

## RESEARCH ARTICLE

# Whale-watching trips in Peru lead to increases in tourist knowledge, pro-conservation intentions and tourist concern for the impacts of whale-watching on humpback whales

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## Abstract

1. Since the implementation of the commercial whaling ban in the 1980s, whale-watching has become the most important economic activity involving whales worldwide.
2. Whale-watching is promoted as a platform for education and conservation awareness of marine biodiversity. In Peru, where cetacean species are still in jeopardy, whale-watching may play an important part in promoting the protection of these species.
3. This study aimed to determine the degree of whale-watching tourists' knowledge regarding cetacean ecology and conservation status and to evaluate if whale-watching tours could serve as platforms for educating the public and raising conservation awareness.
4. The results of 196 closed-ended questionnaires and 20 open-ended interviews conducted before and after whale-watching tours, during the humpback whale season (winter–spring 2014) in northern Peru, revealed an overall lack of knowledge concerning the presence of species of cetaceans in Peruvian waters and threats to marine biodiversity. However, after the whale-watching excursion, participants said they would be more willing to change their behaviour with respect to cetacean conservation and marine environment protection.
5. This study suggests that whale-watching platforms, when implemented with adequate interpreters, can serve as a source of environmental education and can raise conservation awareness. This is an important conservation strategy to consider in countries, such as Peru, where by-catch and direct hunting are decimating local cetacean populations.

## KEYWORDS

coast, conservation, marine mammals, public perception, recreation, tour interpreter, wild life observation

## 1 | INTRODUCTION

Since the growth of the public 'save the whale' movement in the 1970s, with the resulting ban of commercial whaling in the 1980s, whales and dolphins have been the focus of increased marine conservation efforts and public attention. Conservation of these species has been promoted by changing the view of whales as consumable resources, to one of aesthetic appreciation for these charismatic species. In that context, many whale-watching companies (i.e. 'any commercial enterprise that provides platforms for sighting cetaceans in their natural habitat', Warburton, Parsons, Woods-Ballard, Hughes,

& Johnston, 2001) have emerged, with this sector of tourism growing faster than any other type of wildlife tourism and/or ecotourism (Hoyt, 2001). For example, in 2008, approximately 13 million people went on whale-watching tours in 119 coastal countries, producing an income of c. US \$2.1 billion (O'Connor, Campbell, Cortez, & Knowles, 2009). The rapid increase in whale-watching activity, however, has raised concerns in the scientific community because of the negative impacts that whale-watching boats may have on the social, feeding and reproductive behaviour of whales and dolphins (Christiansen, Lusseau, Stensland, & Berggren, 2010; Lusseau, 2004; Parsons, 2012; Schaffar, Garrigue, & Constantine, 2010; Scheidat, Castro, Gonzalez,

& Williams, 2004; Williams, Lusseau, & Hammond, 2006). In some cases, whale-watching impacts may have severe detrimental effects on cetacean ecology, e.g. the reduction of the local abundance of dolphins and a significant decrease in reproductive success (Bejder, Samuels, & Whitehead, 2006; Fortuna, 2007; Lusseau, Slooten, & Currey, 2006; Sitar et al., 2016). Despite these negative effects and the need for strong regulations to control the activity, whale-watching is still promoted worldwide as a tool to create awareness of cetacean conservation (Anderson & Miller, 2006; Corkeron, 2004; Orams, 1994). It has been suggested that nature-based tourism may provide the opportunity for people to become more conservation-minded and to actively contribute to the betterment of the species and their ecosystems (Forestell & Kauffman, 1991). However, just a handful of studies have evaluated if whale-watching fulfills this awareness-raising role.

Studies on the role of whale-watching have highlighted the importance of environmental education during encounters with cetaceans as triggering positive changes in public appreciation of the marine environment and the importance of cetacean conservation (Orams, 1995a, b). Orams (1995b) suggested that trips that integrate educational experiences and increase environmental awareness and positive feelings, are more likely to foster environmentally sustainable attitudes and behaviour. For example, Lück (2003, 2008) showed that people were willing to receive more information about the marine environment and marine mammals after guided dolphin encounters. Mayes, Dyer, and Richins (2004) demonstrated that people felt more positive towards conservation and were willing to support conservation programmes after dolphin encounters in New Zealand. On the other hand, Ponnampalam (2011) proved that whale-watching tours performed in Oman, with poor onboard environmental interpretation and/or education, had no effect on increasing conservation awareness in dolphin-watchers. Although collectively, these examples suggest there is potentially a short-term enhancement of conservation attitudes via interpretation on whale-watching vessels, it is important to understand the social and ecological context in which the activity takes place, as cultural and societal norms differ between communities (Vaske & Donnelly, 1999).

