

Tourism Management Perspectives

Research paper:

Starting to enjoy nature in Mediterranean mountains: Crowding perception and satisfaction

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Abstract

The aim of the present study was to identify the profile and motivations of users of public facilities in Sierra de las Nieves, a protected area ('natural park') in the Spanish Mediterranean mountains, and their influence on perceptions of crowding and satisfaction. A self-reported questionnaire, including socio-demographic questions and a scale measuring perception of crowding, type of motivation, frequency of visits, and satisfaction, was administered to 345 visitors. Four profiles of visitors were identified: *social*, *sport*, *learning*, and *nature visitors*. Results showed that *sport* and *nature visitors* perceived more crowding than *learning visitors*. Type of motivation, and the interactions, age x type of motivation and employment-status x type of motivation, explained a significant amount of variance of perceived crowding. Interaction analysis showed that both age and employment status moderated the relationship between type of motivation and perception of crowding. We suggest implications for park planning and management.

Keywords: Protected natural areas, perception of crowding, motivation, satisfaction

INTRODUCTION

Physical and recreational activities in Protected Natural Areas (PNA) have become increasingly popular since the 1990s, as new forms of leisure preferences evolve (Farias, 2011; Marques, Reis, & Meneses, 2010; Rodríguez, 2009; *Secretaría General de Turismo*, 2014). This changing pattern reflects a situation similar to that already experienced in the sociological context of Anglo-Saxon countries (De Breejen, 2007; Hadwen et al., 2011; Saepórsdóttir, 2010), where the protection of natural spaces and the practice of recreational activities in such spaces date back to the 1950s and 60s. By contrast, in Mediterranean societies, the urbanisation process has been very recent, as has the expansion of PNA (in Spain, following the adoption of Act 4/1989, of 27 March, on the Conservation of Natural Areas and Wildlife). Accordingly, recreational practices in natural spaces are still at an embryonic stage of development, although visitor numbers are growing. In addition, recreational activities in PNA are usually concentrated on a small number of trails and areas. As a result of this growth and visitors' concentration, park managers must reconcile satisfying user demand with the conservation of spaces whose outstanding beauty and importance are matched by their fragility (Garrigós, Narangajavana & Palacios, 2004).

Pioneering studies in this respect, conducted in the Anglo-Saxon context, highlighted two concepts in particular, users' motivation and the social carrying capacity of the area, as valuable tools for managing the recreational use of PNA (Driver, Brown, & Perry, 1978; McCool & Petersen, 1982; Wagar, 1964). Differences in users' motivations were introduced as a factor underlying their perceptions of crowding (Driver et al., 1978; McCool & Petersen, 1982). Knowledge of users' motivations is fundamental to our study goals, as this factor is the basis for understanding the demand for recreational facilities and, at the same time, a valuable tool for developing effective

management measures (Arnegger, Woltering & Job, 2010; Farias, 2011; Saepórsdóttir, 2010) and for estimating social carrying capacity based on perceptions of crowding.

Perception of crowding in PNA is a topical and relevant subject both for the planning and management of recreational use in PNA and the implementation of strategies that reduce social conflicts. Good management of these spaces can reduce the perception of crowding among those visitors who perceive more saturation and, thus, improve their recreational experience (McCool & Lime, 2001). Studies in the United States indicate that 40% of visitors to a natural park have conflicts with this issue and, in European studies, 10–64% of the young visitors perceive crowding (Arnberger & Mann, 2008). The majority of the studies on crowding perception have been developed in the United States and Canada (Arnberger & Mann, 2008; Graefe, Vaske & Kuss, 1984; Pereira da Silva, 2002). In fact, a review by Arbenger and Mann (2008) indicates that, between the years 1980–2008, only 16 studies on crowding perception have been developed in European forest areas and most of them focussed on the areas of Central and Northern Europe. To the best of our knowledge, no studies have yet explored the perception of crowding in a natural park of the Mediterranean area. Also, according to data, and as far as we know, only three recreational profiles of visitors have been identified: Rural, sport, and nature tourists (Secretaría General de Turismo, 2014). The lack of definition of recreational users in natural spaces in Mediterranean mountain areas might contribute to generating a whole series of problems of management and planning of recreational use therein, as well as for the realisation and development of the “nature tourism segment” by the Secretaría General de Turismo (2014). Finally, as far as we know, no previous studies have examined the influence of these users’ motivations on perception of crowding and overall satisfaction.

The study of motivations of visitors and its relation to satisfaction and perceptions of crowding in the Mediterranean area would help in providing insights for managing the natural parks in this area in a sustainable way and to, ultimately, increase visitors' satisfaction.

1.1 Motivation and perception of crowding as components of social carrying capacity

Spain's parks are behind those in the USA and other European countries with respect to number of visitors (Fernández & Santos, 2010). In 2006, the PNA in Spain, as a whole, received over 36 million visitors (Farias, 2011). However, the distribution of this figure among the different natural parks reveals considerable variations in visitor numbers (Eroski Consumer, 2012). Thus, 60% of these parks receive fewer than 50,000 visitors a year, and 33% receive 10,000–50,000 visitors. A similar distribution is found throughout Andalusia [according to the Report of Activities and Results, published by the Spanish Environment Ministry (Ministerio del Medio Ambiente, 2009)], where 50% of the natural parks have fewer than 20,000 visits per year, 25% between 20,000 and 50,000, and only 25% have over 50,000 visitors; of these latter, 21% receive between 100,000 and 300,000 visits annually.

In order to measure perceptions of crowding, a procedure based on the use of surveys and on assessing the '*Number of encounters among users*' (i.e., the 'Encounter rules' method) is commonly used, whereby user experience is expressed in terms of the number, type, and location of encounters with other people on the trail and how these events affect the users' perceptions of quality in the trail activity (Patterson & Hammitt, 1990; Shelby & Heberlein, 1986; Tarrant, Cordell & Kibler, 1997).

The number of encounters is not the only variable that affects crowding perception. As stated by experts, there are two components involved in the evaluation of crowding (Gibson et al., 2014; Shelby, Vaske & Donnelly, 1996): the *descriptive*

component, which includes the physical characteristics of the environment and objective observations of encounters with people; and the *evaluative component*, based on norms (i.e. a set of shared attitudes and preferences towards social, environmental or management aspects of the recreational experience; Shelby & Heberlein, 1986). In this way, crowding differs from other concepts like *density*; a descriptive term referring to the number of people per unit area that can be determined objectively by counting the number of persons and measuring the space they occupy (Vaske & Donnelly, 2002). Crowding, instead, is an evaluative term, as it involves a value judgment that the number of people the individual encounters is too many (Shelby, Vaske & Heberlein, 1989). Actually, the term *perceived crowding* is frequently used to highlight the evaluative and subjective nature of the concept. Crowding is also considered a normative variable because, in all cultures, there is a number of people for each place, time, and situation that is considered adequate (PAOT: people at one time) (Gibson et al., 2014; Shelby et al., 1996). Previous studies of crowding indicate that there is an inverse relation between PAOT and acceptability (Graefe & Vaske, 1987) and a direct relation between PAOT and negative affect, tension, nervousness, and anxiety (Steg, van den Berg & De Groot, 2012). In contrast to these findings, there is also evidence that crowding attracts attention (Kirchgessner & Sewall, 2015). Specifically, these authors found that new visitors approached a crowd rather than avoiding it and their duration watching a difficult-to-observe animal was increased when other visitors were also investing their time to do so. These contrasting findings could be due to the different social scenarios where these studies took place: The first ones (Graefe & Vasque, 1987; Steg et al., 2012) were carried out in the context of an outdoor recreational activity, while the last one (Kirchgessner & Sewall, 1985) was carried out in a zoo, where animals are exhibited in specific locations. New visitors in the zoo

might have been cued by group behaviour to animal locations, while there is not a specific object or animal that is difficult to observe in a hiking park such that attention could have been previously cued.

