Aquatic Mammals 1996, **22.2,** 131-140

Ecotourists' beliefs and knowledge about dolphins and the development of cetacean ecotourism

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Abstract

The current trend towards environmental awareness is accompanied by people seeking ways to change their relationship with nature. Every individual will perceive their relationship with animals, and interpret the behaviour of animals, in the light of their culture. This study explored the relationships among beliefs, knowledge and demographic characteristics of participants in a 'Swim with Wild Dolphins' program in the Bay of Islands, New Zealand. Most respondents interpreted dolphin behavior anthropomorphically, and perceived the dolphins' social structure as being sociocentric. Principal Components Analysis revealed attributions of spirituality, altruism, interspecies sociability and dolphin society. The ecotourists who formed this sample were unacquainted with scientific knowledge related to cetaceans, and therefore were not likely to understand most of the philosophical, educational, economic or ecological values of wildlife. Increased knowledge of the users in terms of beliefs, expectations, and satisfaction will allow for more precise management of human-animal interactions and guide educational programs.

Introduction

People are increasingly interested in active, experiential and educational activities involving wild animals in their natural habitat (Behnke, 1980; Canadian Federal-Provincial Task Force, 1993; Duffus & Dearden, 1990; Kellert, 1980; Kellert & Westervelt, 1982; Pearce, 1991). With the current trend towards animal and environmental awareness, people have become eager to experience wildlife and nature. Tourism can be a good medium for raising environmental awareness (Hughes, 1991; Ross, 1991), and one reason often given for promoting ecotourism is that the participants' experiences will increase awareness of the need to protect the environment (Driver & Tocher, 1970; Kellert, 1980; Kellert & Westervelt, 1982; Krutilla 1967; Krutilla & Fisher, 1975; Loomis & Walsh, 1986; Stoll & Johnson, 1984; Walsh, Bjonback, Rosental, & Aiken, 1985; Weisbrod, 1964; Whelan, 1988).

Increasing tourism results in increasing need for management intervention and educational programs. Management and education rely on assumptions about the knowledge and motivation of ecotourists. Previous research concerning the relationship between humans and nature includes investigation of public attitudes, knowledge and behaviour towards wildlife and natural habitats; factors related to satisfaction in wildlife recreational programs; and, the economic value of wildlife (Brown & Manfredo, 1987; Duffus & Dearden, 1993; Kellert, 1980; Lien & Graham, 1985). However, no work has been done on the influence of cultural factors on people's perceptions and interactions with animals in ecotourist environments, and the contribution of cultural factors to the development of wildlife ecotourism.

Culture, belief and attitude

Culture is defined as a social system from which individuals acquire their attitudes, beliefs and behaviour (Altman & Chemers, 1980; Barlow, 1991; Geertz, 1973; Hofstede, 1980; Marsella, Tharp & Ciborowski, 1979; Moscovici, 1981; Rohner, 1984; Taifel, 1981; Vaughan & Hogg, 1995). Cultural beliefs, values and norms are tacitly used by every individual to define and evaluate the appropriateness of behaviour.

Because cultural beliefs affect how one perceives the role of various forces (e.g. 'fate,' 'nature') in forming causal inferences, cultural beliefs can influence an individual's judgments about the likelihood of relationships, such as human–animal relationships (Barlow,1991; Fraser, 1922; Reed, 1978). Thus, individuals perceive their relationship with animals, and interpret the behavior of animals, in the light of their culture (Kitahara-Frisch, 1991; Noske, 1989; Willis, 1990). Some cultures believe that their well being is closely linked to the well being of native animals and their ecosystem (Heelas & Lock, 1981; Fraser, 1922; Malo, 1987; Marvin,

1988; Rensberger, 1977; Storm, 1972). They emphasize the interdependency of human beings, animals and nature. Other cultures perceive non-human animals and all other forms of life as being incapable of rational and moral thought and as such are considered subordinate to human needs or desires (Boakes, 1984; Rieber, 1980; Wallace, 1911; Wilson, 1978, 1980).