The marine ecosystem of Peru is recognized for its outstanding productivity of small pelagic fish (i.e. anchovy) and its extensive industrial and artisanal fishery (Freón et al., 2010). However, by-catch – the incidental capture of non-target species in fisheries – in Peruvian waters has severely decimated populations of sea birds, sea turtles and cetaceans (Alfaro-Shigueto et al., 2011; Awkerman, Huyvaert, Mangel, Alfaro-Shigueto, & Anderson, 2006; Van Waerebeek et al., 1997). The case of small cetaceans is the most dramatic. After a major collapse of the anchovy fishery in the early 1970s, hunting of small cetaceans (dolphins and porpoises), for food and bait, appeared as an alternative fishery (Read, Van Waerebeek, Reyes, McKinon, & Lehman, 1988; Van Waerebeek et al., 1999) threatening several species (Alfaro-Shigueto et al., 2011; Alfaro-Shigueto, Mangel, & Van Waerebeek, 2008; Mangel, Alfaro-Shigueto, & Van Waerebeek, 2010). Even though the small cetacean fishery was banned by the Peruvian government in 1996, approximately 2000–3000 small cetaceans are by-caught and/or hunted every year (Mangel et al., 2010). This illegal catch is used as bait in the shark fishery and the meat is traded in local black markets (Doherty et al., 2014; Tizka et al., 2010). There is little

law enforcement and *in situ* control of by-catch and hunting is virtually impossible since there is no governmental onboard monitoring throughout the Peruvian coast. Hence, public education could play an important role in helping the conservation of these species.

Whale-watching may be an alternative platform for educating the community about the ecology of cetaceans, and the status of marine ecosystem conservation. Since 2008, small-scale whale-watching operations targeting humpback whales (*Megaptera novaeangliae*) and long-beaked common dolphins (*Delphinus capensis*) have operated in northern Peru (Pacheco, Silva, & Alcorta, 2011). This provides an excellent opportunity to evaluate the educational role of whale-watching in the promotion of conservation awareness and changes of behavioural intentions towards marine conservation among its participants. Specifically, the study aimed to determine the degree of knowledge regarding cetacean ecology and conservation status and to evaluate if whale-watching tours serve as platforms for educational and conservation awareness in Peru.

## 2 | METHODS

Surveys were performed before and after whale-watching at Los Organos (4°10'38.23"S, 81°8.27'4.83"W), northern Peru, between 1 August and 30 September 2014. At the time of the study, there were three whale-watching boats, each with a capacity for 25 people – including the skipper and two onboard tour guides. Whale-watching trips lasted for three hours, on average. From a total number of 2894 tourists, 323 persons were invited to participate in the study and 196 of them completed the questionnaire in full (response rate 61.6%). The first 10 persons that arrived at the harbour for the whale-watching trip were asked to participate in the survey. The survey included closed-ended questions, answered before and after the whale-watching trip. In total, 20 respondents were interviewed after trips using open-ended questions allowing them to express their emotions and opinions about the whale-watching experience. Both questionnaires (pre-and post-trip) were in English and Spanish for the purpose of covering both foreign and local tourists (Supplementary material).

### 2.1 | Pre-trip survey

According to the indicators of tourist benefits from marine animal encounters provided by Orams (1995a, b) and the Cognitive Hierarchy Model of Human Behavior framework (Vaske & Donnelly, 1999) applied in the Whale SENSE program (Harms, Asmutis-Silva, & Rosner, 2013) a paper-and-pen based questionnaire was delivered to tourists before the whale-watching experience. To ensure confidentiality, surveys were anonymous (in the sense that the full name of the participant was not revealed), but questionnaires were coded with name initials for post-trip comparisons. The pre-trip questionnaire consisted of 31 statements including: four questions about demographic characteristics (sex, age, residency and level of education), six closed-ended (i.e. yes/no) questions regarding their current knowledge about whales and conservation awareness, and two sets of Likert-scale type format items. The first set of 10 questions covered aspects related to people's expectations and interests with respect to the whale-watching experience. The second set was related to tourists' environmental and

conservation attitudes and opinions before the whale-watching trip (Harms et al., 2013). Two types of scoring were used on Likert-scale questions; 1 = not at all important to me and 4 = very important to me; and 1 = strongly disagree and 5 = strongly agree.

## 2.2 | Post-trip survey

After the trip the same persons that completed the first questionnaire were asked to respond to a post-trip questionnaire. This survey consisted of five questions about people's opinions, satisfaction and emotions after encountering whales, and three questions about the learning experience and/or whale conservation. The same pre-trip Likert-scale questions were asked to compare the tourists' knowledge, conservation beliefs and attitudes after having taken a whale-watching trip. All the persons that completed the post-trip questionnaires successfully observed humpback whales and/or long-beaked common dolphins.

