Ocean & Coastal Management **20** (1993) 267–282

If Leviathan has a Face, Does Gaia Have a Soul?: Incorporating Environmental Education in Marine Eco-tourism Programs

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ABSTRACT

Current frameworks available to the public for understanding human impacts on the environment may be insufficient to ensure needed reductions in a variety of destructive behaviors. A model is presented for structuring marine eco-tourism programs so as to capitalize on a range of cognitive states experienced by tourists in a novel marine environment setting. The model is demonstrated in the context of a whalewatch trip in Hawaii. Questions as to the suitability and effectiveness of the model are discussed, and future areas requiring additional study are pointed out.

1 INTRODUCTION

For 16 years my colleagues and I have studied whales and dolphins in a variety of settings throughout the Pacific. Our effort has focused on field studies of the natural history, social dynamics, and individual behavior of humpback whales (Kaufman & Forestell, 1986; Forestell, 1989). Prior to the mid 1970s, most of what was known about great whales came from biologists working on whaling ships or at shore-based whaling stations. Since the 1970s, large-scale commercial whaling has all but ceased. Today scientists use benign research techniques to study living whales in the wild and minimize disturbance of the highly endangered animals (Payne, 1983).

A major problem in studying free-roaming cetaceans (whales, dolphins and porpoises) is the difficulty in recognizing individuals. One hundred and fifty years ago, Herman Melville posed the challenge in his

Ocean & Coastal Management 0964-5691/93/$06·00

epic novel, while paying poetic tribute to the mighty tail of Leviathan:

> Dissect him how I may, then, I but go skin deep; I know him not, and never will. But if I know not even the tail of this whale, how understand his head? Much more, how comprehend his face, when face he has none? (Melville, 1979; p. 388).

Modern whale researchers have solved the problem of the faceless whale. It turns out the whale's face is often inscribed on its tail. In 1976 a group led by Steve Katona at the College of the Atlantic in Bar Harbor, Maine began to document individually unique markings found on the under-surface of the tail-flukes of humpback whales. While a number of observers had independently begun to recognize individual markings on certain species of whales, Katona's group was the first to create a virtual 'Who's Who' of North Atlantic humpback whales by publishing a catalog of photographically identified individuals.[1] A tremendous increase in our understanding of the behavior of live whales has resulted from the discovery that '... Leviathan has a face after all. It just isn't always on the front of his head' (Katona, 1987, p. 27).

Information obtained over the last 15 years from the study of marine mammals in their own environment is far from complete. Nonetheless, details of how individual whales make a living, the diversity of association patterns they form, and the vast distances over which they move to find food and mates present the opportunity to provide the public a window into the life of a complex organism with whom we share this planet. This opportunity will be addressed in the following discussion of environmental education and marine eco-tourism.

The following section will present a brief consideration of the influence of science and technology on current views of the environment. A model of an experiential education sequence is then provided, and demonstrated in the context of a whalewatch excursion in Hawaii. A number of issues concerning the applicability of the model are reviewed, followed by a concluding statement urging the incorporation of well-defined environmental education programs by qualified guides in eco-tourism activities.

2 THE MECHANIZATION OF NATURE IN PURSUIT OF TECHNOLOGICAL ADVANCE

The past three centuries have witnessed a transition in industrialized nations following two fundamental vectors that are presently converging with potentially damaging results. The twofold path includes the

mechanization of nature (Sheldrake, 1991) and the urbanization of the majority of populations in industrialized areas (Lovelock, 1986). In the first case, the mechanization of nature has led to a depersonalization of the earth around us, making it easier to use and discard resources that took millions of years to develop. In the second case, urbanization has so removed most of us from the primary means of production of the goods we consume that our consumption rate, unconstrained by effort, has skyrocketed while our ability to understand the pressure we are putting on natural resources and ecosystems has plummeted.[2] Meanwhile, those who produce the goods we consume do so in ways which destroy the integrity and bio-diversity of the surrounding landscape (Ryan, 1992).

