

The Connection to Other Animals and Caring for Nature

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Abstract

In an era in which natural resources are under unprecedented pressure, it is vital to ask how the human relationships with the natural world might be improved. One avenue of inquiry is to explore whether there is a relationship between caring for a non-human animal, for a species, and for an ecosystem and whether this relationship may be a key to encouraging resource conservation and environmental protection. In most occidental industrialized societies, interest in domestic and wild animals is intense. Despite a wealth of research on human-wildlife interactions and human-pet interactions there is a dearth of work on the connection between these relationships and interest in environmental protection. In this article, I will address three topics that I believe are crucial to the understanding of the relationship between humans and other animals: the split between humans and the natural world, the development of caring, empathy, and emotional relationships to non-human animals, and finally the magic, or deep and abiding attraction to other species. These topics are especially relevant to current efforts by zoos and aquariums as they try to document the impact they have on the lives of their visitors.

Keywords: *human-animal interactions, conservation psychology, emotion*

Introduction

In an era in which natural resources are under unprecedented pressure, it is vital to ask how the human relationships with the natural world might be improved. A good starting point might be to explore what is known about how caring relationships with nature develop. Is there a relationship between caring for a non-human animal,² for a species, and for an ecosystem? If so, this relationship may be a key to encouraging resource conservation and environmental protection. These questions composed the formidable challenge facing our panel at the first Conference on Conservation Psychology at the Brookfield Zoo in 2002 (also see Myers

and Saunders 2002). Although the panel members (Lynn Dierking, Steve Kellert, Gene Myers, Carol Saunders and myself) only began to answer these questions, their importance is undeniable.

Melson (2001) notes that pets are present in 50 percent of European and North American households and that Americans spend more than \$8.5 billion on food for cats and dogs. In the United States, zoos and aquariums draw more attendance than major league football, basketball, hockey and baseball combined, and worldwide, 600 million people visit zoos and aquariums each year (AZA 1999). Moreover, the importance of wildlife-related recreational activities is strong and growing. Gray (1993) notes that in 1985, 61 percent of Americans participated in non-consumptive wildlife-related activities, with sixteen percent participating in trips to observe, photograph, and feed wildlife. In 1988, the U.S. Fish and Wildlife Service (cited in Gray 1993) estimated there are more than 80 million people who feed birds, 70 million bird watchers, and eighteen million wildlife photographers. In more recent surveys (U. S. Fish and Wildlife Service 2002), 31 percent of the U. S. population 16 years and older participated in wildlife-watching activities and 30 percent expressed an interest in wildlife around their homes. Finally, we can see the crucial importance of these questions in the steady stream of bad news regarding biodiversity, human-caused global change, and the survival of rare and key animal species.

In this article, I will attempt to respond to these questions by reviewing some salient literature, as well as comments made during the panel discussion mentioned above. In the process, I would like to address three key topics that I believe are crucial to the understanding of the relationship between humans and other animals: the split between humans and the natural world, the development of caring, empathy, and emotional relationships to non-human animals, and finally the magic, or deep and abiding attraction and power of other species. These topics are especially relevant to current efforts by zoos and aquariums as they try to document the impact they have on the lives of their visitors.

The Human-Nature Split

I believe that it is difficult to discuss the genesis of caring about nature³ or conservation behavior without examining the issue of the split between humans and the natural world. In the occidental industrialized world, our relationships with animals have a somewhat paradoxical quality. On the one hand, we understand that we, along with other animals and the rest of nature, exist together as small parts of the universe as a whole. We sometimes have a sense of fellowship with the other beings who share our situation in the grand scheme of things and occasionally experience environmental epiphanies in which we feel at one with the natural world (see, for example, Chenoweth and Gobster 1990, on peak aesthetic experiences). On the other hand, as we continue developing new technologies, we feel less dependent on nature for our survival. One result is that we find ourselves in the paradoxical position of making moral distinctions between the animals that are permissible to eat or kill and those whom we bring into our lives on a more intimate and social basis (Cronon 1991; Serpell 1986).

Even so, by seeking a relationship with nature, often through interactions with other animals, we may be able to connect with what is often a spiritual sense of wonder at being part of a vast interconnected network. Levinson and Mallon (1997/1969) suggested that humans endeavor to affirm their unity with nature. “[The natural world] gives man [sic] a point of reference and support, and to some people, an assuagement of existential anxiety. It appears that the possession of pets symbolizes this unity with nature and thus satisfies some deep human needs” (6). Muth (2000) echoed this idea and suggested that post-modern alienation and existential angst can be seen in our celebration of pets.

Several authors have proposed that, at an early point in our history, humans were closer, both physically and psychologically, to the natural world than they are now (e.g., Eliade 1964; Sheldrake 1999). Campbell (1983; see also Melson 2001, Morris 1998, Nelson 1983; Shepard 1993, 1996 and Urton 1985) argues that the primitive human world was replete with animal symbols and spiritual ceremonies. Serpell (1986) notes that early European settlers of North and South America reported that indigenous peoples kept a wide variety of animals as pets. Others have claimed that the survival of early humans may have depended in part on maintaining the presence of friendly animals that kept watch for predators (e.g., Ingold 1994; Katcher and Wilkins 1993; Melson 2001; Reed 1959). Pet keeping is not universal, however. Diamond (1993) has reported that indigenous cultures in New Guinea do not keep wild animals as pets and Cristancho (2001) found no instances of pet animals among the domesticated animals of the Letuama of the Colombian

How do zoos and aquariums influence visitors' understandings, attitudes, beliefs, feelings, and behaviors toward animals, wild places, and their environment?