## 2.3 | Open-ended interviews

Interviews were conducted with tourists willing to answer face-to-face questions. The objective of these interviews was to obtain qualitative data on detailed perceptions and emotions expressed by whale-watchers in a less structured situation (i.e. persons were free to speak about their experience). The persons were invited to answer questions about whale-watching tourism, attitudes and understanding of cetaceans and oceans threats. A subset of 20 different persons was asked to participate in this interview, in addition to those that participated in the closed-ended questionnaires. People's answers were registered using a portable voice recorder and thereafter typed into a word sheet for hermeneutic analysis of themes (see details in Muhr, 1991 and Myers, 1997). A semantic network analysis was performed to assess the relationship between categories using the software AtlasTi.7 (Muhr, 1991).

## 2.4 | Statistical analysis

Descriptive analyses were used for pre- and post-trip questionnaires' data. Education level was divided into higher (University) and basic (Technical or High School) education. Age groups were classified according to human development stages (Erikson, 1968): teenagers (13 to 19 years), young adults (20 to 40 years), middle-age adult (41 to 64 years), older-adults (65 years and older). Gender was recorded, and residency status was grouped into either domestic whale-watcher ('Peruvians') or 'Foreigners'. Contingency tables were used for descriptions of socio-demographic aspects. For pre-trip knowledge and closed-ended questions regarding the marine environment, non-parametric Pearson's chi-square test (adjusted for ties) was used to evaluate the dependence/independence between variables (e.g. to determine whether residency status was related to the knowledge on the existence of whales in Peru). A Kruskal–Wallis test was used to determine significant differences between the scores of the questions that used Likert-scale. Likert-scale data were tested for reliability and internal consistency using Cronbach's alpha coefficient. Chi-square and Kruskal–Wallis tests were run using the software Minitab 17.6. Reliability tests were performed using the IBM Statistical Package for Social Sciences (SPSS) v. 15.0.

## 3 | RESULTS

### 3.1 | Socio-demographic characteristics of whale-watching participants

Of the 196 respondents who completed the survey, 58.7% were women, resulting in a sex ratio of 0.7 male/female ( $n = 81/115$ ). The sex ratio was similar between Peruvians and foreign whale-watchers (Table 1). The average age of the participants was 36 years. Peruvians made up 58.1% of the participants, while 41.8% were foreigners. Most foreigners came from Chile (22%) and Spain (18.3%). Most of the participants stated that they had achieved a university-level education (91.8%). Overall, Peruvians were slightly more likely to have a university-level education (93.8%) compared with 89.1% of foreign participants.

### 3.2 | Participant's knowledge, interests and expectations on whale encounters before the whale-watching tour

Two-thirds (66.8%) of the participants stated that they had not seen live whales *in situ* before, but 43.9% indicated that they can recognize some species (Table 2). Most participants (67.3%) were not aware of the presence of whales on the Peruvian coast and just 18.3% knew about the existence of whales in Peruvian waters. The Pearson chi-square test detected significant differences between Peruvians and foreigners with respect to their knowledge of the presence of whales in Peru ( $\chi^2_{(2)} = 36.9$ ;  $P < 0.05$ ). Only 14.9% of the Peruvian participants knew that whales were present in the waters of their own country, while the knowledge of whales in Peruvian waters was higher among non-Peruvian participants (23.2%).

When asked about the most important prior expectation, the highest-ranking statement was 'to know that the boat is following guidelines' (mean = 3.48;  $n = 108$ ). The second most important expectation was 'to learn about whale biology' (mean = 3.47;  $n = 108$ ) and the third was 'to learn what they can do to help support marine conservation' (mean = 3.45;  $n = 95$ ). When asked questions regarding the operation of the boat such as: wanting 'to keep the boat at a safe distance' or 'to be as close to the whale as possible', 49% responded that keeping the boat at a safe distance was more important than being close to the whale (mean = 3.42;  $n = 96$ ; mean = 2.8;  $n = 50$ , respectively). Proximity to the whales was not important for 7.1% of the respondents (mean = 2.8;  $n = 14$ ). 'To learn about whale conservation' (mean = 3.28;  $n = 73$ ) was less important for participants than 'to learn about the marine environment' (mean = 3.39;  $n = 90$ ). For a third (39.8%) of respondents it was very important to see more marine fauna during their whale-watching trip (mean = 3.34;  $n = 78$ ). Responses to Likert-scale statements showed an acceptable level of internal consistency (Cronbach's  $\alpha = 0.720$ ) meaning that the multiple Likert-scale questions were reliable. Overall, Kruskal–Wallis tests showed that Peruvian participants were significantly more interested than foreigners in learning about whale biology and conservation, the marine environment, learning how to support marine conservation, as well as being more interested in seeing other marine species (Table 3).