In *The Rebirth of Nature: The Greening of Science and God*, Rupert Sheldrake (1991) argues persuasively that our pursuit of the Cartesian view of science and technology has distorted our relationship with the earth. A mechanistic, deterministic view of life has fired the struggle for dominion over nature through an understanding of complex but predictable interactions between elements of matter or vectors of energy. Sheldrake contends that the benefits gained from viewing the world as a machine have clouded our ability to distinguish between the model that has helped us exploit earth's energy, and the earth itself.

> The practical successes of mechanistic science bear testimony to the effectiveness of this method; the quantitative aspects of the world can indeed be abstracted and modeled mathematically. But such models leave out most of our living experience; they are a partial way of knowing (Sheldrake, 1991, p. 57).

Mechanistic science has been dissected into areas of specialization to enhance the breadth and depth of discovery. Unfortunately, this fragmentation has had the troublesome effect of facilitating ignorance of the interdependence of the earth's dynamic ecosystems (Chittleborough, 1992). The fragmentation is reflected in our education systems, where 'children come to learn about themselves and their worlds piecemeal... Knowledge is sliced up into departments, lessons, and what can fit on machine-scored multiple-choice texts' (Ornstein & Ehrlich, 1989, pp. 198–9). If one learns to observe parts of the whole as if they operate in isolation, then it is an easy step to ignore or deny the reverberations of our manipulations of the world around us.[3]

One antidote to a fragmented, depersonalized view of nature is exposure to a view of life that emphasizes an interdependent, bio-dynamic set of interactions that occur in complex, non-repetitive patterns.[4] This is the product that purveyors of eco-tourism can offer. While immersing the recreational public in natural settings, one can

demonstrate that processes taking place over vast reaches of time and space are linked together in an indivisible network that gives life to our planet; that the currency of survival in such a setting is bio-diversity, and that protection of bio-diversity is at the heart of environmental preservation (Soulé & Kohm, 1989, p. 7).

3 A MODEL FOR ENVIRONMENTAL EDUCATION IN MARINE ECO-TOURISM

Ryel & Grasse (1991, p. 164) define eco-tourism as 'purposeful travel that creates an understanding of cultural and natural history, while safeguarding the integrity of the ecosystem and producing economic benefits that encourage conservation'. Their definition recognizes that eco-tourism is an important educational tool. Real life exposure to a natural situation in the accompaniment of an experienced guide leads to greater increase in knowledge than real life exposure without a guide, or exposure to a knowledgeable guide in an artificial setting.[5]

More than 50 years ago, Swiss psychologist Jean Piaget studied the development of human cognitive capability and its dynamic relationship with the physical world. He viewed cognitive development as an interaction between physical maturation of the brain and environmentally induced changes in learning. He observed that, as children grow, they proceed through a series of increasingly abstract thinking styles (Piaget & Inhelder, 1969). Piaget demonstrated that a primary motivation for learning is resolution of cognitive conflict, which he described as 'disequilibrium'.[6]

Borrowing upon principles of cognitive psychology, my colleagues and I have developed an interpretive model for presenting information about marine mammals and their ocean environment during whalewatch excursions in Hawaii and Australia (Forestell, 1991; 1992; Forestell & Kaufman, 1991). The model has more recently been extended to include snorkeling excursions to coral reef areas near Maui, Hawaii. We are presently working with other segments of the marine tourism industry to offer similar programs in conjunction with SCUBA diving, semi-submersible and recreational submarine trips, and marine sightseeing excursions.