Many zoos and aquariums see their educational mission as bringing about an enlightened conservation ethic among visitors. However, in a recent overview of research, environmental psychologist Robert Swanagan (2000, *Journal of Environmental Education* 31, 4, 26-31) commented that research specifically documenting the impact of conservation messages in zoos, and by extension aquariums, is in its infancy.

Recognizing this need, the American Zoo and Aquarium Association (AZA) dedicated Conservation Endowment Funds to plan a multi-institutional research project (MIRP) that will investigate the overall impact of visits to zoos and aquariums on visitors' understanding, attitudes, beliefs, feelings, and behaviors toward animals, wild places, and their environment. A team of advisors from AZA institutions partnered with the Institute for Learning Innovation, a not-for-profit learning research and development organization, to undertake this planning effort, with three components: 1) the creation of a literature review detailing relevant research efforts to date, 2) the development of a research plan for conducting a series of multi-institutional research projects, and 3) an action plan for implementing the research.

Findings from the literature review indicated that little to no systematic research had been conducted on the topic. What research does exist provides some evidence that, while zoos and aquariums may communicate conservation messages, the messages are subtle and short-term, the conditions under which successful communication occurs are complex and poorly understood, and attribution of any direct effects is extremely difficult.

Based on these results, the MIRP team identified three research questions that will help assess the current educational impact of AZA zoos and aquariums, and help them more effectively communicate their conservation-related messages to the public:

- 1) Who are our visitors? What are their conservation-related understandings, attitudes, beliefs, feelings and behaviors toward animals, wild places, and their environment?
- 2) What is the overall impact of zoos and aquariums on visitors' understandings, attitudes, beliefs, feelings and behaviors toward animals, wild places, and their environment?
- 3) What specific strategies can zoos and aquariums utilize to influence these impacts?

An initial research study (“Assessing the Impact of a Visit to a Zoo or Aquarium: A Multi-Institutional Research Project”), soon to be funded by the National Science Foundation, will create a functional taxonomy of what zoo and aquarium visitors bring to these institutions in terms of understandings, attitudes, beliefs, feelings, and behaviors toward animals, wild places, and their environment. This taxonomy will then be used to assess the experience and impacts of the visit, particularly focusing on changes in understanding. Subsequent research will focus on the impacts of visits to zoos and aquariums on visitors' attitudes, beliefs, and behaviors, as well as specific strategies that influence these impacts. Such research is far more difficult to conceptualize and conduct. The MIRP team plans to utilize meetings and conferences about conservation psychology to develop a research design, identify research partners, and plan investigations to address these questions.

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Amazon. Even in those societies, however, animals are revered as part of the people's cosmology and spiritual practices.

Plato and Aristotle used human rationality and intellect as a basis to provide a privileged and separate status for humans. On the 'Scale of Nature,' humans were at the top rung, with plants and other animals on the lower rungs (Sorabji, cited in Serpell 1986). Early Christianity brought a lessened concern with the material world and an even more privileged status for humans. The focus on heavenly reward and original sin removed the spotlight from the natural world and brought a reinterpretation of it as a fallen place, and battleground of cosmic good and evil. Even though many Christians espoused kindness to other animals, humans were considered the "penultimate expression of God's Divine Plan, and that all other species were inferior and subordinate to His will" (Serpell 1986, 151; also see Glacken 1967). More recently Schultz, Zelezny, and Dalrymple (2000) provided empirical evidence that Christian fundamentalists possess less positive environmental attitudes than the general population.

Medieval times brought great animal cruelty, yet Franklin (1999) and Cohen (1994) suggest that the human animal split was actually lessened at that time, with animals having such equal status with humans that they were brought to trial for misdeeds just as humans were. Franklin also notes that the gaze or attention of a non-human animal was viewed as an honor, or singling out of the recipient as a special person. This is a perception that exists to a certain extent to the present day (Lott 1988).

Many authors argue that it was the Enlightenment and the Industrial Revolution that provided the final coffin nails for the concept of human-nature unity (e.g., Berger 1991; also Melson 2001 provides an overview). Franklin (1999) suggests that we have become alienated from the natural world, and animals in their natural state, by three factors: science, industrialization, and urbanization. Thomas (1983) proposed that attitudes toward animals changed radically at the time of the Enlightenment. He argued that, immediately prior to this time, attitudes toward animals were characterized by the theological viewpoint that humans had the right to use animals as they wished. Thomas believes that development of scientific disciplines such as biology and astronomy changed this perception by causing humans to see themselves as part of a wider universe rather than the center of it. Also, increasing study of natural history inspired greater interest in nature out of sheer intellectual curiosity.

Despite the fact that an intrinsic value of animals was becoming more recognized, Thomas (1983; also Cronon 1991) argues that the twin forces of industrialization and urbanization contributed to a psychological split between

humans and animals by physically removing humans from daily and routine contact with animals. Human relationships with animals that were based on proximity to them gradually changed to relations based on separateness. This feeling of separateness, combined with a sense of the intrinsic value of animals, ultimately led to a more sentimental and emotional attitude toward them that is represented by increases in pet-keeping and animal welfare movements that persist to this day.

