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Psychological Pathways to Ocean Conservation: A Study of Marine Mammal Park Visitors

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Abstract: This study investigated the psychological constructs related to ocean conservation among visitors to a marine mammal park in Portugal. A survey was conducted with 335 adult visitors, assessing value orientations, awareness of ocean vulnerability, attribution of responsibility, personal norms, and behavioral intentions towards ocean conservation. The results revealed two distinct attitudinal profiles among the visitors. ‘Anthropocentric visitors’ prioritize human interests over environmental concerns, along with heightened awareness of the ocean’s vulnerability and greater ascription of responsibility to humans for environmental problems. ‘Ecocentric visitors’ recognize the intrinsic worth of nature, reporting deeper awareness of the consequences of environmental issues on the ocean, more robust personal norms centered on moral obligations towards conservation and higher behavioral intentions to support ocean conservation. Compared to whale-watching tourists from a previous study, the zoo visitors exhibited more polarized anthropocentric and ecocentric profiles, suggesting the whale-watching tourists fell somewhere between the two zoo visitor profiles in their psychological orientations. These contrasting profiles emphasize the heterogeneity in environmental attitudes and highlight the importance of tailoring interventions to resonate with the distinct psychological motivations of different audience segments. Institutions like zoos can play a vital role in shaping public attitudes through targeted communication strategies aligned with visitors’ unique value systems and beliefs.

Keywords: theory; nature-based tourism; zoo; ocean conservation; behavioral intentions; anthropocentric values; biocentric values; marine conservation; marine park



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1. Introduction

Scientific understanding and cultural perceptions of the ocean have evolved significantly over time, potentially influencing public awareness of marine conservation issues [1]. While pinpointing this change in the public awareness is challenging, public attention to and worry about marine conservation have demonstrably risen in recent times [2,3]. Several factors have contributed to this shift, including increased overall knowledge of environmental issues by the general society, as well as recent and relevant advances in marine and earth science. Social media and other sources of internet-based information have also played an increasingly relevant role in disseminating news on many global conservation-related issues [4]. Along with these, media coverage has also contributed to raising awareness of the ocean through increasingly available documentaries, news reports and campaigns about the dire state of the oceans [5]. Added to all these, increased efforts to close the gap between science and the layperson by communicating recent advances in science to the public in simpler and more comprehensible forms have helped shape public opinion and increase support for marine conservation measures [6]. As a result, public interest increased, along with public understanding of ocean issues, encouraging people

to make conscious efforts to reduce their impact on marine ecosystems. Overall, public opinion on marine conservation has evolved from a relatively specific and restricted realm to a mainstream issue that, today, attracts widespread attention and support [7]. Growing awareness of the critical role of the oceans in maintaining a healthy planet has strengthened efforts to address challenges and introduce sustainable solutions to protect them.

Since 2013, significant international attention has been directed towards the oceans and their protection as a fundamental element for the planet's future [8]. An example of this is the Ocean Decade (2021–2030), recently established by the United Nations, where global efforts to educate people on the oceans is a fundamental goal [9]. This increasing awareness of the need to protect the oceans, as projected by the United Nations, aims to change the way we interact with this crucial element of planetary ecology.

1.1. Other Promoters of Ocean Awareness

Smaller in size compared to other global contributors, yet significant in influencing local and regional communities, nature-based tourism such as whale-watching tours and zoos and aquariums have played a meaningful role in shaping public perspectives about the preservation of the ocean. Whale-watching companies strive to educate and raise awareness among visitors about marine ecosystems, conservation challenges, and the importance of safeguarding oceans. By providing opportunities for people to witness marine life up close, these ventures foster emotional connections that nurture empathy and concern for ocean well-being, inspiring tourists to take proactive steps towards environmental conservation [10,11]. Zoos and aquariums have also increasingly recognized the importance of conservation awareness and education in their mission to promote conservation and environmental stewardship [12]. Many of these institutions, especially those that are marine focused, go beyond showcasing marine life, aiming to actively engage visitors in ocean conservation efforts. Many opt for immersing visitors in the underwater world, through exhibits that feature realistic habitats, marine life replicas, and engaging displays that showcase the diversity and fragility of ocean ecosystems. Interactive elements such as touch pools and other technology materials (screens, displays, games, tablets, etc.) are known to help visitors emotionally connect and engage with marine life and better understand ocean conservation challenges (e.g., [13,14]). Through the tailoring of educational programs, workshops, and guided tours focused on ocean conservation, catering to visitors of all ages, these involving approaches cover and engage visitors on topics such as marine biodiversity, climate change's impact on oceans, plastic pollution, and sustainable fishing practices (e.g., [15,16]).

In the public sphere, these nature-based tourist attractions, by engaging media attention, could further stimulate the debate on ocean protection. In addition, witnessing in person the biodiversity and vulnerabilities of marine life through whale watching, zoo visits and aquariums may inspire people to assume more eco-friendly behaviors and back sustainable practices.

1.2. The Psychological Path before Action

Gaining a deeper comprehension of the psychological factors that shape people's intentions regarding ocean conservation is vital. With such knowledge, organizations can devise specific interventions and approaches that effectively motivate environmentally responsible behavior. By leveraging such insights, institutions can strategically design communication campaigns, educational initiatives, and policy instruments aimed at bridging the gap between intentions and actions. Ultimately, this facilitates cultivating a more sustainable relationship between human societies and the oceans. Harms et al. [8] investigated the psychological path of whale watch tours on the participants' behavioral intentions to protect the oceans. Two complementary theoretical frameworks were at the foundation of Harms et al.'s [8] study, i.e., the cognitive hierarchy model for human behavior and the Value–Belief–Norm (VBN) theory. Although both models share common elements such as values and norms, they differ in terms of complexity, structure and emphasis. As

described next, the cognitive hierarchy model provides a more detailed progression of decision making, while VBN theory focuses more explicitly on the role of social norms and beliefs about environmental impacts in shaping pro-environmental behavior. The cognitive hierarchy model outlines the progression of human behavior, moving from internal mental constructs to observable actions [17] (Figure 1).

