

Tourism environmental attitudes in Berlengas Biosphere Reserve, Portugal.

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Abstract

Berlengas archipelago is located in the Atlantic Ocean, on the Portuguese continental shelf, on the western side of Iberian Peninsula. Berlengas is a marine reserve since 1981, a marine protected area since 1998 and, in 2011, it was included into the World Network of Biosphere Reserves (WNBR).

As Berlengas is a relatively accessible archipelago from the west coast, it attracts all sorts of visitors during summer period. As a consequence, Berlengas has been facing a stronger demand for tourism activities each year that, in some cases, may conflict with the sustainable tourism principles desired for this kind of natural areas. The afflux of tourists is regulated by the management plan of the protected area, which defines a carrying capacity of 350 people daily but it is believed that this threshold is widely exceeded, by a factor of 2 or 3 during summer months.

The delicate balance between the conservancy and human visitation can be obtained if tourism respects the natural values in Berlengas. Therefore, it is expected that the visitors of a biosphere reserve should demonstrate a high level of environmental concern and pro-ecological attitudes, especially those tourists who chose to visit such a location motivated by Berlengas' worldwide recognized natural resources.

In this work, the pro-ecological behavior and attitudes of tourists visiting Berlengas biosphere reserve are studied. A questionnaire was developed, using the New Ecological Paradigm (NEP) survey, and responded by 309 tourists visiting the islands in July and August 2014. The main results show that only 38% of the visitors are pro-ecological and most have mid-ecological views and 9% of the respondents showed anti-ecological views.

These results suggest that a higher level of concern should be considered for the tourism industry in Berlengas, and that increasing the environmental awareness of visitors through education and information programs could contribute to a better environmental experience in this UNESCO Biosphere Reserve.

Keywords: new ecologic paradigm (NEP) scale; Berlengas World Biosphere Reserve; environmental attitudes.

Introduction

Humans have for long been using the earth as if their actions have no negative impact and as if it has infinite resources. Although, in the past two or three decades, the important negative impact of humans activities and uses is being increasingly documented and therefore, public awareness seems to be increasing. Consequently, the relationship of humans towards environment appears to be changing into more environmental friendly attitudes.

The more ecological behavior and awareness has been accompanied by the touristic choices of visitors, due to environmental concern regarding tourism impact. The development of ecotourism and other nature-based tourism operations are examples of more sustainable touristic options. Natural sites should provide opportunities to appreciate and enjoy nature and also to develop visitors' knowledge and awareness regarding environmental friendly attitudes and nature conservation (Lee and Moscardo, 2005).

Thus, in the context of nature tourism it is relevant to evaluate the ecological conscientiousness and behavior of such visitors, especially when they travel to natural destinations attracted by their natural features. These visitors may have higher environmental awareness when they experience natural environments and wildlife (Luck, 2003).

