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Factors Influencing the Environmental Awareness of Visitors to the Natural Protected Areas on the Island of Tenerife

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Abstract

In the research, the behavior of the visitors was analyzed and the basic characteristics of the visitors (socio-demographic variables) were determined. Factors influencing the final pro-environmental behavior of visitors were analyzed and for this purpose 206 visitors filled out anonymous research questionnaires built on the basis of a model that links the Theory of Planned Behavior (TPB) with other elements. Visitors were also asked about their perception of the park's waste management and how education from the park administration affects them. The research results support the importance of the influence of environmental education on people's environmental awareness. It was found that awareness of the consequences of behavior significantly affects personal norms and attitudes, and these then have the greatest influence on the final pro-environmental behavior of visitors. A protected natural area can have an educational role, but it is also important to allow visitors to behave consciously in this environment, for which it is necessary to provide them with enough places for depositing and sorting waste and above all to focus on their environmental education, which is extremely important. The research results also pointed out that pro-environmental behavior is influenced by perceived behavioral control, i.e. how difficult it is for visitors to behave in a certain way.

Keywords

Environmental education, environmental awareness, national parks, natural protected areas, Theory of Planned Behavior, TPB

Abstrakt

V rámci výzkumu bylo analyzováno chování návštěvníků chráněných přírodních lokalit na ostrově Tenerife a byly popsány základní charakteristiky návštěvníků těchto oblastí. Návštěvníci vyplňovali anonymní výzkumné dotazníky sestavené na základě modelu, který propojuje Teorii plánovaného chování s dalšími prvky behaviorální analýzy a za pomoci tohoto výzkumného nástroje byly analyzovány faktory ovlivňující výsledné pro-environmentální chování návštěvníků. Návštěvníci byli také dotazováni, jak vnímají v přírodních lokalitách situaci týkající se nakládání s odpadky a jak na ně působí vzdělávání ze strany správy daného přírodního parku. Výsledky výzkumu potvrzují význam vlivu environmentální výchovy na environmentální povědomí lidí. Bylo zjištěno, že uvědomění si důsledků chování výrazně ovlivňuje osobní normy a postoje a ty pak mají největší vliv na výsledné pro-environmentální chování návštěvníků. Chráněné přírodní území může mít výchovnou roli, ale také je důležité umožnit návštěvníkům chovat se v tomto prostředí uvědoměle, k čemuž je potřeba zajištění vhodných podmínek (dostatek odpadkových košů, možnost třídit odpad atd.), a navíc je velmi důležité poskytnout příležitosti k environmentálnímu vzdělávání. Výsledky výzkumu také poukázaly na to, že pro-environmentální chování je ovlivněno vnímanou behaviorální kontrolou, tedy tím, jak obtížné je pro návštěvníky chovat se v daném prostředí určitým způsobem.

Klíčová slova

Environmentální vzdělávání; environmentální výchova; chráněné krajinné oblasti; teorie plánovaného chování; TPB

Introduction

National parks and other protected natural sites are sought after by tourists around the world, and nature-based tourism is booming (Arnegger et al., 2010; Hall & Frost, 2009; Lee et al., 2013; Markowski et al., 2019). This situation brings new opportunities in the field of environmental education and stimulating visitors' interest in nature (Lugg & Slattery, 2003; Myadzelets et al., 2020; Spazziani et al., 2019). As the number of visitors in these areas is often high and protected areas require a high level of protection, this situation also entails environmental challenges and problems that natural areas face (Abdullah et al., 2018; Buckley, 2021; Dangi & Gribb, 2018; Rhama et al., 2020).

Tourism in national parks represents considerable support for the local economy and high attendance of these protected natural areas is in great demand (Theng et al., 2015; Laso & Dahles, 2021; Rhama et al., 2020). However, national parks also play a role in protecting specific ecosystems, and in view of the high number of visitors, these two functions of national parks are in conflict (Buckley, 2021; Dangi & Gribb, 2018; Sobhani et al., 2022; Wolf et al., 2019). In order for national parks to sustain the pressure from tourism and at the same time play a role in protecting local nature, attention must be paid to the environmental education of visitors and appropriate measures by the park administration (Duan & Yang, 2020; Esfandiar et al., 2019; Sobhani et al., 2022; Valdivieso et al., 2015).

We must therefore think about how to plan the environmental education of visitors as effectively as possible and thus influence their behavior in parks, as well as pro-environmental behavior in all situations of everyday life, and stimulate their interest in the protection of nature and natural resources (Oleśniewicz et al., 2020; Repka & Švecová, 2012). The influence of park tourism as an influential factor in increasing the environmental awareness of visitors has already been demonstrated in previous studies (Ballantyne et al., 2011; Føyn, 2019).

Spain has a total of 16 national parks and Teide National Park in Tenerife is the most visited. Spain's national parks are visited by approximately 15 million visitors each year, and visitors to Teide National Park make up almost 30 percent of that number (Ministerio para la Transición Ecológica y el Reto Demográfico, 2022a). The aim of our study is to analyze the factors that affect the pro-environmental behavior of visitors through observations, interviews with the management of protected areas and a questionnaire survey among visitors using Theory of Planned Behavior (TPB) and Norm Activation Model (NAM). We want to find out how to plan environmental education effectively and what further steps should be taken to ensure that visitors adopt the right environmental behaviors in these protected areas. Our research was carried out in the Teide National Park, as well as in other rural parks in Tenerife (Teno, Anaga).

Background

The educational potential of park tourism has already been demonstrated by several studies, and visits to protected natural areas can be considered an influential factor in positively influencing the environmental awareness of visitors (Ballantyne et al., 2011; Føyn, 2019; Wolf et al., 2019). National parks and protected areas are a good place for nature tourism, as they allow visitors to see the most representative ecosystems of the area (Barros et al., 2019). People are looking for these areas for recreation, sports activities, education and connection with nature (Barros et al., 2019; Buckley, 2020; González et al., 2018a).

From an economic point of view, there is a tendency for national parks to be visited by as many tourists as possible. At the same time, however, the demands on nature conservation in these parks are extremely high as specially protected species require specific treatment and their natural environment can be disturbed by tourism, especially if there is inappropriate behavior of visitors, walking off marked trails, feeding wild animals, picking plants, disturbing and garbage disposal (Buckley, 2021; Dangi & Gribb, 2018; Sobhani et al., 2022; Sterl et al., 2008; Wolf et al., 2019).

Another problem mentioned in the current studies is the excessive use of cars that visitors use to travel to national parks. Many parks are responding to this problem by introducing alternative transport options in the parks (increasing bus connections, the possibility of using shared bicycles, etc.) (González et al., 2018b; González et al., 2019; Monz et al., 2016).

National parks that are visited by high numbers of visitors face several types of problems that disrupt the park's environmental balance. These problems often include littering, feeding and disturbing wildlife and visitor off-trail behavior (Abdullah et al., 2018; Esfandiar et al., 2019; Goh, 2020b; Miller et al., 2020; Porras-Murillo et al., 2022).

For this reason, it is particularly important that the administration of the national park pays attention to the implementation of effective measures and educates visitors effectively.

According to (Ancin-Murguzur et al., 2020; Hofman et al., 2020), before we start planning the education of visitors, it is necessary for the national park administration to monitor the number of visitors and their characteristics, so that the education can suit the group of visitors.

It is also necessary that the education selects only the key topics that are important for the protection of the park's nature and educates visitors with them concisely and clearly. When visitors are overwhelmed with too much information, including prohibitions and orders, education is too demanding and confusing, it demotivates them and is therefore rather ineffective (Hofman et al., 2020).