The general model underlying our program is presented in Table 1. Its application can be examined in the context of a typical 2·5 h commercial whalewatch trip aboard a Pacific Whale Foundation passenger vessel to observe humpback whales in Hawaii. Each whalewatch trip is a different venture, controlled by such variable factors as the

TABLE 1
The Experiential Education Sequence

1. **Creating Dynamic Disequilibrium:** 'The Teachable Moment'.
2. **Providing Relevant Formal Content:** Managing Dynamic Disequilibrium.
3. **Follow-up Activity:** Consolidation of Learning; Resolution of Cognitive Dissonance; Evaluating Success.

number and type of passengers, weather conditions, what the whales choose to do (or not do, as the case may be), the type of vessel, and the experience of the captain. Nonetheless, it is possible to view the trip as a structured experience, and to guide participants through an educational sequence that has very clear goals and objectives that can be monitored and evaluated over time.

For heuristic purposes, a whalewatch may be divided in three phases: Pre-contact (the time between leaving the dock and seeing the first whale); Contact (the period of time during which whales are actively being observed); and Post-contact (the time between sightings, or the time between observing the last pod and returning to the dock. The division follows the natural sequence of looking for whales, observing whales, and returning to port, but we have also found that during each phase, participants demonstrate identifiably different frames of mind, express different cognitive focuses, and require different kinds of program content from the guide. We have documented the transitions by recording and analyzing samples of questions asked and comments made by participants as the trip progresses.

The occurrence and duration of each phase varies considerably throughout the time whales are present in Hawaii. Early or late in the season, trips are sometimes comprised entirely of the 'pre-contact' phase. Whales are relatively few in numbers, and may not be observed at all during a 2–3 h trip. At the peak of the season, whales are often seen within minutes of leaving the harbor, and may be within good viewing distance throughout the entire trip, leaving little time for preparation (pre-contact) or wrap-up (post-contact) by the guide. The most frequent occurrence, however, is for the trip to include approximately equal periods of time in each phase.

3.1 Phase one: Pre-contact

Most whalewatchers in Hawaii are experiencing their first exposure to whales in the wild. For many, it is the first time on a large boat in an offshore area. This precipitates a ready state of apprehension and excitement that leads to many questions about whales and the ocean

during the pre-contact phase. Often, the credentials of the guide are queried.[7] Questions early in the trip generally have to do with perspective ('How big is a humpback whale?', 'How deep is it here?', 'Have you ever swum with them?'), safety ('Do whales ever attack boats?', 'How rough does it get?', 'How long have you been doing this?'), or anticipation ('How close can we get?', 'How long before we see them?').

The information we provide during the pre-contact phase is skill-oriented, preparing the participant to observe whales and the interactions between them (if and when they appear). A general orientation to the boat and any observable landmarks helps participants report the location of whales, or observe whales quickly when seen by others. A description of the most frequent cues that signal the presence of a whale (a blow, a distant set of flukes above the water, a splash from a high-energy activity) is also useful. As time permits a discussion of the geographical surroundings and the geological, oceanographic or natural history significance of the area reminds participants they are in the natural habitat of a wild and endangered species.

An additional task to accomplish during the pre-contact phase is to point out ways in which the participant may assist in protecting the marine environment during the trip. Avoiding the use of Styrofoam cups; saving aluminum cans for later recycling; holding on to paper and plastic materials to prevent them from blowing overboard; extinguishing cigarettes in ashtrays on board the vessel;[8] are all important ways to encourage active participation in environmentally sensitive behaviors.

Whalewatch excursions in Hawaii are too brief (approximately 2·5 h) to allow complicated or overly detailed explanations of anatomical adaptations, physiological specializations, evolutionary principals, or behavioral dynamics. During the pre-contact phase, such information is kept to a minimum, although it is provided in response to specific questions. In areas where it is necessary to travel for more than an hour to find whales (e.g. East coast US mainland; Australia) more detail can be provided, but one must be careful not to inundate passengers with more information than can be easily assimilated. Information is best given in relatively short doses, and a period of consolidation allowed between such episodes. The primary objective of the pre-contact phase is to orient the participant to the experience, establish the credibility of the guide, and alleviate concerns about safety.