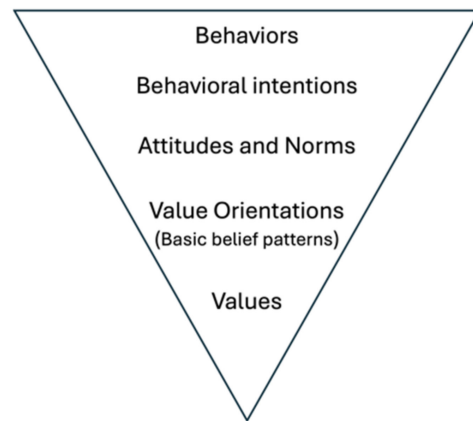


Figure 1. Cognitive hierarchy model of human behavior (adapted from Schultz and Zelezny [18]).

It consists of several interconnected components of the individual, namely, values, value orientations, norms, attitudes, behavioral intentions which will shape the final behavior. At the base of the model are the values, which are broad, abstract ideals or principles that guide a person's beliefs about what is important and desirable. They serve as foundational concepts shaping one's perception of, among others, the environmental issues, and their significance. Values are followed by value orientations, which are clusters of related values that form a person's overall worldview or belief system. Value orientations provide a framework for interpreting these environmental issues and deciding how to engage with them. Norms are socially accepted standards or rules of behavior that reflect shared values and value orientations. They shape how individuals perceive appropriate actions and behaviors in relation to the environment, as influenced by their cultural, social, and peer contexts. Attitudes represent an individual's evaluations or feelings towards specific aspects of the environment. They are influenced by the previous constructs, and they play a crucial role in determining how one responds emotionally to environmental concerns. An individual's behavioral intentions represent their conscious plans and motivations to engage in specific environmental conduct. These intentions serve as a critical link between one's attitudes and their actual behaviors, signaling a readiness to act in a particular manner. Ultimately, behaviors themselves are the observable actions and choices people make through their interactions with the environment. They are preceded and influenced by all the other constructs, and they reflect the culmination of these cognitive and emotional factors [18]. Using an example, let us consider the separation of household waste. At the core, people may have deep-rooted values related to environmental stewardship. These values shape their value orientations, leading to a biocentric view of the world, seeing human beings as an integral part of nature. In addition, in their community, certain norms have developed around these shared values—everyone is expected to separate household waste.

Influenced by these norms and their value orientations, they develop positive attitudes towards separation, seeing it as an effective way of contributing to environmental protection. These attitudes, in turn, foster behavioral intentions. In the end, and already at the top of the hierarchical model, these intentions manifest themselves as observable behaviors, separating recyclable waste and placing it in the correct containers. The second theoretical framework is the VBN theory, first developed by Stern et al. [19]. It seeks to explain pro-environmental behavior by examining the connections between, as the name implies,

values, beliefs, and social norms (Figure 2). This theory proposes a causal relationship between three factors, influencing individuals’ pro-environmental behaviors.

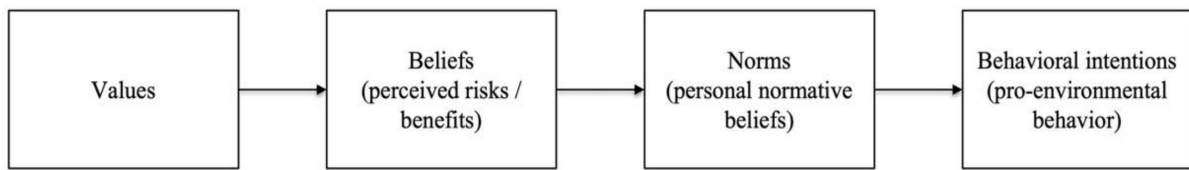


Figure 2. Value–Belief–Norm theory (adapted from Stern et al. [19]).

The first refers to an individual’s core values that shape its overall worldview and priorities. These values serve as fundamental guiding principles in a person’s life and act as the starting point for the causal chain. These core values directly inform and shape an individual’s beliefs regarding environmental consequences. This causal relationship influences how a person perceives and interprets information about environmental issues. Environmental beliefs, in turn, affect an individual’s perceptions of social norms surrounding environmental action. This connection shapes an individual’s understanding of the environmental situation and influences how an individual interprets actions that are expected or approved by society. When a person’s core values and beliefs align with supporting eco-conscious actions, and they view such pro-environmental behaviors as socially accepted and expected, they exhibit a higher likelihood of engaging in those environmentally responsible practices.

Let us consider the same example of sorting household waste. At the beginning are one’s values—they deeply appreciate environmental protection and believe in the importance of sustainable living. These values inform their beliefs about the world. In this case, they believe that incorrect waste disposal contributes significantly to environmental pollution. The combination of these values and beliefs leads to the development of personal norms—they will display a strong sense of personal obligation to actively separate and reduce their waste production. These personal norms, shaped by values and beliefs, end up guiding behavior. As a result, they constantly engage in separation practices and consciously try to minimize their everyday waste production.

Grounded in these two complementing theoretical frameworks, Harms et al. developed a conceptual model of the psychological constructs predicting the whale watchers’ path from values to behavioral intentions [8]. The model proposes that whale watchers’ biocentric value orientations and problem awareness will influence the understanding of the impact of human-induced activities on the marine environment (awareness of consequences). This, in turn, leads to increased acknowledgment of personal responsibility for one’s own actions affecting the marine environment (ascription of responsibility), followed by a stronger personal commitment to safeguarding the marine environment (personal norm), ultimately leading to a positive influence on the intention to actively support marine conservation (Figure 3).