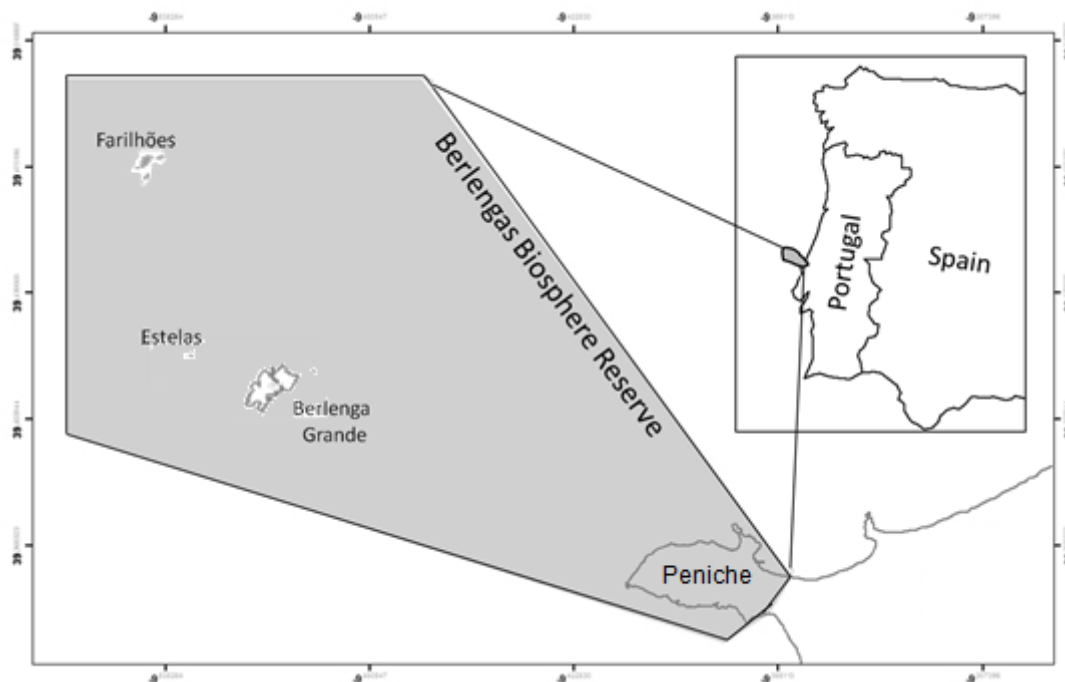
In this paper we study the case of Berlengas' Natural Reserve, a Portuguese natural area, recognized as world biosphere reserve by UNESCO, visited by about 40 thousand tourists every year. The main goal of this paper is to evaluate the ecological perspective and attitudes of the Berlengas' visitors, applying a measurement scale that has been

already applied and validated in different contexts (Dunlap, et al., 2000) – the New Environmental Paradigm (NEP).

Characterization of the Berlengas Protected Area

The Berlengas' archipelago comprises three groups of islands - Berlenga Grande Island and adjacent islets and reefs, Estelas Islands and Farilhões Islands – and is located in the Atlantic Ocean. The archipelago has a small land surface with roughly 104 ha, from which 78.8 ha corresponds to the Berlenga Grande, the largest island, and other 3.8 ha corresponding to the islets and reefs around it. The marine area is much larger, with around 9000 ha (figure 1).

Figure 1 - Berlengas archipelago location (adapted from: www.icnf.pt)



The Berlengas archipelago hosts important features, which are relevant either national and internationally. Their occurrence is due to its insular nature, its geological characteristics, its geographical location and climate, along with a low human interference motivated by the small size of the islands and land scarcity. These features contributed to the preservation and to the appearance of new species, such as terrestrial and marine flora and fauna (Amado et al., 2007; Queiroga, et al. 2008).

Regarding the geographical location of the archipelago, it is located in the transition zone between the European and Mediterranean sub regions (Amado et al., 2007, Romão, J.M., 2009). Therefore, global biodiversity is very high, exhibiting both species from colder waters, mainly during autumn and winter, and species from warmer waters, mainly during spring and summer.

Berlengas is also under the influence of the Nazaré Canyon, a submarine canyon of tectonic origin. The canyon has great impact on underwater richness by bringing to the surface large amounts of nutrients that nourish the food chain, allowing the growth of large numbers of pelagic fish.

Important species comprise large number of marine bird species, some of them migratory, such as the guillemot, petrel-billed yellow, yellow-legged gull, dark wing gull, tridactyl gull, and many others (Queiroga, et al. 2008), marine invertebrates, including corals, gorgonians, anemones and a special reference to the goose barnacle (*Pollicipes pollicipes*), due to its commercial value. More that seventy species of fish have also been catalogued, including many with commercial value, such as de small pelagic sardine, chub mackerel, Atlantic mackerel, and horse mackerel, which are the most important fish species caught with the seine nets used by the fishing boats from Peniche. Six marine mammal species are also frequently seen in the marine area (Rodrigues, et al., 2008).