Shepard (1993) takes quite a different approach, arguing that humans drew a distinct line between culture and nature at an early point in our history. He suggests that it is this recognition of differences between ourselves and other species that led to greater respect for animals, whereas our modern crossing of that line has led to the celebration of domestic pets to the exclusion of the truly wild nature of the animal:

From this metonymic stew of the animal as friend and object emerges the paradox that primal peoples kept their distance from animals — except for their in-taking as food and prototypes — and could therefore love them as sacred beings and respect them as other "peoples" while we, with the animals in our laps and our mechanized slaughterhouses, are less sure who they are and therefore who we are. The surprising consequence is that "nature" is more distanced, not less. (Shepard 1993, 289)

Myers (1998) notes that various factors motivate our sense of separation. To the extent that humans are developmentally inclined toward empathy, the exploitation of animals may generate moral discomfort and cognitive dissonance, leading to the adoption of various ambient distancing mechanisms. Among these are the philosophical distinctions the occidental world has persistently used to distinguish us from animals. These have then been picked up in psychological theories (most clearly in classical developmental theory), thus formalizing and reifying the culturally constructed separation.

The sense of separateness from the animal world may also be enhanced by feelings of guilt and shame at the prospect of killing animals or destroying nature for survival purposes (Serpell 1986). Erikson (2000) has suggested that pet-keeping itself may be an effort to resolve guilt about hunting and consuming wild animals. In a study of pet-keeping among indigenous Amazonian tribes, he proposes that "if hunting poisons the relations between humans and the masters of game, household animals act as a kind of antidote" (14). Similarly, Cronon (1991) suggests that alienation from food sources (specifically meat) has a necessary parallel alienation from nature. The idea that alienation may be a

functional way to deal with the relationship between humans and animals is receiving increasing attention.

Vitterso, Bjerke, and Kaltenborn (1999) provide evidence that an individual's closeness to the natural world may not result in positive emotions toward all animal species. Their study showed that attitudes toward some carnivores were negative among farmers but positive among urban residents. Similarly, Bixler and Floyd (1997) demonstrated empirically that negative emotions such as disgust toward animals affect preference for both indoor and outdoor environments. Biophobia coexists with biophilia and, rather than a contradiction, this may be functional and adaptive.

The main thrust of the formulations presented here is the alienation of humans from their natural roots, and their reluctance to see themselves as natural entities in a natural ecosystem. For many in the industrialized world, nature has become a sentimental luxury and along with it, the animals that either live there or in our homes. Keeping pets, watching wildlife, and visiting zoos offer connections with nature in ways that may be somewhat satisfying, but are still carefully controlled. Nonetheless it may be those activities that help us to gain a sense of ourselves as natural entities, subject to natural forces. If intimate association with animals is in fact an attempt to reconnect with our natural world, then it may be possible to heal the human-nature split and approach the world in a spirit of cooperation and conservation.

Emotion, Caring, and Conservation Psychology

The emotional bond with non-human animals has been discussed by diverse individuals, from poets and philosophers to scientists and practitioners of animal-assisted physical therapy and psychotherapy. It is a fact that many of us take comfort from our pets, and to a certain extent from wild animals. Sheldrake (1999), whose theories are admittedly a bit controversial, maintains that the emotional bond with animals is what caused us to draw them into our lives in the first place. He suggests that, "Most of us seem to need animals as part of our lives; our human nature is bound up with animal nature. Isolated from it, we are diminished. We lose a part of our heritage" (19). He echoes a suggestion first made by Sir Francis Galton (1865) that pet-keeping based on this affinity for non-human animals actually preceded more utilitarian forms of domestication. The idea that it is our nature to bond with other living entities has also been proposed by Wilson (1993).

Many mechanisms have been proposed to explain the nature of the human-animal bond:

- Animals offer comfort, companionship, and social support (Beck and Katcher 1996; Garrity and

Stallones 1998; Serpell 1986)

- Animals are social facilitators (Levinson and Mallon 1997/1969)
- Animals reinforce self worth, usually through what is perceived as the unconditional love of the animal (Beck and Katcher 1996; Corson and Corson 1980; Lott 1988; Melson 1991, 1998)
- Animals help humans to develop a sense of self and self-esteem (Beck and Katcher 1996; Lasher 1998; Melson 2001; Triebenbacher 1998)
- Animals aid in presentation of the self (Gosling and Bonnenburg 1998; Lockwood 1983; Perrine and Osbourne 1998)
- Humans are social creatures and animals appeal to our propensity to interact socially (Myers 1998)
- Animals may help to heal psychological and physiological disorders and prolong our lives (Beck and Katcher 1996; Friedman, Katcher, Lynch, and Thomas 1980; Friedman, Katcher, Thomas, Lynch, and Messent 1983; Jennings, Reid, Jennings, Anderson, and Dart 1998); Hines and Fredrickson 1998)
- Animals help humans connect with nature (Melson 2001; Myers and Saunders 2002)

Although most of these mechanisms have emotional foundations, it is beyond the scope of this article to discuss them all in detail. I will focus here on emotional bonds through processes such as attunement, nurturing, and role-playing that may lead to caring for the natural world and healing the split between humans and nature. I will then present a model developed by Schultz (2002) that may offer prospects for integrating some of the work on animals and emotion into a conservation psychology framework. I will conclude the section by discussing the ramifications of these ideas and findings for zoos and aquariums.