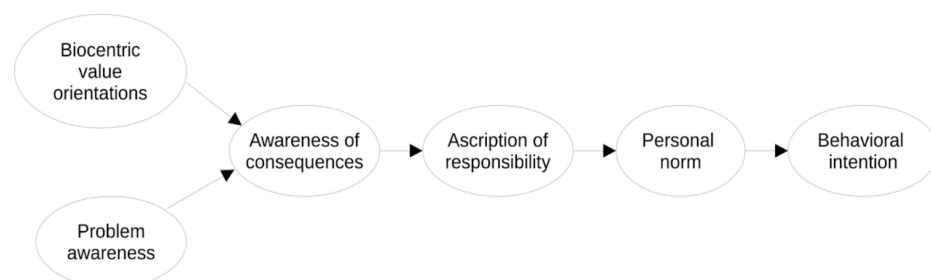


Figure 3. Conceptual model, adapted from Harms et al. [8], with the several constructs influencing the intention to actively support marine conservation from whale watchers.

1.3. Study Objectives

This research investigated the attitudes (encompassing values, beliefs, and norms) that a sample of tourists at a marine mammal park (henceforth, zoo visitors) held towards the ocean. Looking more closely at the psychological constructs within the visitors' sample, we sought out to identify possible visitors' profiles regarding these constructs, as well as examine possible correlations between the psychological constructs under study. Additionally, we also aimed to compare if these attitudinal profiles differed from those of whale-watching tourists (henceforth, whale watchers) studied by Harms et al. [8].

2. Materials and Methods

2.1. Sampling

Participants were all adults and systematically selected from different resting areas of the zoo, with every third visitor being chosen for participation, following a systematic random sampling approach. Data were collected at Zoomarine Algarve, a marine mammal park located in southern Portugal. This study ran for a total of 60 non-consecutive days. Sampling days were randomly selected to ensure equal representativeness of weekdays. An average of 6 surveys were collected each day, either in the morning or in the afternoon. Participation followed the ethical standards towards research on humans as required by the host institution and approved by its Science Committee (project number ZM_2022ID04). All subjects were informed about their rights for participation, the possibility to stop participation at any moment with no harm. An informed consent form was signed by all participants, stating their voluntary and anonymous participation. They were also informed about the ethical principles of confidentiality and anonymity in research studies. All procedures performed in this study were in accordance with the American Psychological Association (APA) ethical principles and the Portuguese regulation for data protection.

2.2. Procedure and Instruments

Visitors were asked to answer a questionnaire when inside the zoo. The questionnaire was originally adapted from Harms et al.'s [8] study on the causal relationship between whale watch experience, a whale watcher's awareness of problems and their consequences to foster support for marine conservation (for the complete set of questions used, see Table S1). Participants were prompted to answer a questionnaire about their personal relation with the ocean. For better flow and engagement, the questionnaire was divided into four sections. Section 1 corresponded to general demographic questions (gender, age, country of residence and education). It also included a question about the main reason for visiting the zoo, aiming to understand the main motivation for the visit. The available options were ticket price (price sensitivity of visitors), reputation (impact of the zoo's public image on visitation), lack of other alternatives for observing animals (if the zoo is seen as a unique attraction in the area), affiliation with conservation organizations (if conservation efforts influence visitation) and other reasons. Participants were asked to choose only one option.

Sections 2–4 corresponded to the psychological constructs under study. Section 2 was entitled "The Ocean and Humans" and included the Anthropocentric Value Orientations (3 items) and Biocentric Value Orientations (3 items) variables. Section 3 was entitled "The Ocean and Marine Life" and included the Awareness of Ocean's Vulnerability (3 items) and Awareness of Consequences (3 items) variables. The last section was entitled "The Ocean and Me" and included the Ascription of Responsibility (2 items), Behavioral Intention (1 item) and Personal Norm (1 item) variables. No items were reverse coded.

Participants were asked to indicate, on Likert scale, to which extent they agreed or disagreed with a set of statements. Responses ranged from 1—strongly disagree to 7—strongly agree and included a non-substantive response option (4—neutral).

2.3. Data Analysis

To ensure the robustness and validity of this study's main findings, a general linear model (GLM) analysis was performed to control for the potential confounding effects of gender, age, and education. These variables were chosen as they are common factors that could influence the results of this study. No significant effect was found after controlling for these variables.

Normality assumptions were met by analyzing skewness and kurtosis values. All values were below the threshold recommended by Curran et al. [20] (i.e., 2 and 7, respectively). All variables displayed good internal reliability (all Cronbach alphas > 0.60). One-sample *t*-test analysis was performed between each variable and the middle point of the scale (3.5).

To identify possible visitors' profiles, a k-means cluster analysis was performed using SPSS (version 26.0). The analysis used Lloyd's algorithm with Euclidean distance as the similarity measure. Initial cluster centers were selected as the first *k* cases in the data (maximum number of iterations was set to 10, and the convergence criterion was set to 0, ensuring that all 10 iterations were performed). Cases with missing values on any clustering variable were excluded from the analysis. To define the number of clusters, a first factor analysis was carried out to define the eigenvalues. For this, a Principal Components Analysis using SPSS (version 26.0) with default settings was performed. These eigenvalues were then compared with those defined by a parallel analysis. O'Connor's [21] syntax was used, where the ideal number of clusters to analyze will be those whose observed eigenvalues are higher than those obtained at random. The number of clusters was then set to 2 (maximum number of iterations was limited to 10 and the convergence criterion was set to 0). The clustering variables used were all constructs except the dependent variable (Behavioral Intention). An ANOVA analysis was then performed between each construct and clusters to check for differences. The dependent variable was then linearly regressed considering the identified clusters, accounting also for reported gender and age. The enter method was used for variable selection. All assumptions were met. Pearson's correlation analysis was performed to examine possible correlations between all pairs of psychological constructs under study. All analyses were conducted using a 0.05 threshold for statistical significance.