Terrestrial endemic plant species are also relevant to biodiversity: *Armeria berlengensis*, *Herniaria lusitanica* subsp. *berlengiana* and *Pulicaria microcephala*. Two of these species – *Armeria* and *Pulicaria* – are registered in Annex II of the Habitats Directive, due to their conservation relevance, and are considered vulnerable (Araújo, S.M, 2012).

Due to its importance to conservation of biodiversity and of habitats, to scientific study and to nature tourism, the archipelago was classified as a Natural Reserve in 1981. In 1998, the area was reclassified as Marine Reserve Area, increasing the marine protected area to its current size (Amado, et al., 2007). In 1997 this area was integrated into the Nature Network 2000 (92/43/EEC), and in 1999 was classified as a Special Protected Area for Wild Birds (79/409/CEE), showing the importance of this area for biodiversity conservation in the European context.

Finally, in 2011, the archipelago was included into the World Network of Biosphere Reserves (WNBR), demonstrating the importance of this natural reserve worldwide (Amado et al., 2007, Queiroga, et al., 2008).

The main economic activities in the archipelago are tourism and fisheries. Commercial fisheries are forbidden within the protected area, but the use of recreational fishing with rod is allowed. An important commercial activity is the catch of goose barnacles, which is licensed, subjected to annual quotas and regularly surveyed. This activity greatly contributes to the income of local economy, due to the high commercial value of this population of barnacles.

Tourism in Berlengas' Natural Reserve

Every year, around 40 thousand tourists visit the main island, during the hotter period (May to September), although there is a tendency of increase of the number of tourists visiting the area. The afflux of tourists is regulated by the management plan of the protected area, which defines a carrying capacity of 350 people daily (Amado et al., 2007), but recent empirical data revealed that this carrying capacity is widely exceeded every day during the months of July and August, by a factor of 2 or 3. The main touristic activities are sea and sun, swimming, diving, snorkeling, fishing, sailing, boat trips, walking tours, and nature contemplation. There are more than 20 licensed tourist operators to implement such activities. The island also has one restaurant, one market, and around 200 accommodations provided by a camping and two lodges. All these activities and facilities also significantly contribute to the income of the local economy. The establishment of the natural reserve determined the definition of boundaries for the different activities, regarding the main natural values and traditional uses, as well as the definition of a management plan, trying to compromise between conservational issues and social needs. One of the actions taken was the definition of horizontal zoning, which resulted in different land uses and forbidding the access of tourists within core protected areas and surrounding landscapes, namely geological features, seabird nesting areas and cliff vegetation, protecting them from potential external damage. Management plan also addresses the need to control seagulls and invasive plant species and other issues such as education and public awareness (Amado et al., 2007; Queiroga et al. 2008).

As Berlengas is such an important protected area, it is expected that the tourists should demonstrate a high level of environmental concern and pro-ecological attitudes, especially those tourists who chose to visit such a location motivated by Berlengas

worldwide recognized natural resources. Yet, the exceeding number of tourists and some of the activities regularly developed have negative impact on the marine resources and natural values, pressuring the environment and biodiversity, therefore endangering the quality of protected area.

Environmental attitudes

Several approaches have been developed in the past decades to study environmental behavior in different contexts. One of such approaches is the New Environmental Paradigm (NEP), proposed by Dunlap and Van Liere (1978).

An environmental social paradigm can be used to describe the new way of thinking about how humans approach, nowadays, their activity after they have considered the impact on production efficiency, economic validity, social responsibility and environmental compatibility (Kostova et al., 2011).

In this context, the New Environmental Paradigm was impelled by a growing interest in public attitudes towards the environment (Luzar, et al., 1995). The NEP assumes that (Catton, W.R., Jr., Dunlap, R.E., 1978):

1. “Human beings are but one species among the many that are interdependently involved in the biotic communities that shape our social life;
2. Indicates linkages of cause and effect and feedback in the web of nature produce many unintended consequences from purposive human actions;
3. The world is finite, so there are potent physical and biological limits constraining economic growth, social progress, and other societal phenomena.”