In medieval Europe, it was commonly believed that animals recognized holiness in humans when they saw it and that the gaze of an animal implied that there was something special about the human gazed upon (Hill 1987). In a study of park visitors' motives for feeding bighorn sheep, Lott (1988) discovered similar feelings among contemporary North Americans. His interviews showed that the two most common motives were to bring the sheep closer and to show that the sheep trusted the visitor. Visitors indicated that being approached by the sheep spoke highly of the person and that it made them feel better about themselves. They also said that they would think better of others approached by the sheep and that they expected that others would think better of them as well. A less commonly mentioned, but interesting motive was that feeding the sheep was a way to enter the animal's world and to become part of nature.

Levinson, one of the earliest practitioners of companion

animal assisted psychotherapy, conducted some of the more interesting theorizing on the effects of companion animals in children's development. He suggested that children fantasize about animals and play the role of animals in order to act out the problems of childhood, including the establishment of a relationship with nature (Levinson and Mallon 1997). Based on grounded theoretical work with a group of American children, Myers (1998) argues that children's animal role playing actively uses the animal as a reference point for the developing sense of self with a rich emotional relating in the process.

Lasher (1998) and Myers (1998) have suggested that, through a process of attunement, animals can facilitate the process of feeling and expressing emotions. The unconditional and non-judgmental love that appears to be offered by animals is another mechanism through which we may bolster our sense of worth. Much of the research on and practice of animal-assisted psychotherapy is based on this principle and there are abundant studies that demonstrate that contact with animals has positive physiological effects as well (Katcher and Wilkins 1993).

The urge to be comforted often comes with the urge to comfort or nurture. Levinson and Mallon (1997) propose that the first human contact with a wild animal may have been to throw food to it in an empathic gesture. They quote Zeuner (1963) who describes this beginning of the domestication process as an "elementary manifestation of solidarity with life." Taylor (2002) echoes this process in her theory of the tending instinct. She proposes that humans need not only to be tended but to tend as well. An important question is how the tending or comforting process might be related to caring, not only for the individual, but also for other individuals of the same species, and for animals and ecosystems more generally.

Interestingly, Taylor's concept of a nurturing instinct is based on studies of the stress responses that show gender differences. Women were shown to respond to stress by tending whereas men were more likely to isolate from others (Taylor 2002). Her findings are consistent with Gilligan and Attanucci's (1994) assertion that women tend to have a morality of caring whereas men tend to have a morality of justice. Melson and Fogel (1989) found that gender differences existed in children for care of baby dolls (girls were caregivers for dolls and all of the children identified adult females as caregivers of babies) but not for animals. These results show that there may be gender differences in the bonding process. Otherwise, aside from a few studies of gender differences in preference for species (usually dogs versus cats) little attention has been paid to the idea that men and women may bond with animals differently.⁴

Several studies have demonstrated that animals, and natural environments in general, have restorative, calming, and

focusing effects (e.g., Kaplan 1995, Ulrich 1983, 1993). Friedman et al. (1980) determined that the companionship of a pet was a strong predictor of successful recovery from a heart attack. Katcher, Friedman, Beck and Lynch (1983) showed that watching an aquarium lowered research participants' blood pressure. In an experimental study of individuals waiting for oral surgery, Katcher, Segal, and Beck (1984) found that the presence of an aquarium in a waiting room was more effective in reducing stress than a poster of a wooded waterfall or a control situation with blank walls. Interestingly, the aquarium was as effective as hypnosis, but hypnosis performed in addition to the aquarium did not confer any additional benefits. Finally, Katcher and Wilkins (1993) found that, when compared to an outdoor challenge program, a nature study program including animals was more successful in encouraging focused and interested responses from a group of children diagnosed with hyperactivity/attention-deficit disorder and conduct disorder.

What remains unanswered from these studies is whether caring about animals or the environment is a part of the restorative response. In other words, does our caring about the environment or animals help to produce the restorative response? Alternatively, does the restorative response engender caring about animals and the environment? Or perhaps both are true. A feedback loop of caring and calming seems reasonable but I am not aware of studies that have examined this directly.

Nonetheless, there is ample evidence that strong emotional bonds can be established between humans and animals. How do those bonds, and the caring response develop? Chawla (1999) addressed this issue indirectly in her interviews with American and Norwegian environmentalists. Detailed life histories indicated that there are two factors that influenced her respondents to care about the natural world as adults. One of these is the presence of a role model who, through modeling and direct instruction, influenced the individual to respect and care for the natural world. A second factor was experience with the natural world as a child. Daitch, Kweon, Tyler, and Vining (1996) produced similar findings in depth interviews with ten individuals. All of the research participants mentioned animals in the context of reporting their environmental experiences, often while relating stories about special places. For some of the research participants, caring for animals was part of environmental experiences throughout the lifespan and included a spiritual component as well.