There are several theories that explain the perception of crowding (Gramman, 1982; Lee & Graefe, 2003; Schreyer and Roggenbuck, 1978) according to evaluative and descriptive components.

a) *'Expectancy theory'* (expectancy as a temporary belief that an act will be followed by a determined result). This theory is based on the evaluative component of crowding and explains the weak relationship between crowding perception and actual encounter level. The theory states that people usually participate in recreational activities waiting for a reward (emotional, social status, loneliness, etc.). These expectations depend on individual, socio-economic, and circumstantial factors, such as personality characteristics, the degree of conversation with others, situational variables, and the value and type of previous experiences. In the case that the anticipated reward is solitude and privacy, and that this expectancy is frustrated (e.g. when the visitor encounters more people than expected), the visitor may experience an increased level of loss of control, perceived lack of space, invasion of personal space, or unwanted interference, even though the actual number of encounters is not high. In this line, several studies (Andereck & Becker, 1993; Ditton, Fedler & Graefe, 1983; Shelby, Heberlein, Vaske & Alfano, 1983) have found that encountering more people than expected induced visitors to feel more crowded, while seeing fewer or the same number of expected visitors caused significantly lower crowding perceptions, supporting the concept that crowding is more related to user's expectations than to actual level of density.

b) '*Stimulus overload*'. This theory is based on both descriptive and evaluative components of crowding. It is derived from the analysis of social psychology in urban areas of high stress and density (Gramman, 1982). According to this theory, an overload of stimuli may be negative because the individual is not able to cope with the high number and frequency of stimuli. Specifically, individuals feel crowded when there are excessive unwanted and uncontrolled interactions and unusual or unsuitable social contacts (Andereck, 1989) and strategies to handle this overly stimulating state do not work (Gramman, 1982). This model is useful to explain crowding perception in high density conditions.

c) '*Social interference*'. This theory is based on the evaluative component. Crowding can be perceived when levels of density interfere in the activities of the visitor or their objectives in a particular environment. Density interferes with the individual's ability to control the situation and achieve their goals (Gramman, 1982). The theory assumes that the behaviour of visitors in recreational settings is mostly motivated by the desire (conscious or not) to seek solitude, release stress, or engage in social interaction. Thus, the perception of crowding may be due to the fact that these goals are not achieved.

Perceptions of crowding are, therefore, mostly evaluative and subjective judgments by individuals, and depend on widely varying social and/or psychological factors, including the type of user, the activity performed, and the environment in which it takes place (Graefe & Vaske, 1987). At the scale of our study area, the natural park, there is a limited number of activities that can be performed, as the only facilities available are a group of recreational areas and a network of public hiking trails. Hiking is the only recreational activity in the study area for which the infrastructure available can be analysed in terms of the impact received and of users' motivations and

satisfaction. Therefore, this is the main focus of our study of the park's social carrying capacity. However, hiking is the most popular recreational activity, both in PNA and among all outdoor recreational activities in Spain. According to the last report published by the Spanish Centre for Sociological Research (CIS, 2010), 8.6% of people aged between 16 and 75 years practice mountaineering, hiking, and/or backpacking. Therefore, the study results can be extrapolated to most of the PNA in Spain. The report by the LEADER European Observatory (2001) concluded that, for most people, hiking is a recreational activity, rather than a sport, and is undertaken for many reasons, including an interest in the natural world.

The segmentation of visitors according to their motivation is useful both for analysing the characteristics of the demand for recreational facilities (Collins-Kreiner & Kliot, 2016) and for determining the relationship between these characteristics and users' perceptions of crowding (Graefe et al., 1984; Oftedal, Hang & Schneider, 2015; Tanner et al., 2008). In this respect, Manfredo, Driver, and Tarrant (1996) distinguish between the individual's intrinsic or extrinsic incentive to engage with an activity. This distinction reminds us of Crompton's (1979) *push and pull model*, which emphasises that these two forces (push factors and pull factors) influence tourists' choice of a travel destination. *Push factors* derive from an individual's intrinsic needs and desires (e.g., need to rest and relax, desire to escape from routine and stress) and push individuals from home, while *pull factors* derive from external forces (e.g., characteristics of the destination that pull individuals toward a specific destination).

It would be also useful to segment the users according to their socio-demographic factors (e.g., age, gender, level of studies, employment status) and to study the relationship of these factors with crowding perception and satisfaction in order to understand users' demand according to their socio-demographic characteristics

(Manning, 1999). However, and to the best of our knowledge, there is not information in the literature regarding the association between socio-demographic factors and perception of crowding.

1.2 Localisation, Study Area

The natural park of Sierra de las Nieves (Andalusia, Spain, see Fig. 1), with relatively low visitor numbers (10,000-50,000), is the most common and is the natural park that accounts for the largest total surface area, both in Spain as a whole and in the region of Andalusia in particular. It is a significant example of the function of Mediterranean mountain areas in the context of the European Union, as many natural parks are located in such areas. Thus, this area is representative of PNA in Spain, and the study results could be extrapolated to most of the PNA in Spain.

The park is conveniently located at a distance of about two hours by car from the surrounding metropolitan areas (see Fig. 1), providing a potential user population of around one million from Sevilla and Málaga-Costa del Sol, and of 300,000 from Algeciras. The area presents other physical factors that are also of greater significance for the nearby population in the provinces of Málaga, Cádiz, and Sevilla, namely its altitude and the presence of snow. Torrecilla Mountain, at 1,919 m above sea level, is the highest peak in the province of Málaga. In terms of visitor numbers and the hiking-oriented focus of the park's infrastructure and regulations, the park reflects the user conditions prevailing in Spanish natural parks.

Park planning is based on the presence of *Abies pinsapo bois*, a highly valuable tree from the biodiversity viewpoint. The definition and management of this natural park (with a total surface area of 20,163 ha) is the responsibility of the Andalusian Regional Government, in application of Act No. 4/1989 of 27 March on the

Conservation of Natural Areas and Wildlife (Junta de Andalucía, 1989). This status is equivalent to the IUCN Protected Area Category V-Landscapes/Seascapes (Dudley, 2008). The fundamental justification for establishing this status for the natural park of Sierra de las Nieves is the delicate situation of two species, the Spanish fir (*Abies pinsapo bois*) and, to a lesser extent, the gall oak (*Quercus faginea ssp. Faginea*). The Spanish fir dates back to the Cenozoic era and is only found in a few areas of the Serranía de Ronda and in the Yebala range in northern Morocco. Thus, in terms of biodiversity, this area is of great importance. Nevertheless, processes of deforestation, incessant since the 16th century, had led to a clear risk of this species' extinction, a risk known to the National Forestry Department for several decades. In 1995, the (extended) area was declared a Biosphere Reserve, but in Spain there are no specific management and zoning regulations for this territorial category, and so it is subject to the regulations applicable to natural parks. Among other objectives, the park managers seek to consolidate and amalgamate the currently discontinuous presence of Spanish firs, previously found only in shaded slopes where the altitude and orientation provided the humidity and cool temperatures needed for their survival. Applying protectionist zoning criteria, these formations comprise the central area afforded the very highest levels of protection, as stipulated in the Natural Resources Management Plan (Junta de Andalucía, 2003). In addition, a peripheral area of protection was established around the Spanish fir woods.