An ANOVA analysis ($\alpha = 0.05$) was performed to check for differences between the different tourist profiles (visitors and whale watchers) for each psychological construct under study. Tukey's HSD test for multiple comparisons ($\alpha = 0.05$) was performed for each construct.

3. Results

3.1. Survey Sample Description

A response rate log was maintained throughout this study, showing a participation rate of 78%. The final sample was composed of 46.9% male participants (mean age = 40.85; *SD* = 10.55) and 52.8% female participants (mean age = 35.80; *SD* = 10.69). Most participants had a college degree (55.8%), followed by high school graduates (38.5%), and a smaller proportion with basic school education (5.7%). This study included participants from various countries, with the highest representation from Portugal (46%), followed by the UK (28.4%) and Ireland (11.9%). Participants reported the most common reason for visiting the park's reputation (46.6%). Only a small number cited price (4.8%), affiliation with conservation organizations (4.8%), and lack of other alternatives (3.3%) as motivation for visiting. (Table 1 for detailed demographic description.)

Table 1. Demographic description of the participants.

Gender	N	%
Male	157	46.9
Female	177	52.8

Table 1. Cont.

Gender	N	%
Not reported	1	0.3
Education		
Basic School	19	5.7
High school	129	38.5
Graduate	187	55.8
Country of residence		
Portugal	154	46.0
UK	95	28.4
Ireland	40	11.9
Others	46	13.9
Motivation		
Reputation	156	46.6
Other	136	40.6
Price	16	4.8
Affiliation with conservation organizations	16	4.8
Lack of other alternatives	11	3.3

3.2. General Visitor Attitudinal Profile

Table 2 shows the mean scores (*M*) and standard deviations (*SD*) obtained in the visitors’ sample of the present study. Visitors reported relatively low anthropocentric value orientations ($M = 3.17$ on a scale of 7), differing significantly from the middle point of the scale ($t = -3.674, p < 0.01$), suggesting a tendency of not prioritizing human interests over environmental concerns. Visitors reported relatively high biocentric value orientations ($M = 5.90; t = 34.166, p < 0.01$), indicating a strong inclination to value nature and ecosystems for their intrinsic value; however, they reported a low awareness of the ocean’s vulnerability ($M = 2.13; t = -17.771, p < 0.01$), but high awareness of the consequences of environmental issues ($M = 5.79, t = 32.931, p < 0.01$). They also reported a moderate ascription of personal responsibility to address these issues ($M = 3.59$), being the only variable not significantly different from the middle point of the scale ($t = 1.027, p = 0.31$). Visitors also reported high personal norms ($M = 5.70; t = 28.102, p < 0.01$) and equally high behavioral intentions ($M = 5.99; t = 36.144, p < 0.01$), suggesting a strong sense of moral obligation and willingness to take action to protect the oceans.

Table 2. Descriptive statistics of the variables for zoo visitors. ** = the mean differs from the middle point of the scale at $p < 0.01$ (one-sample *t*-test).

	N	M (SD)	t	p
Anthropocentric Value Orientations	335	3.17 ** (1.62)	-3.674	<0.001
Biocentric Value Orientations	335	5.90 ** (1.28)	34.166	<0.001
Awareness of Ocean’s Vulnerability	335	2.13 ** (1.41)	-17.771	<0.001
Awareness of Consequences	335	5.79 ** (1.27)	32.931	0.000
Ascription of Responsibility	335	3.59 (1.62)	1.027	0.305
Personal Norm	335	5.70 ** (1.43)	28.102	<0.001
Behavioral Intentions	335	5.99 ** (1.26)	36.144	<0.001

3.3. Different Visitors' Profiles

The results of the cluster analysis clearly identified two distinct visitor profiles based on their responses to the psychological constructs assessed in this study. Figure 4 shows the final cluster centers, with the Z score values of each construct.