Myers and Saunders suggest that caring about an individual animal may lead to caring about the natural world:

If you care about another — whether human or animal — you are likely to care about what that individual needs and the conditions that affect his or

her well-being. This developmentally probable 'natural care' about animals may lead to broader environmental caring. (2002, 154)

However, Myers and Saunders (2002) note that determining the psychological basis for the extension of care about an individual to care about the species, its ecological context, and hence to the natural world remains a challenge. Little empirical research exists on this topic. This formulation may have important exceptions. We know, for example, that caring for an individual human is not necessarily associated with caring for humanity as a whole, or for humanity's habitat.

Schultz (2002) has developed a model that may begin to respond to that challenge. Schultz's model proposes that there are three psychological components of inclusion with nature (or the sense that one is part of the natural world): cognitive, affective, and behavioral. The cognitive component consists of a sense of connection, the affective component is the caring response, and the behavioral component of his model is the commitment to action. Schultz puts these constructs together to form paths that lead either to inclusion with, or exclusion from nature. The biocentric leg of this model begins with a sense of connectedness, which leads to caring for (most of) nature and then to a commitment to protect (most of) nature (parentheses my emphasis). The anthropocentric leg of the model begins with the absence of a sense of connectedness to the natural world, leading to caring for one's self, and ending with a commitment to protect the self.

Although Schultz's model does not deal specifically with attachment to animals, it suggests that caring responses are more likely to be found from people who consider themselves to be a part of nature than from people who see themselves as apart from it. Nevers, Gebhard, and Billmann-Mahecha (1997) suggest that "the condition of 'oneness' with other organisms evidenced by anthropomorphism forms the psychodynamic foundation for humans' relationships to nature" (177). In their view, children's tendency to anthropomorphize reflects a sense of unity with the anthropomorphized animal. Such anthropomorphism is then the basis for the sense of unity that may affect subsequent relationships, not only with animals but with the natural world as well. In a similar vein, Kahn (1999) refers to anthropomorphism as "isomorphic reasoning" and proposes that it may be a cognitive mechanism by which we develop a biocentric approach to the natural world. As an anonymous reviewer of this article suggested, interpreting nature or parts of nature as human-like may permit at least some parts of nature to be included in an extended circle of moral responsibility.

Kluckhohn and Strodtbeck (1961) suggest that three different patterns of cultural worldviews (people who feel they

are subjugated to nature, people who feel they are part of nature and people who feel they are above nature) lead to different value orientations and behaviors. There are some data that support this assertion. Schultz found that the extent to which research participants believed themselves to be part of nature correlated with general environmental attitudes (as measured by the scales of the New Ecological Paradigm, or NEP instrument).

Preliminary results of a small-scale pilot test I conducted⁵ indicate that attachment to animals, as measured on the Lexington Attachment to Pet Scale (Johnson, Garrity and Stallones 1992) is correlated with the NEP scales. These correlations are shown in Table 1. The NEP consists of items reflecting a positive orientation toward the environment. This orientation is in contrast with what Dunlap and Van Liere call the dominant social paradigm, which they characterize as "anti-environmental" (Dunlap and Van Liere 1978, Dunlap, Van Liere, Mertig, and Jones 2000). As noted in Table 1, the NEP is divided into subscales that reflect beliefs

Table 1. Correlation matrix for New Ecological Paradigm items with Pet Attachment Scale items.

	Animals Have Equal Rights	General Attachment to Animals	Animals are a Substitute for People
Balance of Nature (Concern that the balance of nature is easily upset)	.349 (.000)		.193 (.040)
Ecological Catastrophe (Feeling that an ecological catastrophe is impending)	.329 (.000)		.220 (.018)
Ecological Limits (Understanding that there are limits to how much damage humans can do)	.267 (.003)		.239 (.010)
Human Domination * (Endorsement of human dominance over the non- human world)	.544 (.000)	.279 (.002)	.410 (.000)
Rejection of Exemptionalism (Humans are not exempt from the laws of nature)			
NEP Total	.411 (.000)	.187 (.048)	.308 (.001)

Data in table are Pearson product-moment correlations with p values in parentheses. Empty cells have $p > .05$

*Scales are coded such that the attitude expressed is positive toward the environment.

about “humanity’s ability to upset the balance of nature, the existence of limits to growth for human societies, and humanity’s right to rule over the rest of nature” (Dunlap et al 2000, 427). Dunlap et al. argue that the NEP items assess “primitive beliefs about the nature of the earth and humanity’s relationship with it” (427). The Attachment to Animals Scale has three subscales indicating the extent to which the individual believes that animals have equal rights to humans, the extent of attachment or caring for the animal in question, and the belief that companionship and care received from animals substitute for the same from humans (Johnson et al. 1992).

Interestingly, the strongest correlations are with Johnson et al.’s (1992) subscale for animal rights, which contains items indicating that animals have similar rights as humans. Thus, respondents’ beliefs about nature and the human relationship to nature are positively associated with their beliefs that animals have equal rights to humans. Correlations with the NEP scale of Human Domination (the scale is reverse-coded) are found for all three pet attachment scales, indicating that respondents who viewed humans as not dominating the earth were more likely to be attached to their pets. These findings connote a sense of belonging to the natural world among respondents who cared strongly for their pets. Some of these correlations are small but it is worth bearing in mind that the survey was completed by the person who received it, and that person was not necessarily the one most connected to the family pet. Accordingly, pet-keeping itself was not correlated with the NEP scales.