<Insert Figure 1>

<Insert Figure 2>

The number of park trails users is 23,000 per year, a piece of data available to us thanks to the ecocounters (automatic data recorders) installed on the trails (see figure 2).

Focusing on hiking, it is significant that the only park activities assigned a specific location are those of leisure (recreation areas) and hiking (see figures 3 and 4). The latter is the most popular recreational activity, both in protected natural areas and among all outdoor recreational activities in Spain. Several studies (Cabalar, 2013; Farias, 2011; Muñoz, 2008) show that virtually all Spanish protected areas have public trails with or without signposting.

<Insert Figure 3>

<Insert Figure 4>

As can be seen in Figure 2 [See also figure 5 for an illustrative example], the trail network of the natural park of Sierra de las Nieves is located in the areas with the highest biodiversity values due to planning being linked with the earlier UICN proposals (environmental education). However, visitors may not be particularly interested in biodiversity values; moreover, their activity might affect more vulnerable natural elements at risk of extinction. Instead, users might primarily seek recreational activities such as hiking, encountering solitude, or being in contact with nature. Therefore, determining users' motivations and comparing them with the management objectives for the park can provide an effective means of relocating hiking facilities and infrastructure to areas where environmental values are less fragile and, thus, increasing the satisfaction of visitors, without creating problems for the resources of the area (Arnegger, Woltering, & Job, 2010). This is especially important in small areas with a significant demand from visitors (Farias, Grau, & Camps, 2005), as is the case for the natural parks of the Mediterranean area, and even more so in the case of the Natural Park of Sierra de las Nieves, since it is located in the hinterland of an important international tourist destination, the Costa del Sol.

<Insert Figure 5>

1.3 Study Purpose

The fundamental aim of this study is to identify demand segmentation in terms of the motivation of users of the public facilities offered in a protected area ('natural park') in the Spanish Mediterranean mountains; and to examine the influence of the socio-demographic characteristics and type of motivation of these users on levels of satisfaction and perceptions of crowding, in order to determine the social carrying capacity of the park, according to these users' demands. This information could be useful to verify the degree of consistency between management goals for the natural park (e.g., conservation of vulnerable natural elements at risk of extinction) and visitors' motivations. Specifically, it would help park managers to make decisions regarding the relocation of the public trail network, the only outdoor activity included in Natural Park planning, in the case that users are not particularly interested in biodiversity values, or enabling more trails if most users perceive crowding.

This overall goal will be addressed in terms of the following specific targets:

1. Classify users according to their motivations.
2. Analyse the level of satisfaction and crowding perceived by the different types of users according to their socio-demographic characteristics and type of motivation.
3. To study the influence of motivations on perception of crowding and overall satisfaction.
4. Estimate the social carrying capacity of the park.

METHOD

2.1. Sampling

The survey was conducted between October 2010 and June 2011. The availability of ecocounters facilitated the counting of the visits. Ecocounters are mechanical counters of path users. Eight ECO-TWIN ecocounters were installed along the public path network (see Fig. 2).

Data collection was interrupted during the hottest months (June to September, when temperature usually reaches 30°C to 45°C), as the ecocounters reflect a sharp fall in the number of trail users in these months. Only those persons who identified as users of public trails were included in the survey. To ensure this outcome, the survey was planned such that the survey sites were exclusively those where there was access by motor vehicle to the start point of a trail (see Fig. 1). Of these sites, we then selected the three which preliminary field work had shown to be most frequented by vehicles (see Fig. 2). The criterion for selecting respondents were that they should be aged over 18 years and have hiked the trail in question, in full or in part.

The visitors who agreed to participate in the study were given a brief description of the study goals. Data were collected from midday until sunset (the exact time depending on the month), and so the answers provided referred to activities that had already been carried out. The questionnaires were completed by the interviewers. A total of 345 valid questionnaires were obtained.

2.2. Measures

A self-reported questionnaire was used as a data collection instrument. The questionnaire was self-administered, and included socio-demographic questions and scale for measuring perception of crowding, type of motivation, frequency of visits, and

satisfaction with the trail experience. We also included data from the ecocounters to account for objective and countable variables (e.g. type of days chosen for the visit).

2.3.1. *Socio-demographic variables.*

The socio-demographic variables analysed for this study were *age, gender, education level, employment-status, and origin*. Four age groups were included: “18–29 years”, “30–44 years”, “45–60 years”, and “older than 60”. Response options for education level were: “primary studies”, “secondary studies”, “professional studies”, and “university level studies”. Four response categories were included for employment status: “unemployed” (e.g. housewives, students, retired, and unemployed), “casual workers”, “self-employed without employees” (i.e. small business self-employed workers without employees in charge), and “permanent employment” (i.e. permanent employees, and employers in charge of employees). Finally, the question regarding origin asked: ‘*Where are you visiting us from?*’

2.3.2. *Perceived crowding.*

Three variables were used to measure perceived crowding among visitors of Sierra de las Nieves.

2.3.2.1. *Number of persons that visitors met during the visit.* Visitors were asked: “*How many people have you crossed with along the route?*” Response options were: 1 = nobody; 2 = 1–5 persons; 3 = 6–10 persons; 4 = more than 10 persons. “Do not know” was considered a missing value.

2.3.2.2. *Degree of perceived crowding.* On the basis of the subjective nature of judgments regarding perceived crowding (Graefe & Vaske, 1987), this item was measured by the following question: “*How do you rate the number of people you have met along the way?*” A Likert scale with three options was used. Response options were: 1 = scarce; 2 = acceptable; 3 = excessive.

2.3.2.3. *Perception of crowding.* This was created from *Degree of perceived crowding*. It was given a value 1 = yes, for the visitors whose answer was ‘excessive’; and a value of 0 = no, for those whose answer was either ‘scarce’ or ‘acceptable’.

2.3.3. *Type of motivation to visit Sierra de las Nieves.* On the basis of the *Recreation Experience Preference (REP)* items of Driver (1977), type of motivation to visit Sierra de las Nieves was measured by the following question: “*What is the main reason that best defines your visit to Sierra de las Nieves?*” (See Table 1). According to the answers to this question, those whose main reason was *contact with nature* were called *nature visitors*; those whose main reason was being with friends, *social visitors*; those who reported physical exercise as their main reason to visit Sierra de las Nieves, *sport visitors*; and those reporting specific reasons like “*knowing the natural park Sierra de las Nieves*” or “*learning about its natural values*” were categorised as *learning visitors* (Driver, 1977; used by Galloway, 2012; and Manfredó et al., 1996).

< **Insert Table 1** >

2.3.4. *Frequency of visits.* Visitors were asked “*How often do you visit Sierra de las Nieves?*” Response options were: 1 = several times a year; 2 = monthly; 3 = weekly. “Do not know” was considered a missing value.

2.3.5. *Types of days chosen.* Ecocounters counted the number of people who visited Sierra de las Nieves on weekdays, weekends, holidays, long weekends, Christmas weekdays, and Christmas weekends.

2.3.6. *Satisfaction with the visit to Sierra de las Nieves.* Visitors were also asked: “*After having made this journey, are you satisfied with your visit?*” A Likert scale with 5 options was used. Response options were: 1 = “*Not at all satisfied*”; 2 = “*Slightly satisfied*”; 3 = “*Moderately satisfied*”; 4 = “*Very satisfied*”; 5 = “*Extremely satisfied*”.