Hence, NEP recognizes the detrimental effect of human-influenced interactions with their surrounding natural landscape. It is opposite to Dominant Social Paradigm (DSP) which favors economic growth, scientific development, competition, free market economy, care for the present population without thinking about the future, exploiting the grow-or-die principle, combining financial and political resources and enduring risks (Kostova et al., 2011).

Both DSP and NEP represent the vast majority of people within the world. Although the increasing concern for the environment seems to be experiencing a shifting the world beliefs from the anthropocentric (DSP) to the ecocentric (NEP) (Luck, 2003), more than three decades of their existence accompanied by research and discussions have not brought the two views to a consensus on the proper route to take in order to resolve environmental issues (Kostova et al., 2011).

New Environmental paradigm scale

Studies and explanations of human-environment relationships on different levels – individual, group, societal, political, economic, organizational, etc., are of great value for the development of a scale to measure environmental concern of people (Beck & Grande, 2010; Kostova et al., 2011). This scale is being used for more than 30 years and is well recognized by psychologists, political scientists, sociologists and geographers. Despite some criticism, the NEP is the most frequently used measure of environmental concern and is generally acknowledged as a reliable multiple-item scale for environmental attitudes (Dunlap, 2008; Filby, 2015; Kostova et al., 2011; Lee & Moscardo, 2005, Luck, 2003; Ogunbode, 2013). The New Ecological Paradigm scale is

a measure of endorsement of a “pro-ecological” world view. It is used extensively in environmental education, outdoor recreation, tourism, and other domains (Dunlap et al., 2000; Lee & Moscardo, 2005).

The first version of NEP (1978) is a 12 items scale, focused on water pollution, loss of aesthetic value and resource conservation. It took into account the fact that the environmental impact of local activities had global effects on the planet. The revised second version of NEP – New Ecological Paradigm Scale (Dunlap et al., 2000) is a 15 items scale and focuses on pollution hazardous wastes, ozone depletion, deforestation, loss of biodiversity, climate changes on a global level (Stern et al., 1992). It is composed of three distinct dimensions: balance of nature, limits to growth and human dominance of nature, and can be used as a single scale or as multidimensional measure. This second version is composed of five distinct dimensions, as mentioned in table 1.

Table.1 - Analyzes of the five hypothesized facets of an ecological worldview (Dunlap et al., 2000)

The five hypothesized facets of an ecological worldview	
The reality of limits to growth	The fragility of nature’s balance
NEP.1 We are approaching the limit of the number of people the earth can support.	NEP.3 When humans interfere with nature it often produces disastrous consequences.
NEP.6 The earth has plenty of natural resources if we just learn how to develop them.	NEP.8 The balance of nature is strong enough to cope with the impacts of modern industrial nations.
NEP.11. The earth is like a spaceship with	NEP.13 The balance of nature is very delicate

very limited room and resources.	and easily upset.
Antianthropocentrism	Rejection of exemptionalism
NEP.2 Humans have the right to modify the natural environment to suit their needs.	NEP.4 Human ingenuity will insure that we do NOT make the earth unlivable.
NEP.7 Plants and animals have as much right as humans to exist.	NEP.9 Despite our special abilities humans are still subject to the laws of nature.
NEP.12 Humans were meant to rule over the rest of nature.	NEP.14 Humans will eventually learn enough about how nature works to be able to control it.
The possibility of an ecocrisis	
NEP.5 Humans are severely abusing the environment.	
NEP.10 The so-called “ecological crisis” facing humankind has been greatly exaggerated.	
NEP.15 If things continue on their present course, we will soon experience a major ecological catastrophe.	

Source: Dunlap et al. (2000).

The statements in white boxes support NEP, therefore matching ecocentrism, that is, focusing basic ideas on human-nature relationships following environmental ethics. The statements in grey boxes support DSP that is, matching anthropocentric beliefs. Hence, in the seven even numbered items (2, 4, 6, 8, 10, 12, 14) disagreement indicates pro-ecological view, while in the eight odd numbered items (1, 3, 5, 7, 9, 11, 13, 15) agreement indicates pro-ecological view (Dunlap, et al., 2000).