3.2 Contact

The contact phase provides a dramatic counterpoint to the anticipation or apprehension of the pre-contact phase. The first sight of whales,

particularly if it is associated with spectacular behavior (e.g. a leaping breach, high out of the water), or the sudden appearance of an animal in close proximity to the boat, creates a palpable change in the observer, generally characterized by a brief period of surprise, followed by a host of questions. Once whales are observed, questions and comments begin to focus on what is actually being seen, with an eye still kept to safety and reliability of the guide. Questions at this time pertain primarily to identification of specific whales ('What are those marks all over its body?', 'Is that a female?'), behavioral descriptions ('Why does it lift its head out of the water like that?', 'Are its eyes open when it breaches?'), verification of knowledge ('How do you know?', 'Why do you think that happens?') and safety ('Are you *sure* they don't attack boats?').

The excitement generated by exposure to whales appears to generate a cognitive state similar to that identified by Piaget as the precursor to new learning. It is the moment that inspires one to seek an answer—the discovery of a question. When observing relative novices in a dramatic natural setting, the moment can be clearly identified by the behavioral responses (shouting, clapping, crying, jumping) almost immediately followed by excited questions. We refer to that state of wonder as 'dynamic disequilibrium'.

Marine tourism settings are ideal for creating 'dynamic disequilibrium'. The experience of entering a novel environment, whether on the ocean or in the ocean, is a stimulating, if somewhat disarming step. Watching whales in their own natural environment; snorkeling over a brilliant coral reef teeming with colorful fish; diving below the surface with the aid of SCUBA or in small submarines; are activities likely to emphasize discrepancies between the participants' initial knowledge base and subsequent perception of the world around them. Experienced guides can alleviate that disequilibrium by providing formal content: a structured, goal-oriented program, based on sound scientific information.

The formal content of a nature tourism program achieves its greatest effect in describing the interactive dynamics of an ecosystem, rather than simply pointing out the objects in it. During a snorkel trip, for example, it is important to avoid the urge to concentrate on species identification, and focus on facilitating the participants' ability to observe the relationships between organisms and how the geophysiology of the environment shapes the diversity and abundance of species within it. During a whalewatch we attempt to describe behavioral dynamics, relationships between animals, and how their environment shapes their behaviors.

The primary goal of the contact phase is twofold. The first part is to generate motivation to learn by creating or uncovering an imbalance between an individual's initial knowledge base, and some current perception of the world. The second part is to provide sound knowledge to allow the participant to regain cognitive balance.

3.3 Post-contact

Following observation of one or more groups of whales, two general phenomena tend to appear among program participants—personal validation and generalization. During the post-contact phase, participants appear to contrast and compare what they knew or believed prior to the trip with what they have seen or learned during the trip. What has just been observed is compared with what was learned from school, television, or newspapers and magazines. This process is usually signaled by comments or questions relating to personal experiences ('Once when I was fishing with my Dad. . .', 'Are these the same kind of whales we see off California?', 'I'm sure that whale looked right at me.').

A second pattern observed during the post-contact phase is the incorporation of the whalewatch experience into a broadened vision of environmental issues. Whalewatch participants begin to reconsider global environmental threats (e.g. oil spills, 'scientific' whaling, drift nets, marine debris, over-development) in the context of the dynamic, personal interaction they have just experienced. Questions during this process usually refer to concerns about the well-being of the whales ('Are any countries still hunting whales?', 'Is there anything that feeds on these whales?', 'Did we bother that mother and calf while we were watching her?'). The state of the environment is no longer a problem somewhere out on the ocean; it is a direct threat to the very whales they have just observed.

From an environmental education perspective, it is during the final, post-contact phase that the important transition from current experience to future behavior change must occur. We encourage participants to recognize the connections between their own behavior and the survival of the whales and other marine animals. Answers to their questions during this phase emphasize the relationships between what they have just seen and their own knowledge and behavior in other contexts.

