

VISITOR'S PHYSICAL ACTIVITY BEHAVIOUR IN PROTECTED NATURAL AREAS: A CASE STUDY OF ALT PIRINEU NATURAL PARK - SPAIN

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ABSTRACT

Recreational and sport activities in protected natural areas (PNA) have increased in recent years. Specific policies regulate PNA, thus are an appropriate time and environment to promote health and wellbeing through the practice of physical activity and sport. Identifying the visitors profile is essential in PNA to provide targeted programmes. The purpose of this study is to identify visitors' profile in relation to the type and intensity of physical activity according to metabolic equivalent (MET) consumption in order to investigate the association between physical activity behaviour and visitors' characteristics at Alt Pirineu Natural Park, Spain. Visitors to the Alt Pirineu Natural Park completed structured surveys to analyse their type and

intensity of physical activity (independent outcome) according to the MET compendium in relation to the dependent outcomes such as: sociodemographic data and visiting behaviour. Visitors completed 1600 surveys from 16 accesses to the park during 12 months. One hundred thirty-five (8.6%) visitors reported sedentary activities (remaining at the park entrance), 129 (8.2%) light-intensity activities (driving 4x4 vehicle, fishing trout), 1036 (65.8%), moderate-intensity (hiking, mushrooming, riding ATV or motorbike, snow shoeing, downhill skiing) and 274 (17.4%) reported vigorous-intensity activities (trekking, climbing hills, MTB, Nordic skiing and ski touring). Twenty-six cases were discarded. The results were discussed in terms of visitors' groups and management implication.

Keywords: Protected Natural Areas, physical activity-intensity, visitors segmentation, health-enhancing physical activity

INTRODUCTION

Protected areas provide multiple and valuable ecosystem services to society, such as biodiversity conservation, clean air and water, recreation and environmental education (Romagosa, Eagles & Lemieux 2015). However, protected natural areas (PNA) are not only promising means to satisfy ecosystem services, but they also are an ideal environment to promote physical activity (Bedimo-Rung & others, 2005). Protected areas, such as national parks, natural parks or wilderness areas are popular tourist destinations. It is not surprising then, that a number of research and community initiatives are focusing on the contributions of protected areas to the enhancement of physical activity and health.

While health and physical activity promotion as a matter of policy may be a newer trend in protected areas, biodiversity and landscape conservation are well monitored. Despite the evidences of park and protected areas as places to exercise (Bedimo-Rung, Mowen & Cohen, 2005; Kaczynski and Henderson, 2008; Mowen and Baker, 2009; Pietilä and others, 2014; Romagosa, Eagles and Lemieux, 2015), there are only few studies that include physical activity outcomes; especially in Europe and Spain. Indeed, much of past physical activity research has been focused in urban parks and has been developed mainly in the USA and Australia (Calogiuri & Chroni 2014; Romagosa, Eagles & Lemieux 2015). Currently, little research exists on the amount of physical activity in PNA and even less research focused on physical activity intensities. Some of the few examples we can find in the

research carried out by Larson, Whiting, Green & Bowker (2010), Mowen, Trautwein, Graefe & Son (2012), Veitch & others (2015) and Brown, Weber & Schebella (2016). However, whereas the major part of them take in consideration this perspective in a complementary way, only the study carried out by Mowen, Trautwein, Graefe & Son (2012) based their research in METs approach. In this case, the study carried out by these authors take in consideration the visitors participation in vigorous and moderate physical activity at the park during their visit applying a systematic survey and conclude, that demographics, activity type, and desired psychological experience preferences played a significant role in shaping park-based physical activity intensities, but their influence varied depending on the intensity level (moderate vs vigorous). Understanding physical activity intensities in protected areas could not only foster management decisions on visitor and resource management, it can also contribute to the evaluation of protected areas as destinations for promoting physical activity. Incorporating and analyzing physical activity intensities and visitor characteristics associated, would help to engage specific program and policy interventions to increase physical activity in these areas.

