variance. The first factor, labelled *Physical activities*, contained four corresponding variables and yielded a reliability coefficient of 0.740. The second, *Nature,* comprised three items and produced a reliability coefficient of 0.635. The third, *Novelty*, reflected two variables and had an α value of 0.627. Factor two, *Nature,* was the most important motivation dimension, with a grand mean of 4.65.

Hierarchical regression analysis

After controlling for the effects of series of sociodemographic, travel and motivational characteristics, a four-step hierarchical multiple regression analysis was run to examine the influence of PA intensity, classified within MET values, on individual spending during the visit, x.

Prior to the regression analysis, a bivariate correlation analysis was conducted, as shown in Table 7. Seven out of the ten independent variables correlated significantly with the dependent variable. Among them, only age and frequency had negative associations. Correlations between independent variables were predominately weak and did not exceed 0.4. Additional preliminary analyses confirmed no violation of the assumptions of normality and multicollinearity. Four sociodemographic predictors (place of residence, gender, age and education level) were entered at the first

Table 6 – Motivation for visiting the park: Descriptive statistics, principal component analysis and factor loadings.

Principal components	M	SD	Item loading	Eigenvalue	Explained variance	Reliability coefficient
Factor 1: Physical activities	3.03	1.35		3.222	35.76	0.74
To do physical activities			0.86			
To practise some specific PA or sport			0.86			
To improve health			0.55			
To visit specific trails			0.52			
Factor 2: Nature	4.65	0.65		1.35	14.94	0.63
To relax and disconnect			0.77			
To enjoy the scenery			0.70			
To be close to nature			0.70			
Factor 3: Novelty	3.79	1.13		1.01	11.95	0.63
To enjoy new experiences			0.83			
To explore new places			0.80			

Table 7 – Correlations among dependent and independent variables.

	Individual spending per visit[a]	1	2	3	4	5	6	7	8	9
1. Place of residence	0.123**									
2. Gender (Ref: Female)	0.025	0.047								
3. Age	−0.223***	−0.097*	0.071							
4. Education level	0.064	0.078*	0.146**	0.096*						
5. Number of visits in the last 2 years	−0.142**	−0.087*	−0.041	0.047	−0.025					
6. Visit duration (days)	0.416***	0.079*	0.068	−0.109**	0.055	0.064				
7. Physical activities	0.162***	0.056	−0.005	0.005	0.187***	0.047	0.055			
8. Nature	0.05	0.237***	0.053	0.015	0.083*	−0.013	−0.136**	0.122**		
9. Novelty	0.162***	0.138***	0.037	0.082*	0.032	−0.190***	−0.023	0.107**	0.311***	
10. METs	0.197***	0.069	−0.005	−0.002	0.245***	0.005	0.131**	0.313***	0.186***	0.148***

Significance level (two-sided): *p < 0.05; **p < 0.01; ***p < 0.001
Note: [a] Dependent variable

step and accounted for statistically significant variance in the dependent variable ($R^2 = 0.066$, F change $(3.462) = 8.226$, $p < 0.001$). Addition of travel descriptors at step two (i.e., number of visits in the last two years and visit duration), led to a statistically significant increase in the R^2 of 0.170, F $(1.460) = 51.321$, $p < 0.001$. Three motivational dimensions (*Physical activity*, *Nature* and *Novelty*) entered at step three resulted in a statistically significant increment in R^2 of 0.039, F $(2.457) = 8.310$, $p < 0.001$. Finally, by adding the physical activity intensity in the fourth step, the final model reflected a weak but statistically significant change in R^2 of 0.006, F $(1.456) = 3.909$, $p < 0.05$. The full model comprising all predictor variables was statistically significant, $R^2 = 0.282$, F $(10.465) = 17.947$, $p < 0.001$. Here, statistically significant influences of the predictor variables on individual expenditure during the visit were found for age ($\beta = -0.182$, $p < 0.001$), frequency of visits ($\beta = -0.138$, $p < 0.001$), visit duration ($\beta = 0.393$, $p < 0.001$), motivational dimensions *Physical activity* ($\beta = 0.101$, $p < 0.05$), *Novelty* ($\beta = 0.123$, $p < 0.01$), and intensity of physical activities (MET; $\beta = 0.086$, $p < 0.05$).