Previous studies that have analyzed the behavior of visitors in national parks have used a wide range of methods for analysis. Tenerife National Park visitors' behavioral surveys were carried out, for example, using ordered logit model (González et al., 2018b), geotagged photographs and GPS tracks from social networks (Barros et al., 2019), pairwise comparison survey method of landscape preferences of visitors (DeLucio & Múgica, 1994) or CHAID algorithm for determining tourism segmentation (Díaz-Pérez et al., 2020; Diaz-Perez & Bethencourt-Cejas, 2017). Planned behavior theory has been used in previous research to examine the impact of Galletas whale watching programs on visitors' environmental awareness and their future intentions to pay attention to the protection of whale populations (Jacobs & Harms, 2014).

In general, TPB is widely used to analyze the effects on pro-environmental behavior (De Leeuw et al., 2015; Goh, 2020a; Goh, 2020b; Greaves et al., 2013; Hu et al., 2019; Poškus, 2018). In modern research, TPB is often expanded and enriched with additional elements (Aziz et al., 2021; Hu et al., 2019; Esfandiar et al., 2019). In our case, similarly to the study by Esfandiar et al. (2019), TPB was used in combination with another NAM theory. The analysis of pro-environmental behavior with an emphasis on binning behavior using this method has not yet been carried out in this area. Research can help us to discover how visitors perceive the conditions for conscious behavior in nature parks and what are the biggest obstacles to their possible better pro-environmental behavior.

A theoretical model was proposed for research purposes (see Figure 1). The model shows the factors for which we calculate the correlations and the degree of influence on the final pro-environmental behavior of visitors in the park. A research questionnaire was designed based on the model.

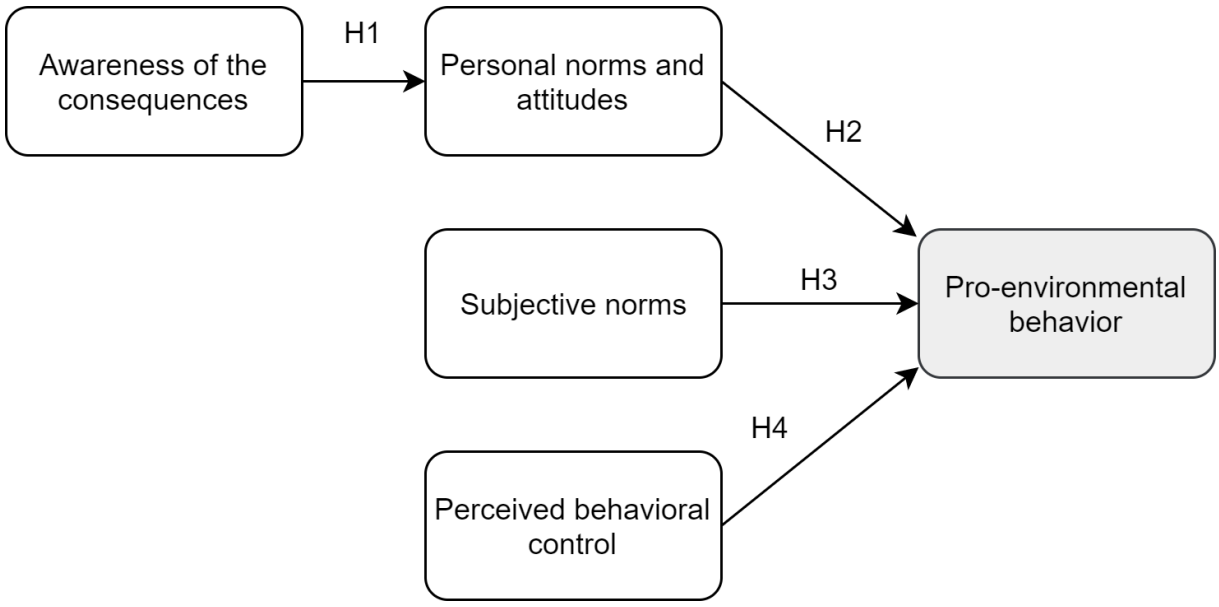

Figure 1 Research model

The questionnaire contained a total of 63 questions and was divided into individual logical units. The largest part of the questionnaire concerned the factors from the mentioned model and was designed on the basis of TPB enriched with NAM elements. This part of the questionnaire was used to find out what internal and external factors affect the final pro-environmental behavior of park visitors.

The author of the TPB method, Icek Ajzen, a social psychologist and professor emeritus at the University of Massachusetts Amherst assumes that human behavior is ultimately influenced by a set of several interdependent factors. These factors include attitudes based on the belief in the possible effects of the intended behavior, subjective norms including the attitudes of other close participants in the decision-making process, and finally self-control of behavior represented by the belief in the ability to perform a certain action. Individually factors interact with each other and through the creation of a certain behavioral intention then lead to specific behavior. The TPB method has been used successfully for research in the field of human behavior and is also used for research in the field of environmental behavior in specific situations.

The NAM method was proposed by the social psychologist Shahlom H. Schwartz (1977) in order to explain the prosocial one and pro-environmental behavior. The model describes the personal norms that determine specific behavior of the individual in the given situation. Personal norms are then activated by two main factors – by being aware of the consequences of their behavior and taking responsibility for that behavior.

Increasingly, studies do not use TPB or NAM separately from other methods, and there is a tendency to link or enrich the methods with elements of other behavioral theories. In particular, environmental awareness studies often combine NAM with TPB, as exemplified by Chen (2020), Esfandiar et al. (2020) or Park and Ha (2014). And their newly created research models usually use only some items of the original models. The same is true of our research. The TPB method, which we used to monitor attitudes, subjective norms and perceived behavior control, was extended by two main items based on the NAM method – personal norms and awareness of the consequences of behavior. The source of inspiration for this procedure was the study by Esfandiar et al. (2020), which successfully used this combination of TPB and NAM research models and examined pro-environmental behavior with a specific focus on waste management. The enrichment of TPB by other factors is also supported by the creator of the theory, Icek Ajzen (1991), who supports the idea that TPB will be modified and supplemented according to the needs of specific research.

Following the example of the study by Esfandiar et al. (2020) we also proceeded to adjust one of the items based on TPB. In contrast to the original form of the model, respondents are not asked about the intentions of their future behavior, but the questions are formulated with regard to specific manifestations of pro-environmental behavior of individual respondents in the current time and in specific situations. The use of real (respectively declared by respondents) behavior instead of mere intention for this behavior, seems to be suitable mainly due to better graspability for visitors and the possibility of obtaining more accurate results within this indicator.

Characteristics of the Natural Protected Areas of the Island of Tenerife

Teide National Park is located in Tenerife, one of the Canary Islands. The Canary Islands are an archipelago of a total of seven islands. There are a total of 3 national parks on the Canary Islands - located on the island of Tenerife, La Palma and La Gomera (Ministerio para la Transición Ecológica y el Reto Demográfico, 2022a).

There are also several rural parks on the islands. On the island of Tenerife we find two rural parks - Parque Rural de Anaga and Parque Rural de Teno (Cabildo de Tenerife, 2022). Our research was conducted in Teide National Park and in both rural parks in Tenerife.

Teide National Park is located in the center of the island and covers an area of almost 19,000 hectares with an average altitude of 2,000 meters. The highest point of the national park (El Teide) is located at an altitude of 3718 meters and is also the highest peak in Spain**.** The national park was founded in 1954 and was declared a UNESCO World Heritage Site in 2007 (González et al., 2018b).

Teide National Park is unique for its volcanic and natural characteristics and is currently the most visited national park in Spain (Cabildo de Tenerife, 2022).