Apart from culture, the depth of sensitivity towards animals may arise from the way in which individuals relate to or match the animals' behaviour and emotions to their own. The degree of empathy or emotional distance may be a function of both anthropomorphism and anthropocentrism. Anthropomorphism is the tendency to ascribe human qualities to animals or objects, and appears to be primed by the degree to which physical and/or behavioural traits of the animals match analogous traits in human brings (Agassi, 1964; Fisher, 1991; Staddon, 1989; Vicchio, 1986). Anthropocentrism is the view that humans are superior to and different from animals and that every behaviour or event should be interpreted relative to human values and experiences (Gilson 1978; Lessley 1991; Wallace 1911; Wilson 1978).

Ecotourism

There has been tremendous growth in the number of individuals participating in non-consumptive wildlife recreational programs. Individuals form impressions of animals which strongly motivate their desire to experience these preconceptions. Also, while some individuals participate in wildlife and nature activities in support of environmental awareness, other individuals participate to satisfy their curiosity or to achieve relaxation in their life (Brown & Manfredo, 1987; Duffus & Dearden, 1990; Hughes, 1991; Ross, 1991; Pearce, 1991).

The number of ecotourists participating in dolphin and whale watching excursions have been steadily increasing. Whale watchers on commercial vessels run to hundreds of thousands annually (Coughran, 1993; Duffus & Dearden, 1993; Tilt, 1985; Osborne, 1991; Forestell & Kaufman, 1991). In 1985, 32,000 tourists participated in whale watching in Greater Puget Sound (Pacific Northwest, North America). In 1991, 16,500 tourists participated in whale watching in Australia, 130,000 in Hawaii, and 255,000 in Southern California.

The intense interest in wildlife and nature activities such as dolphin and whale watching have stirred some serious concerns over the planning and management of these programs. Both the participants and the animals can benefit from wildlife and nature programs (Decker & Goff, 1987; Duffus & Dearden, 1993; Kaplan & Talbot, 1983; Kellert, 1984; Loomis & Walsh, 1986). However, research on the physical and emotional effects human presence on whales and dolphins suggests that there are costs in wildlife recreational programs that cannot be ignored (Duffus & Dearden, 1990, 1993; Norris & Reeves, 1978). Alterations to accommodate recreationalists may inevitably make it intolerable for many animals and will therefore damage the ecosystem as a whole (Duffus & Dearden, 1993; Hammitt & Cole, 1987; Scarff, 1980; Talbot, 1987; Webb, 1968). The bottom line is that in the long run, if whales and dolphins' normal routines are constantly interrupted, they will be the ones who suffer.

Kellert (1984) found that most lay people do not have a clear understanding of the philosophical, educational, economical or ecological values of wildlife. Therefore, ecotourism can provide information and services that can enrich and satisfy tourists expectations. The individual benefits that are associated with the emotional fulfillment of being near the animals may serve to strengthen feelings toward commitment to various environmental issues (Brown & Manfredo, 1987; Duffus & Dearden, 1993; Hughes, 1991; Kaplan, 1974; Kellert, 1980, 1984; Talbot & Kaplan, 1986). Anthropomorphic sympathy influenced by observations of whales and dolphins sociability probably has the strongest effect on future conservation and protection (Vicchio, 1986).

Scientists, conservationists, and managers are expressing increasing concern for more efficient public education and conservation programs that include research into cultural aspects of human relationship with whales and dolphins. It is apparent whale watching and dolphin swim programs attract individuals from different cultures, therefore, it is both sensible and timely to investigate the origins of ecotourists perceptions. This study investigated the possible relationships among knowledge, demographic characteristics and personal values of ecotourists participating in a 'swim with wild dolphins' program. A questionnaire was distributed in order to explore several questions related to cultural factors in perception of dolphin behavior.