Discussion of findings and implications

This study is the first attempt to analyse a comprehensive dataset on the microeconomic impact of tourism in a PNA in Spain as linked to visitors' behaviour. Where the three main goals of this research are con-

Table 8 – Hierarchical regression analysis for variables predicting total spending per individual during their visit.

Independent variable	Model 1			Model 2			Model 3			Model 4		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Place of residence (Ref: City of Barcelona)	0.088	0.042	0.094*	0.054	0.039	0.058	0.023	0.039	0.024	0.024	0.039	0.026
Gender (Ref: Female)	0.025	0.045	0.025	−0.007	0.041	−0.007	−0.007	0.040	−0.007	−0.002	0.040	−0.002
Age(Year of birth)	−0.008	0.002	−0.223**	−0.006	0.002	−0.171***	−0.007	0.002	−0.184***	−0.007	0.002	−0.182***
Education level (Ref: University degree)	0.069	0.043	0.074	0.047	0.039	0.051	0.023	0.038	0.024	0.007	0.039	0.008
Number of visits in the last 2 years				−0.011	0.003	−0.154***	−0.010	0.003	−0.137***	−0.010	0.003	−0.138***
Visit duration (days)				0.033	0.003	0.401***	0.034	0.003	0.404***	0.033	0.003	0.393***
Physical activities							0.042	0.014	0.122***	0.035	0.015	0.101*
Nature							0.031	0.032	0.043	0.022	0.032	0.031
Novelty							0.055	0.018	0.130***	0.052	0.018	0.123**
METs										0.066	0.033	0.086*
R^2		0.066			0.237			0.276			0.282	
F		8.226***			23.789***			19.383***			17.947***	
ΔR^2		0.066			0.170			0.039			0.006	
ΔF		8.226***			51.321***			8.310***			3.909*	

*p < 0.05; **p < 0.01; ***p < 0.001
NOTE: B = Beta of unstandardized coefficients; β = Beta of standardized coefficient; R^2 = Variation in the dependent variable explained by the independent variables; ΔR^2 = R square change; F-distribution (F-test); ΔF – F-test change

cerned – to analyse how much visitors spent, to group visitors according to PA intensity, and to assess the contribution of PA intensity to the level of spending – the results obtained provide an information base for detailed discussion.

Visitor spending

Although there were difficulties in finding specific studies that help to put our data in context, the mean daily spending identified in our study serves as a first national reference. Namely, we found that the mean daily and total spends per person for Alt Pirineu Natural Park visitors are similar to the national averages for tourists in Spain; visitors to this park spend 31.7€ per day (national average: 33€) and 111€ per trip (national average: 125€). Despite the different approach used, the present results corroborate some of the findings of the studies referred to earlier. For example, the daily average spend established in our study was very similar to that observed in the study by Shirpke et al. (2018): if we exclude the travel costs in the Italian study, we find a difference of 20% between visitors of Natura sites in both countries (Spain: 31.7€ *versus* Italy: 37.86€). Another important finding was the significant differences between the various entrances regarding spending. Results indicated that visitors who entered the park through Tavascan or La Farga spent significantly more than those who entered through Saint Joan or Os de Civis, which is probably related to the main characteristics of the different entrances. Namely, Tavascan and La Farga offer more opportunities for engagement in various PAs and are characterized by a wider range of supporting areas. In this case, we do not have any specific references with which to compare these results, but they could also be connected with the differences identified by Schirpe et al. in the 10 Natura sites, which ranged from 15.92€ (Grigna) to 71.72€ (Fogosa). However, more data are needed to be able to establish connections between the characteristics of each site/entrance and spending levels.

PA segmentation

Although the results of the segmentation approach do not provide empirical evidence in relation to the issue, this new approach would be easily transferable if we consider that recreational activities are a common data type collected in studies related to the identification of visitor profiles in this type of area. Some examples of the approach are to be found in Farías-Torbidoni et al. (2018), Mowen et al. (2012) and Walden-Schreiner et al. (2014), who demonstrated that a metabolic equivalent approach could be used to categorize the recreational and physical activities performed by visitors to PNAs. For instance, while Mowen et al. (2012), who sampled visitors to 6 parks in Pennsylvania (USA), found similar results (almost 60% of the sample reported participation in moderate-intensity PA), Walden-Schreiner et al. (2014), who examined visitors in the high-use meadows in Yosemite National Park (USA), found that only 44% of visitors participated in moderate-intensity PA during their visit. However, the potential of this approach in connection to promoting health-enhancing physical activity (HEPA) in PNAs has been argued intensively (Farías-Torbidoni et al. 2018), not least because these kinds of data provide a good example of how existing monitoring programmes may be adapted to incorporate indicators relevant to PA evaluation point.