According to data we received from Teide National Park since the beginning of its existence, the park has been visited by over 3 million visitors every year. Since 2016, the annual number of visitors has been over 4 million, with the exception of 2020 due to the covid-19 situation. We use the latest data provided to us for research purposes. Data on park attendance until 2018 are freely available to the public (Ministerio para la Transición Ecológica y el Reto Demográfico, 2022c).

As already mentioned, national parks face a challenge that requires maintaining the protection of local ecosystems while striving for the highest possible number of visitors. Teide National Park is proof of this, as it offers significant economic benefits to the island, but such high attendance poses challenges for the park's sustainability and nature conservation (Ministerio para la Transición Ecológica y el Reto Demográfic, 2022b).

The entire island of Tenerife has a population of 972 234 (data for 2021) (Statista, 2022). Teide National Park is therefore visited by four times as many tourists each year as the population of the entire island.

The nature of Teide National Park generally requires that we pay close attention to its protection. One of the aspects is the mentioned high number of tourists. Another factor is that island territories are more susceptible and require more protection (Ramdas & Mohamed, 2014; Zubair et al., 2011). In addition, the small islands often have a high degree of endemism and biodiversity, together with a relatively small number of species, which poses a high risk of extinction of fauna and flora (Zubair et al., 2011).

A significant problem for Teide National Park, in addition to the risk of possible inappropriate behavior of visitors, also includes considerable car traffic. Approximately 70 % of visitors use a car to travel to Teide National Park and to travel through the park, which is a great burden on the nature of the park (González et al., 2018b).

Methodology

The article presents a research on quantitative design, which involved 206 visitors to one of the nature parks on the island of Tenerife (Teide National Park, Anaga Rural Park, Teno Rural Park). The research group consisted of 129 women and 77 men. 150 visitors were reached in Teide National Park, 36 visitors in Anaga Rural Park and 20 visitors in Teno Rural Park. As mentioned above, due to the ongoing covid-19 pandemic, the number of tourists on the island of Tenerife and in the parks was significantly lower than in the previous period. In addition, at the time of data collection, both regular public transport bus lines to Teide National Park were out of order.

At the beginning of the research, we set the following hypotheses:

H1: Awareness of consequences (AC) has a positive effect on personal norms and attitudes (PNA) towards pro-environmental behavior.

H2: Personal norms and attitudes to pro-environmental behavior (PNA) have a positive effect on pro-environmental behavior (PEB).

H3: Subjective norms (SN) have a positive effect on pro-environmental behavior (PEB).

H4: Perceived behavior control (PBC) has a positive effect on pro-environmental behavior (PEB).

In short, we hypothesize that if visitors are aware of what can cause inappropriate behavior in a given park, it will influence their attitudes and norms. And given attitudes and norms will be the main driving force in terms of pro-environmental behavior.

We also assume that visitors will be influenced by their surroundings, people from their family, friends and other people from their immediate surroundings. Thus, the behavior of these groups of people will influence the final pro-environmental behavior of the respondents.

Last but not least, whether appropriate behavior in a given place is perceived as difficult for visitors, we count as an obstacle to actually behaving appropriately in the given environment.

Hypotheses H2, H3 and H4 are based on TPB. We work with the assumption that the above categories of variables (personal attitudes, subjective norms and perceived behavior control) have the potential to influence intentions for a certain behavior, or in the case of our modified model directly the final pro-environmental behavior. In the case of hypothesis H1, we determined a possible correlation based on the NAM model, which assumes that certain factors (in our case, awareness of the consequences of the behavior) may contribute to the activation of personal norms.

Questionnaire

The questionnaire contained 5 general demographic questions, in which our aim was to find out basic information about respondents, including whether they are tourists on the island of Tenerife (then, if so, where they come from) or permanent residents. We also asked how often they visit the park.

Part of the questionnaire compiled on the basis of a combination of TPB and NAM consisted of 50 questions. In this section, the respondents determined, using the Likert four-point scale, how much they agreed or disagreed with the prepared statements concerning their behavior in the park or the environmental problems that the park management should work with.

The last part of the questionnaire contained 5 supplementary questions to find out to what extent the respondents are interested in environmental issues, whether they sort waste in their households, what importance they attach to nature and how often they carry out outdoor activities.

The last 2 items of the questionnaire were open-ended questions in which respondents had the opportunity to express their views on what could help the park administration to improve the

current situation in terms of nature protection in the park and how visitors can contribute to nature protection of the park.

Respondents were personally approached to participate in the research in the mentioned parks. The questionnaire was in paper form and the respondents took an average of 20-25 minutes to complete. Data collection was carried out during March-June 2021.

Evaluation of Results

The hypotheses were tested using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method in SmartPLS 3 program. The PLS-SEM method was selected based on the recommendations of the Hair et al. (2019), who recommend the application of this method in cases where the theoretical framework is tested from a prediction perspective, when the structural model shows elements of considerable complexity and includes multiple indicators and also applies in the survey for the development of the model or theory, namely even if the research has a small sample size. Purwanto and Sudargini (2021) also comment on the size of the research sample and states that although SEM requires a relatively large research sample of at least 100-200 respondents, PLS can easily work with a small sample (minimum 30-50).

Validity and reliability were tested and evaluated using indicators designed for this purpose. To determine the internal consistency of the model, Composite Reliability was preferred to the widely used Cronbach's Alpha. As stated by Purwanto and Sudargini (2021), the use of this indicator is more appropriate in the case of SEM analysis because Cronbach's Alpha does not assume the same weight of each indicator and tends to lower construct reliability more than Composite Reliability.

Hair (2021) makes recommendations regarding composite reliability values, which should be ≥ 0.7, which is met in our case and all values have reached this limit. According to Hair (2021), AVE (average variance extracted) values should be greater than 0.5, however, according to Fornell and Larcker (1981), if the values of composite reliability are higher than 0.6, the convergent validity of the given model is adequate already at AVE values ≥ 0.4. This is the case in our study because AVE values ranged between 0.4 and 0.5. Table 1 shows detailed values of composite reliability and AVE for individual factors from our model.

Table 1 Values of Composite Reliability and AVE for each of the factors

	Composite Reliability	Average Variance Extracted (AVE)
Awareness of Consequences	0,752	0,432
Perceived Behavioral Control	0,713	0,443
Personal Norms and Attitudes	0,742	0,415
Pro-environmental Behavior	0,766	0,402
Subjective Norms	0,761	0,444

Furthermore, all VIF (Variance Inflated Factor) indicators reach values less than 5, which means that multicollinearity is not a problem in our model (Hair, 2021).

The SRMR coefficient was chosen to determine the model fit and its value is 0,097. These are limit values, but we can still consider them acceptable.

The other questions of the questionnaire were evaluated by the basic methods of descriptive statistics, the open questions were coded by open coding.