We also provide participants with a number of action alternatives aimed at furthering sound environmental goals. These vary in degree of effort and complexity. Simple acts like signing a petition may be as far

as many participants are prepared to go. Many are willing to financially support the efforts of non-profit environmental groups. Others may wish to become participants in specific lobbying efforts. Reference materials are made available to provide many avenues of action for participants. Most communities have volunteer programs aimed at improving recycling efforts, reclaiming natural areas, enhancing awareness of the need to conserve precious resources such as fresh water, or cleaning up public areas. A wide variety of these options are presented to program participants.

4 ADDITIONAL CONSIDERATIONS

4.1 Is a whalewatch an effective platform for education and change?

There are two fundamental difficulties in attempting to conduct successful environmental education programs with the public during a marine eco-tourism activity such as whalewatching. One problem is that most marine eco-tourism settings provide relatively brief opportunities (between 3 and 5 h) to interact with the participants. The guide must establish credibility quickly to maintain interest and attention. The Russian psychologist Vygotsky (1978) wrote that cognitive change occurs when individuals internalize knowledge contained within a social group. From that perspective, a sense of timing is critical for coordinating each participant's self-discovery, the groups shared discoveries, and the educator's imposed discovery (Weir, 1989, p. 69).

In the highly social setting of most marine tourism activities, the relationship between educator and participant is an important basis for facilitating behavioral change. Factors that influence credibility include appearance, speaking ability, accessibility, personability, organization, and knowledge. We believe that ability to deliver a successful program can be enhanced by developing a well-structured program and employing appropriately trained guides.

A second difficulty is the lack of formal training among the participants. Training lay people to understand ecosystem dynamics is a challenging task. The secularization of science has facilitated a perception that understanding nature requires formal initiation into a professional priesthood. Naturalistic observations are considered unscientific, and therefore inferior to the observations of the professional scientist. Ideally, however, the direct experience of the naturalist and the systematic observation of the scientist complement each other (Shel-

drake, 1991). The capability of eco-tourism programs to empower that synthesis is enormous.

> Knowledge gained through experience of plants and animals is not an inferior substitute for proper scientific knowledge; it is the real thing. Direct experience is the only way to build up an understanding that is not only intellectual but intuitive and practical, involving the senses and the heart as well as the rational mind (Sheldrake, 1991, p. 211).

4.2 Are we simply preaching to the converted?

A survey of whalewatchers in Hawaii (Kaufman *et al.*, 1987) found that approximately 62% of whalewatch respondents earned more than $40 000 per annum in 1984, while 90% earned more than $20 000 per annum. Approximately 68% of whalewatch respondents were between the ages of 20 and 60. Those who go whalewatching in Hawaii tend to be well-educated, relatively affluent, and potentially socio-politically active.

A subsequent survey (Forestell & Tarule, unpublished data) documented self-reports of the degree to which environmental considerations influenced behaviors such as voting, selection of household products, automobile use patterns, and recycling. No significant difference was found between respondents randomly selected while waiting in line at the dock to go on a whalewatch, and respondents randomly selected while waiting in the airport to board an airplane back to the mainland US.

The data suggest that whalewatchers in Hawaii represent a cross-section of the traveling public, and not a significantly more environmentally aware group. Personal observation over the past 15 years leads us to believe the same is true of whalewatchers in Australia and elsewhere in the US. Those we deal with during whalewatches are not necessarily a specialized sub-group of environmentalists predisposed to internalize our program.

4.3 How do we evaluate our impact?

Following the resolution of disequilibrium, new information must be incorporated into the participants' behavioral repertoire before the experience can be considered an effective learning situation. Whether this takes place, and how it takes place, will serve as ultimate indicators of the program's success. Siegler & Jenkins (1989, pp. 118–23) have shown that incorporation of new learning proceeds slowly as long as there are no opportunities to demonstrate that the new behavior is

more effective, more efficient, more elegant, or even more novel than old behavior. They divide development of new behavior into two stages: discovery and generalization.

