

The Humane Society Institute for Science and Policy
Animal Studies Repository

6-2003

Considering Animals—Not “Higher” Primates

Marc Bekoff

University of Colorado, marc.bekoff@gmail.com

Follow this and additional works at: http://animalstudiesrepository.org/acwp_asie

 Part of the [Animal Studies Commons](#), [Comparative Psychology Commons](#), and the [Other Animal Sciences Commons](#)

Recommended Citation

Bekoff, M. (2003). Considering animals—not “higher” primates. *Zygon*, 38(2), 229-245.

This Article is brought to you for free and open access by the Humane Society Institute for Science and Policy. It has been accepted for inclusion by an authorized administrator of the Animal Studies Repository. For more information, please contact eyahner@humanesociety.org.

Considering Animals—Not “Higher” Primates

Consciousness and Self in Animals: Some Reflections

Marc Bekoff
University of Colorado

KEYWORDS

animal cognition, cognitive ethology, consciousness, Charles Darwin, self-awareness, selfhood

ABSTRACT

In this essay I argue that many nonhuman animal beings are conscious and have some sense of self. Rather than ask whether they are conscious, I adopt an evolutionary perspective and ask why consciousness and a sense of self evolved—what are they good for? Comparative studies of animal cognition, ethological investigations that explore what it is like to be a certain animal, are useful for answering this question. Charles Darwin argued that the differences in cognitive abilities and emotions among animals are differences in degree rather than differences in kind, and his view cautions against the unyielding claim that humans, and perhaps other great apes and cetaceans, are the only species in which a sense of self-awareness has evolved. I conclude that there are degrees of consciousness and self among animals and that it is likely that no animal has the same highly developed sense of self as that displayed by most humans. Many animals have a sense of “body-ness” or “mine-ness” but not a sense of “I-ness.” Darwin’s ideas about evolutionary continuity, together with empirical data (“science sense”) and common sense, will help us learn more about consciousness and self in animals. Answers to challenging questions about animal self-awareness have wide-ranging significance, because they are often used as the litmus test for determining and defending the sorts of treatments to which animals can be morally subjected.

Was Jethro, my late companion dog, a conscious being? Did he know who he was? Did he have a concept of self? Questions such as these continue to be pondered by scholars from different disciplines, and the jury is still out. Suffice it to say that there is much interest and as much (likely more) controversy concerning the notions of consciousness and self-awareness in nonhuman animal beings (hereafter, “animals”; see, for example, Dawkins 1993; de Veer and van den Bos 1999; *American Zoologist* 2000; *Animal Welfare* 2001; Bekoff 2002a; Gallup, Anderson, and Shillito 2002; Mitchell 2002; Shumaker and Swartz 2002).

While there are a number of reasons why scholars in different fields are interested in consciousness and self in animals, there seem to be at least five reasons that embody still others:

1. simple curiosity about animals and Earth
2. a desire to learn about who we humans are in the grand scheme of beings and where we fit into the world—are we unique or special?
3. a desire to learn about what animals might know about themselves and others—do they have a theory of mind? (following Premack and Woodruff 1978, 515, where it is proposed that “An individual has a theory of mind if he imputes mental states to himself and others that allows him to make predictions, specifically about the behavior of other organisms”

4. an interest in developing better and more reliable (and hopefully more ethical) methods of study
5. a desire to learn about what animals might feel about themselves and others when we use and abuse them for food, research, education, and amusement.

Some of my conclusions seem to me so obvious that they border on being trite, but when I delve into the comparative literature on consciousness and self in animals I see that much can still be gained in attempts to flesh out some of the details of their nature by asking questions about their evolution and by discussing the notions of behavioral flexibility and error correction. This is especially so for those who do not directly study animal behavior but who nonetheless want to know about the diversity of behavior shown by individuals of different species.

CONSCIOUSNESS AND SELF IN ANIMALS

What is it like to be a ———? Cognitive ethologists frequently ask what it is like to be another animal and consider the evolution of different degrees of consciousness and self as adaptations to what individuals need to be able to do to function adequately in their social and nonsocial worlds. Two other important and difficult questions center on what cognitive skills are required for an individual to be a normal social being in his or her social group and how variation in these traits influences behavior, survival, and reproduction. Comparative and evolutionary studies of behavior suggest that some animals would clearly benefit from having some notion of self, whereas for others it might make little difference as they go about their daily activities. There are many holes in our knowledge base, and there is much exciting but also frustrating and challenging work to do in this area. Cognitive ethology as well as its theoretical underpinnings and methodological contributions are useful for learning more about the evolution and taxonomic distribution of animal consciousness and senses of self.