2. 4. *Data analysis.*

Information was processed using the statistical program SPSS 19 and PROCESS, a computational tool for moderation analysis (Hayes, 2012). Pearson correlations, ANOVA analyses, *T* tests, *Chi-square* tests, hierarchical multiple regression analysis, and moderation analyses were conducted to explore the effects of socio-demographic variables and type of motivation on visitors' perceptions of crowding and satisfaction.

RESULTS

3.1. Descriptive Analysis

3.1.1. *Age*. Most visitors were in the age range of 30–44 years (185; 53.6%); 78 visitors (22.6%) were 18 to 29; 75 (21.7%) were 30 to 44; and only seven visitors (2.0%) were older than 60.

3.1.2. *Gender*. The majority of visitors were men (248; 71.9%); 97 (28.1%) were female.

3.1.3. *Level of studies*. Mostly visitors had university-level studies (170; 49.3%); 81 (23.5%) had secondary studies; 64 (18.6%), professional studies; and 29 (8.4%), primary studies.

3.1.4. *Employment status*. The majority of visitors were permanent employees (227; 65.8%); 62 (18.0%) were unemployed; 45 (13.0%) were casual workers; and 11 (3.2%) were self-employed without being in charge of employees.

3.1.5. *Origin*. The majority of the visitors came from Málaga (257; 74.5%). Forty-six (13.3%) came from Sevilla; 22 (6.4%) from Cádiz; four (1.2%) from Córdoba; four (1.2%) from Granada; four (1.2%) from Huelva; two (0.9%) from Madrid; one (0.3%) from Gibraltar; one (0.3%) from Jaén; one (0.3%) from Murcia; one (0.3%) from Toledo; and one (0.3%) from Asturias.

3.1.6. *Degree of perceived crowding*. Most visitors (224; 64.9%) valued the number of people they met in their visit as *acceptable*. Thirty-three visitors (9.6%) valued the

number of persons they met as *scarce*; and 72 visitors (21.9%) valued the number of people they met as *excessive*. Sixteen visitors were either *indifferent* or did not know.

3.1.7. *Type of motivation to visit Sierra de las Nieves.* (See 2.3.3). Most visitors (203; 58.8%) were *nature visitors*. Sixteen (4.6%) were *social visitors*; 51 (14.9%), *sport visitors*; and 67 (19.4%) were *learning visitors*.

3.1.8. *Frequency of visits.* Most visitors (155; 44.9%) indicated that they visited Sierra de las Nieves several times a year. Twenty-one visitors (6.1%) referred to visiting it on a monthly basis; and 10 visitors (2.9%) pointed to visiting it weekly.

3.1.9. *Types of days chosen for a visit.* The ecocounters database found that most visitors chose weekends (18,791; 54%), followed by those visiting on weekdays (7,309; 21%), long weekends (5,210; 15.2%), holidays (1,167; 3.4%), Christmas weekdays (887; 2.5%), and Christmas weekends (822; 2.4%).

3.1.10. *Satisfaction with the visit.* Almost all of the visitors (295; 85.5%) indicated that they were extremely satisfied with the visit. Twenty-six visitors (7.5%) were very satisfied; 19 (5.5%) were moderately satisfied; three (0.9%) were slightly satisfied; two (0.3%) were not at all satisfied.

3.2. *Correlations*

Correlations were computed between socio-demographic variables and type of motivation, and perception of crowding and satisfaction (Table 2). Type of motivation correlated negatively with perception of crowding, with *learning visitors* reporting less perception of crowding than *generalist visitors*. The multiplicative terms age x type of motivation and employment-status x type of motivation correlated negatively with perception of crowding, indicating that age and employment-status negatively moderates the relation between type of motivation and perception of crowding.

No significant correlations were found between age, gender, employment-status, or level of studies and perception of crowding. Neither were significant correlations found between any of the considered variables and satisfaction.

<Insert Table 2>

3.3. Type of motivation on perception of crowding and satisfaction

A main effect of type of motivation to visit Sierra de las Nieves on degree of perceived crowding was found ($F_{(3,322)} = 3.51, p < .05$).

Post-hoc *t* tests showed that *nature visitors* perceived more crowding than *learning visitors* ($t_{(3,270)} = 3.13; p < .05$). In addition, *Chi squared* test revealed that the number of *nature visitors* who perceived crowding was significantly higher than the number of *learning visitors* ($X^2_{(1,270)} = 6.43; p < .05$), although there was no significant difference between the number of people both groups met ($t_{(3,270)} = 1.32; p > .10$) or in the type of days chosen for the visit (all *ps* > .05).

Post-hoc *t* tests revealed that *sport visitors* perceived more crowding than did *learning visitors* ($t_{(3,118)} = 2.16; p < .05$), and also declared meeting with more people than *learning visitors* ($t_{(3,118)} = 3.17; p < .05$). There were no significant differences in frequency of visit ($t_{(1,118)} = 0.31; p > .10$) between both groups. There were significant differences regarding the type of days chosen for the visit between both groups: the percentage of *learning visitors* who referred to choosing weekends and holidays to visit the park was higher than for *sport visitors* ($X^2_{(1,118)} = 3.80; p < .05; X^2_{(1,118)} = 4.54; p < .05$, respectively), while the percentage of *learning visitors* choosing to visit on long weekends, and Christmas weekdays and weekends, was lower than that of *sport visitors*: ($X^2_{(1,118)} = 4.03; p < .05; X^2_{(1,118)} = 6.86; p < .05; X^2_{(1,118)} = 6.85; p < .05$, respectively). Given that most visitors (76%) chose weekends and holidays, and the minority (24%)

chose long weekends and Christmas weekdays and weekends, it is likely that *learning visitors* met more people than *sport visitors*.

ANOVA tests showed no effect of type of motivation on satisfaction ($F_{(3,345)} = 0.51, p > .10$).

3.4. Incremental Predictive Utility

To examine both the predictive utility of type of motivation and the potential moderating effect of age and employment status on type of motivation in accounting for variance in perception of crowding and satisfaction, beyond the effects of socio-demographic variables, we conducted several hierarchical multiple regression analyses. Perception of crowding and satisfaction were regressed onto age and gender in the first step; level of studies and employment-status in the second step; type of motivation in the third step; and, additionally, to test for the potential moderating effect between age x type of motivation, and employment-status x type of motivation, both multiplicative terms were entered in the final steps of the equation (Aiken & West, 1991).

Results indicated that age and gender accounted for significant variance of perception of crowding (2%) in the first step (Table 3). Level of studies and employment-status did not account for significant variance in the second step. Type of motivation accounted for 3% of variance of perception of crowding in the third step, even after controlling for the variance attributable to previous socio-demographic variables. It is also noteworthy that, according to the formulated interactive model, we found an age x type of motivation interaction, explaining a significant variance of perception of crowding ($\Delta R^2 = .03$) beyond the variance contributed by the main effect of the demographic variables and type of motivation; and, also, an additional significant variance (2%) explained by employment-status x type of motivation in the last step,

above and beyond the effects of demographic variables, type of motivation, and the age x type of motivation interaction.

No variable was found to explain any significant variance of satisfaction.

<Insert Table 3>

3.5. Age and employment status as moderators of the relationship between type of motivation and perception of crowding

To illustrate the age x type of motivation interaction for perception of crowding, we plotted the regression of perception of crowding on age intervals for different types of motivation (social, nature, sport and learning) (Fig. 6), controlling the effects of covariates that could have relationship with perception of crowding (i.e., gender, level of studies, and employment-status). The interaction between age and type of motivation was a significant predictor of perception of crowding ($b = -.13$, $t_{(3,345)} = -2.71$, $p < .01$). Among *sport visitors* and *learning visitors*, those who were older than 44 were found to perceive less agglomeration compared to younger visitors. However, no significant differences as for the age groups were found on the number of encounters, neither between *sport visitors* ($F_{(3,51)} = 0.10$; $p > .05$) nor between *learning visitors* ($F_{(3,67)} = 2.30$; $p > .05$).