In our model, discovery begins with the process of dynamic disequilibrium. Generalization requires utilization of new behavior in those later situations in which it is most effective. One of the most difficult aspects of providing educational programs through recreational activities has been the ability to monitor the effectiveness of programs. Tourists are a transient and elusive group. The use of computer reservation systems, however, provides a tremendous opportunity to conduct follow-up studies of participants in a wide range of specific activities. We are currently developing survey methodology to answer this important question.

4.4 Education or indoctrination?

Environmental education is often considered to be riddled with value judgements, and that leads to a fear that participants may become 'indoctrinated'. The irony, notes Chittleborough (1992, p. 181), is that 'teaching children about the marvels of modern technology is not considered to be indoctrination, while teaching them of the dangers of that technology is'. Increasingly, the challenge falls to those operating in natural settings, under less formal circumstances, to recruit the public into understanding the dynamics of ecosystems and our impact on them (Forestell & Kaufman, 1991, p. 401). Consequently, we view modeling of desired behaviors, active recruitment of participants to commit to change, and the presentation of action alternatives, as essential components of nature-based programs. The intention is not to solidify stances on difficult issues and choices, but to familiarize participants with the dynamic nature of the world in which they will ultimately make those choices.

For the most part, current fascination with the environment is expressed primarily in word, not in deed. We have entered the age of 'eco-chic'. Educational tourism programs require a clear and effective model for empowering clients, not just humoring them. Knowledge without behavior leaves no discernible trace of change. In the long run, behavior without knowledge will last only until the next fad. A significant positive impact on the environment depends on our ability to recruit the public into acting in concert with an environmentally sensitive philosophy. That is a behavioral challenge requiring a knowledge of human learning and behavior.

5 CONCLUSION: THE SEARCH FOR GAIA'S SOUL

James Lovelock's Gaia hypothesis (*Gaia* is an ancient Greek word for the Mother Earth) proposes that the planet earth comprises a living organism with the ability to respond to its surrounding atmosphere by altering its species composition (Lovelock, 1986). The Gaian hypothesis challenges us to recognize that planetary balance derives from the local activity of individual organisms, and gives new impetus to the expression 'think globally, act locally'. So far as we now know, humans are the planet's only organisms with an ability to act on that challenge. In doing so, we can temper the anthropocentric belief, first articulated by Sir Francis Bacon (and grounded in a mis-reading of *Genesis*) that the human capacity for science and technology wins us the divine right to establish power and dominion over nature (Sheldrake, 1991, pp. 40–4).

Humans, as all species, may be viewed as an evolutionary experiment. In a non-static environment, species are challenged to adapt (e.g. through natural selection) or become extinct. Humans have learned to modify the environment with a diversity of options beyond the ken of any other species we know. Our expanded cortical functioning enables powers of reasoning and creativity unknown in any other life form on this planet. One cannot deny the benefits in comfort and longevity these powers have brought us. However, our ability to use our cognitive powers in the pursuit of technological advances may have outstripped our ability to understand the impacts of those advances on the world in which we live (Ornstein & Ehrlich, 1989, p. 64). If the dinosaur brain seems too small for its body, perhaps the human brain must be viewed as too big for its boots!

Eco-tourism programs are uniquely poised to counter a depersonalized, mechanized view of nature with a demonstration of the planet as living organism. Lovelock's (1986) hypothesis raises the difficult question of what it means to say that Gaia is alive (Sheldrake, 1991, p. 158). An extreme (and widely disputed) interpretation holds that the biosphere imposes certain organizing principles according to its own purposes or goals. Perhaps, the claim is, Gaia is conscious; perhaps she even has a soul. The intent of this paper has not been to attempt confirmation or disconfirmation of such a claim. It has, instead, been to encourage the possibility that such questions be asked by more than theoreticians and philosophers. The importance of recognizing that our own survival is related to environmental integrity and bio-diversity cannot be understated, nor can the importance of raising these issues in the context of eco-tourism programs. And just as Melville hardly

imagined that we would find Leviathan's face inscribed on his tail, it remains to be seen whether or where one might find Gaia's soul.