1. Knowledge of cetacean natural history and the degree to which people interpret animal behaviour using biological concepts.
2. Perception of the dolphins' social structure and the degree to which people use the norms of human society to interpret or assess dolphin activity.
3. Perception ecotourists have of the cognitive and emotional states of whales and dolphins.

Methods

Research site

The research was conducted during 1994 in the Bay of Islands Maritime National Park, the

Table 1. Country of residence grouped in regional categories

Region	Country of residence	Female	Male	Total residence per region
Asia	Southeast Asia	0	1	11
	Hong Kong	2	1	
	Indonesia	0	1	
	Japan	1	2	
	Singapore	1	0	
	Taiwan	0	1	
	Thailand	1	0	
Europe	Austria	2	4	94
	Belgium	1	1	
	Denmark	7	4	
	France	0	1	
	Germany	15	13	
	Holland	7	6	
	Italy	0	1	
	Norway	2	1	
	Spain	1	2	
	Sweden	6	3	
	Switzerland	8	9	
North	Canada	7	4	77
Commonwealth	England	35	24	
	Ireland	2	0	
	Scotland	0	2	
	Wales	1	2	
South	Australia	19	12	94
Commonwealth	New Zealand	40	23	
USA	United States of America	15	10	25
Other	Global	0	1	5
	South Africa	2	1	
	Zimbabwe	0	1	
Grant total		175	136	306

northeastern region of the North Island of New Zealand (approx 35°17′S., 174°05.5′E.). In the Bay of Islands, tourists are most likely to see bottlenose (*Tursiops truncatus*) and common (*Delphinus delphis*) dolphins, and may get a chance to see killer whales (*Orcinus orca*), Brydes (*Balaenoptera edeni*), sei (*Balaenoptera borealis*) and minke whales (*Balaeneoptera acutorostra*). On rare occasions, visitors may see humpback whales (*Megaptera novaeangliae*) or pilot whales (*Globicephala* spp.).

The data were collected from an ecotourist company operating out of the town of Paihia, located in the southwestern end of the Bay. *Dolphin Discoveries* usually ran two boats and made two trips per day (approximately 3.5 hours per trip). The first cruise began at sunrise and the second in late morning or midday. Bottlenose and common dolphins were encountered about 90% of the time. Bottlenose dolphins were typically found in groups of 10–20 individuals, in coastal waters less than 10 m deep (inside the bay). Common dolphins were most likely to be found in groups of several hundred individuals, in deeper offshore waters.

Subjects

A total of 306 respondents completed the questionnaire, 175 (57%) females and 131 (43%) males. Of the 306 respondents, 173 (57%) were between 17–29 years old, 76 (25%) were in their 30s, and 57 (17%) were 40 years and older. The majority of respondents (280, or 92%) were Caucasian, 12 (4%) were Asian, and 14 (4%) were of other races. Respondents identified 29 countries of residence (Table 1) which were categorized into regions. The majority (190, or 62%) were from English-speaking regions, that is, Australia, New Zealand, Canada, U.S.A. and the United Kingdom. The second largest region of residence was Europe, With 95 (31%) respondents.

Sketch of an excursion

When all of the passengers had boarded the boats, the Skippers described important details and rules

of the excursion. They discussed their obligation in meeting with governmental management regulations, explaining that swimmers were not allowed in the water when the dolphins are resting, feeding or when a calf was present. They described the Marine Mammals Protection Regulations (New Zealand, 1994). Finally, they discussed the swimming gear (wet suits and goggles) and weather and sea conditions in the Bay.

Once the Skippers had gone over these details, they drove out into open water and began their search for dolphins. It usually took less than an hour before one of the Skippers encountered a pod of bottlenose or common dolphins. In many instances, the bottlenose and common dolphins would approach the boat and ride on the bow wave. Behaviour included fast swimming, making sharp turns, swimming upside-down, holding head above surface, head slaps, tail slaps, chasing each other, jumping and passing each other in midair, and rubbing bodies. Activity was often accompanied by vocalizations. There were times, however, when the dolphins were quiet and floating nearly motionless.