**TABLE 1** Demographic characteristics of whale-watching participants in northern Peru included in this study

	<i>n</i> = 196 (%)	Gender		Age			Education	
		Male (%)	Female (%)	<19 (%)	20–40 (%)	>41 (%)	Basic (%)	High (%)
Peruvians	58.1	41.2	58.7	0	67.5	32.4	6.1	93.8
Foreigners	41.8	41.4	58.5	4.2	70.7	24.3	10.9	89.02
Total		41.3	58.7	2.04	68.8	29.08	8.1	91.8

**TABLE 2** Questions assessing participant's knowledge about whales and the marine ecosystem before the whale-watching experience. Chi-square significant values ( $P < 0.05$ ) are denoted with “\*”; df: degrees of freedom

	All participants ( <i>n</i> = 196)			Peruvians ( <i>n</i> = 114)			Foreigners ( <i>n</i> = 82)			$\chi^2$ (df)
	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)	Yes (%)	No (%)	Not sure (%)	
Have you seen whales before?	33.1	66.8	0	30.7	69.3	0	36.5	63.4	0	0.74 (1)
Can you recognize any species?	43.9	56.1	0	41.2	58.7	0	47.5	52.4	0	0.77 (1)
Did you know that whales inhabit Peruvian waters?	18.3	14.2	67.3	14.9	2.6	82.4	23.2	30.4	46.3	36.9* (2)

**TABLE 3** Questions assessing the interests and expectations of the participants concerning the whale-watching performance before the trip. Significant Kruskal–Wallis values ( $P < 0.05$ ) are denoted with “\*”. Comparisons between Peruvians (P) and Foreigners (F) respondents are provided

	Not important at all (%)	Less important (%)	Important (%)	Very important (%)	Mean	SD	Kruskal–Wallis H
Knowing that the boat is following guidelines	0.5	5.6	38.8	55.1	3.48	0.6	21.9* P > F
Learning about whale biology	0	2.04	48.9	48.9	3.47	0.5	4.8* P > F
Learning what I can do to help support marine conservation	0	5.6	43.4	51	3.45	0.6	12.2* P > F
Having the boat maintain a safe distance from the whales	1	4.6	45.4	48.9	3.42	0.6	2.4 P = F
Learning about the marine environment	0	6.1	47.9	45.9	3.39	0.6	6.6* P > F
Seeing other wildlife (sea birds, sea lions, sea turtles)	0	6.1	54.1	39.8	3.4	0.5	5.7* P > F
Learning about whale conservation	0	10.2	52.04	37.7	3.28	0.6	16.2* P > F
Being as close to the whale as possible	7.1	23.5	43.9	25.5	2.8	0.8	0.01 P = F

### 3.3 | Post-whale-watching trip participant knowledge about whales and satisfaction with whale encounters

When questioned before their trip, ‘what is a whale?’ only 8.7% of participants gave the correct answer: ‘marine mammal and cetacean’. Remarkably, 95% of the non-Peruvians did not know the correct answer. After the whale-watching tour, the proportion of participants giving the correct answer improved to 17.9%. Pearson chi-square test showed that the increase in whale-watching tourist knowledge was significant ( $\chi^2_{(1)} = 7.184$ ;  $P < 0.05$ ) (Table 4). Most of the respondents (96.4%) were satisfied with their trip experience and 98.5% felt that they had ‘learned something new during the trip’ (Table 5). Overall, participants considered that their whale-watching trip ‘contributes to marine mammal conservation’ (95.4%), and that ‘money, time and effort should be invested in [whale] conservation’ (98.9%). It should be noted that these responses are the tourists' opinions about the trips

and their conservation impact and not empirical evidence of actual conservation benefits resulting from whale-watching tourism.