6 ACKNOWLEDGEMENTS

This article is based on two papers originally presented at the 1990 Congress on Coastal and Marine Tourism in Honolulu, HI, 25–31 May. I thank Greg Kaufman, Barbara Klemm and anonymous reviewers for many helpful comments. I also thank Marc Miller for his encouragement and stimulating suggestions.

NOTES

1. See Katona *et al.* (1979) for a description of tail fluke identification. The first catalog of North Atlantic humpback whales was published by Katona *et al.* (1980). Similar catalogs are available for humpbacks in the North Pacific (Perry *et al.*, 1988) and South Pacific (Kaufman *et al.*, in press). Individual identification from body markings is now a widely employed technique in the study of many species of cetaceans (Hammond *et al.* 1990).
2. No suggestion is intended that this is an exhaustive review (which would be well beyond the scope of this paper) or the most widely accepted account of metaphors of the environment commonly held by inhabitants of industrialized nations. Additional treatments of environmental metaphors and paradigms may be found in Commoner's (1972) association of environmental crises with energy shortages and economic decline; Petulla's (1980) history of the development of the American environmental movement; and Botkin's (1990) review of myths that shape human views of nature. For an important review of cultural influences on the development of environmental values in Japan, see Oyadomari, (1989).
3. The term 'fragmentation' represents more than a metaphor. The evidence that a fragmented treatment of science and education by industrial nations can be associated with negative impacts on the environment is detailed in Soulé & Kohm (1989, pp. 6–7). They report that the Society for Conservation Biology, in a 1988 workshop funded by the National Science Foundation, identified conservation of biological diversity as the number one research priority for conservation biologists. They further point out that fragmentation of habitats is one of the three primary categories of major threat to biological diversity.
4. See Miller & Kirk (1992) for a useful elaboration of a typology of environmental ethical viewpoints, based on perceived differences in the relative 'potency' of human and environmental forces. In their terminology, the present discussion advocates the development of some form of holothetic ethic to counter the excesses of an over-exuberant development ethic. It is recognized, however, that there is a danger of oversimplification in attempting to fit complex issues of education, ethics and the environment in too-tidy Procrustean beds of theoretical conceptualization.

5. See Lien & Atkinson (1988) for a discussion of factors influencing changes in attitudes and behaviors related to environmental issues.
6. See Piaget (1970). He and others (e.g. Festinger, 1957) have shown that when an individual experiences a dichotomy between what is known internally and what is perceived externally, cognitive conflict arises. At low levels, conflicts may be enjoyable: as with art and humor (Nicki *et al.*, 1979). At high levels phathology may result: racism, suicide, psychotic delusions may have their roots in unresolvable cognitive conflict (Campbell, 1949). At intermediate levels, the individual is motivated to resolve the conflict by up-dating the knowledge base (which Piaget called accommodation), or by redefining the observation to fit the knowledge base already available (assimilation).
7. The Pacific Whale Foundation is a non-profit 501-(c3) organization founded in 1980 to educate the public, from a scientific perspective, about marine mammals and their ocean environment. Research and education programs are funded, in part, by placing field guides on marine excursions for the public. Guides are selected according to the following minimum criteria: undergraduate degree in the biological sciences; research field experience; general knowledge of marine biology, and public speaking ability. Guides spend part of their time conducting whalewatchers or snorkel excursions, and part of their time participating in field research programs. The Foundation maintains an ongoing training program to ensure consistency and accuracy in the information presented to the public.
8. Small, non-biodegradable products like cigarette butts, plastic pellets, and small plastic bags are frequently mistaken for food by seabirds, marine turtles, and fish. Once ingested, the materials remain in the digestive system, and may ultimately cause the death of the animal.

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