The purpose of this study is to identify visitors' profile in relation to the type and intensity of physical activity according to metabolic equivalent (MET) consumption in order investigate the association between physical activity behaviour and visitors' characteristics at Alt Pirineu Natural Park, Spain.

METHOD

Study area

The present study was carried out in the Alt Pirineu Natural Park, which was established in 2003 by the Catalan government and covers an area of 69,850 hectares (172,600 acres), including the highest peaks of the Catalan Pyrenees. It stretches over the counties of Pallars Sobirà and Alt Urgell (Figure 1). This is an area of great ecological value and scenic beauty that preserves a series of traditional communal rights over the exploitation of local resources. For management purposes, the park is divided into five geographic areas: Vall d'Àneu, Vall de Cardós, Vall Ferrera, Vall de Santa Magdalena and Massís de l'Orri. One of the park's most important features is that it has a vast provision of trails and managed areas to practise outdoor activities such as hiking, mountain biking, snow activities and off-road driving. The recreational offer includes more than 173 trails (for more

July 2010 and June 2011 on 2 to 15, depending on the entrance, according to two main criterions: 1) the amount of visitors using the entrance, estimated by a sensor pressure resulting in three categories (i.e., priority entrance, more than 10,000 visitors per year; medium entrance, from 3,000 to 10,000 visitors per year; and secondary entrance, less than 3,000 visitors per year), and 2) the time of the year that the entrance was open. For instance, while entrances Tavascan and Sant Joan de l’Erm are open all year long, Fornet and Cerbi entrances are closed during winter and during some months of autumn and spring. In total 131 sampling unities were taking in consideration. See table 1.

Visitors were interviewed between 10 am and 7 pm. The respondents were approached on their way out of the reserves through the main entrances because most of the questions included in the questionnaires referred to the activities they had (e.g., place visited, activity practiced and length of visit)

The survey was conducted with the assistance of staff trained in field survey techniques. A random sample selection system was adopted depending on the route of access to the park. For example, we did one interview per car, one interview per group of walkers, of bikers and one of people using other forms of access. When a group was encountered, the researcher alternated asking the first adult male or female to complete the questionnaire. The average time spent on the interview was 8 minutes. The response rate was of 96%.

Table 1: Sampling distribution and surveying days for each access point

Sampling points	Type of access	Total days
1. Fornet	Priority ^a	9
2. Cerbi	Priority	8
3. Tavascan	Priority	15
4. Esterri de Cardós	Priority	10
5. La Farga	Priority	10
6. Tor	Priority	10
7. Bordes de Virós	Priority	14
8. Coll de So	Priority	10
9. Sant Joan de l’Erm	Priority	15
10. Baiasca	Priority	10
11. Os de Civís	Intermediate ^b	6
12. Comes de Rubió	Intermediate	6
13. Mollera	Secondary ^c	2

14. Escaló	Secondary	2
15. Estaon	Secondary	2
16. Arboló	Secondary	2
Total		131

^a Entrances with an estimated register higher than 10000 visitors per year;

^b Entrances with an estimated register from 3000 to 10000 visitors per year;

^c entrances with an estimated register lower than 3000 visitors per year.

Sources: Authors

Questionnaire

The questionnaire included 16 close-ended questions in two sections. The first included six demographic questions about the visitors (i.e., age, gender, residence, level of education, occupation, knowledge of the park and its protection status). The second section included nine questions related to visiting behaviour (i.e., group profile, accommodation, frequency of visits, length of visit in the park and park area, type of trail and sectors visited, and reasons to visit the park). Regarding the reason or motivations of visiting the area, we included nine items based on research by McColl and Reilly (1993), Wallace & Smith (1997), Chhetri & Arrowsmith (2002) and (Farías 2011). Respondents were asked to specify the three most important reasons in order of priority.

Although the survey used close-ended question, there was the possibility to register some other recreational or physical activities. In this case, the activity selected was highest intense form of physical activity and interaction with the natural environment. To facilitate comparison of the number of visitors to different trails, at each access point the trails were divided into two categories according to level of popularity and accessibility: 1) classic trails (i.e., hallmark trails in each area, which are better signposted and maintained than the others); and 2) other trails not included in the first category (i.e., no classical, did not know, no park).