<Insert Figure 6>

In addition, to illustrate the employment-status x type of motivation interaction for perception of crowding, we plotted the regression of perception of crowding on the four types of employment status at different types of motivation, controlling the effects of covariates that could be related to perception of crowding (i.e., age, gender, and level of studies) (see Fig. 7). The interaction between employment-status and type of motivation was a significant predictor of perception of crowding ($b = -.08$, $t_{(4,345)} = -2.96$, $p < .01$). Among *social visitors* and *nature visitors*, those who had permanent

employment were found to perceive more agglomeration compared to those without a permanent job position, whereas, among *learning visitors*, we found an opposite pattern: those with permanent employment scored lower in perception of crowding. However, no significant differences as for the employment status were found on the number of encounters, neither between *social visitors* ($F_{(3,16)} = 1.64; p > .05$), nor *nature visitors* ($F_{(3,203)} = 1.00; p > .05$), nor *learning visitors* ($F_{(3,67)} = 0.66; p > .05$).

<Insert Figure 7>

DISCUSSION

Visitors from Málaga, Sevilla, and Cádiz accounted for 94% of the respondents, with a clear predominance of those from Málaga (75%), followed by those from Sevilla and Cádiz. This data shows the relationship between road access, the respondents' place of origin, and their distribution among the three selected survey points, corresponding to a proximity model. The population, therefore, mainly come from nearby, which is in accordance with the characteristics observed in other PNA, both in Spain as a whole (Ruiz & Galdós, 2007) and in Andalusia (Hidalgo, 2009). This finding is also in line with Wöran and Arnberger (2012) regarding the prevalence of users from the same country, although the latter study did not report the proximity of visitors' area of origin or the duration of their visit. In both studies, visitors predominantly arrived in their own vehicles (98.5% vs. 97%), which suggests proximity.

According to the ecocounters, the majority of visitors (almost 55%) chose weekends to visit Sierra de las Nieves, followed by far by those choosing weekdays (21%) and long weekends (15%). Three per cent of visitors chose holidays, and 5% Christmas weekends and weekdays. The choice of weekends by most visitors can be explained by adaptation to working hours. Since the number of long weekends and holidays is lower than that of weekdays, it is not surprising that visits on weekends

outdoor visits on other holidays. Regarding visits on Christmas weekends and weekdays, and considering that Christmas-time lasts only a few days, it is understandable that only 5% of all visits during nine months were performed on those days.

Nearly two-thirds of the respondents considered the number of people encountered on the trail to be acceptable. In fact, the total number of people encountered was never more than 200, and high levels were experienced by only 21.9% of the respondents, whose common denominator was their having visited the park on days when the presence of users was above average (according to the ecocounters). Our results show that the problems of overcrowding do not produce dissatisfaction among the majority of park users, as the hikers who are attracted by this phenomenon have a high level of tolerance of the presence of large numbers of other visitors. In the same line, Stewart and Cole (2001) found that most of the hikers in their study reported high quality experiences even if they encountered more people than expected. Only 5% of the hikers revealed that the quality of their experience was strongly affected by perceived crowding. It seems that the decline of satisfaction resulting from perceived crowding may be small compared to the multiple benefits (e.g. exercising, achieving physical challenges, exploring, viewing scenery, personal realisation, socialising, etc.) associated with engagement in a recreational activity.

The characteristics of the respondents were similar to those reported by Wöran and Arnberger (2012) in a study carried out in the Austrian Alps. In line with our study, they found that the majority of their visitors were employed, middle-aged, university educated men. These findings reflect the fact that such active, outdoor activities have only recently been widely adopted, hence the scant presence of retired people. The low percentage of students and retirees could be interpreted as a factor that poses a threat to the long-term continuity of these activities, whose appeal is currently concentrated

among the middle-aged population, being apparently of little interest to the youngest and retirees.

Type of motivation was a predictor of perception of crowding. As found in previous research (Weinzimmer et al., 2014), most of the visitors were the *nature* type, looking for contact with nature, and not seeking special aspects of the natural park. This finding is in agreement with the “Interference theory” that assumes that the behaviour of visitors in recreational settings is mostly motivated by the desire (conscious or not) to seek solitude, release stress, or engage in social interaction. Only 19.4% of visitors were the *learning* type, seeking cultural and biodiversity values.

Although *nature visitors* perceived more crowding than *learning visitors*, there were no differences between the numbers of people they actually met or the types of days chosen for the visit. This data could be explained by Crompton’s (1979) *push and pull* framework. *Nature visitors* might be ‘*pushed visitors*’, visitors who are pushed by internal motives. They could have chosen to visit Sierra de las Nieves for the same reason (e.g. ‘being in contact with nature’) that they could have chosen any other natural destination, with the likely intention of escaping from the daily routine of the city (e.g. buildings, crowds of people, stress, etc.). Instead, *learning visitors* might behave as ‘*pulled visitors*’, choosing to visit Sierra de las Nieves for its specific and novel characteristics (e.g. its natural and cultural values, its routes, sightseeing places, etc.; Caber & Albayrak, 2016). Thus, since *nature visitors* seem to crave solitude and contact with nature, they could be more likely to perceive that “any” amount of people they met during their visit was “excessive”, compared to *learning visitors*, who seemingly do not try to escape from the crowdedness of the city. The “Expectancy Theory” (Schreyer & Roggenbuck, 1978), which states, as mentioned before, that people’s expectations regarding crowding are related to socio-economic or

environmental variables, might help to explain the weak relationship between the low number of encounters and the perception of crowding. *Nature visitors* may not only have the desire but also the expectation of encountering solitude in natural parks and, thus, perceive more crowds compared to other visitors.

Sport visitors were found to perceive more crowding and to meet with more people than *learning visitors* although, according to the type of days chosen for their visit, the latter are more likely to have met more people than the former. Therefore, the higher perception of crowding among *sport visitors* compared to *learning visitors* should be explained by subjective reasons. The *Flow Theory* (Csikszentmihalyi, 1975) outlines that people who are fully immersed or absorbed in an activity reach a state of *flow* (i.e. a state of concentration or complete absorption with the activity) during which anything else is ignored. *Learning visitors* might behave as “*immersed visitors*”, fully engaged with the activity at hand (e.g. watching natural and cultural aspects of Sierra de las Nieves), for whom nothing else (including people around them) matters. Compared to *learning visitors*, *sport visitors* might have behaved as “*non-immersed visitors*”, noticing people around them and, thus, perceiving more crowding. The ‘Interference Theory’ could also help explain why *sport visitors* perceived more crowding compared with the *learning visitors*. The former could have felt that levels of density found during their visit interfered with their sporting activities or with their ability to control the situations and achieve their goals. In contrast, *learning visitors* might have perceived no interference between the contemplation of specific characteristics of the natural park (a less “active” activity, compared to the sport) and the presence of visitors around them.