In a separate study, my colleagues and I asked participants if they were part of or separate from nature and why (Vining, Tyler and Kweon 1998). About two-thirds of the respondents replied that they considered themselves part of nature (although, interestingly, many of these individuals defined nature as free of human evidence or contact). Some of them argued that humans are part of nature by virtue of interdependency with it or simply by definition. Others argued that they were part of nature because they appreciated nature-based aesthetics such as a sunset or mountain range. Others maintained that they were a part of nature in a moral sense by virtue of actions they performed. These included taking Boy Scouts on nature trips, recycling, taking public transportation, and enjoying the outdoors. These results suggest that Schultz’s model may in fact be a feedback loop: commitments and actions consistent with the connection with nature may reinforce the sense of connection and caring. In other words, a sense of connection may lead to caring which is operationalized as a particular behavior. The performance of that behavior reinforces the sense of connection or inclusion and the positive emotions associated with it.

Although there is much research to be done and many more questions to be answered, there is ample evidence for

the existence of the emotional bond, both positive and negative, between animals and humans. One of the most important questions for conservation psychology is how caring can be promoted and whether caring for animals can generalize to caring for species and in turn to ecosystems (Myers and Saunders 2002). I now turn to the ways that zoological parks and aquariums may help visitors to engage with animals and the natural environment in a way that promotes emotion and pro-environmental behavior.

Dierking, Burtnyk, Buchner, and Falk (2002; also see sidebar) note that the Association of Zoos and Aquariums recognizes a need to understand the influence that zoos and aquariums have on people’s understanding, attitudes, beliefs and feelings toward animals, wild places and their environment in general. Over the past 30 years, most studies conducted in zoos and aquariums have concentrated on assessing cognitive factors such as attitudes, knowledge, and interest levels of the public in order to design better exhibits. However, studies of the *impact* of exhibits on either cognitive factors or behavior are less common.

Although studies of emotional responses to zoo and aquarium environments are quite rare, several studies have demonstrated that zoo and aquarium visitors are more environmentally concerned than the general public (e.g., Adelman, Haley-Goldman, and Falk 2001; Adelman, Falk and James 2000). This might indicate that the levels of caring and feeling for animals and the environment are elevated in this group, but this connection has not yet been demonstrated. Heinrich and Birney (1992) and Gates and Ellis (1999) observed that there was a strong emotional component to the zoo/aquarium experience. However, studies of the relationship between caring and emotion in the zoo and aquarium environment are virtually nonexistent (see Myers, Saunders and Birjulin, 2002).

Dierking et al. (2002) suggest that zoos and aquariums can promote caring by making use of the constructs developed by Chawla (1999): social learning and opportunities to interact with the natural world. For example, rather than caring for animals when visitors are not present, some zoos and aquariums are featuring the care of animals during visiting hours in order to model the care-giving behavior. The design of a new children’s exhibit at the Brookfield Zoo in Chicago was based on psychological principles and it specifically focuses on different ways for young children to care about animals and plants. At the San Francisco Zoo, animal care is made part of the zoo experience when animal caretakers visibly do their jobs during visiting hours and by offering animal feeding opportunities for visitors. Results of these programs are currently being tested empirically.

Another important question for zoos and aquariums is whether the exhibition of animals in captivity may enhance

the visitor's sense of separation from the animals specifically, and from the natural world more generally. Kellert (2002a) points out that zoos are part of a continuum of animal experiences, ranging from direct to vicarious. Myers (2002) noted that a "critical issue with zoos and aquariums is that the captivity of the animals can reinforce certain assumptions in our culture about anthropocentrism and the 'proper place' of humans and animals." Many zoos are implementing programs such as petting zoos and feeding programs that allow the visitor to make contact, even if vicariously by watching others. Also, there is a growing emphasis on exhibiting animals in naturalistic enclosures and producing interpretive material that promotes a sense of natural context (Bitgood 2002). Research is needed to determine whether these programs enhance a sense of inclusion with the animal world and with nature more broadly.

Finally, it is important to ask whether the development of caring for an individual of a species translates into caring for the entire species and for the natural world in general. Miller (2002) argued that care for an individual can preclude care for the species and may interfere with management of populations. He mentioned the example of deer in and around urban centers where the public does not accept management of the population by culling and predator control. He argued that the connection from caring for individuals to caring for populations is not being made. Shore (2002) emphasizes that caring for a domesticated species (through neutering, feeding, etc.) does not translate to the proper caring for a wild species. Research is needed to examine whether there is a logical or feeling transition from caring for individuals, to caring for populations, to caring for ecosystems. This requires a careful definition of the dependent variable of "caring."

Magic

Several years ago, I attended a workshop on dolphin-assisted therapy at a Delta Society meeting. In these programs, dolphins are used to help children with autism and developmental disabilities and sometimes adults with organic brain disorders. The organizers of this session went to great lengths to emphasize the fact that there was no "magic" involved in these programs. Interactions with the dolphins were used as reinforcers for the production of target behaviors. In addition to the dolphins, they used a golden retriever, a manta ray, and opportunities to prepare the fish for the dolphins. The latter was the children's favorite reinforcer, as it gave them the opportunity to dig their hands in buckets of fish. I wondered, if the therapy is based simply on reinforcement theory, why go to the trouble and expense of using the dolphin at all? To me, the answer is that there *is* magic. Even

though they didn't want parents to have false expectations, and even though they were trying to maintain a psychological rigor in the therapeutic process, at least some of the program's success could be attributed to the magic of the human-animal bond.