Description of Park Visitors

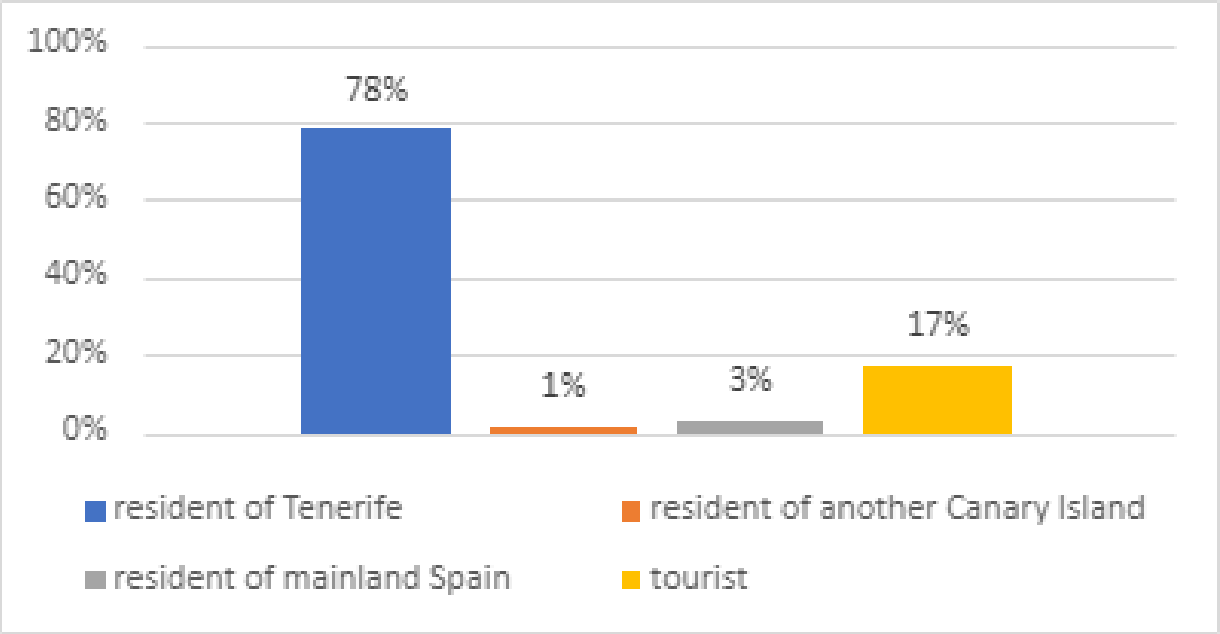

Figure 2 Relative frequencies of residents and non-residents among park visitors (n=206). The tourist is not a resident of any of the Canary Islands or mainland Spain.

The diagram (Figure 2) shows the ratio of residents to non-residents of the island of Tenerife among park visitors.

The following diagram (Figure 3) shows the age composition of the park visitors who participated in the research. Figure 4 contains data on how often respondents visit the park. If we take into account the responses of the visitors, it is observed (Figure 4) that 41 % of them visit the natural spaces more than once a year. And that with the exception of 0.5 %, the rest of the visitors would repeat the experience. The degree of affection is very high.

Note: the abbreviation PA stands for Protected Area.

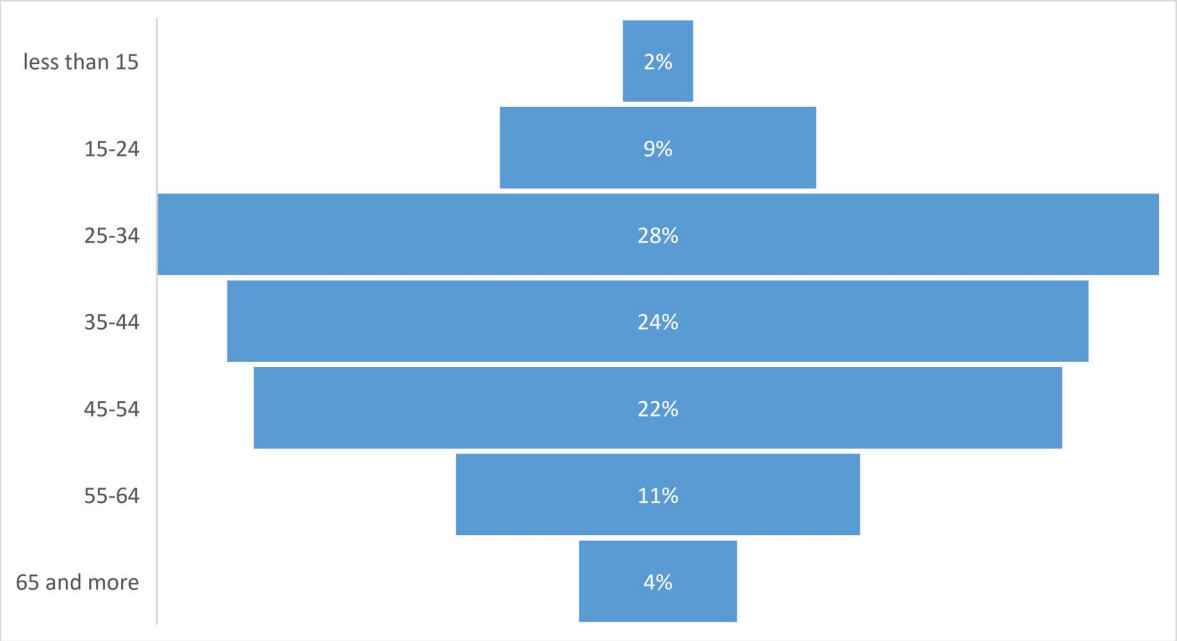

Figure 3 Relative frequencies of respondent´s age (n=206)

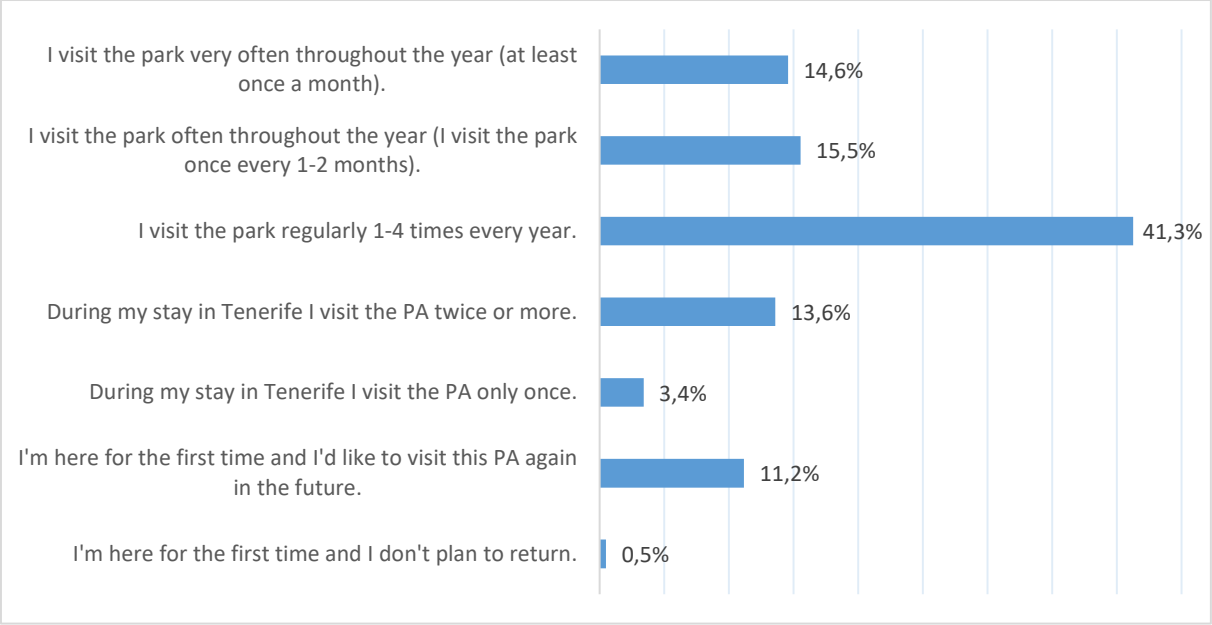

Figure 4 Relative frequency of visits to the nature park (n=206)

Results

View of Visitors on the Environmental Management of the Park

As part of the research, we analyzed how respondents perceive the quantity and location of bins and what are the possibilities of waste sorting in nature parks. Figure 5 shows the extent to which respondents agreed with the statement that the quantity of baskets in a given nature park is

sufficient. Figure 6 then points to the topic of waste sorting options in the given nature parks. We can note that in Teno Park, almost 80 % of respondents consider the quantity of waste bins and waste sorting options to be insufficient. This statement also often appeared in the open answers in the questionnaire, and the respondents also informed us of this fact in Teno Park during personal contact.