Data analysis

Statistical analyses were made using PASW Statistic Processor (SPSS Statistics 18). First, we identified the different groups of activities. Then we classified these activities according to MET consumption (Ainsworth & others, 2000 and 2011). Activities that are considered sedentary required a metabolic consumption less than 1.5 METs, light intensity between 1.5 and 3 METs, moderate intensity required from 3 to 6 METs, and vigorous intensity require more than 6 METs (Table 2). Chi-Square test were conducted to

examine bivariate associations between park-based sedentary, light, moderate and vigorous-intensity physical activity, and socio-demographic, park visitation characteristics and opinions. Descriptive statistics were used to describe the park visitor group characteristics.

We deem appropriate to conceptualize the physical activities included in Table 2. *Hiking* is defined as all kinds of physical activity that involve hiking in the countryside, the forest or the mountains along trails or paths for more than 30 min. Whereas *Recreational Hiking* refers to a recreational activity that implied walking "for pleasure" at a moderate pace. *Mushroom picking* is defined as all kinds of tourist activities that involve picking mushrooms while walking in the countryside, mainly in forests. This is a very popular activity in the Pyrenees that requires more than 30 minutes of walking. *Mountaineering* includes only people climbing a peak and *Mountain Biking* incorporates visitors using a mountain bike. Finally, *Staying at the place of arrival* was used as a category for people who have not done any of the previous mentioned activities, and it included, for example, resting on picnicking areas.

Table 2: Recreational, sporting and tourist activities and MET classification

Activities	Total sample n=1562	%	Code ^a	MET	Category
Staying to entrance	135	8.4	09055	1.3	Sedentary
Recreational hiking (less than 30 min)	289	18.1	17090	3.3	Moderate
Hiking (more than 30 min)	436	27.3	17082	5.3	Moderate
Mountaineering	107	6.7	17040	7.3	Vigorous
Mountain biking	68	4.3	01009	8.5	Vigorous
Picking Mushrooms (more than 30 min)	199	12.4	08246	3.5	Moderate
Off-road driving	109	6.8	09105	2.0	Light
Moto-cross. Quads	22	4.0	15470	4.0	Moderate
Snow shoeing	36	2.3	19090	5.3	Moderate
Skiing cross country	81	5.1	19090	9.0	Vigorous
Skiing downhill	54	3.4	19160	5.3	Moderate
Snow mountaineering	18	1.1	19130	15.5	Vigorous
Fishing	20	1.3	04061	1.8	Light
Others	26	1.6	--	--	--
Total	1.600	100	--	--	--

^a Ainsworth (2000): Sedentary behavior \leq 1,5 MET; light (1.5 to 3 MET), moderate (3 to 6 MET), vigorous (>6 MET).