Methods

Questionnaire, data collection and sample

In order to measure the ecological awareness of tourists visiting Berlengas, a questionnaire was elaborated, based on the NEP scale described in table 1. The 15 items described in table 1 are expressed in a Likert scale with the statements 1-“strongly disagree”(SD), 2-“mildly disagree” (MD), 3- “unsure” (U), 4- “mildly agree” (MA) and 5- “strongly agree” (SA).

Data were collected from tourists who were going on a trip to Berlengas, during July and August of 2014, and who agreed to collaborate in this study. Participants were requested to collaborate answering the questionnaire just before their boat trip and visit to Berlengas.

The questionnaires were provided in Portuguese, for the Portuguese participants, and in English, for the international visitors.

A total of 309 tourists participated in this study, but only 273 participants completed all the 15 items of the NEP scale and so, when the results on the NEP scale are analyzed globally, only these respondents are considered. 53% of the participants are women, 77% live in Portugal, 62% are not higher education graduates and 80% visited Berlengas with friends and/or family.

Statistical methods

In order to evaluate the global NEP score of each respondent, the scores corresponding to the even numbered NEP items (grey items in table 1) were reordered so that, for all the items, high scores indicate pro-NEP worldview. After this reorientation, in order to assess the reliability of the revised NEP scale for the Berlengas’ visitors case, the

Cronbach alpha was determined. This coefficient measures the internal consistency reliability among a group of items combined to form a single scale, reflecting how well the items are measuring the same concept.

The NEP score of each respondent was obtained by operationalizing the answers using the Likert scale, with the same orientation from an “ecological awareness” measurement point of view. The final NEP score of a respondent is the average of the scores for each item. Therefore, it ranges from 1 (all answers 1-“strongly disagree”) to a maximum of 5 (all answers 5-“strongly agree”). Based on this score, each respondent is associated to one of three “ecological awareness” categories – pro-ecological, mid-ecological and anti-ecological. The criteria used to associate a score to a category were adapted from Thompson, (2013).

Pro-ecological – NEP score greater than 4. Such a score indicates that on average the respondent would have had to give environmentally positive strongly agree or mildly agree to most NEP answers and strongly disagree and mildly disagree to most DSP answers.

Mid ecological – NEP score greater than 3 and less than or equal to 4, corresponding to a wide range of possible combinations.

Anti-ecological – NEP score between 1 and 3 (3 included). The most environmentally positive answers someone in this group could give would be 15 unsure responses. At the lower end someone would have to strongly disagree with all NEP statements and strongly agree with all the DSP statements.

Results

We start the analysis of our data with a description of the results for each item. For a better evaluation, we divided the results into two tables that show separately the view of NEP and DSP. In table 2 the NEP is represented and in table 3 the DSP is represented. So the ecological paradigm (pro-ecological beliefs) is stronger when the answer was closer to the “strongly agree” (high score) on the table of the NEP (table 2) and closer to the “strongly disagree” (low score) on the table DSP (table 3). On the other side, a person has pro-DSP orientation with a low score on table 2 and high score on table 3. This means that this person believes in values such as individualism, but also faith in technology, resource abundance, unlimited growth, and endless progress.