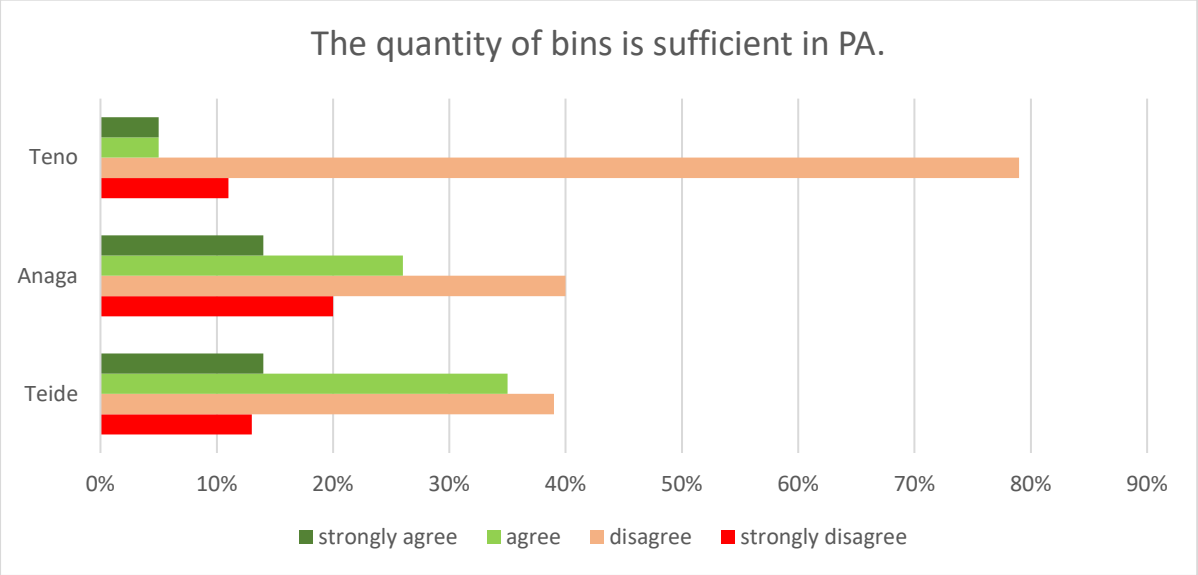

Figure 5 Relative frequency of answers to the question of the quantity of waste bins in individual parks (Teno, n=19; Anaga, n=35; Teide, n=148)

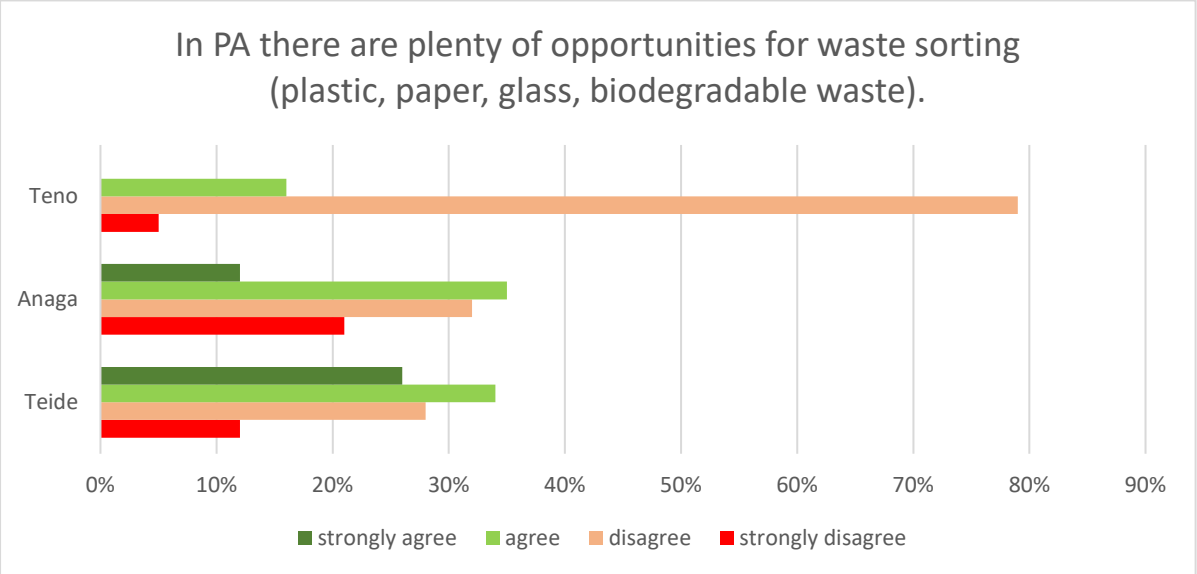

Figure 6 Relative frequency of answers to the question of the quantity of opportunities for waste sorting in individual parks (Teno, n=19; Anaga, n=34; Teide, n=145)

We also asked respondents how they perceive the education and the effort to increase the environmental awareness of visitors by the park administration (Figure 7). We were interested in

whether visitors perceive this effort as sufficient and are aware of it. A higher level of disagreement occurred again in the case of Teno Park. In general, however, given the diverse responses and the fact that only about a quarter of the visitors expressed full agreement with the statement, we can conclude that environmental education and information on appropriate behavior in the park can be further improved. The environmental education of visitors is currently either insufficient or a large number of visitors are not aware of it.

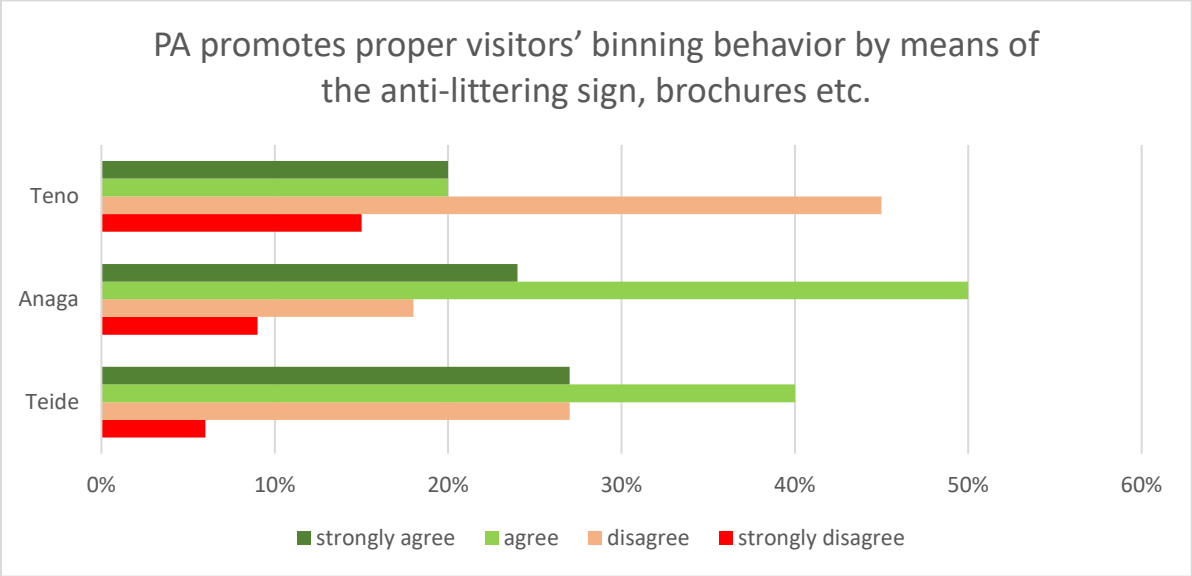

Figure 7 Relative frequency of answers to the question of environmental education of visitors in individual parks (Teno, n=20; Anaga, n=34; Teide, n=143)

The questionnaire included two open questions regarding the possible improvement of the current situation in the park in terms of nature protection and environmental awareness. Among the current problems, respondents very often mentioned the lack of toilets, which in their opinion should be available at least at several points in the park. According to visitors, toilets are often missing in very busy places such as information centers or large parking lots. Visitors stated that especially in some parks (Anaga, Teno) there is a lack of rubbish bins. A large part of the visitors stated that they would like to see, in addition to increasing the number of bins, also more signs for waste bins and thus the possibility of throwing and sorting waste. Many visitors cited high financial penalties for violating park rules and polluting nature as possible motivations for conscious behavior. In this case, they also stated that it was necessary that visitors be constantly monitored. Some respondents would not even oppose the introduction of paid admission to some parts of the parks to help keep the park clean.