RESULTS

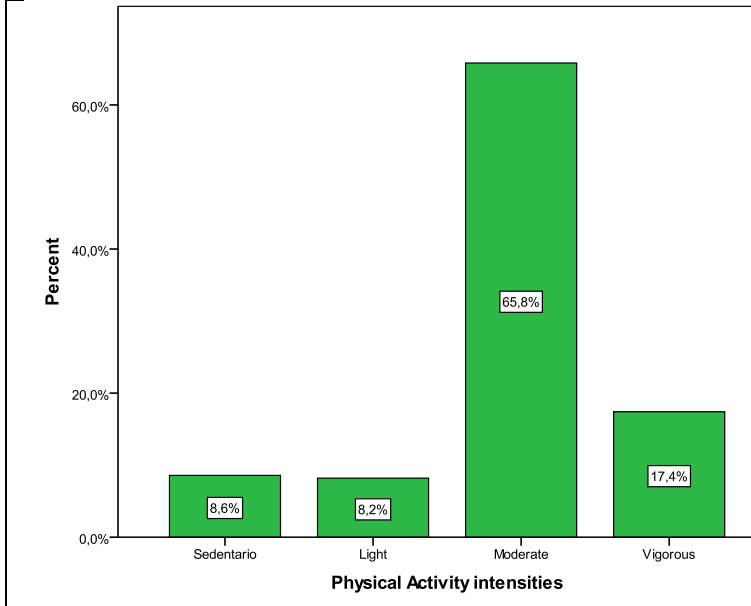
Main characteristic of visitors

Significantly, the sample included more men than women (67.2% and 32.8%, respectively). Respondents' ages ranged from 12 (the age of eligibility for participation) to 86, the 29% between 32 to 41 years. More than 54% were residents in Barcelona and 14.2% live in the Natural Park area. The 49% completed University education and have a wage-earner occupation (44.7%). Of the respondents, 36.1% had known about the area for a long time, 17.5% had heard about it by word of mouth (17.5%), and 83.5% were aware of the area's protected status. The respondents recorded their responses to several questions associated with visiting behaviour: about 31.1% were visiting the park with the family, 28.5% with their partner and 28.8% with their friends. They would stay in a hotel (23.2%) or second residence (20.2%), and 35.4% of them were visiting the protected area for the first time. Most of them visited the park for 0-6 hours (81.39%) and visit the classic trails (78.8%). See Total Sample in Tables 3 and 4.

Physical activity intensities and visitors characteristics

The results obtained in the current fieldwork shows that 135 (8.6%) visitors reported sedentary activities, 129 (8.2%) light-intensity activities, 1036 visitors (65.8%) moderate-intensity and 274 visitors (17.4%) vigorous-intensity. See Graph 1.

Graph 1: Physical activities intensities in the protected natural area



Sources: Authors

The socio-demographic characteristics of visitors according to physical activity intensities are shown in Table 3. Significant differences in park use according to physical activity intensities were observed for age, sex, education, occupation, and level of knowledge of protection status of the PNA. Comparing by age groups, a lower proportion of older adults and seniors (52 years and above) were observed in the Light activity group (23.7%) and a higher proportion of young adults (22 to 41 years) were observed both in Sedentary and Vigorous groups (47.4% and 55.2%, respectively). Although men were majority in all categories, a major proportion of women were observed in the Sedentary and Moderate visitors group (41.5% and 34.1%, respectively) and a higher level of men were observed in the Light group (81.4%). Moreover, regarding to level of education, a higher proportion of visitors with university degrees engaged in moderate and vigorous-intensity physical activity (47.5% and 57.6%, respectively). Finally, there is a positive relationship between the physical activity-intensity and the level of knowledge of protection status. The more visitors physical activity-intensity the more knowledge about the status of protection of the PNA they have.

Table 3: Variables that best define socio-demographic characteristics of the Alt Pirineu Natural Park visitors group (see text for more details)