After spending some time observing the dolphins' behaviour, the Skippers decided whether to allow swimmers in the water. Up to 24 swimmers were put in the water with the dolphins (12 from each boat). Before the tourists were allowed in the water, the Skippers explained that it would be best if they slowly slipped into the water so as not to startle the dolphins. A swim usually lasted between 10–15 min.

Questionnaire design

The questionnaire was designed and distributed in accordance with the University of Auckland Human Subjects Ethics Committee. It was available in English, German and Japanese, accompanied by a cover letter that explained the purpose of the study and instructions for completion. Responses were anonymous.

The questionnaire comprised a set of 40 questions related to beliefs and knowledge about dolphins (BK variables), a set of 14 questions related to personal values that required the respondents to self-rate their attitudes or personal traits as well as rank the importance of various matters in life (PV variables), and a set of demographic items (a copy of the questionnaire is available on request). BK variables appealed to attitudes, beliefs and knowledge about dolphin behaviour, abilities, social structure and cognitive capabilities. The BK questions represented a wide range of scientific and lay literature and mass media depictions of dolphins (reviewed in Amante-Helweg, 1995). Each BK variable consisted of a statement, and required the respondents to express the degree to which they agreed on a 7-point Likert response scale (Oppenheim, 1973) that extended from 'Strongly Agree' to 'Strongly Disagree.' The PV variables addressed the strength of respondent's values toward a particular topic (i.e. religiousness, environment, cultural role, etc.). PV variables were measured using both Likert Scales and Osgood semantic differential scales (Oppenheim, 1973). The Osgood semantic differential scale required the respondents to choose between two adjectives with opposing valences (e.g. 'strong' vs 'weak').

Research procedure

Data were collected at the end of each excursion, when the ecotourists were gathered in a nearby cafe. The researcher described the study and informed them that their participation was voluntary and that they could refuse to participate without explanation. Respondents were allowed as much time as needed to complete the survey (approximately 15 min). Respondents returned the survey to the researcher in person, after which questions were answered.

Statistical analyses

The data were analyzed in two steps. In the first step, the BK variables were subjected to Principal Component Analysis (Tabachnick & Fidell, 1989). Principal Component Analysis is an exploratory multivariate technique used to reveal psychological factors that underlie responses to the BK questions. Principal Components were determined from the correlations among the BK variables using PROC FACTOR (SAS Institute, Inc., 1989), with orthogonal VARIMAX rotation. Each PC summarized a cluster of highly correlated BK variables. The correlation (loading) of the raw variable score on the PC indicated the extent to which that PC represents that variable. Variables with absolute loadings greater than 0.5 were selected to form part of the PC. The *pattern* of loadings were used to construct an interpretation of each PC. If the pattern of loadings was not interpretable (i.e. meaningful), the PC was discarded.

In the second step, the relationship between the respondents' PC scores and cultural characteristics was explored. Biplots of average PC scores as a function of demographic characteristics were prepared, and multiple correlations between the PC scores and the respondents' and personal values (PV) were calculated using PROC GLM (SAS Institute, Inc., 1989).

Results

Data were collected after 14 excursions in October and November, 1994. When conditions were appropriate (12 of the 14 trips), all passengers were offered the opportunity to swim with the dolphins. When offered, 44% of the respondents entered the

Table 2. Sample of Principal Components structure

Example BK question	Principal Component (PC)			
	PC 1 Spirituality	PC 2 Altruism	PC 3 Sociability	PC 4 Society
Dolphins can help humans find inner peace	**0.61**	0.10	0.02	− 0.01
Dolphins have extrasensory abilities (ESP)	**0.70**	− 0.16	0.04	0.15
Dolphins have healing powers	**0.77**	0.09	− 0.003	0.08
Dolphins protect each other from sharks	0.01	**0.65**	0.05	− 0.02
Dolphins protect people from sharks	0.44	**0.64**	0.11	0.01
Dolphins like to play near boats	0.10	0.02	**0.65**	0.11
Dolphins like to swim with people	0.21	0.08	**0.78**	− 0.03
Dolphin mothers are very strict	0.08	0.01	0.10	**0.60**
Every dolphin group has its own territory	0.18	− 0.04	− 0.04	**0.61**