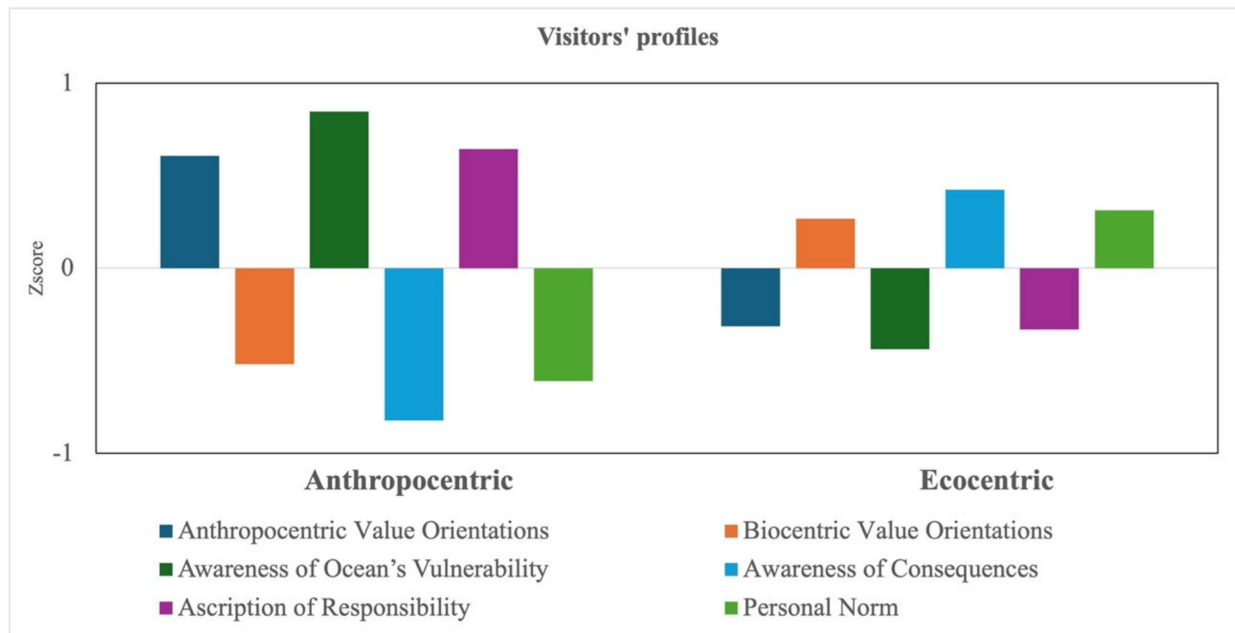


Figure 4. Comparison of psychological constructs between two visitor clusters: Anthropocentric (Cluster 1) vs. Ecocentric (Cluster 2). Cluster Centers obtained after k-means analysis.

Cluster 1, consisting of 114 cases, exhibited higher mean scores for Anthropocentric Value Orientations, suggesting a stronger belief in human superiority over nature. Additionally, this cluster displayed a heightened Awareness of the Ocean's Vulnerability. Moreover, they demonstrated a higher Ascription of Responsibility, indicating a tendency to perceive humans as primarily responsible for environmental problems. This cluster was named "Anthropocentric visitors".

Cluster 2, comprising 221 cases, had higher mean scores for Biocentric Value Orientations, reflecting a greater appreciation for the intrinsic value of nature and ecosystems. This cluster also showed a more profound Awareness of the Consequences of environmental issues on the ocean and reported stronger Personal Norms related to ocean conservation obligations (Figure 5; see Table S2 for detailed information in Supplementary Materials). This cluster was named "Ecocentric visitors".

The ANOVA analysis revealed significant differences between the two clusters across all the psychological constructs examined (Anthropocentric Value Orientations: $F(1, 333) = 78.69, p < 0.001$; Biocentric Value Orientations: $F(1, 333) = 53.50, p < 0.001$; Awareness of Ocean's Vulnerability: $F(1, 333) = 196.36, p < 0.001$; Awareness of Consequences: $F(1, 333) = 180.00, p < 0.001$; Ascription of Responsibility: $F(1, 333) = 90.95, p < 0.001$; Personal Norm: $F(1, 333) = 79.10, p < 0.001$; Behavioral Intentions: $F(1, 333) = 118.88, p < 0.001$), suggesting the presence of two distinct attitudinal profiles among the zoo visitors surveyed (see Table S2 for detailed information).

This analysis revealed two distinct visitor mindsets—one more anthropocentric with higher vulnerability awareness, i.e., more focused on human needs but with a heightened awareness of the fragility of the oceans, and the other more ecocentric, aware of consequences, and feeling a stronger personal obligation towards ocean conservation behaviors.

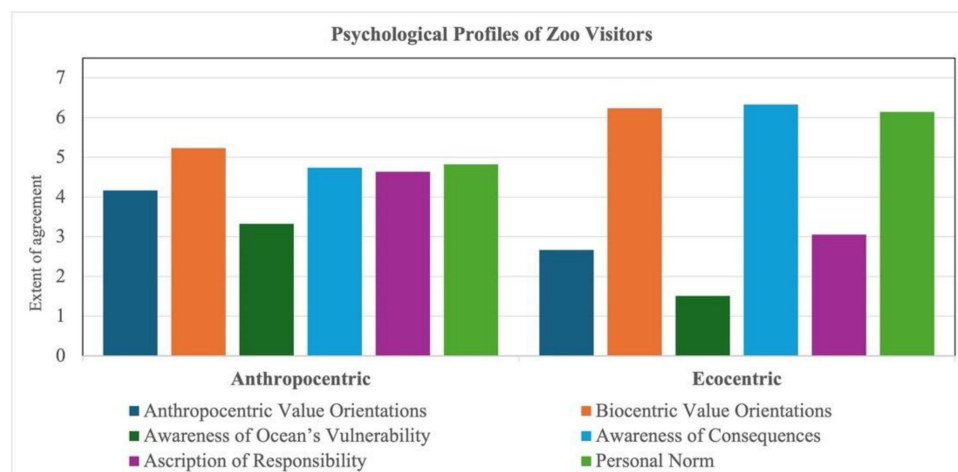


Figure 5. Average scores of psychological constructs for Anthropocentric and Ecocentric visitor groups.

A multiple regression was also run to predict Behavioral Intentions for each visitor mindsets, and with gender and age as control variables to check if one profile was associated with a higher behavioral intention. The proposed model explained about 28% of the variation in the dependent variable ($F(3, 329) = 41.86, p < 0.001, R^2 = 0.28$). Visitor mindset showed a significant positive effect on behavioral intentions ($B = 0.514, t = 10.924, p = 0.000$). Passing from cluster 1 to 2 is associated with an increase in the behavioral intention to protect oceans. In other words, participants characterized by an ecocentric profile report a stronger intention to engage in conservation actions. Gender and age were controlled for by including them as variables in the multiple regression model alongside visitor mindset. Gender had a significant effect on behavioral intentions ($B = 0.110, t = 2.283, p = 0.023$), with female participants reporting higher scores in the anthropocentric profile. Age did not show any significant effect on behavioral intentions ($B = 0.042, t = 0.879, p = 0.380$).