Variables	Sedentary n=135 (8.6%)	Light n=129 (8.2%)	Moderate n=1036 (65.8%)	Vigorous n=274 (17.4%)	Total N=1574
Age groups*					
21 years or less	1.5%	1.6%	1.4%	2.9%	1.7%
22 to 31 years	13.3%	7.0%	12.0%	17.2%	12.6%
32 to 41 years	34.1%	20.9%	26.9%	38.0%	29.0%
42 to 51 years	27.4%	31.0%	25.7%	25.9%	26.3%
52 to 61 years	17.8%	27.1%	22.6%	13.1%	20.9%
Over 62 years	5.9%	12.4%	11.4%	2.9%	9.5%
Sex*					
Male	58.4%	81.4%	65.9%	69.7%	67.2%
Female	41.5%	18.6%	34.1%	30.3%	32.8%
Current place of residence					
Barcelona County	54.8%	53.5%	58.1%	57.2%	54.7%
Lleida County	16.3%	11.6%	10.4%	8.0%	9.5%
Tarragona County	9.6%	6.2%	4.9%	4.5%	6.6%
Girona County	1.5%	3.9%	3.8%	4.8%	3.6%
Other Provinces	5.9%	5.4%	7.8%	10.8%	7.7%
Other Countries	1.4%	5.5%	4.4%	5.4%	1.8%
Residence zone	8.9%	6.2%	8.6%	8.3%	14.2%
Andorra	1.5%	7.8%	1.9%	1.0%	1.8%
Level of education*					
Primary education	6.7%	10.1%	10.1%	4.7%	8.9%
Secondary education	20.7%	21.7%	15.4%	13.1%	16.0%
Vocational training	24.4%	24.8%	26.9%	24.5%	26.1%
University and more	41.2%	43.4%	47.5%	57.6%	49.0%
Occupation*					
Student	0.7%	1.6%	2.2%	3.7%	7.3%
Wage-earner	56.3%	34.1%	41.5%	42.8%	44.7%
Self-employed	16.0%	39.5%	25.6%	21.6%	25.6%
Government employee	13.3%	7.8%	15.0%	12.4%	13.8%
Unemployed	2.2%	4.7%	4.1%	5.5%	4.2%
Retired	6.7%	12.4%	8.5%	1.8%	7.5%
Homemaker	0.7%	0.0%	0.3%	0.0%	.4%
How did you know about the area?					
I live in the zone	9.6%	7.8%	8.8%	8.5%	11.7%

I did not know about it	8.1%	13.2%	7.9%	5.8%	8.8%
It's been a long time since I heard about it	34.1%	41.9%	36.7%	37.2%	36.1%
Word of mouth	21.5%	14.7%	18.8%	19.0%	17.5%
Signposting	5.9%	9.3%	9.1%	8.3%	9.1%
Tourism Office, agencies	5.2%	1.6%	3.2%	3.5%	2.6%
Maps, guides, books	6.7%	3.9%	6.8%	8.9%	6.9%
Internet or medias	5.9%	6.2%	4.4%	6.5%	5.1%
Others	3.0%	1.6%	4.3%	2.4%	2.2%
Knowledge protection status*					
Yes	78.5%	78.3%	83.9%	86.5%	83.5%
No	21.5%	21.7%	16.1%	13.5%	16.6%

* Significance differences Chi-Square test

Sources: Authors

The characteristics of the park visit according to physical activity intensities are showed in Table 4. A higher proportion of friends group were observed in the Vigorous group, whereas family group were higher in the Sedentary group. Visiting the park alone or living in the area (accommodation) was concentrated in Vigorous group. Compared with the other accommodations, a higher proportion of second residence and hotel or hostel was observed in Sedentary and Light visitors group (51.8% and 51.1%, respectively). In terms of typology of trail visited (i.e., classical, hallmark trails in each area, which are better signposted and maintained than the others, or no classical, do not know) no long differences were observed between groups, except in the case of Sedentary visitors group. More than 45% of this visitors group stay outside the territory park (near to the border).

Table 4: Variables that best define visitation behaviour of the visitors Alt Pirineu Natural Park group (see text for more details)

Variables	Sedentary n=135 (8.6%)	Light n=129 (8.2%)	Moderate n=1036 (65.8%)	Vigorous n=274 (17.4%)	Total N=1574
Composition of the group*					
Alone	5.2%	6.2%	9.3%	16.8%	9.7%
Partner	29.6%	34.1%	25.8%	20.1%	28.5%
Family	37.0%	33.3%	34.5%	19.7%	31.1%
Friends	24.4%	25.6%	28.8%	41.2%	28.8%
Organized group	2.2%	.0%	.3%	0.7%	0.4%