Note: the full Principal Components loading matrix is available upon request to the author.

water while 56% prefered to view the dolphins from the boat. Of those who did swim, only 4% reported they were able to touch the animals, but 100% of the swimmers reported enjoying the excursion regardless of the outcome. Of those who did not swim, 96% reported that they had enjoyed the excursion. Lack of enjoyment (5 of 306 respondents) was closely linked to seasickness or lack of proximity to dolphins.

Factual knowledge

The respondents' knowledge of cetacean natural history was tested using 15 factual questions related to taxonomy (e.g. 'dolphins are a type of fish'), biological characteristics (e.g. 'dolphins have very sensitive hearing'), and social structure (e.g. 'dolphins babysit each other's babies'). The number of correct responses ranged from 3 to 12, with a median of 8 correct. The majority of the respondents (75%) answered five of the fifteen factual questions correctly. However, none answered more than 12 correctly and less than 5% made replies suggesting expert knowledge. Personal observations suggest that most respondents conflated media portraiture of dolphins with scientific knowledge about dolphins.

Principal Components Analysis of beliefs and knowledge

The Principal Component Analysis revealed four categories of attributions about dolphins. Table 2 presents a sample of the types of BK variables and the pattern of loadings associated with each of the four PCs. Considering each group of variables, the loadings on each Principal Component suggest the following interpretations: PC 1, Spiritual Attributions; PC 2, attributions of dolphins having altruistic characteristics; PC 3, dolphin–human interactions; PC 4, perceptions of dolphin society. More detail is shown in Table 3, including a verbal description of each of the Principal Components.

Cultural differences in attributions

The Principal Component Analysis revealed four categories of attributions of dolphins. The average PC scores for several sets of cultural groupings are presented as biplots in Figures 1–3. Groups with different attribution strengths appear as widely separated points.

Differences according to gender were most visible along the Spirituality dimension (PC 1). The scores for males and females are most widely separated along the Spirituality dimension, and females tended to make more positive spiritual attributions than males (Fig. 1). There were no obvious separations between males and females along the other dimensions (Altruism, Interspecies Sociability and Dolphin Society).

In the relationships between ethnic groups and spirituality, Asians tended to agree with Spiritual attributions (PC 1) more than Caucasians or Other respondents (Fig. 2). There was no clear separation between the ethnic groups along attributions of Altruism, Interspecies Sociability and Dolphin Society.

In the relationships between regions and Spirituality (PC 1), there was a wide separation between the Asian and South Commonwealth regions and the European, North Commonwealth and United States regions (Fig. 3). Respondents living in the Asian and Southern Commonwealth regions were, on average, more likely to believe in spiritual attributions than those who come from Europe, North Commonwealth and the United States. Also, residents of Asian countries tended to make more negative attributions of Altruism (PC 3) than did others. However, there were no clear separations

Table 3. Description of the four Principal Components of beliefs and knowledge

Principal Component 1. *Spiritual Attributions*
Spritual attributions are related to people's perceptions of animal spirituality, and may reflect belief in 'New Age' philosophies. People with this view either perceive marine mammals as having extraordinary abilities that enable them to deal with particular situations or perceive them as being at an equal or higher 'spiritual plane' than humans.

Principal Component 2. *Altruistic Attributions*
Altruistic Attributions are related to people's perceptions of dolphins having cognitive capabilities and unselfish regard and devotion to the welfare of others. People with this view believe that marine mammals have sentimental feelings towards each other and humans.

Principal Component 3. *Interspecies Sociability*
Interspecies sociability are related to people's perceptions of dolphins having the ability to interact with humans in a mutual or cooperative manner. People with this view perceive dolphins as being mutually agreeable and interested in interacting with species other than conspecifics.