The multiplicative terms age x type of motivation and employment-status x type of motivation were predictors of perception of crowding. Interaction analyses showed that, among *sport visitors* and *learning visitors*, the older visitors perceived less

agglomeration than those younger than 44, although no differences between age groups were found in terms of number of encounters. It is possible that older *sport visitors* and *learning visitors* constitute the most “experienced” profile of visitors (i.e. those who have been visiting this area more frequently, since they look for specific aspects and, therefore, repeat their visit). Since this profile of visitors is more used to visiting PNA, it is possible that they have developed some *habituation* and, thus, more tolerance to the presence of other visitors, compared to younger and less experienced visitors. The phenomenon of habituation would not take place among *nature visitors* and *social visitors*, presumably less used to visiting these natural areas. Among experienced *sport visitors*, compared to low-experienced ones, they have been found, in a recent study (Caber & Albayrak, 2016), to be more motivated by the physical setting, challenge, and catharsis. Therefore, these higher internal and external sport motivations might have contributed to a greater focus on the physical activity (and, thus, less focus on the surrounding visitors) among the older (and, presumably more experienced) *sport visitors* in our study, making them perceive less crowding.

Interaction analyses also showed that, among *social visitors* and *nature visitors*, those with permanent employment perceived more agglomeration than those without a permanent job position, although no differences were found on number of encounters as for the employment status. As it was said before, *nature visitors* could behave as “*pushed visitors*”, visitors pushed by internal motives, such as escaping from an urban environment. It is possible that, among this profile of visitors, as well as those visiting PNA for social reasons, those with permanent positions (compared to unemployed or eventual workers) are those with the greatest desire or need to escape from the daily routine in the city, and might behave as “*pushed visitors among pushed visitors*”. They might visit these areas with the expectation of finding solitude (‘Expectancy Theory’)

and find these expectations frustrated once they start meeting people around. Interaction analyses also showed that, among *learning visitors*, those with permanent employment perceived less agglomeration than those without a permanent job position, although no differences were found on number of encounters as for the employment status. *Learning visitors* could be characterised as “*pulled visitors*”, as mentioned before, since they visit PNA mainly for their specific values. It is possible that, among this profile of visitors, those with permanent positions and, thus, with less time to enjoy the characteristics of these natural areas, are those longing more for enjoying these areas, and thus, might behave as “*pulled visitors among pulled visitors*”. As a result, this profile of visitors might ignore or tolerate crowds better.

Despite these differences between types of visitors, levels of general satisfaction with the visit were high among all types of visitors, with no differences between them. Therefore, implicitly, motivation does not impact the quality of the experience. The absence of severe overcrowding, as well as the special interests and characteristics of the area, may explain this overall satisfaction.

Regarding the application of the concept of carrying capacity as a management tool, the results obtained show that there is no perception among the users that crowding is a factor reducing the quality of the park experience. In this regard, the discussion then concerns the validity of the concept of social carrying capacity as a management tool, and the possibility of extrapolating the results obtained (McCool, 1989; McCool & Lime, 2001).

4.1 Strengths and limitations.

The present study has a number of strengths. One is the large sample. Furthermore, the study incorporated ecocounters that counted the real number of visitors. In addition, three types of users were identified according to their motivation;

and relations between types of users and crowding perception and satisfaction were explored. Furthermore, to our knowledge, this was the first study to investigate the moderating effects of sociodemographic factors on the relationship between users' motivations and crowding perception. Therefore, we not only assessed users' motivations, crowding perception, and satisfaction, but also measured the effect of variables like age and employment status on changes in crowding perceptions by different types of users. Nevertheless, the study has limitations. One is that users' satisfaction was measured only with one item, which might have been insufficient to test for satisfaction. Another limitation of this study is that data was collected with a cross-sectional design. Hence, it is not possible to know whether the influence of users' motivation on crowding perception and satisfaction persists over time. It would be interesting to replicate this study with a longitudinal design.

In view of these findings and conclusions, we highlight the following practical aspects of the present study.

- a) Our results showed four profiles of visitors: *nature visitors*, *social visitors*, *sport visitors*, and *learning visitors*, with different needs and expectancies, and with diverse degrees of crowding perception. Most of the visitors were the *nature* type, searching for solitude and contact with nature, and with no specific interests. If visits continue increasing, there may be a clear problem of overload. This data provides a reason for diversifying the location and characterisation of the infrastructure within the natural park, and generating a methodology for relocating trails in accordance with user preferences and environmental constraints, thus alleviating the pressure on areas that are currently over-utilised (<http:// analisisgeografico.uma.es/sierranieves/>). It could also be useful to provide

visitors with information regarding peak visiting times and locations, so that they can plan their leisure experience based on their preferences of density.

- b) Results suggest that management efforts should be directed toward relocating trails outside core areas, such that user preferences may be satisfied, while less impact is made on the areas of highest environmental value.

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Table 1. *What is the main reason that best defines your visit to Sierra de las Nieves?*

Type of reason	Items
Generalist reason	<i>Contact with nature</i>
Social reason	<i>Being with my friends</i>
Learning	<i>Knowing the natural park Sierra de las Nieves</i>
	<i>Enjoying the landscape</i>
	<i>Knowing its natural values</i>
	<i>Learning about its cultural values</i>
Sport	<i>Because I already know it and I like it</i>
	<i>Making physical exercise</i>

Table 2. Correlations between characteristics of visitors, and (degrees of) perception of crowding and satisfaction with the visit.

	Perception of crowding (degree)	Satisfaction
Age	.02	-.10 [†]
Gender	-.09	-.06
Level of studies	.05	-.02
Employment-status	.03	-.02
Type of motivation	-.16*	-.02
Age X type of motivation	-.15*	.08
Employment-status X type motivation	-.14*	.04

Note: [†] $p < .10$; * $p < .05$

Table 3. Hierarchical regression analyses showing amount of variance in perception of crowding and satisfaction accounted for by visitors' characteristics and types of motivation.

	B	SE _B	β	R^2	$F\Delta$	ΔR^2
<i>Perception of crowding (degree)</i>						
1. Age	-.06	.04	-.08	.02	3.01*	.02
Gender	-.11	.07	-.09 [†]			
2. Level of studies	.01	.02	.03	.02	.57	.00
Employment-status	.02	.03	.04			
3. Type of motivation	-.11*	.04	-.16	.04	6.98*	.02
4. Age X type motivation	-.07*	.03	-.13	.07	7.34*	.03
5. Employment-status X type motivation	-.08*	.03	-.15	.09	6.99*	.02
<i>Satisfaction with the visit</i>						
1. Age	.02	.06	.02	.00	.75	.00
Gender	-.09	.09	-.05			
2. Level of studies	-.01	.02	-.02	.00	.07	.00
Employment-status	-.01	.03	-.02			
3. Type of motivation	-.01	.05	-.01	.00	.06	.00
4. Age X type motivation	.05	.04	.07	.01	1.70	.01
5. Employment-status X type motivation	.02	.04	.03	.01	.25	.00