(school)					
Organized group (Campus)	1.5%	.0%	.2%	0.7%	0.8%
Organized group (4x4, Travel agencies)	.0%	.8%	1.0%	0.7%	0.7%
Accommodation*					
Living near the Park	10.4%	14.7%	11.5%	17.2%	12.6%
No accommodation	13.3%	13.8%	13.7%	9.1%	13.2%
Second residence, flat, family, friends	24.4%	24.7%	21.4%	13.1%	20.2%
Country cottage	5.9%	4.7%	7.2%	3.3%	6.2%
Hotel or hostel	27.4%	26.4%	18.4%	10.6%	23.2%
Shelter	3.0%	1.6%	4.4%	10.6%	5.1%
Campsite	12.6%	12.4%	14.7%	10.6%	13.6%
Mountain hut	2.2%	.0%	2.6%	6.9%	3.1%
Others (mobile home. etc.)	2.7%	2.4%	4.7%	12.0%	7.8%
Way into the park					
Private car	94.1%	94.6%	83.5%	78.8%	84.5%
Taxi	.0%	.8%	1.3%	0.7%	1.0%
BTT	.7%	.8%	1.0%	17.2%	3.7%
Walking	3.0%	1.6%	11.0%	2.2%	8.0%
ATVs, etc.	.7%	1.6%	1.7%	0.0%	1.3%
Others	1.5%	.8%	1.5%	1.1%	1.4%
Frequency of visits (last two years)					
In live in the area	13.3%	19.4%	11.6%	12.8%	12.6%
First time	39.3%	34.1%	35.4%	33.9%	35.4%
Second time	10.4%	17.1%	16.2%	11.3%	14.9%
Between 3 to 6 times	21.5%	15.5%	19.6%	23.4%	20.1%
Between 7 to 9 times	6.7%	7.8%	8.1%	7.3%	7.8%
More than 10 times	8.9%	6.2%	9.1%	11.3%	9.2%
Length of the visit to the Park*					
Less 1 hour	3.7	1.6	1.9	0.0	1.7
From 1 to 2 hours	48.2	36.4	23.9	11.2	24.8
From 3 a 6 hours	39.6	55.1	59.3	45.2	54.89
From 7 a 10 hours	5.9	4.7	5.9	27.8	10.8
More than 10 hours	2.9	2.4	9.0	15.4	7.9
Trail*					
Classic	46.7%	79.8%	81,1%	84.7%	78.7%
Non classic	5.9%	6.2%	3.5%	7%	4.6%

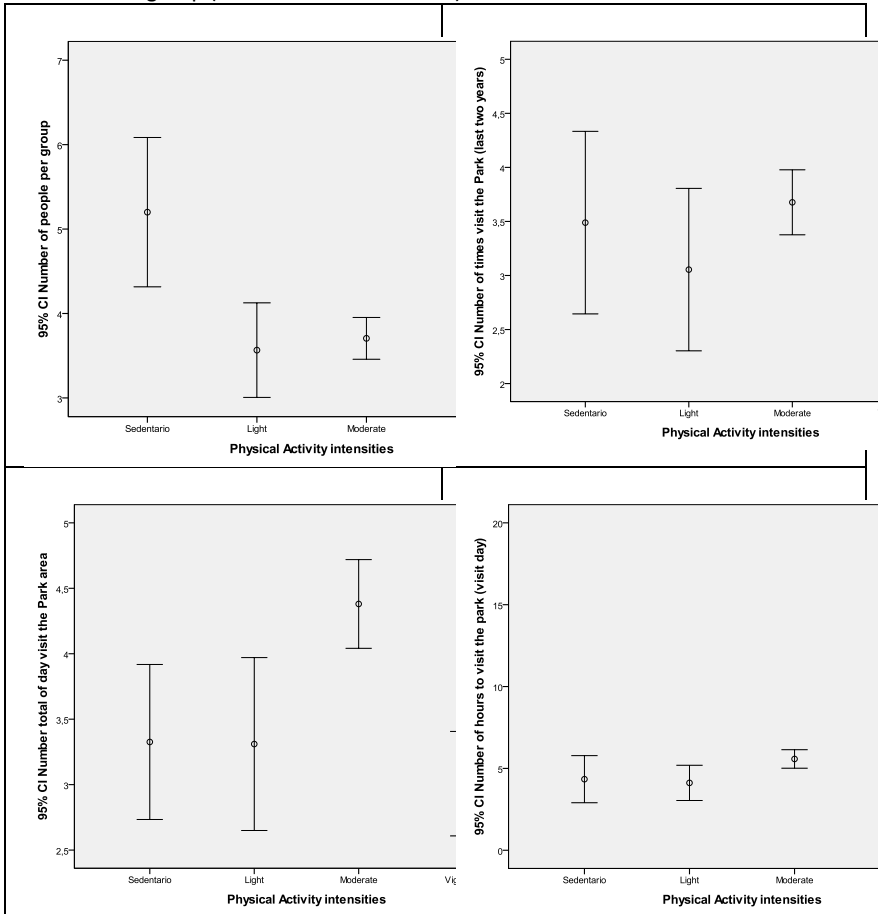
Don't know	1.5%	2.3%	0.4%	0.4%	0.6%
No Park	45.9%	11.6%	15.1%	7.3%	16.1%
Others places in the park					
Yes	40.0%	34.9%	43.7%	35.8%	41.3%
Non	54.0%	61.2%	49.8%	60.9%	53.0%
I don't know	6.0 %	3.9%	6.5%	3.3%	5.7%