Principal Component 4. *Attributions of Dolphin Society*
Attributions of dolphin society are related to people's perception of cetacean social structure. A view in which people may use the social norms of human society to interpret whale and dolphin societies.

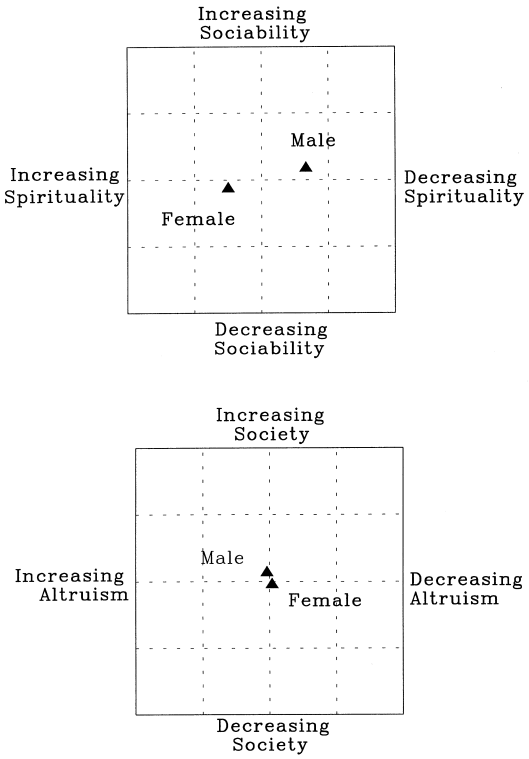

Figure 1. Biplots of the relationships among the average principal component scores for gender groups. The top panel shows the separation of gender scores along the Spiritual and Sociability dimensions (PC 1 and PC 3). The bottom panel shows the separation of gender scores along the Altruistic and Society dimensions (PC 2 and PC 4).

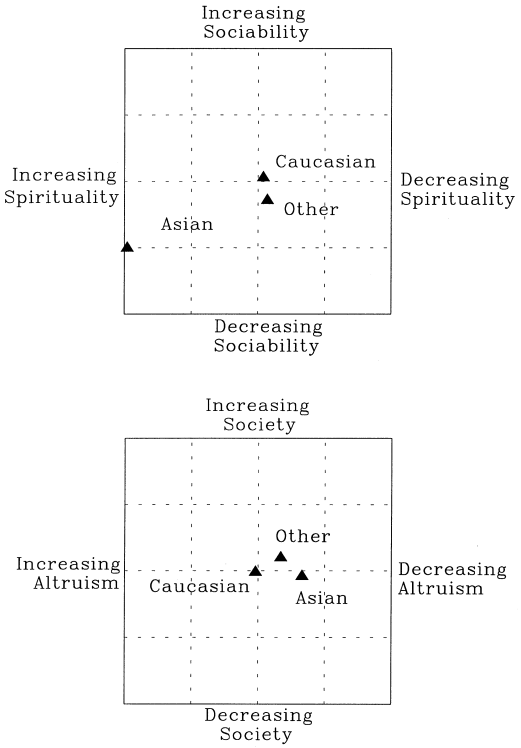

Figure 2. Biplots of the relationship among the average principal component scores for ethnic groups. The top panel shows the separation of ethnic group scores along the Spiritual and Sociability dimensions (PC 1 and PC 3). The bottom panel shows the separation of ethnic group scores along the Altruistic and Society dimensions (PC 2 and PC 4).