### 3.4 | Changes in whale-watching participants' attitudes toward marine conservation

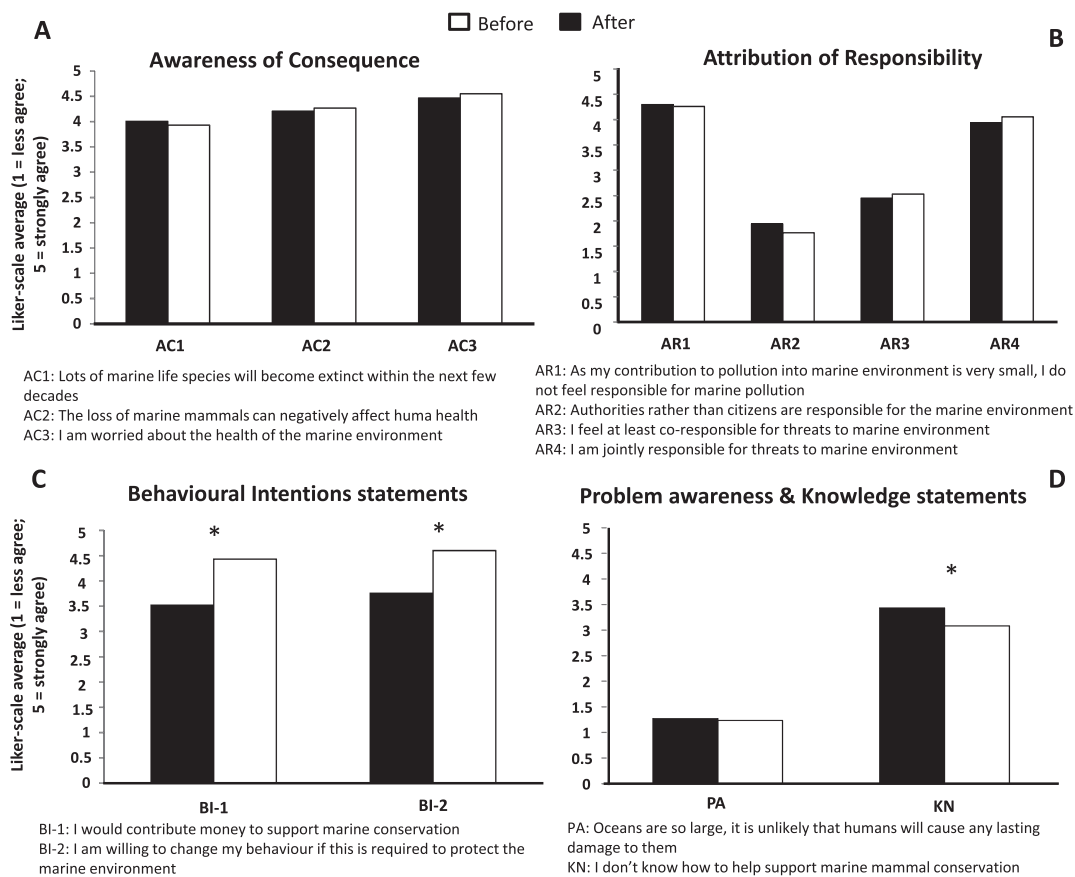
Three statements measured awareness of the consequences of human activities on the marine environment: ‘I am worried about the health of the marine environment’; ‘the loss of marine mammals can negatively affect human health’; and ‘lots of marine life species will be extinct within the next few decades’ (Figure 1a). Agreement with the first two statements improved after the whale-watching tour with a higher percentage of participants in strong agreement. Regarding the third statement, the pre-tour survey showed that more respondents strongly agreed with the statement (43.3%) than did so in the post-tour survey (37.2%) (mean = 4;  $n = 85$ ; pre-tour; mean = 3.93;  $n = 73$ ; post-tour).

**TABLE 4** Summary of the responses of whale-watching participants before and after the tour when asked ‘what is a whale?’. Chi-square significant value ( $P < 0.05$ ) is denoted with “\*”; df: degrees of freedom

	Education level ( <i>n</i> = 196)			Residency ( <i>n</i> = 196)			All participants ( <i>n</i> = 196)		
	Basic (%)	Superior (%)	$\chi^2$ (df)	Peruvians (%)	Foreigners (%)	$\chi^2$ (df)	Pre-trip (%)	Post-trip (%)	$\chi^2$ (df)
Others	16	90.5	1.6 (1)	88.6	95.1	2.5 (1)	91.3	82.1	7.1* (1)
Mammalian-cetacean	0	9.4		11.4	4.9		8.7	17.9	

**TABLE 5** Summary of answers regarding participant's satisfaction, education and conservation attitudes after the whale-watching trip. No significant differences between Peruvian and foreigner answers were found after chi-square test. df = degrees of freedom

	All participants (n = 196)		Peruvians (n = 114)		Foreigners (n = 82)		$\chi^2$ (df)
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	
Do you feel you have learned something after the trip?	98.5	1.5	99.1	0.8	97.5	2.4	0.7 (1)
Do you consider that you had a successful sighting?	96.4	3.5	94.7	5.2	98.7	1.2	2.2 (1)
Do you think whale-watching contributes to marine mammal conservation?	95.4	4.5	97.3	2.6	92.6	7.3	2.4 (1)
Do you think that money, time and effort should be invested in their conservation?	98.9	1.02	100	0	97.5	2.4	2.1 (1)



**FIGURE 1** Bars represent the average of the responses weighted per five degrees of the Likert-scale. Black bars represent before tour responses, and white bars after tour answers. Asterisks indicate significant differences ( $P < 0.05$ ) after Kruskal-Wallis test

Four statements measured opinions about personal responsibility and the marine environment. Answers to the statement 'I am responsible for threats to the marine environment' (mean = 4.3;  $n = 108$  pre-tour; mean = 4.26;  $n = 104$  post-tour) and 'Authorities rather than the citizens are responsible for the marine environment' (mean = 2.45;  $n = 22$  pre-tour; mean = 2.53;  $n = 26$  post-tour) showed that opinions about personal responsibility worsened after taking the whale-watching trip. Fewer participants declared responsibility with respect to marine environmental threats and they thought that authorities were more responsible than citizens (Figure 1b). However, two issues related to personal responsibility for marine environment issues increased: responsibility for marine pollution (mean = 1.94;  $n = 104$  pre-tour; mean = 1.76;  $n = 118$  post-tour) and co-responsibility for threats to marine mammals (mean = 3.93;  $n = 74$  pre-tour; mean = 4.1;  $n = 84$  post-tour).