* Significance differences Chi-Square test

Sources: Authors

Moreover, as it can see in the Graph 2, the results achieved regarding the number of people per group, frequency of visit and length of the visit in the park (hours) and in the park areas (days), show an interesting differences. For instance, higher level of frequency of visit (times visited the park during the last two years) and hours visiting the park are allocated in the Vigorous visitors group, whereas the shorter length of visit in the park (hours) was concentrated by the Sedentary and Light visitors group. The visitors in the Moderate group spent the most time visiting the park area (with a mean of almost five days).

Graph 2: Variables that best define visitation behaviour of the visitors Alt Pirineu Natural Park group (see text for more details).



Sources: Authors

Regarding the motivations to visit the PNA, the results obtained are showed in the Table 5. Whereas *to get closer to nature and to relax and disconnect* were the higher common motivations selected by practically all groups, except for the Vigorous group (relax motivation), the most active visitor group (Moderate and Vigorous) prioritise *to practice some exercise* (sport or physical activity). Moreover, *to spend time with family or friends* are, in the

case of less active visitors (Sedentary and Light visitors group) within the three main motivations to visit the protected natural area.

Table 5: Motivations to visit the park (see text for more details).

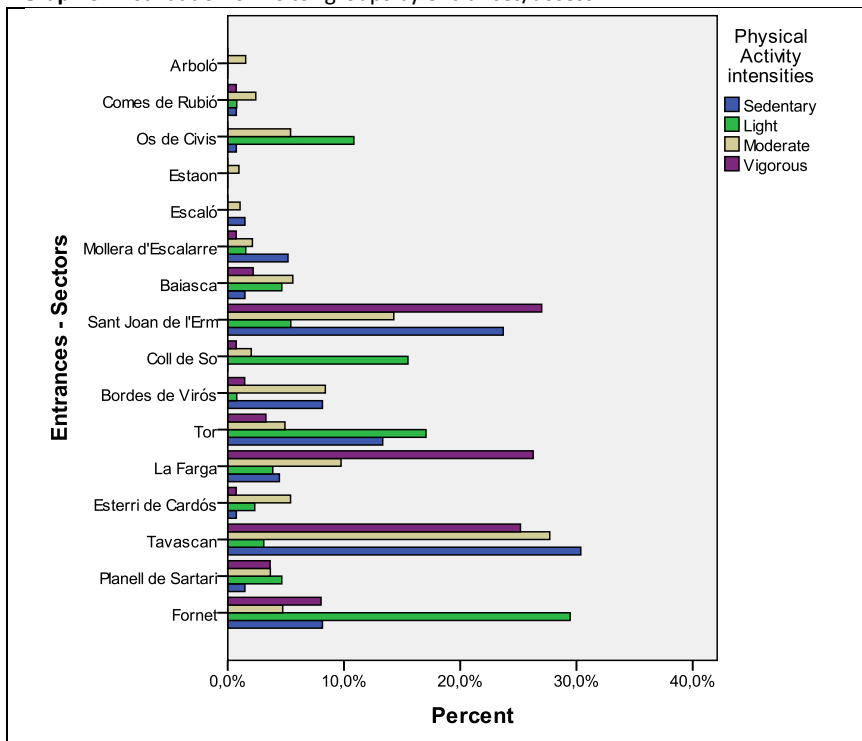
Variables	Sedentary n=135 (8.6%)	Light n=129 (8.2%)	Moderate n=1036 (65.8%)	Vigorous n=274 (17.4%)	Total N=1574
To get closer to nature	27.4%	31.6%	28.7%	25.2%	28.2%
To practise some exercise (sport or PA)	10.4%	8.8%	16.7%	29.8%	18.0%
To visit a particular trail o area	6.5%	11.4%	8.3%	9.3%	8.6%
To spend time with family/friends	21.8%	12.8%	11.9%	12.4%	12.9%
To know new places	11.8%	12.8%	8.4%	8.3%	8.7%
To relax and disconnect	17.8%	16.8%	14.9%	11.5%	14.4%
To pick mushrooms	.9%	3.7%	8.7%	1.6%	6.3%
Working related issues	.3%	2.0%	.3%	0.7%	.4%
Other reasons	3.0%	0%	2.4%	1.2%	2.5%