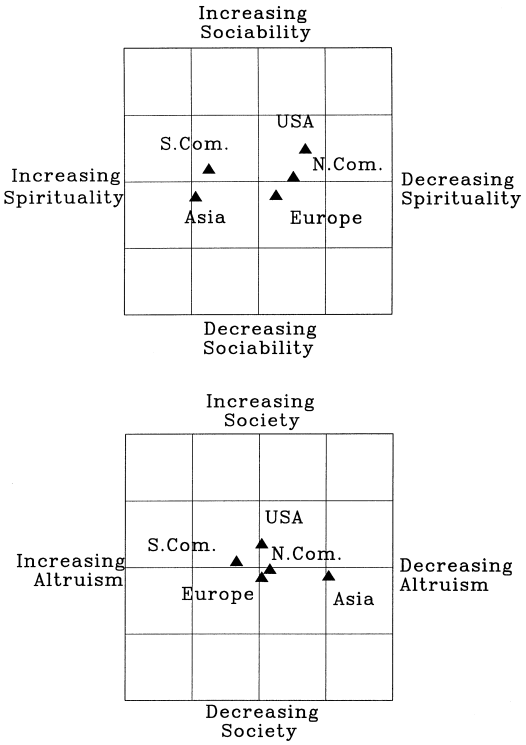

Figure 3. Biplots of the relationship among the average principal component scores for regional groups. The top panel shows the separation of regional group scores along the Spiritual and Sociability dimensions (PC 1 and PC 3). The bottom panel shows the separation of regional group scores along the Altruistic and Society dimensions (PC 2 an PC 4).

between the regions along Interspecies Sociability and Dolphin Society.

Anthropomorphism, anthropocentrism, and social structure

The results show that 11% of the respondents had an anthropocentric view of animals and ecotourism ('Dolphins are here for my enjoyment'). These respondents reasoned either that the dolphins were there for their enjoyment or that they were out seeking an adventure. However, most respondents perceived that dolphins had human-like virtues, beliefs associated with anthropomorphism (Vicchio, 1986). The majority of the respondents (99%) strongly agreed that 'dolphins are intelligent', and perceived the dolphins' social structure to be collectivistic ('every dolphin wants to belong to a group') and structured ('every dolphin group has a leader'), independent of the type of society in which the respondent lived. There was more than 80% consensus among respondents on questions related to interspecies sociability which included tolerance and fondness of humans ('dolphins like the company of people'), and eagerness to approach boats. This finding, along with the fact that Interspecies Sociability loaded on as a principal component, suggests that the majority of the respondents believed that the dolphins enjoyed their company and reflected the certainty that most participants have in human and dolphins interaction.

Correlations between beliefs about dolphins and Personal Values

The four Principal Components were used as criterion variables in tests of the relationship between the respondents' beliefs and knowledge about cetaceans and their Personal Values (PV) using multiple linear regression (PROC GLM; SAS Institute, Inc., 1989). There were no significant relationships between Altruistic Attributions (PC 2) or Attributions of Dolphin Society (PC 4) and PV variables.

Spiritual Attributions (PC 1) was significantly related to the combination of 'Religiousness', 'Accepting my role in my culture', and 'Preserving my group's image' ($F(3,302)=15.57$, $P<0.0001$). The more religious the respondent, the more willing they were to accept their role in culture, and the more important the role if preserving the group's image, the more likely he/she would agree with statements that make attributions of dolphin spirituality.

Interspecies Sociability (PC 3) was significantly related to two personal values, 'Honoring of parents and elders' and 'Loyalty to friends' ($F(2,303)=11.80$, $P<0.0001$). As the importance of honoring parents and elders and loyalty to friends increased, the respondents' were more likely to agree with attributions that dolphins enjoy social contact with humans. Thus, subjects who rated honoring of parents and elders and loyalty to friends as very important made the most positive attributions about interspecies sociability.

Discussion

Of the 306 respondents, 96% enjoyed the program (of which 53% did not have an opportunity to swim with the dolphins). This indicates that the dolphin-swim experience had fulfilled their expectations. However, it is unclear whether satisfaction was due to the respondents having the opportunity to view the dolphins and whales or because they enjoyed being in a novel and beautiful setting (Brown & Manfredo, 1987; Hartig, Mang & Evans, 1991; Talbot & Kaplan, 1986).