I should note here that by using the word "magic" I do not mean to invoke the supernatural or mystical, but rather the sense of awe and wonder that often accompanies such peak experiences (Maslow 1964; Keltner and Haidt 2003). I mean magic to refer to the sense that something very special and powerful has occurred, accompanied by emotions such as awe and wonder and by cognitive structures such as curiosity and interest. Words fail most of us when talking about such experiences and there is much empirical work to be done to define and describe the sense of magic. I will elaborate this definition below.

Why haven't scientists heretofore dealt much with the magic in the human-animal interaction? Part of the reason is because the magic is in James's (1950) words, noetic but ineffable — the concept is knowable but we are unable to describe it in words, much less measure it in a scientific manner. Magical, ineffable experiences are notoriously difficult to describe verbally, and verbal output is a major means by which social scientists explore human thoughts and feelings. Chawla (2002) notes that "magic consciousness defies rational explanation. Therefore, it also tends to be ignored or dismissed as 'irrational' by the rational world of research" (209). However, until the late 1970s scientists ignored emotion for the most part for the same reason. Now research on emotion, both quantitative and qualitative, is thriving and I suggest that the magical experience could easily be studied in similar ways.

There are some pioneering studies of the magical sense, though most of the researchers don't call it that. Chawla (2002) analyzes the efforts of Gebser to understand the magical form of consciousness, characterized in his philosophy by the experience of the union of self and other, individual and world. She notes that magic is grounded in myth and ritual and that it is a "silent intuition of the world's power and our own power" (209).

Others have put words to this silent process. Most notably, Maslow (1964) elaborated the peak experience, in which an individual might feel "disorientation in space and time, ego transcendence, and self-forgetfulness: a perception that the world is good, beautiful, and desirable: feeling passive, receptive, and humble: a sense that polarities and dichotomies have been transcended or resolved: and feelings of being lucky, fortunate, or graced" (Keltner and Haidt 2003, 302)."

Taking Maslow's lead, Chenoweth and Gobster (1990) studied what they called peak aesthetic experiences, the sense

that an individual transcends the self and feels at one with the world. In qualitative analyses of research participants' journals, Chenoweth and Gobster discovered that peak aesthetic experiences occur primarily in natural environments. Similarly, Fiedelley (1994) studied visitors' experiences of encounters with African wildlife. He suggests that the presence of animals in an environment is an indication of the quality of the condition of the ecosystem. His participants were reassured about the environment and pleased, not only by the sight of an animal, but even just by evidence that an animal had been present. Moreover he reports that his participants experienced a strong emotional response that probably contributed to a sense of adventure and a momentary forgetfulness about the passage of time. As a heightened sense of discovery and excitement about the world, and the ability to become healthily absorbed in some of life's details are described by a number of authors as desirable states of being (Csikszentmihalyi 1968; Rogers 1969), this type of response may certainly be classified as therapeutic."

In the context of the attempts of zoos and aquariums to foster the sense of magical context with animals, an important question is whether the experience of other animals in captivity enhances the sense of magic, or relationship, or if it instead promotes a sense of anthropocentric separation and superiority. On the one hand, research results such as those presented here suggest that fascination, focus, and insight are experiences offered by the presence of animals in a natural or naturalistic landscape. On the other hand, the sight of an animal behind a barrier may reinforce anthropocentrism by emphasizing separation and otherness. Using a drawing study to explore how zoo children perceive the needs of animals, Myers, Saunders, and Garrett (2003) offer some intriguing evidence for anthropomorphic, aesthetic and psycho-social frameworks related to the development of biocentric caring.

Overall, there appears to be an argument that zoo and aquarium experiences, properly constructed, have the potential to enhance a sense of magic, or insights, empathy, and epiphanies. In fact, it might be argued that natural environments, including those represented by zoos and aquariums, offer opportunities for epiphanies that are valuable, if not necessary, elements of human experience. Kellert argued that magic is not magical:

In the sense of being unfathomable, unknowable, otherworldly. It's instrumental to our well-being and it's our job in conservation psychology to develop the vocabulary and understanding to make manifest why it is that the quality of magic is so critical to our physical, spiritual and mental capacity. And it's adaptive, associated with our fitness as

individuals and collectivities, and we need to make that apparent. And it has to be spontaneous, intimate, immersive and everyday, not that it occurs every day but that it is accessible on an ongoing and integral basis to one's life, not just something we occasionally visit. (Kellert 2002b)

In a similar vein, Shepard (1996) argued that the "human species emerged enacting, dreaming, and thinking animals and cannot be fully itself without them" (4).

I want to emphasize that we need to look at the negative side of human-animal interactions opposite as well. Felthous and Kellert, (1987), Ascione (1993), and Melson (2001) have described in vivid detail the kinds of negative interactions with animals that can occur. In emphasizing the pressures on animals and plants, zoos and aquariums walk a fine line between encouraging visitors to care enough to change their own behavior versus provoking despair that there is little anyone can do. To be rigorous about the study of the relationship between humans, other animals, and ecosystems, we need to look not only at the benefits of interactions with animals but also at their *effects*: we need to understand what we construe as the bad as well as the good. For example, scales used by Myers et al. (2002) to assess the emotional experience of watching zoo animals allowed respondents to rate both positive and negative affect. Caring is actually a multidimensional concept that includes the full range of emotions (see Kellert 2002a).