Note: [†] $p < .10$; * $p < .05$

Figure 1. Location of study site: the natural park of Sierra de las Nieves

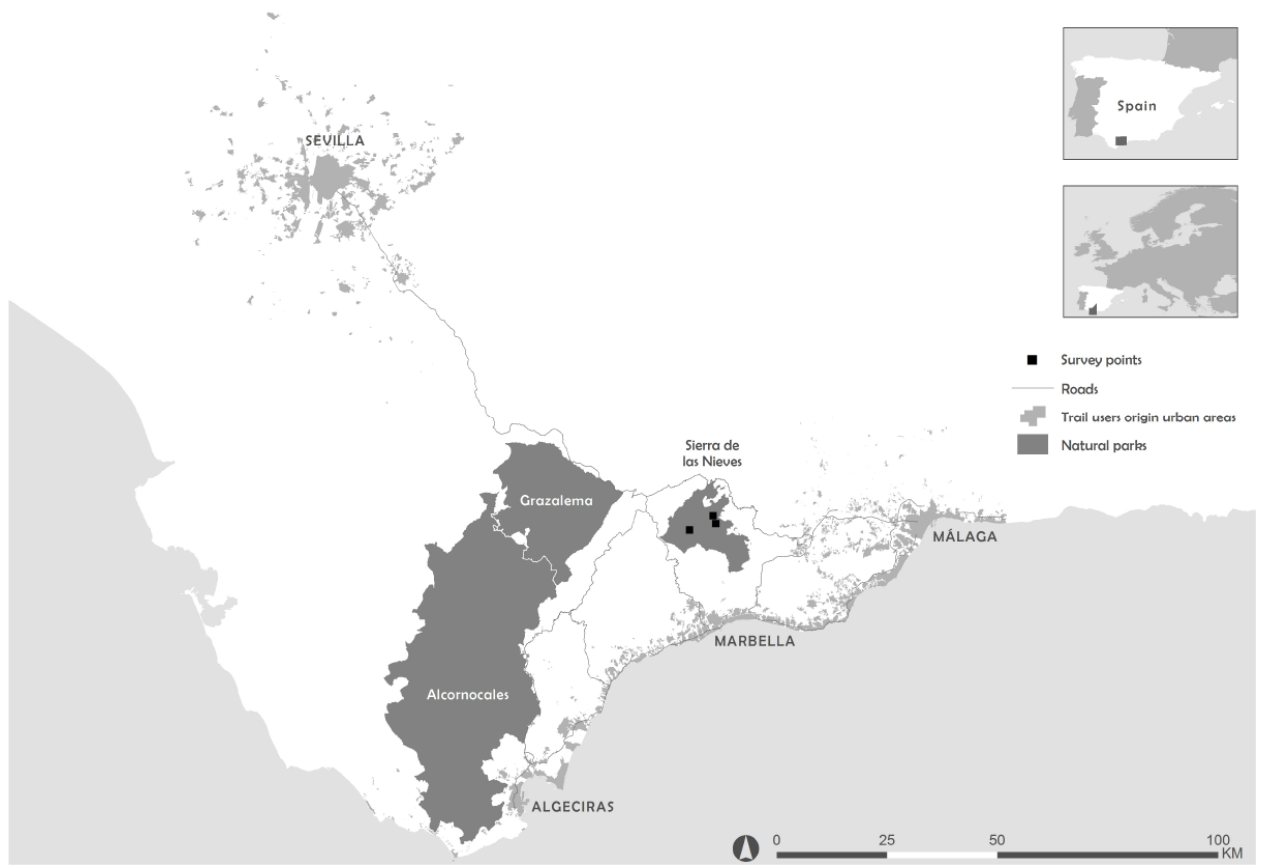


Figure 2. Management zoning, trails and location of automatic counters (ecocounters)

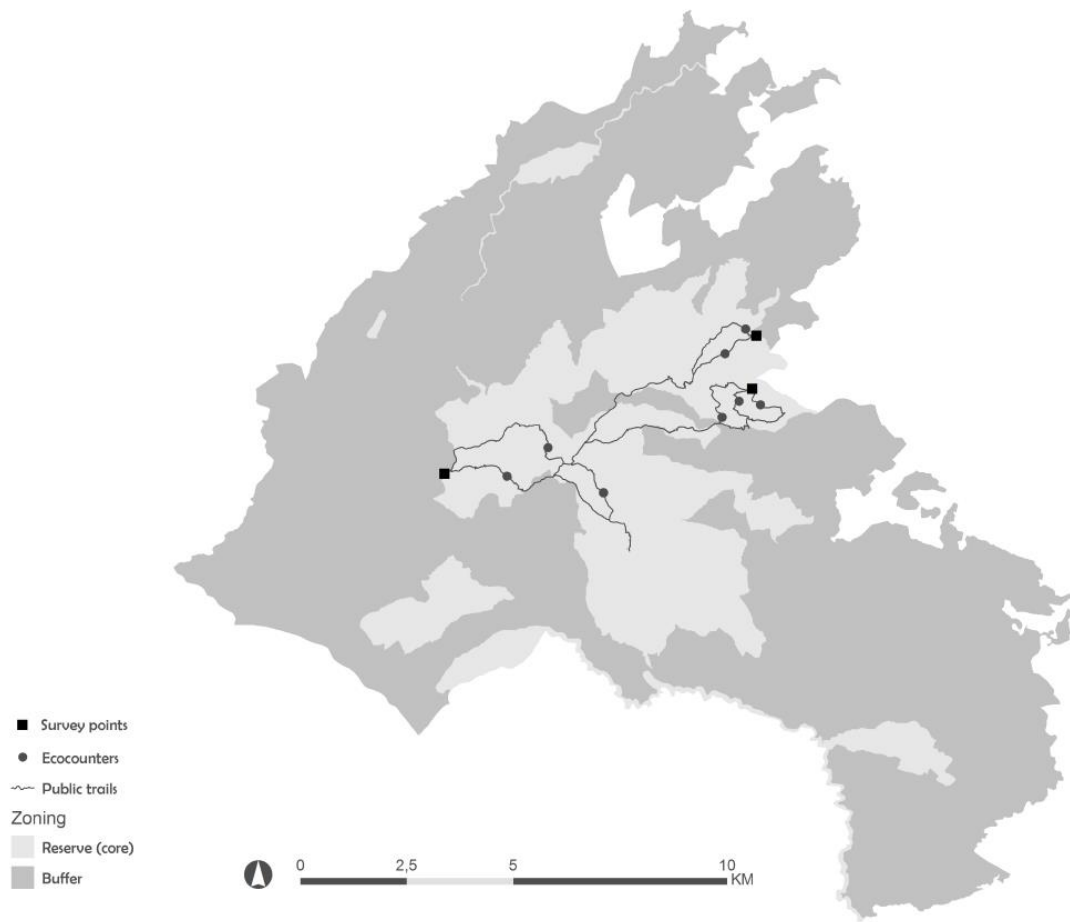


Figure 3.