In this study, 86% of the respondents noted an interest in myths and legends related to cetaceans. This finding agrees with Gilbert's (1982) study on knowledge about urban wildlife in Ontario. His results showed that the public had a wider

definition of wildlife than one that was scientific. Therefore, he concluded that the public may be more receptive to a holistic rather than a species-oriented approach towards wildlife. The respondent's interest in the myths and legends of cetaceans, as well as the fact that spiritual attributions turned out to be the strongest component in this study, supports Gilbert's conclusion.

The results show that 11% of the respondents had an anthropocentric view of animals and ecotourism ('Dolphins are here for my enjoyment'). These respondents reasoned either that the dolphins were there for their enjoyment or that they were out seeking an adventure. However, most respondents perceived the dolphins as having human-like virtues associated with anthropomorphism (Vicchio, 1986). Moreover, Principal Component Analysis (PCA) revealed that the respondents made attributions of Spirituality, Altruism, Interspecies Sociability and Dolphin Society. The majority of the respondents perceived the dolphins' social structure as being sociocentric (every individual important to the subsistence of the group), regardless of the degree of sociocentrism attributed to the respondent's own culture.

In this study, factual questions were species-specific, judged relative to bottlenose dolphins. Given that bottlenose dolphins are the animals with which these tourists are most attracted to and most familiar (personal observations), we would expect a substantial degree of pre-knowledge. Instead, the majority of the respondents answered only 33% of the factual questions correctly. Therefore, although 177 (58%) ranked themselves as having great deal of knowledge about animals, the results revealed that less than 5% of them made replies suggestive of expert knowledge. The degree of knowledge indicates the stage this program has reached. As an ecotourism program becomes popular, the type of tourists participating changes from mainly exploratory users (wildlife specialists) to a mixed group of specialists to finally being dominated by wildlife generalists (general public) (Duffus & Dearden, 1990; Smith 1977).

Thus, it would appear that this particular program is entering the final stage of development, with a decrease in experts and an increase in general public. Exploratory users are individuals who have preknowledge about the animals they visit, therefore, require very little management and interpretive services. Generalists are less knowledgeable and may benefit from interpretive centres. If the degree of knowledge among ecotourists is known, then the rate of progress in an ecotourist program can be estimated (Duffus & Dearden, 1990; Smith, 1977). This information can also be used to guide educational programs and management services.

This study provided some understanding of how people interpret human-animal interactions (specifically dolphins). It is important to note that we are not generalizing that people's beliefs about cetaceans are the same beliefs they may have about other animals. However, understanding what people believe and know about particular animals will enable us to improve upon specific management practices and build upon educational possibilities.

Due their interest in wildlife, recreationists may be hoping that participation in wildlife and nature programs will increase their level of knowledge. However, many individuals may not have the time nor energy to review what is available in the libraries, let alone know where to begin. Therefore, in order to enrich the knowledge of recreationalists involved in wildlife programs, we need to take every opportunity to present the knowledge we have regarding particular animals, their habitats, and the ecological systems.

A more effective educational program might be designed around what we know about how the public interpret nature. The results of this study show that people perceived the dolphins and interpreted their behavior anthropomorphically, and had little factual knowledge. It also revealed that the ecotourists who formed this sample would have enjoyed an educational program that included both cultural and biological knowledge related to whales and dolphins. Hence, it may be sensible to construct an educational program that make biological knowledge more accessible using an understanding of the roles of culture and linking it to research that has been done.

Acknowledgements

This research was supported in part thanks to an Auckland City Council Queen Elizabeth II Pacific Island Scholarship. A very special thanks to *Dolphin Discoveries* in Paihia—co-owners Steve Stembridge and Louise Andrew; Skippers Andrew, Nigel, and Trent; and administrative staff Ian and Eve, who made it possible for me to carry out my research project. Their support, patience and assistance with the tourists as well as their sincere concern for the dolphins' welfare has made this project worthwhile.

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