Among the most common responses to visitors' motivation for behavior were improved environmental education for pupils in schools and efforts to improve environmental education for the public when visiting the park, as older people often do not have the right habits and are not a good role model for younger generations. Frequent responses also included motivation by rewarding appropriate behavior and gaining discounts and other benefits.

Many respondents were of the opinion that the sale of products in many packages in the park should be eliminated so that waste is not generated at all. The sale of products that would emphasize zero waste and environmentally friendly packaging materials would lead to some form of visitor education.

When we asked the respondents what they think visitors can contribute to nature conservation in parks and sustainable development in the case of tourism in individual parks, the most frequently

mentioned answer was for visitors to take their waste back from the park. Many people have expressed the understanding that in such large nature parks, it is not possible for rubbish bins to be everywhere, because it is not within the power of park management to regularly take out the garbage from these places.

In response to our questions about keeping the park clean, the Teide National Park Administration said the administration took care of the daily cleaning of rubbish that tourists had thrown out of the trash. For the purpose of maintenance, the National Park uses the services of a total of 17 employees of the external cleaning service, of which 8 employees are dedicated to the daily cleaning of garbage after visitors. The park administration also stated that visitors to Teide National Park are relatively responsible and leave rubbish exceptionally, as evidenced by the quality and cleanliness of the national park's environment, despite the fact that it is visited by several million visitors each year.

The park administration said that the place is appropriately clean, although of course there are visitors who disturb this condition and behave uncivilized.

According to its statement on visitor education, the administration is actively involved in organizing environmental events at Tenerife's environmental education centers and organizes guided tours of the national park, courses and lectures at the Telesforo Bravo Visitor Center. It also occasionally organizes guided tours of the park for the general public; however, this activity is in great decline due to the need for budget cuts.

Environmental Awareness of Visitors

Respondents showed interest and motivation to take part in the research when they were told that it was research on environmental education and nature conservation. According to the results of the research, 89 % of respondents are interested in current environmental topics. Figure 8 shows in more detail how residents and non-residents of Tenerife responded to the issue of this interest.

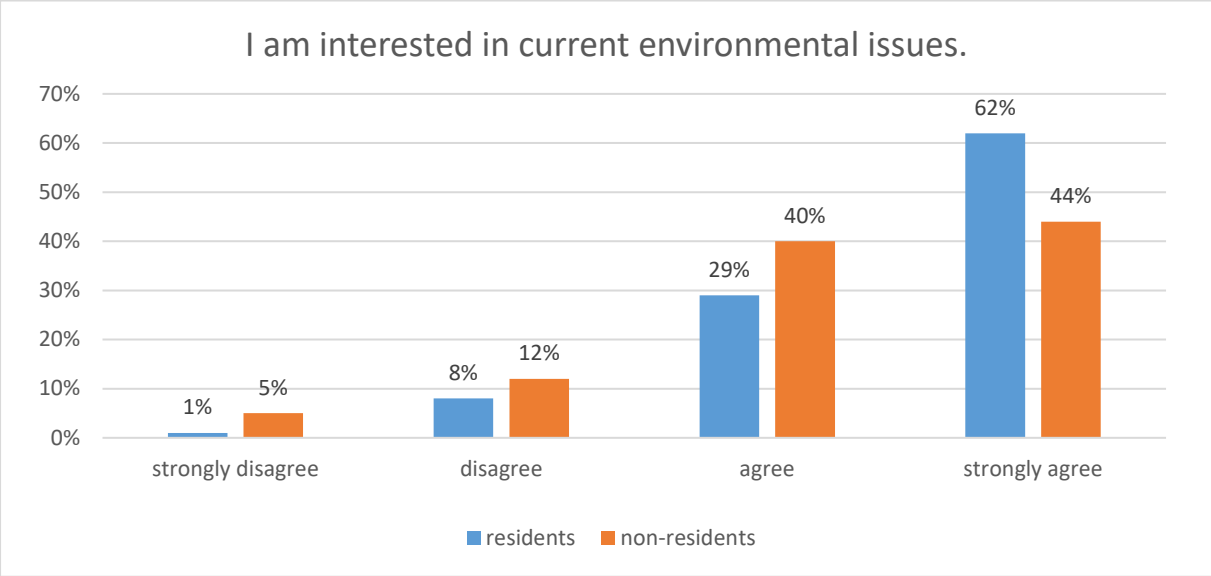

Figure 8 Relative frequency of answers to the question of interest in current environmental issues among residents and non-residents (residents, n= 154; non-residents, n= 43)

Because in the previous text we looked at how visitors perceive the possibilities of sorting waste in parks, we were also interested in whether the respondents sort waste in their households. Figure 9 shows how residents and non-residents responded in this regard.

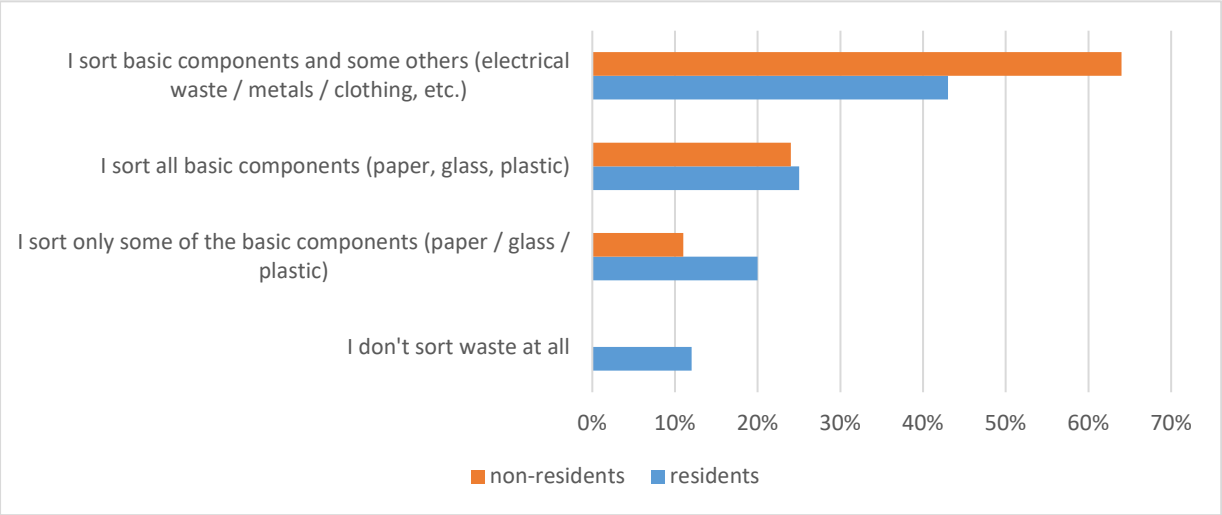

Figure 9 Relative frequency of answers to the question of household waste sorting among residents and non-residents (residents, n= 159; non-residents, n= 45)

Regarding the environmental issues and respondents' attitudes towards nature, we also asked them how often they go out into nature during the year (Figure 10). We see that non-residents more often stated that they go out for outdoor activities a little more often, more than 50 % of non-residents go for nature walks at least once a week, one fifth of them even daily.