Two statements measured conservation-oriented behavioural intentions. Most of the whale-watching trip participants agreed that they will 'contribute money to support marine conservation' (mean = 3.5;  $n = 42$  pre-tour; mean = 3.75;  $n = 54$  post-tour) and they also were 'more willing to change their behaviour to protect the marine environment' after the whale-watching tour (mean = 4.4;  $n = 114$  pre-tour; mean = 4.6;  $n = 130$  post-tour) (Figure 1c). Non-parametric Kruskal-Wallis tests show significant differences in these two statements and thus, pro-conservation behavioural intentions ( $H_{(1)} = 4.86$ ;  $P < 0.05$ ;  $H_{(1)} = 2.95$ ;  $P < 0.05$ , respectively). It is important to note that these questions measured intention, and data on whether whale-watchers donated money, or changed their behaviour, was not measured. To one of the questions evaluating marine conservation awareness - 'Oceans are so large, it is unlikely that humans will

cause any lasting damage to them' – most participants disagreed strongly with the statement (90.8%) before trip, and this percentage increased after taking the trip, with 92.3% of participants strongly disagreeing (Figure 1d). Most participants felt that they had learned how to support marine mammal conservation after the whale-watching experience. The item regarding education/learning 'knowledge about how to support marine mammal conservation' showed the most significant differences between before and after the tour ( $H_{(1)} = 7.17$ ;  $P < 0.05$ ) (Figure 1d).

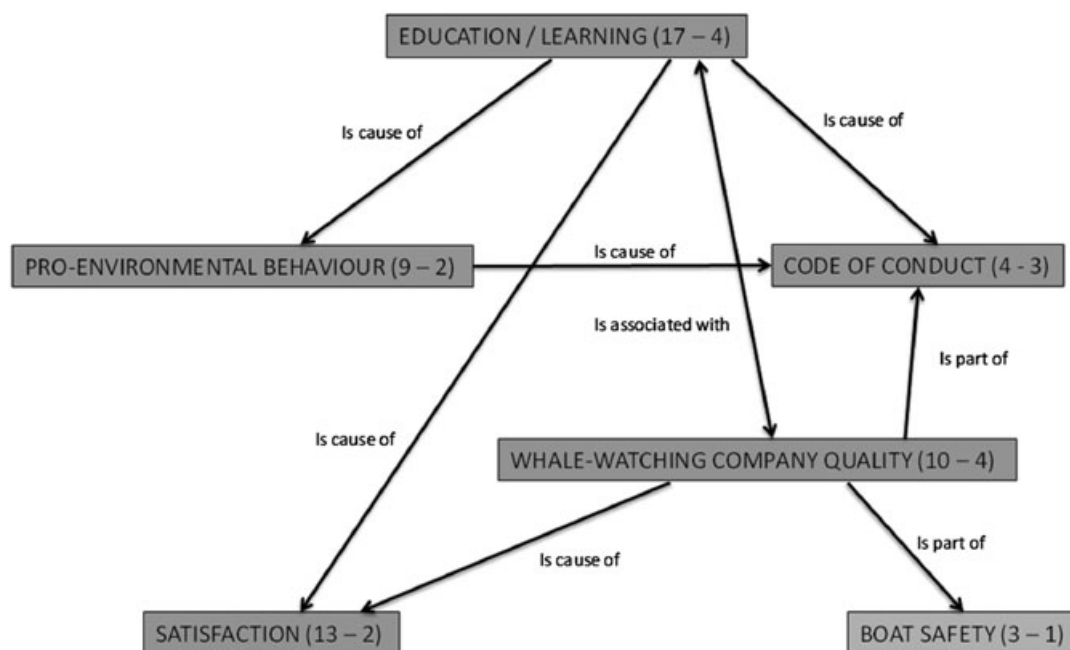
### 3.5 | Views from open-ended responses

The results of the qualitative analysis are shown in the semantic network diagram, which illustrates the main themes gathered from open-ended questions (Figure 2). Themes analysis was performed by classifying people's expressions into the following categories: education/learning, pro-environmental behaviour, quality of the whale-watching company, satisfaction with the tour, security onboard and conduct code of the boat during encounters with whales. The most important theme was 'education/learning'. Participants declared that they had gained knowledge about the biology of whales, as they learnt that whales are the biggest mammals on Earth, that northern Peru is a breeding area for humpback whales, that whales feed their calves with milk, whales communicate with songs, that whales migrate, and about the impact of the former whaling on whale populations. The second most important theme was 'satisfaction', with participants being satisfied overall with their whale-watching experience. Satisfaction was linked to 'quality' of the activity provided by the whale-watching trip operator, and was the third most important theme obtained during interviews. The theme 'pro-environmental behaviour' concurred with

education/learning, in which most participants declared concern regarding the marine environment but recognized that whale-watching may help to support marine conservation. The sub-theme 'code of conduct' appears in open-ended question analyses, with participants indicating concern related to the proximity of boats to whales, the boat speed during time of first whale sighting, the engine noise, and the high number of boats around the same whale. Whale-watching 'conduct code' and 'boat safety' themes are part of the quality of the whale-watching operator and although participants felt safe during the trip, they were nonetheless worried about the impact of the whale-watching boat on whales.