Contribution of PA intensity on spending levels

Although the final model of hierarchical multiple regression analysis explained a notable 28.2% of total variance, PA intensity itself made marginal but still significant contributions to visitor spending after controlling for other descriptors ($\Delta R^2 = 0.006$). These findings undoubtedly highlight the notion that they should be perceived holistically and should take into consideration other visitor characteristics. Namely, the findings have shown that increasing age was negatively associated with likelihood of expenditure. In other words, they revealed that the younger population is willing to spend more money while visiting the area. In addition, the results clearly showed that individuals who stayed longer were more motivated by internal factors, such as PA and new experiences, and were more likely to spend more money during their visit. These results are not surprising and agree with the findings of other studies in the field, which also found a positive association between visitor age (younger to middle-aged), engagement in activities with higher intensity (e.g. mountain biking, rock climbing, intensive hiking), and motivations and variables that reflect spending during the visit (Barić et al. 2016a; Cordente-Rodriguez et al. 2014; Fredman 2008). For instance, Barić et al. (2016a) found that, compared to general visitors, rock climbers, who were younger and more interested in experiences related to personal achievement, preferred to stay longer and overnight in local accommodation in surrounding villages, which indirectly implied greater spending. Freedman (2008) uncovered similar associations. Examining visitor spending in mountain regions, he found that individuals who stayed longer and participated in higher intensity PA (e.g. downhill skiing) were more likely to spend more at the destination than those who stayed for shorter times and engaged in lower-intensity PAs (e.g. snowmobiling). It is therefore reasonable to assume that the positive association between PA intensity and spending found in this study greatly depends on a range of other behavioural characteristics. However, care should be taken in making these assumptions as there is little empirical evidence about the moderating effects of sociodemographic, trip and motivational descriptors on the association between PA intensity and total spending.

Overall, the present findings have important implications and could be of great importance to park managers, local tourism operators and decision makers in

formulating more transparent, accurate and effective planning strategies and wider marketing programmes. In short, this study provides holistic insights into the associations between the influence of PA intensity on total spending, considering other relevant characteristics, and may aid managers to better understand visitors' behavioural patterns, perceiving them not as an undifferentiated group but more as mutually related and dependent units who are open to changes according to managerial needs. Managers could use this information to set site-specific strategies for improving particular physical and social conditions in parks, widening the range of recreational opportunities for visitors, and stimulating them to stay longer and spend more money. Moreover, these findings might aid park managers in developing clearer links between inputs (i. e., facilities and services provided) and outcomes (visitor spending), which could pave the way for more rational recreation and tourism strategies.

Conclusion and limitations

Earlier studies have analysed and discussed the importance of the economic impact of tourism in PNAs and the contribution of these areas to the promotion of PA and health. However, the relationship between these two factors has not been examined empirically. This is the contribution of the present study.

First of all, the results obtained in terms of visitor spending not only serve as a first national benchmark, but also allow us to corroborate the findings of earlier studies at both national (Spain) and regional (Europe) levels. Furthermore, the results obtained indicate, if inconclusively, a possible connection between park facilities (PA and supporting areas) and visitor spending levels.

Second, because recreational activities are a common data type collected in any study related to identifying the profiles of visitors to protected areas, the segmentation approach is readily transferable (although its results do not provide empirical knowledge).

Finally, although the contribution of PA intensity to the level of expenditure is not conclusive, the results obtained here show a statistically significant influence of predictor variables on individual spending. We found that age, visit duration, the motivational dimensions of *Physical activity* and *Novelty,* and PA intensity are good predictors of how much a visitor will spend. This indicates that, by increasing PA intensities, managers and local officials could increase visitor spending and open up a new approach to expand the roles of PNAs in society. Although the results of this study regarding the relationship between the two benefits (i. e. the economic and the health impacts) are not conclusive, they do offer a line of work for future research, which could create a further segmentation of PA intensities based on market tourism theories. Such data could help inform policy decisions, aiding managers to direct and support increasing PA intensity and take more appropriate decisions to increase the economic impact on the region.

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