Table.2 New Ecological Paradigm (NEP) items distribution

NEP items	% Distribution ¹					N ²	Mean	St.D ³
	1-SD	2-MD	3-U	4-MA	5- SA			
1. We are approaching the limit of the number of people the earth can support	9.1	16.6	22.8	36.8	14.7	307	3.31	1.18
3. When humans interfere with nature it often produces disastrous consequences	3.6	5.8	6.5	36.6	47.6	309	4.19	1.03
5. Humans are seriously abusing the environment	3	4.6	8.2	32.2	52	304	4.26	0.99
7. Plants and animals have as much right as	2	1	4.2	15	77.8	306	4.66	0.77

humans to exist									
9. Despite our special abilities, humans are still subject to the laws of nature	1.3	3.6	16	30.4	48.7	306	4.22	0.93	
11. The Earth is like a spaceship with very limited room and resources	9.5	10.5	17.8	32.2	29.9	304	3.63	1.27	
13. The balance of nature is very delicate and easily upset	3.6	10.6	11.2	36	38.6	303	3.95	1.11	
15. If things continue on their present course, we will soon experience a major ecological catastrophe	2.3	6.8	14.6	35.7	40.6	308	4.06	1.01	

¹ *SD* (Strongly disagree); *MD* (Mildly disagree); *U* (Unsure); *MA* (Mildly agree); *SA*

(Strongly agree).

² *N* = Number of participants who responded to each item.

³ *St.D* = standard deviation

Overall most of the people that were submitted to the survey have high scores on the table of the NEP, especially on the item 7 “Plants and animals have as much right as humans to exist”. As expected, there is a certain amount of concern about the environment demonstrating that most tourists share the ecocentric beliefs for most items (namely items 3, 5, 7, 9 and 15), clearly perceiving that animals and plants have the same rights as humans, that humans are seriously abusing the environment and that humans are ruled by the same laws of nature. These findings are consistent with Lundmark, 2007 (p. 337), because the "laws of nature are a scientific fact (...) As such, it is compatible with any position regarding the proper relationship between human beings and nature”. This author also states that from the viewpoint of environmental

ethics, the best item to discriminate between ecocentrism and anthropocentrism deals with the 7th item. This is, in fact, the most ecocentric item for the tourists interviewed, with 77.8% of answers Strongly Agreed and 15% Agreed.

Table.3 Domination Social Paradigm (DSP) items distribution

DSP items	% Distribution ¹					N ²	Mean	SD ³
	SD	MD	U	MA	SA			
2. Humans have the right to modify the natural environment to suit their needs	34.9	35.5	9.8	14.7	5.2	307	2.20	1.21
4. Human ingenuity will insure that we do not make the Earth unlivable	18.8	25.3	24.7	27.6	3.6	304	2.72	1.16
6. The Earth has plenty of natural resources if we just learn how to develop them	9.2	16	11.8	27.5	35.6	306	3.64	1.34
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations	31	34.3	14.7	14.7	5.2	306	2.29	1.19
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated	22.6	29.8	23.3	17.7	6.6	305	2.56	1.20
12. Humans were meant to rule over the rest of nature	58.8	21.6	7.8	7.8	3.9	306	1.76	1.13
14. Humans will eventually learn enough about how nature works to be able to control it	27.1	29.7	18.5	18.8	5.9	303	2.47	1.23

¹ SD (Strongly disagree); MD (Mildly disagree); U (Unsure); MA (Mildly agree); SA

(Strongly agree).

² N = sample size.

³ SD = standard deviation

The lowest score obtained for NEP (and highest for DSP) , occurs for the item 6 “The Earth has plenty of natural resources if we just learn how to develop them” which has high score (M= 3.64), compared to all the other items, which exhibit below medium score (< 3). There may be a possible explanation in the positiveness of this question in contrast with the negativeness of the other DSP items. In fact this 6th item does not seem to have a negative context as the others items of the DSP or people truly believe that the Earth has plenty of natural resources if we just learn how to use them sustainably. Regarding the 6th item, there seems to be some anthropocentric beliefs, maybe showing some ingenuity towards the capacity of humans to overcome the problems dealing with overpopulation and the overuse of limited resources.

All the other items support a pro-ecological behavior and, at some extent, ecocentric beliefs of the tourists visiting the islands.