3.4. From Values to Behavior Intentions

The correlation analysis for Cluster 1 (see Table 3) revealed fewer significant relationships among the variables. Anthropocentric Value Orientations showed a weak positive correlation with Awareness of Ocean's Vulnerability ($r(221) = 0.19, p = 0.004$), and Personal Norm ($r(221) = 0.16, p = 0.02$). Biocentric Value Orientations did not have any significant correlations with the other variables. Awareness of Ocean's Vulnerability did not have any significant correlations with the other variables. Awareness of Consequences had a weak positive correlation with Personal Norm ($r(221) = 0.19, p = 0.01$), and Behavioral Intentions ($r(221) = 0.20, p = 0.003$). Ascription of Responsibility did not have any significant correlations with the other variables. Personal Norm had a weak positive correlation with Behavioral Intentions ($r(221) = 0.30, p < 0.001$).

Cluster 2 revealed several significant relationships among the variables. Anthropocentric Value Orientations showed weak relationships with Biocentric Value Orientations ($r = 0.31, p = 0.001$), Awareness of Ocean's Vulnerability ($r = 0.37, p < 0.001$), Ascription of Responsibility ($r = 0.31, p = 0.001$), Personal Norm ($r = 0.47, p < 0.001$), and Behavioral Intentions ($r = 0.24, p = 0.01$). Biocentric Value Orientations, in turn, correlated weakly with Ascription of Responsibility ($r = 0.34, p < 0.001$), Personal Norm ($r = 0.37, p < 0.001$), and Behavioral Intentions ($r = 0.39, p < 0.001$) but had no significant correlation with the other variables. Awareness of Ocean Vulnerability correlated weakly with Awareness of Consequences ($r = 0.32, p = 0.001$), Ascription of Responsibility ($r = 0.25, p = 0.01$), and Personal Norm ($r = 0.38, p < 0.001$), but not significantly with Behavioral Intentions. Awareness of Consequences showed a weak positive correlation with Ascription of Responsibility ($r = 0.20, p = 0.04$), Personal Norm ($r = 0.27, p = 0.004$), and a stronger correlation with Behavioral Intentions ($r = 0.49, p < 0.001$). Ascription of Responsibility correlated weakly

with Personal Norm ($r = 0.39, p < 0.001$) and Behavioral Intentions ($r = 0.38, p < 0.001$). Finally, Personal Norm showed a moderate positive correlation with Behavioral Intentions ($r = 0.56, p < 0.001$).

Table 3. Correlations (Pearson’s r correlation coefficients) between variables within clusters. Cluster 1 below the diagonal. Cluster 2 above the diagonal (* $p < 0.05$; ** $p < 0.01$).

	Anthropocentric Value Orientations	Biocentric Value Orientations	Awareness of Ocean’s Vulnerability	Awareness of Consequences	Ascription of Responsibility	Personal Norm	Behavioral Intentions
Anthropocentric Value Orientations	1	0.31 **	0.37 **	0.28 **	0.31 **	0.47 **	0.24 **
Biocentric Value Orientations	0.00	1	0.08	0.18	0.34 **	0.37 **	0.39 **
Awareness of Ocean’s Vulnerability	0.19 **	0.06	1	0.32 **	0.25 **	0.38 **	0.01
Awareness of Consequences	−0.04	0.08	−0.04	1	0.20 *	0.27 **	0.49 **
Ascription of Responsibility	0.065	0.04	0.13	0.00	1	0.39 **	0.38 **
Personal Norm	0.16 *	0.05	0.08	0.19 **	−0.08	1	0.56 **
Behavioral Intentions	0.05	0.12	−0.09	0.20 **	−0.09	0.30 **	1

3.5. Comparison between Visitors and Whale Watchers

The average scores obtained in this study were also compared with those of the reference study [8]. Table 4 shows the mean values and standard deviations for each psychological construct quantified for the Harms et al. study [8]. From here, it is possible to see some differences between the types of tourists.

Table 4. Descriptive statistics of the variables for whale watchers [8] and the present study clusters.

	Harms et al. [8]		Cluster 1	Cluster 2
	N	M (SD)	M (SD)	M (SD)
Anthropocentric Value Orientations	1065	2.26 ^{ab} (1.25)	4.16 (1.52)	2.67 (1.43)
Biocentric Value Orientations	1061	5.88 ^{ab} (1.27)	5.23 (1.34)	6.24 (1.11)
Awareness of Ocean’s Vulnerability	1084	1.78 ^{ab} (1.16)	3.32 (1.67)	1.51 (0.69)
Awareness of Consequences	1075	5.55 ^{ab} (1.19)	4.74 (1.48)	6.33 (0.68)
Ascription of Responsibility	1072	4.89 ^b (1.18)	4.64 (1.33)	3.05 (1.49)
Personal Norm	1059	5.13 ^b (1.58)	4.82 (1.59)	6.14 (1.10)
Behavioral Intentions	1069	4.88 ^b (1.39)	5.09 (1.58)	6.45 (0.70)

^(a) Mean values differ significantly from cluster 1 ($p < 0.05$). ^(b) Mean values differ significantly from cluster 2 ($p < 0.05$).

Looking at the scores for anthropocentric value orientations, visitors from cluster 1 scored significantly higher than both the whale watchers ($p < 0.001$) and cluster 2 ($p < 0.001$), while cluster 2 outsourced the whale watchers ($p = 0.001$) ($F(2, 1397) = 112.21, p < 0.001$). On the other hand, visitors within cluster 2 demonstrated the highest biocentric value orientations scores ($F(2, 1393) = 24.49, p < 0.001$), significantly higher than both the whale watchers ($p = 0.003$) and cluster 1 ($p < 0.001$). Whale watchers scored higher than visitors from cluster 1 ($p < 0.001$) in this variable.