* Significance differences Chi-Square test

Sources: Authors

Finally, as it can see in the Graph 3, the distribution of visitors group by sectors/entrances, according to physical activity intensities shows a higher proportion of the Sedentary and Vigorous visitor group in the same entrances: *Tavascan* and *San Joan* and a major concentration of Light group in the *Coll de So and Os de Civis* entrances.

Graph 3: Distribution of visitor groups by entrances/access



Sources: Authors

CONCLUSIONS

This study describes the characteristics, visitation behaviour taking into account physical activity-intensities of visitors at Alt Pirineu Natural Park - Spain. According to Veitch, Carver, Abbott, Giles-Corti, Timperio & Salmon (2015), physical inactivity is a major contributor to the burden of chronic disease, including cardiovascular disease, diabetes, and overweight and obesity, understanding the characteristics of park visitors and park visitation is important in order to develop strategies to increase physical activity use in this type of areas.

In general, the results obtained show that the 83% of visitors do moderate to vigorous physical activity during their visit in the protected area (65.8% and 17.4%, respectively), in line with previous studies such as Mowen, Kaczynski & Cohen (2012). This is important to demonstrate the contribution of this type of areas as a promising place to satisfy current physical activity recommendations to maintain health issued by the WHO (2010).

In specific terms, and regarding the distribution of the entrance used by the different visitors group, we observed a non-homogenous distribution, for instance, both the visitors who performed sedentary or vigorous-intensity activities were concentrated in the entrances of *Tavascan* and *San Joan de l'Erm*. That shows no relation between the features and characteristics of the entrance in relation to the intensity of the physical activity.

Differences in socio-demographics visitors' characteristics and behaviour of visitation were observed according to the physical activity-intensity visitors group: age, sex, level of education, occupation, level of knowledge about the status of protection of the PNA group visit (included number of people), accommodation, length to visit in the park (hours) and in the park are (days). For instance, visitors performing sedentary and light-intensity activities were more likely to visit the area with family, to stay in a hotel or second residence and to spend more than 3.5 hours visiting the park, whereas visitors performing vigorous-intensity activities were more likely to visit the park with friends or alone, live in the area, visit the park more than two times per year and spend more than fifteen hours visiting the park.

Results obtained from motivations to visit protected areas also show some interesting differences that can contribute, especially, to increase physical activity in the visitors who take part on sedentary activities. For instance, visitors being sedentary from other groups in their preference *to spend time with family and friends* and *to know new places*.

Further research is needed to examine how physical activity-intensity varies in protected areas with different features and amenities. Also, how programming Protected Natural Areas' activities and supporting facilities can optimise protected areas-based physical activity for all visitors.

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