In the current study, the Cronbach alpha coefficient for the 15 items NEP scale was 0.748, suggesting that the NEP scale has a good internal consistency. According to Nunnally, (1978), a Cronbach alpha coefficient greater than 0.70 is considered "acceptable" in most research situations. All items appear to be consistent: apart from the 6th NEP item, all items correlated with the total scale ranging from 0.278 to 0.463. Removal of the 6th item would increase alpha only by 0.01.

In Lück, (2010), the Cronbach's alpha coefficient of different studies with different populations was compared, all, with the exception of one study, showing coefficients large enough to support the consistency and, therefore, the use of the NEP. Yet, in the research studies considered in Lück, (2010), a 12-items NEP scale was used and thus one cannot directly compare the corresponding coefficients with the present results.

In Erdogan, (2009), the 15-items NEP scale was applied to Turkish undergraduates students and in this case the alpha coefficient was rather low (0.53), indicating that the NEP scale has low consistency in the Turkish case. Curiously, in the Turkish case, the removal of the 6th item would also increase the Cronbach’s alpha, which can also be a consequence of the arguments presented previously about the interpretation of this item. In other study where the NEP scale was used on Nigeria population the reliability test was conducted to measure the internal consistency of the full NEP scale, and a Cronbach’s alpha value was of 0.61 (Ogunbode, 2013). The 15-items NEP scale was also applied to Pennsylvania freshman and senior class undergraduates (Rideout, 2014) and the corresponding alpha coefficient was of 0.80, justifying the use of this NEP scale.

NEP scores of the participants of this study varied between 2.27 and 4.93, with an average score of 3.80. In table 4 some descriptive statistics on the distribution of the NEP scores of the respondents are presented.

Table.4 Descriptive statistics for the NEP Score variable

	N	Min.	Max.	Mean	St. Dev.	Quartil 1	Quartil 2	Quartil 3
NEP Score	273	2.27	4.93	3.80	0.52	3.40	3.80	4.20

At least 75% of the participants had NEP score greater than or equal to 3.40 and so, in some sense, a “positive” classification.

Considering the criteria described previously, an ecological classification category was attributed to each respondent and the distribution of the participants for each category is presented in table 5.

Table.5 Scores into the categories of pro-ecological, mid-ecological and anti-ecological (categories adapted from Thompson, (2013).

	<i>Anti-ecological NEP Score in [1,3]</i>	<i>Mid-ecological NEP Score in]3,4]</i>	<i>Pro- ecological NEP Score in]4,5]</i>
<i>% of respondents</i>	9.2%	52.7%	38.1%

Most of the tourists who participated in this study are mid-ecological (52.7%) and less than 10% have a “negative” NEP score classification. However, only 38.1% of the visitors exhibit true pro-ecological attitudes, as 61.9 % of the people fail to show these ecocentric beliefs, which is specially worrying when we are considering a sample of tourists who were about to visit a biosphere reserve where there are limitations to the numbers of visitors and these may not be conveniently controlled. Inadequate behavior of these visitors can, indeed, increase the negative impacts of visitation.

We expected that nowadays people try to be more eco-friendly when they travel and have greater concern regarding natural areas. The results show that most of the tourists surveyed have mid-ecological views and 9% of the respondents showed anti-ecological views which is consistent with other studies that reported that most eco-tourists have a

high level of environmental awareness (Thompson, 2013; Lee & Moscardo, 2005), but not all of them actually participate in environmental management practices (Lee & Moscardo, 2005; Filby, et al. 2015).

Therefore, these results show that most visitors have some concern towards the environment, but if their ecocentric beliefs are in fact mid-ecological and not truly pro-ecological, their attitudes when visiting Berlengas' islands may be such that they may have a negative impact on the islands ecosystem or natural resources. Additionally, as stated, the carrying capacity of the natural reserve is exceeded during the month of July and August, when the interviews occurred. This also causes additional stress to the environment and to natural resources.

Since the island of Berlenga is a natural reserve there should be a higher level of concern, increasing the environmental awareness of visitors through education and information programs.

Stakeholders should also comply with the established carrying capacity, in order to prevent further damage to the natural reserve.

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