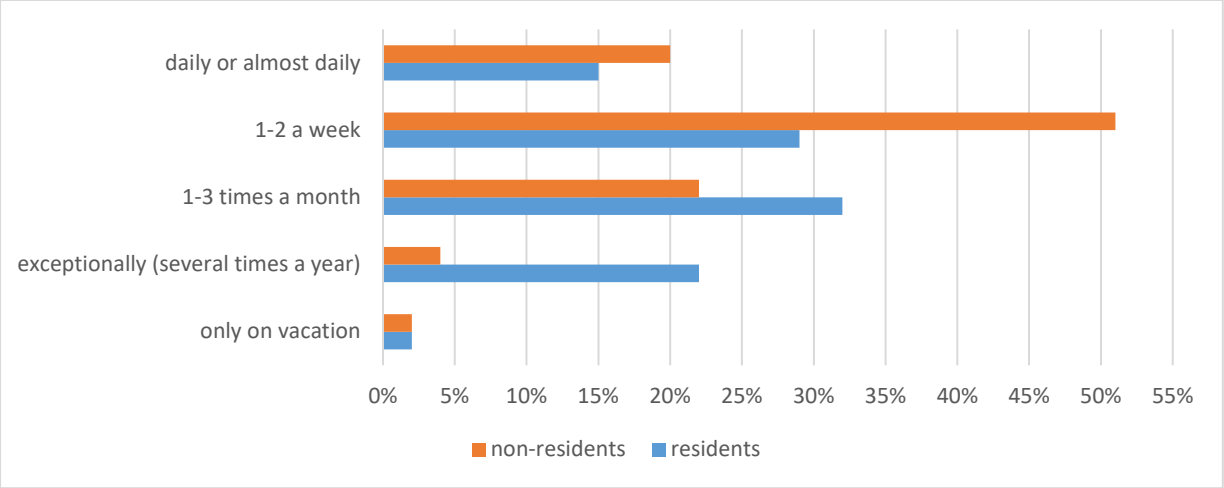

Figure 10 Relative frequency of answers to the question of frequency of outdoor activities throughout the year among residents and non-residents (residents, n= 159; non-residents, n= 45)

Analysis of Factors Influencing the Pro-environmental Behavior of Visitors

The values related to the testing of individual hypotheses can be found in Table 2. For hypotheses H1, H2 and H4, the p value is less than the preselected level of significance p = 0.05 and we can therefore confirm the hypotheses. However, we cannot confirm hypothesis H3, which expresses the positive influence of subjective norms on pro-environmental behavior, at the mentioned 95% level of significance.

Table 2 Values related to the testing of individual hypotheses

Hypotesis	*Standard Deviation (STDEV)*	*T Statistics*	*P Values*
H1	*0.087*	*4.977*	*0.000*
H2	*0.135*	*2.524*	*0.012*
H3	*0.129*	*0.858*	*0.391*
H4	*0.120*	*2.161*	*0.031*

The β coefficient expresses the degree of correlation between the individual factors. A graphical representation of these relationships can be seen in Figure 11.

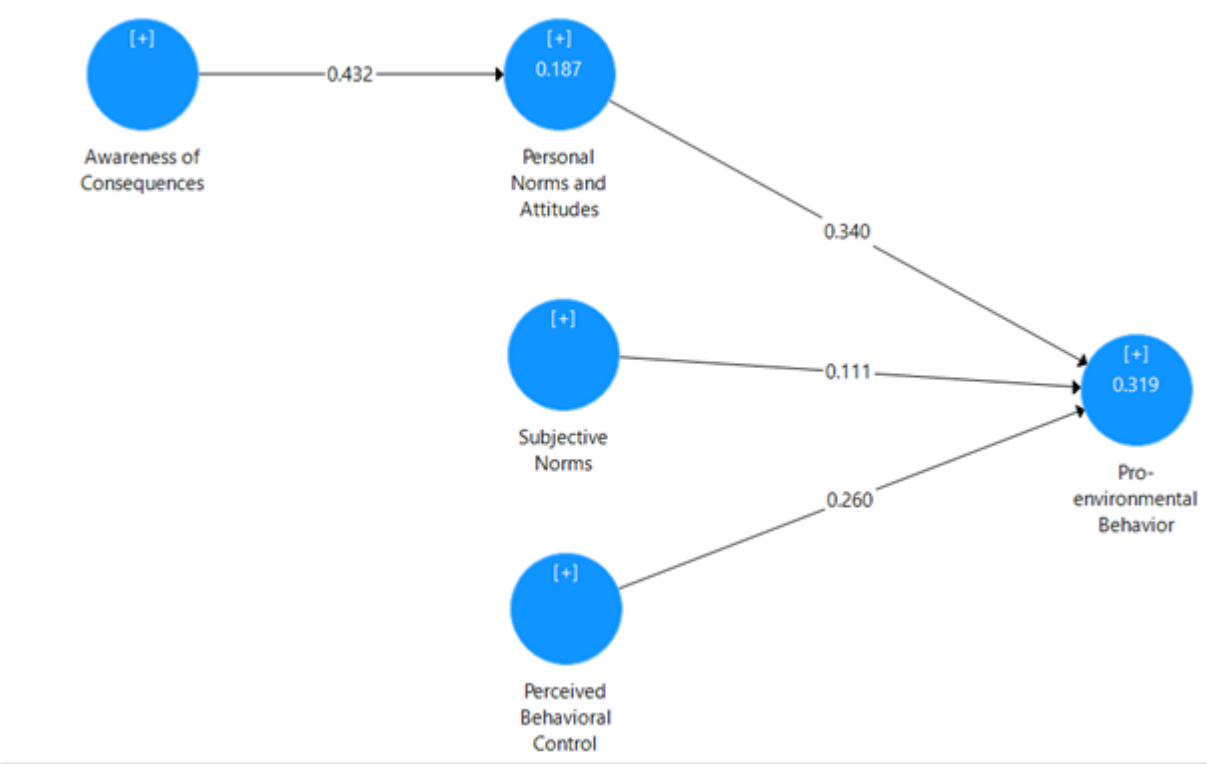

Figure 11 Graphical representation of correlations between individual factors

In addition, we highlight that the indirect effect of awareness of consequences on pro-environmental behavior reaches the values of the β coefficient = 0.147, σ = 0.078, t-value = 1.877 and p-value = 0.061.

Discussion

The research was conducted in the spring of 2021, at the time of the covid-19 pandemic. At this time, various forms of restrictions were imposed around the world, affecting many areas of life. This situation is also the reason for influencing our results, which may not indicate a normal state, but a state of exceptional events. Free travel between countries was restricted at this time, as were bus lines to the national park during the research period. Events involving more than one person at a time were also limited. All these external circumstances clearly had an impact on tourism in the individual parks.

This fact is also indicated by the statistics expressing the numbers of visitors in the national park and on the island of Tenerife in general, which we presented in this article. The number of visitors to the island of Tenerife fell to 1.86 million in 2020 due to the covid-19 pandemic, and in 2021 the island was visited by 2.68 million visitors, a huge difference from 5-6 million visitors a year in previous years (Statista, 2022).

For this reason, in our research, the ratio of respondents is mostly made up of island residents and only a small part is made up of tourists.