## 4 | DISCUSSION

This study provides the first qualitative analysis of social aspects of whale-watching activity in Peru in terms of the demographic characteristics of the participants and the potential of the activity as a platform for education and for increasing conservation awareness of whales and/or the marine environment. While most studies have focused on the negative impacts of whale-watching boats on cetaceans (Parsons, 2012), this research gathered public opinion and perception regarding the activity. These two sides of whale-watching effects must both be considered for the management and better performance of the whale-watching industry. The results suggest that whale-watching may play a role in enhancing people's knowledge about whales and their environment. *In situ* exposure to whales in nature influence people to become conservation minded. If people perceive that whale-watching is safe for them and the whales, this may foster conservation awareness and pro-environmental behaviour.



**FIGURE 2** Graphical representation of the results of the semantic network analysis after open-ended personal interviews. The first number in parentheses shows the number of times a theme was declared. The second number in parentheses indicates the number of times a theme co-occurred with other themes. See text for further interpretations of the connectivity among themes

#### 4.1 | Knowledge and learning benefits from whale encounters

After a whale-watching experience in northern Peru, participants' knowledge of certain aspects of whale biology improved. For instance, 17.8% of participants learned that whales were cetaceans and mammals after the tour showing a significant improvement of knowledge over the pre-trip survey. However, there is no straightforward explanation as to why this did not increase by a greater amount. It is possible that this was because not all participants were assimilating the interpretation given by the guide, tourists were observing the whales rather than listening to the guide. Also, perhaps, tourist guides did not highlight whale biology or ecology during their talk or those tourists did not pay attention to the guide. Nevertheless, in open interviews participants declared that they had learned about humpback whale lactation, whale migration, and breeding behaviour in northern Peru. In addition, they learned that blue whales are the largest mammals on the planet, about humpback whale songs, and were able to recognize certain marine fauna. This result concurs with a study about whale-watching dwarf minke whales (*Balaenoptera acutorostrata*) in Australia, where 14% of visitors learned about whales, marine life and the type of research conducted with the whales (Birtles, Valentine, Curnock, Arnold, & Dunstan, 2002). On whale-watching trips in Scotland, 71% of participants learned about minke whale biology and 36% learned that cetaceans were mammals (Warburton, 1999). Lück (2003) reported that 29% of visitors on 'swim with dolphin' tours in New Zealand 'strongly agreed' that the tour was an educational experience and 17.6% 'strongly agreed' that they had learned a great deal about dolphins.

A high proportion of whale-watchers in this study had university level education, which is a trait that has been found in similar research (Ambler, 2011; Finkler & Higham, 2004; Forestell & Kaufman, 1991; Lück, 2003; Parsons et al., 2003). However, the proportion of university-educated whale-watchers found in this project is one of the highest recorded among those studies. Despite the high level of education, there was a distinct lack of prior knowledge about whales. In general, Peruvian participants did not know that there were whales in the coastal waters of their own country. In contrast, nearly half of city dwellers in Scotland were aware of the presence of whales in Scottish waters, and the possibilities to view these animals on whale-watching trips (Howard & Parsons, 2006). In Aruba, three-quarters of residents knew about the presence of cetaceans in local waters (Luksenburg & Parsons, 2014). At both locations, however, knowledge of cetacean diversity and the exact species present was not as high (Luksenburg & Parsons, 2014; Scott & Parsons, 2004). Whale-watchers in Peru stated that learning about these animals on a whale-watching trip was one of their main interests. This has likewise been found in other locations, with tourists being interested in learning more about whales and dolphins in the wild (Draheim, Bonnelly, Bloom, Rose, & Parsons, 2010; Parsons et al., 2003).

The Environment and Education Policy of Peru states the importance of developing environmental education and culture oriented to the formation of environmentally responsible citizens and a sustainable Peruvian society (Decreto Supremo N017 2012 ED). One of the specific aims of the Peruvian Environment and Education Policy is to

ensure that there is an environmental focus during educational processes and within educational institutions, at various levels and stages. This study demonstrates that despite this explicit policy, most Peruvians that go whale-watching have little knowledge about whale biology/ecology, marine fauna, or human threats to whales and the marine environment, even though most had received a university education. Overall, environmental education may not be fully implemented in the educational plans in schools or universities in Peru. Therefore, whale-watching may represent a complementary way to learn about cetacean conservation and ecosystems, at least in the short term. Education and learning on whale-watching trips plays an important role in customer satisfaction (Bierman, 2001; Draheim et al., 2010; Forestell, 1992; Kessler, Harcourt, & Bradford, 2014; Lück, 2003; Neil, Orams, & Baglioni, 1996; Orams, 2000; Reid, 1999; Roggenbuck, Loomis, & Dagostino, 1990; Shapiro, 2006). The semantic network analysis showed that participants were satisfied with their whale-watching experience. Onboard learning, boat safety and boats following security whale-watching guidelines were important elements for a satisfactory whale-watching experience.