The best of science is driven by a sense of wonder. It is a testament to this sense of wonder that we are struggling to find ways to study the magic as well as the rationality or logic of the human-animal encounter. The following quote illustrates that magic can be made verbal and that the ineffable can be communicated clearly through stories (Vining and Scrogum 2000). It is from an environmental autobiography that one of my students wrote:

Suddenly the captain came across the loudspeaker and said the coastguard had spotted a pod of orcas off Orca's Island, ten minutes away. We sped through the water and stopped directly in the path of the approaching orcas. They slowed as they reached our boat, and I feared they would dive and come up a mile away. They stayed at the surface and encircled the boat. I was ecstatic. My husband had to hold on to my jeans to keep me out of the water. I thought that if I could just touch one, everything would be all right. Then it happened. One of the orcas came up to the surface. He, or she, tipped to one side and looked at me with one eye. He dipped into the water and did it again, only this time more slowly. Everybody on the boat was shouting and

taking pictures, but I just hung there over the side of the boat and stared right back. This happened one more time as my tears fell in the water. Then he smacked his tail on the surface and took the pod away. (Used with permission)

Conclusion

Although progress has been made in understanding the bond between humans and animals, generalization of that bond beyond the two individuals has not been demonstrated. We do not know whether caring for individual animals translates to caring about species, any more than we know that caring for an individual human leads to caring for humanity. We cannot assume that caring for species leads to caring for ecosystems. And perhaps even more problematic, we have made little progress understanding how caring for ecosystems might lead to conservation behavior (Vining and Ebreo 2002).

Nonetheless there are many intriguing avenues for future research on these topics. For example, emotion is at the core of caring specifically, and of relationships between humans and animals in general. Given the recent surge in interest in emotion in mainstream psychology, there has been surprisingly little work on the subject within either environmental or conservation psychology (Vining and Ebreo 2002) or with respect to the visitor experience in zoos and aquariums (Dierking et al. 2002). In addition, with some notable exceptions the bias in the literature on human-animal interactions is toward the study of positive emotions. The issue of emotion is fundamental, but our focus should extend beyond positive emotions such as caring. Negative emotions, such as feelings of guilt and cognitive dissonance because we shelter and adore some animals but eat and exploit others (Serpell 1986), disgust toward some species (Bixler and Floyd 1997), and despair because so many creatures are in trouble in the wild are all worthy of research attention.

The split between humans and nature seems worth exploring as well. Little research has focused on the relationship between a person's sense of his or her place in the natural order and caring for the environment. In my own ongoing work (also Vining, Tyler and Kweon 1998) my colleagues and I have discovered that most people believe they are a part of nature, but many of the same individuals will define nature and the natural as free of human presence and contact. This conflict may be a key to understanding the disconnection between caring at the individual and more global levels, as well as to understanding the cognitive dissonance that may underlie the disconnect between environmental attitudes and values and pro-environmental behavior. With his inclusion in nature concept, Schultz (2002) provides an excellent framework for study of these issues.

Nonetheless, it must be acknowledged that "nature" is a big idea and a large entity, to which humans may not be able to relate. The global concept of the environment may not be as meaningful to most people as specific entities within the environment. For example, an individual might endorse protection of a predator generally but object to the existence of the same predator nearby. Moreover, the environment includes entities that disgust as well as those that enchant. Thus, the prospect of humans developing caring responses to the environment or nature as a unified concept may be problematic. Finally, the idea of healing the human-nature split is complicated by the possibility that such a split may function in a variety of ways to simplify and order our relationship with the physical environment. For example, affection for animals (and perhaps the environment) may be enhanced more by the idea that they are separate from us. Is nature more likely to be on a pedestal, and perhaps protected, if we view it as a special "other" rather than a part of ourselves?

It is a particularly exciting time for conservation psychologists and other social scientists interested not only in helping to conserve resources, but also in understanding the fundamental emotions and cognitions that underlie our relationship with animals and the environment. As zoos and aquariums move forward with agendas promoting conservation as well as entertainment, they will be logical places for academic researchers to form partnerships with practitioners to pursue both basic and applied research on the relationships between caring for animals, for entire species, and for ecosystems.

Endnotes

1. E-mail: jvining@uiuc.edu
2. I recognize that humans are part of the animal world and that non-human animals are most appropriately referred to as such. However for the sake of simplicity and flow of language I will use the word "animal" to refer to non-human animals in this paper.
3. I acknowledge that the distinction between humans and nature is problematic. However, as a convenience in this discussion, I will refer to nature as the non-human world.
4. I am not referring here to the work on women and animals or ecofeminism, of which a great deal has been done.
5. The survey comprised a questionnaire mailed out to a United States sample of 1000 individuals. Unfortunately the questionnaire was mailed two days before the attacks on September 11, 2001 and follow-ups were sent while anthrax was a threat, resulting in a poor response rate. Our response rate was 192 of 1174 deliverable questionnaires, or 16 percent. Follow-up telephone calls to non-respondents did not reveal any systematic bias in responses. The correlations in Table 1 are based on respondents who completed the pet attachment inventory, N=113-119, depending on missing data.

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