As part of the research, we had the opportunity to see the nature and the state of the environment in the individual parks, but this view could also be influenced by less visitors. Restrictions causing the suspension of industry, reduced human travel, etc. have led to a significant reduction in negative environmental effects worldwide (Bashir et al., 2020; Buckley, 2021; Rousseau & Deschacht, 2020; Verma & Prakash, 2020).

Visitors also stated that the parks could provide educational events related to environmental protection. We must reckon with the fact that even in this case, the situation may have been affected by the pandemic and the restrictions on associating more people and holding personal meetings. Some visitors may have thought that events were never held, although the park administration said it was committed to environmental education. However, the research definitely showed the fact that visitors are interested in environmental issues and consider education in this area to be very important. This is in line with the findings of the research by Sokolíková and Andreska (2021), which also examined attitudes towards environmental education by students who stated that they would like to know more about current environmental issues and environmental issues in general.

Visitors' interest in environmental education should be used. We must therefore find ways to present these topics to the public. Information signs, leaflets and posters are a well-known and used option. Given the number of visitors traveling around the island and to the parks by car, consideration could be given to setting up educational signs along the roads to the nature parks and parking spaces. In the same way, the buses on the island use screens, where there are, among other things, information and advertising spots and event trailers from the Cabildo de Tenerife. Studies confirm that we can raise environmental awareness through appropriate advertising (Han et al., 2018; Shruthi, 2020; Tee et al., 2021).

The studied parks differ in terms of tourism and natural appearance. While Teide National Park is the most visited park in the island, i.e. the whole of Spain, Rural Park Teno and Rural Park Anaga are significantly less visited and at the same time provide a smaller number of tourist attractions. For this reason, fewer respondents from the two mentioned parks also took part in the research, and the island's attention is less focused on tourism and the necessary conditions for its implementation in these parks than in the national park. Nevertheless, the island administration should consider improving the conditions for visitors' waste behavior in Teno Park, as the results indicated that visitors considered the conditions to be insufficient.

The hypothesis of a significant influence of perceived behavioral control on pro-environmental behavior has been proven and the park administration should make every effort to make appropriate

behavior easily feasible for visitors. This means, for example, providing a sufficient number of waste bins, waste sorting facilities or public toilets.

An analysis of the factors that may influence the final pro-environmental behavior of visitors has highlighted the greatest influence of personal norms and attitudes, which are significantly influenced by awareness of consequences. A significant effect was also demonstrated in the case of the mentioned perceived behavioral control, i.e. how difficult or easy it is for visitors to behave in a given park in a certain way that they would like to apply. Thanks to these findings, we can plan appropriate ways of realizing environmental education activities for visitors building on awareness of consequences of their behavior and personal norms and attitudes.

Significant influence was not demonstrated in the case of subjective norms, which represent the degree of influence of close persons and their behavior on respondents.

The results of studies that analyze the factors influencing pro-environmental behavior differ. Studies often use the models, as in our case, in various modifications to best suit the needs of the research. For example, Niaura (2013) used a variable that includes the influence of people from the respondent's environment. The results show that the effect of this factor is low and the results in this case are close to our findings. Similarly, the study by Xu et al. (2018) examining environmental awareness effects did not find a significant impact of subjective norms on environmentally responsible behavior.

In contrast, the study by Esfandiar et al. (2020) confirmed the significant influence of subjective norms on final pro-environmental behavior. However, our results agree with the study in many respects, for example in the highest degree of correlation between personal norms and attitudes and pro-environmental behavior followed by the degree of correlation between perceived behavioral control and pro-environmental behavior. Also, as in our case, the highest degree of correlation occurred between awareness of consequences and personal norms. The reason why our results differ in confirming/not confirming hypothesis H3, which describes the influence of subjective norms on environmental behavior, may be, for example, the different geographical area of our research. As stated by Esfandiar et al. (2020), these results can be very strongly influenced by the phenomenon that Hofstede (2001) describes in his work, namely that people of different nationalities have different habits and tendencies to a certain behavior. Hofstede always describes them within two polarities, such as the long-term or short-term orientation of society, restraint or indulgence, or, for our question, the fundamental inclination to individualism or collectivism. The people of Western European countries generally have a slightly greater tendency towards individualism than the countries of the East, where the above-mentioned studies were conducted and where people are more oriented towards a collectivist approach. The same is the case with Spain (Hofstede Insights, 2022), which is apparent in our research.

Conclusion

National and other nature parks and reserves are an important part of education, leisure and the protection of rare species of animals and plants in today's world. Naturally, people probably have more respect for the protection of specific protected natural areas. However, these areas can play an important role in environmental education in raising public awareness and the importance of nature conservation in all parts of the world, not just nature reserves.

Given the current environmental situation, it is clear that environmental education is a key precondition for people to be interested in nature and its protection and to ensure that further development is sustainable. At the same time, in order to plan environmental education for the public effectively, we must conduct local research that takes into account the specifics of the place and the specifics of the population that will be educated in this way.

Education is one of the important conditions, however, as our results suggest, there is room for improvement not only in environmental education, but also in other measures. Visitors to the parks perceive some problems, which definitely include a lack of waste bins, a lack of bins for waste sorting or the absence of toilets. Considering that the final pro-environmental behavior is largely influenced by perceived behavioral control, ie how challenging the appropriate behavior is for visitors, it is necessary to adapt the conditions to this. It is also appropriate to focus on positively influencing the norms and attitudes of visitors, because it is these norms that determine how visitors will behave towards the environment. And we can influence personal norms and attitudes, as research has shown, by showing visitors what environmental consequences certain behaviors can have.

As already mentioned, the research results are affected by the situation due to covid-19, especially in terms of the ratio of residents and non-residents among the participants in the research, and this can be considered as a limitation of our research. At the same time, however, this situation represented a relief to the environment worldwide and because the normal situation was interrupted, many people may have become more aware of the importance of protecting the environment.

From the results, we can conclude that awareness of the consequences of behavior significantly affects personal norms and attitudes, and these then have the greatest influence on the final pro-environmental behavior of visitors. If visitors have a clear view of the importance of keeping the park tidy, they will be aware of the consequences of not doing so. This will then influence their attitudes and personal norms, and they will be more likely to internalize new behavioral habits.

Perceived behavioral control, ie how easy/challenging it is for visitors to behave consciously and responsibly towards the environment in the nature park, also has a significant effect on pro-environmental behavior.

On the contrary, the influence of subjective norms (the influence of people around that person) on pro-environmental behavior has not been proven.

Here we also come across one question that may concern many natural protected sites. If trash cans and dustbins were placed in the entire area of the park, even this fact could spoil the appearance of the place. For that reason, it seems like the best solution is to really focus on educating visitors on the importance of keeping the site completely clean and encouraging them to, for example, take their waste home with them or to a nearby trash can. Through education, we are able to influence perceived behavioral control so that visitors perceive the necessity of nature protection as a completely essential and indispensable task. And at the same time, through education, we can work to ensure that visitors learn as much information as possible about the possible consequences of inappropriate behavior in the natural area. Thanks to this, we will directly influence their attitudes and personal norms.

Nevertheless, it must be added that the results should also take into account the management of individual natural sites and also do their best to help visitors in their conscious behavior. Therefore, more trash cans do not have to be placed directly in the center of the given park and in the most protected and sensitive area, but our goal should be to equip at least the periphery of these areas with trash cans and toilets (parking lots where visitors start/end their trips, information centers etc.).

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Ethics Declarations

The research was conducted with human participants in a non-interventional way. Participants gave verbal informed consent in advance and the questionnaires were filled out anonymously.

Declaration of interest statement

The authors report there are no competing interests to declare.

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