It is often assumed that proximity to the whales is related with customer satisfaction, and whale-watching vessels try to get as close to the whale as possible to satisfy their clients (Duffus, 1988; Kessler et al., 2014; Muloin, 1996; Orams, 2000; Shapiro, 2006), even though studies suggest that tourists are often satisfied even if they do not approach animals closely. Several studies have found that tourist satisfaction is greatest when they know that their operators are following proper navigation guidelines, avoiding harm to their target species, whilst being educated about the animals they are watching (Draheim et al., 2010; Kessler et al., 2014; Lück, 2003; Orams, 2000; Reid, 1999; Shapiro, 2006). The results of this study suggest that people's satisfaction is not related with whale proximity, instead, people's satisfaction was related with their own safety in terms of keeping a prudent distance from the whale, and learning about marine conservation.

#### 4.2 | Conservation benefits and awareness yield from whale-watching

The results suggest that the participant's behavioural intentions towards pro-environmental behaviour improve after enjoying a whale-watching tour (Ambler, 2011). However, this study also revealed that whale-watchers do not feel responsible for the consequences of their actions and threats to the marine environment. Instead, they believed that the authorities must take responsibility for marine environment conservation. The challenge of whale-watching tours is to encourage behavioural changes in favour of the marine environment (Finkler & Higham, 2004). According to the Value-Belief-Norm theory (Stern, Dietz, & Kalof, 1993), people must first be aware of their own consequences before accepting some responsibility for their actions. Harms (2011), showed that evoking emotions and feelings of responsibility among whale-watchers promoted and fostered behavioural intentions towards supporting whale conservation more significantly than only providing information about whale biology and ecology. On swim with dwarf minke whale tours, 27% of tourist changed their attitudes to conservation, displaying a

greater awareness of whales, marine life, whaling and other human impacts (Birtles et al., 2002). In whale-watching trips in Scotland, 46% of visitors thought that the activity had a positive impact mainly by increasing visitor awareness of whales (Warburton, 1999). Changing human behaviour is notoriously difficult. If the whale-watching industry is proclaimed as a positive contribution to the conservation of cetaceans and marine environment, companies must adopt carefully designed education programmes, which incorporate strategies and methodologies that facilitate behavioural change. Threats to whales in general, and specifically to the species being watched, should be adequately addressed and provide participants with opportunities to help. Onboard interpretation in northern Peru, should highlight the human impacts on the marine environment and advocate responsible behaviour while fostering the public's feelings of personal responsibility.

### 4.3 | Implications for whale-watching industry research and management

When interviewed about the performance of whale-watching boats, participants expressed their concern regarding whale safety. They were worried about boat proximity to the whales, the high number of boats surrounding mother and calf groups of whales, the speed of the boat when approaching the whales, and the fact that engine noise might disturb the whales. Since the onset of the whale-watching industry, researchers have become concerned about the short- and long-term adverse effects that the activity can have on cetacean behaviour, population abundance and reproductive success around the world and have pinpointed the need for regulation of the activity (Brownell & Oosthuizen, 2004; Constantine, Brunton, & Dennis, 2004; IWC, 2009; Orams, 2000). On whale-watching trips in Scotland, 30% of tourists expressed concern about boat interference or noise (Warburton, 1999). In land-based whale watching in the USA, 39% of tourists were concerned about the impact of noise, boats and kayaks on killer whales (*Orcinus orca*) (Finkler & Higham, 2004). International whale-watching guidelines suggest minimum approaching distance, maximum number of boats surrounding the same animal at any given time, maximum time allowed around the animals, and observation speeds (Carlson, 2010; Garrod & Fennell, 2004). Peru is one of several developing countries with a burgeoning whale-watching industry (Hoyt & Iñiguez, 2008). In northern Peru, there are some well-established whale-watching companies operating under international regulations, but others are local fisherman offering tours opportunistically without observing any type of code of conduct for whale-watching. In Peru, there are no official whale-watching regulations, or national guidelines or codes of conduct (Pacheco et al., 2011). In this study, people declared that whale-watching boats were navigating too fast, boats were too close to whales and that there were too many boats spending extensive periods of time with the same whale group. Management of the whale-watching industry in Peru is urgently needed and requires an official set of rules, to avoid adverse impacts on cetaceans.

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## SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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