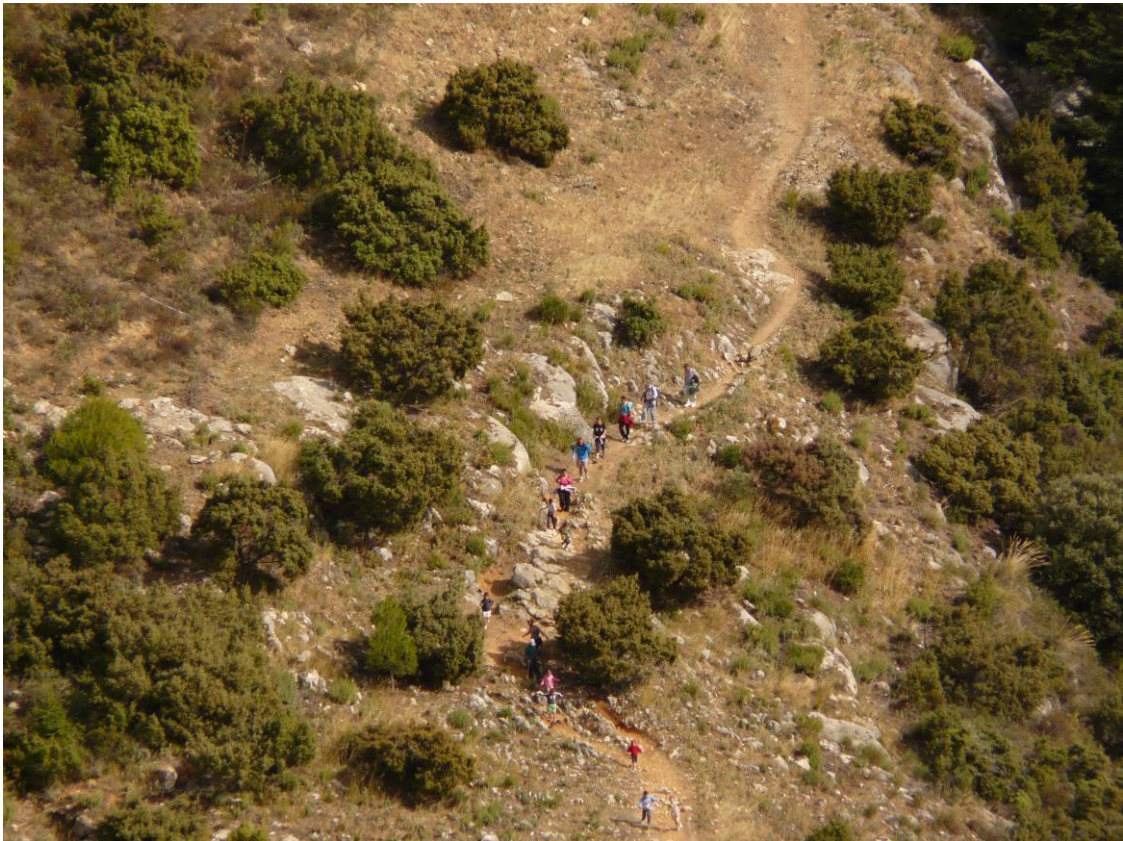


Figure 4.



Figure 5



Fig. 6. Interaction of age and type of motivation in predicting degree of perception of crowding.

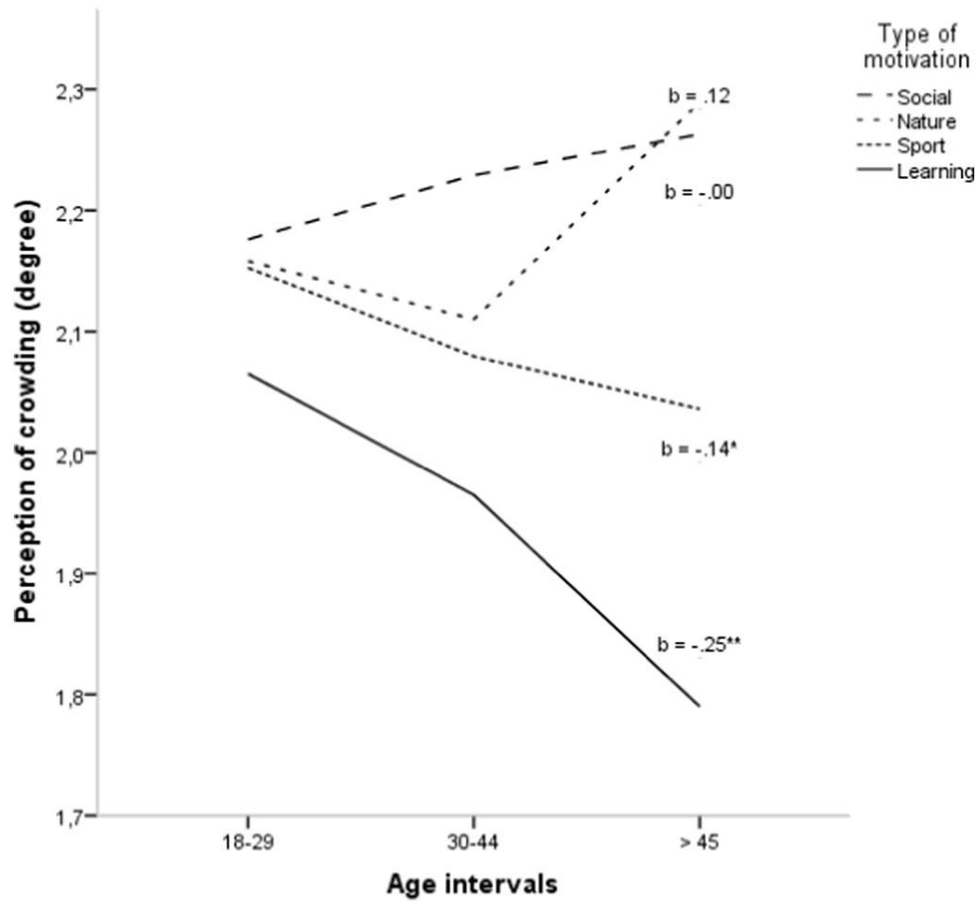
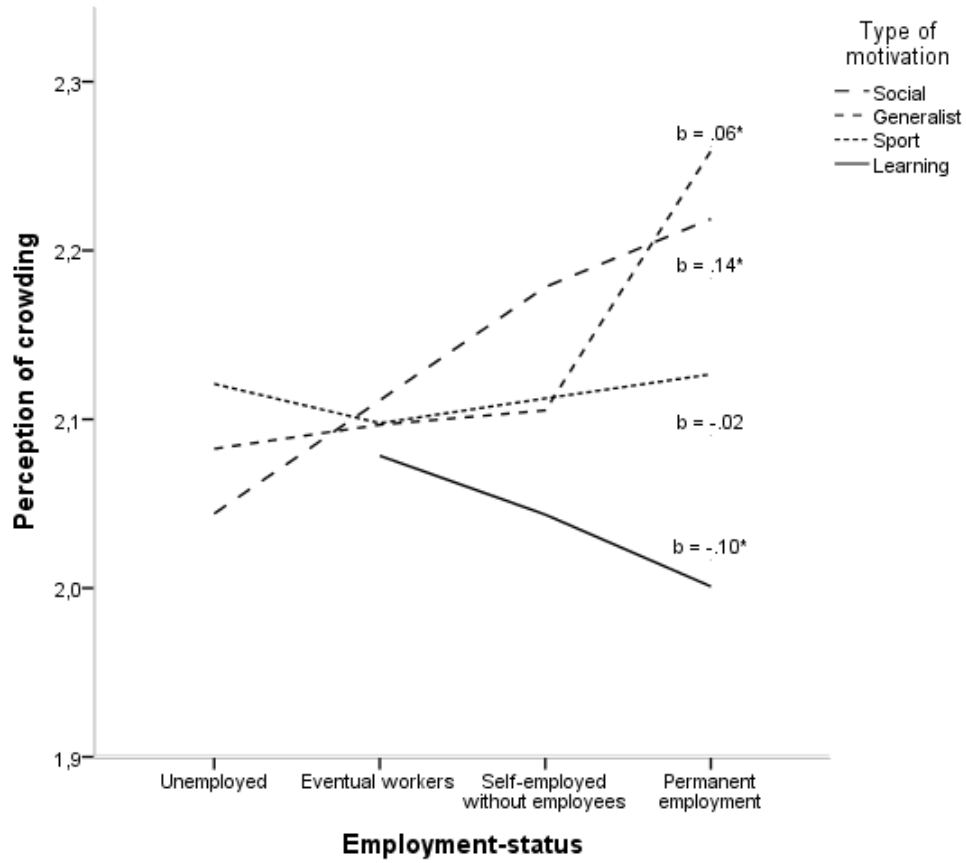


Figure 7. Interaction of employment-status and type of motivation in predicting *degree of perception of crowding*



Note: * $p < .05$