Significant differences were also found ($F(2, 1416) = 104.48, p < 0.001$) in the scores relating to awareness of the ocean’s vulnerability. Cluster 1 visitors exhibited the highest scores,

rating this variable significantly above whale watchers ($p < 0.001$) and visitors from cluster 2 ($p < 0.001$), while the whale watchers outsourced cluster 2 ($p = 0.043$). Cluster 2 scored significantly higher than whale watchers ($p < 0.001$) and cluster 1 visitors ($p < 0.001$) regarding awareness of consequences ($F(2, 1407) = 77.01, p < 0.001$). Whale watchers outsourced cluster 1 visitors ($p < 0.001$) in this variable. Ascription of responsibility did not differ between the whale watchers and cluster 1 visitors ($p = 0.104$), but both groups scored significantly higher than cluster 2 visitors ($p < 0.001$) in this variable ($F(2, 1404) = 199.94, p < 0.001$). A similar pattern was observed for personal norms, where the whale watchers and visitors from cluster 1 showed no significant difference ($p = 0.095$), but the visitors from the second cluster scored significantly higher than both groups ($p < 0.001$) ($F(2, 1391) = 45.98, p < 0.001$). Lastly, visitors from cluster 2 demonstrated significantly higher behavioral intentions compared to the whale watchers ($p < 0.001$) and cluster 1 ($p < 0.001$), while the latter two groups did not differ significantly ($p = 0.241$) ($F(2, 1401) = 128.99, p < 0.001$).

4. Discussion

This study investigated the psychological factors underlying intentions to support ocean conservation among visitors to a marine mammal park. The results revealed a complex interaction between values, perceptions of threat, feelings of personal obligation and intended environmental behavior.

Overall, general visitors held strong biocentric values, recognizing the intrinsic worth of nature and ecosystems, acknowledging the consequences of environmental issues, reporting a sense of personal obligation to address them, and exhibiting intentions to support ocean conservation efforts. These results positively align with the VBN theory [18] that guide this study, stating that values shape beliefs about environmental consequences, activating personal norms and influencing behavioral intentions.

The cluster analysis further revealed the presence of distinct attitudinal profiles among the zoo visitors, with one group leaning more anthropocentric and exhibiting higher vulnerability awareness, while the other demonstrated stronger biocentric values, greater consequence awareness, and more robust personal norms.

4.1. Contrasting Visitor Mindsets

The cluster analysis of zoo visitors revealed two distinct groups—one more anthropocentric (cluster 1) and the other more ecocentric (cluster 2). The cluster 1 visitors, with noticeably higher scores for anthropocentric value orientations, suggest a stronger belief in human superiority over nature. Additionally, this group displayed a heightened awareness of the ocean's vulnerability. Moreover, they demonstrated a higher ascription of responsibility, indicating a tendency to perceive humans as primarily responsible for environmental problems. Visitors belonging to cluster 1, referred to here as anthropocentric visitors, may view environmental protection more through a utilitarian perspective focused on mitigating threats to human well-being, suggesting a belief system that prioritizes human interests over nature [22]. However, this greater awareness of the vulnerability of the oceans and tendency to attribute responsibility for environmental problems to humans indicate an environmentalist mindset aimed at addressing threats, albeit from an anthropocentric perspective centered on human impacts. However, this greater awareness of the ocean's vulnerability did not directly translate into stronger behavioral intentions. This finding aligns with other studies, such as Moss et al. [23], which found only a weak link between biodiversity-related knowledge/awareness and self-reported proconservation behavior. This suggests that simply being more aware about ocean vulnerability may not be sufficient to drive behavioral change, and other factors play an important role in motivating conservation actions. These results can be linked to the concept of the 'bystander effect', as described by Mills [24] in his study on the ecological crisis and moral responsibility. Mills argues that, despite widespread awareness of environmental threats, there is a tendency for individuals and societies to remain passive observers rather than active participants in solving these challenges. This phenomenon aligns with our observations that increased awareness of

ocean vulnerability does not directly translate into greater behavioral intention. This global bystander effect provides a broader context for understanding this disconnect, suggesting that the scale and complexity of environmental issues can lead to a diffusion of responsibility and a feeling of powerlessness among individuals. Coherent with this effect is a view based on technological optimism, i.e., the belief that environmental problems will somehow be solved through technology (as a by-product of humanity), and that it is only a matter of time before they are solved [25]. This counterintuitive finding suggests that merely recognizing environmental problems may not be enough to motivate action, which underscores the importance of fostering deeper connections and emotional engagement with nature [26].

On the other hand, the cluster 2 visitors had higher mean scores for biocentric value orientations, reflecting a greater appreciation for the intrinsic value of nature and ecosystems. This group also showed a more profound awareness of the consequences of environmental issues on the ocean and reported stronger personal norms related to ocean conservation obligations. Furthermore, this latter group demonstrated higher behavioral intentions compared to that of cluster 1. This group, here called ecocentric visitors, seems to have a more ecocentric worldview that values ecological preservation, reflecting an ethical position that recognizes the intrinsic value of nature and ecosystems, regardless of human utility. This group's deeper awareness of the environmental consequences on the ocean, coupled with stronger personal norms, exemplifies a conservationist worldview driven by moral obligations to protect the natural environment. This aligns with the findings of Amérigo et al. [27] on the contrasting effects of biocentric and anthropocentric beliefs. These authors also found that individuals with stronger biocentric orientations were more likely to express intentions to adopt pro-environmental behaviors, reinforcing the result of normative personal beliefs that positively predicted behavioral intentions in relation to ocean conservation. Thus, visitors with a less human-centered view, and a stronger personal norm, i.e., the belief in the moral rightness of ocean conservation, will be more likely to act for ocean conservation. This is in line with the theory that personal moral beliefs are the main drivers of pro-environmental actions [28,29]. According to a recent review study, nature-based tourism, including zoos and aquariums, can enhance environmental knowledge, behavior attitudes, and intentions through meaningful first-hand experiences with wildlife, natural history, and conservation messages that are well-planned [30]. Somewhat paradoxical, ecocentric visitors did not report a high awareness of the vulnerability of the oceans, this may be related to a merely informative perception of this variable and therefore less relevant when accompanied by a high awareness of consequences and personal norm. Also interesting is the lower scores of ascription of responsibility. Although surprising at a first glance, it may reflect a phenomenon known as the diffusion of responsibility [31], where individuals feel fewer personal obligations when they perceive the responsibility for addressing an issue is shared among many others. In the context of ocean-related problems, which often involve complex global challenges, the diffusion of responsibility may undermine individuals' sense of personal responsibility.

The clear delineation between these two profiles highlights the diverse perspectives and mindsets that exist among park visitors. These two psychological approaches are consistent with the general understanding of anthropocentric and biocentric orientations in environmental attitudes and behavior [32,33].

These results thus underline the heterogeneity of the visitor population with regard to ocean-related attitudes and values. Understanding and addressing the different psychological motivations behind each group's environmental attitudes can be crucial for designing targeted interventions or messages to effectively promote ocean conservation behaviors among different visitor segments [34–36].

For anthropocentric visitors, emphasizing the utilitarian benefits of ocean conservation, such as safeguarding resources for human well-being and economic sustainability, may be more effective in fostering engagement. Simultaneously, reinforcing personal norms and addressing the diffusion of responsibility could help strengthen their sense of individual

agency and moral obligation towards conservation efforts. On the other hand, ecocentric visitors may be more responsive to campaigns that highlight the intrinsic value of marine ecosystems and the ethical approach of protecting the ocean for its own sake. Enhancing their awareness of the consequences of environmental issues on the ocean could further solidify their personal norms and translate into stronger behavioral intentions.

4.2. Comparison between Zoo Visitors and Whale Watchers

This study also compared the psychological constructs between the identified visitors' profiles and the whale-watching tourists from the original study. Although it is not possible to know the different profiles, if any, of whale watchers from the original study, which would make this study more in-depth, we nevertheless considered it important to make a comparison between the available profiles.

Based on the results presented, there are distinct attitudinal profiles observed between zoo visitors and whale watchers. This latter group seem to fit in between the two identified zoo visitor profiles, but closer to the attitudinal framework of the anthropocentric visitor. This profile scored, nevertheless, significantly higher in anthropocentric value orientations, indicating a stronger belief in human superiority over nature compared to whale watchers. Additionally, the former profile also demonstrated a heightened awareness of the ocean's vulnerability, rating it significantly above whale watchers. However, their ascription of responsibility for environmental problems did not differ significantly from whale watchers, as well as personal norms and behavioral intentions.

In contrast, the ecocentric visitor converge more closely with the whale watchers' attitudinal framework in some variables. Just as whale watchers, this group exhibited relatively high biocentric value orientations, reflecting a shared appreciation for the intrinsic value of nature and ecosystems. Although ecocentric visitors outscored whale watchers in their awareness of the consequences of environmental issues on the ocean, suggesting a deeper understanding of the impacts, whale watchers significantly outscored the anthropocentric visitors in this regard. A key divergence emerges in the personal norms related to ocean conservation. Ecocentric visitors also showed higher personal norms than those of whale watchers, indicating a stronger sense of personal obligation and moral responsibility towards conservation efforts. Perhaps the most notable divergence between ecocentric visitors and whale watchers lies in their behavioral intentions. In this regard, whale watchers aligned more closely to the anthropocentric profile, both with significantly lower scores than ecocentric visitors.

While both visitor groups at the zoo share some similarities with whale watchers in their attitudinal frameworks, the anthropocentric visitors seem to align more closely overall. Their lower ascription of responsibility, personal norms and behavioral intentions when compared to ecocentric visitors suggest a more distant psychological framework to that more willing to assume ocean related conservation behaviors. Both have, nevertheless, strong scores indicating a potentially receptive audience for environmental education and engagement efforts.

4.3. Limitations and Future Directions

It is important to note that the limitations of this study, such as the specific sample of visitors to a marine mammal park and its limited geographical location, should be considered when interpreting and generalizing the results. Future studies could explore these relationships in different contexts and populations to gain a more comprehensive understanding of the psychological factors that influence marine conservation attitudes and behaviors.

A final reflection concerns the comparison between tourists, specifically the timing between samples, i.e., 10 years between the two studies. Cultural differences aside, this time gap may indicate a greater societal awareness of the problem of the oceans, leading to a construction of values more in line with pressing conservation needs.

5. Conclusions

This study provides valuable insights into the psychological pathways that shape individuals' intentions to engage in ocean conservation behaviors. By examining the intricate relationship between value orientations, environmental awareness, perceived responsibility and personal norms, these results underline the importance of fostering biocentric values and nurturing emotional connections with nature to motivate pro-environmental actions.

The identification of distinct visitor profiles, with different levels of anthropocentrism and biocentrism, highlights the need for tailored approaches in environmental education and communication efforts. Institutions such as zoos and aquariums can play a crucial role in this regard, crafting targeted interventions and messages that resonate with the unique motivations and mindsets of different audience segments.

This study also emphasizes the need to go beyond merely raising awareness of environmental problems. While recognizing vulnerabilities is essential, it may not be enough to motivate action. Instead, fostering deeper emotional connections and cultivating a sense of personal responsibility emerge as critical factors in motivating individuals to actively support ocean conservation efforts.

Overall, this research contributes to a better understanding of the psychological factors that determine environmental behavior. This hopefully can contribute to more effective strategies to promote sustainable relationships between humans and the ocean. By drawing on this knowledge, institutions such as marine mammal parks and other zoos can play a vital role in shaping public attitudes and inspiring positive change towards a more sustainable future.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/jzbg5030031/s1>, Table S1: List of items used to measure each variable (adapted from Harms et al. [8]), Table S2: Mean (and standard deviation) values for all variables in each cluster. ANOVA analysis between clusters.

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