A Potpourri of Views. The following seven quotations show clearly that bright minds often generate a lot of heat about animal consciousness and self-awareness, even in species in which it is obvious that individuals are conscious and have *some* sense of self. These quotations frame my essay and its arguments.

It may be freely admitted that no animal is self-conscious, if by this term it is implied, that he reflects on such points, as whence he comes or whither he will go, or what is life and death, and so forth. (Darwin [1871] 1936, 460)

Nevertheless, the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind. (Darwin [1871] 1936, 494)

To affirm, for example, that scallops “are conscious of nothing,” that they “get out of the way of potential predators without experiencing them as such and when they fail to do so, get eaten alive without (quite possibly) experiencing pain”. . . is to leap the bounds of rigorous scholarship into a maze of unwarranted assumptions, mistaking human ignorance for human knowledge. (Sheets-Johnstone 1998, 291)

Donald Griffin’s . . . attempt to enrich the study of animal behaviour by making it cognisant of consciousness . . . deserves attention as an example of the muddled thinking that is increasingly influential in this area.” (Heyes 1987, 107)

It is perhaps at this moment that the cognitive ethologist decides to hang up his field glasses, become a cognitive psychologist, and have nothing further to do with talk about consciousness or intention. (Heyes 1987, 124)

I conclude that not only are some animals aware of themselves but that such self-awareness enables these animals to infer the mental states of others. In other words, species that pass the mirror test are also able to sympathize, empathize and attribute intent and emotions in others—abilities that some might consider the exclusive domain of humans. (Gallup 1998, 66)

I argue that self-awareness, consciousness and mind are an expression of the same underlying process, so that organisms aware of themselves are in a unique position to use their experience as a means of modeling the experience of others. (Gallup 1998, 68)

As divergent as these views are, I think that they can be reconciled without throwing out the proverbial baby with the murky bath water by assuming an evolutionary and comparative approach to the questions at hand and by letting cognitive ethologists and others who study animal cognition continue their important research.

The Parsimonious "Self." The multidisciplinary and interdisciplinary field of research concerned with the notions of consciousness and self in animals is difficult to navigate, but this does not have to be the case. While I am not a speciesistic deflationist concerning the cognitive and emotional capacities of animals—indeed, I believe that many are rather intelligent, surely perceptually conscious in their own ways, and that they also have deep emotional lives—I will say that I do not believe that any animal has as rich a sense of self as do “normal” human beings. But animals’ parsimonious selves are not “less than” the more highly developed selves of human beings, they are just different, and we need to discern just what the differences are and, if possible, come to a good understanding of why these variations exist. Asking what cognitive capacities members of a species need to deal with to adapt to the demands of their social and nonsocial lives grounds the study of animal consciousness in an evolutionary, ecological, and comparative framework. This practice is consistent with the practices of cognitive ethologists who ask what it is like to be a given animal.

Degrees of Self. I organize my ideas in the following scheme. My scheme of degrees is not a hierarchy, and I do not think that there are “better” or “worse” conditions. An evolutionary view does not allow for the assignment of value to different sorts of conscious states, when they are viewed as adaptations to a “species-typical” life style.

First, there are reflexes such as removing one’s hand or paw from a hot flame. These moves happen so rapidly that there is no need to say to oneself, “That’s my hand (or paw), so I had better remove it.” All that is necessary is that an individual is neurally wired so that her paw is removed from a potentially damaging stimulus.

Next, there is a sense of “body-ness.” Thus, for example, some experimental treatment, object, or other individual might cause pain, and the receiving individual says something like “Something is happening to this body, and I had better do something about it.” There is no need to associate *this* body with *my* body or “me” (or “I”). The sense of “mine-ness” or “body-ness” captures the essence of what I mean. Many animals know about the placement in space of parts or most of their body as they run, jump, and perform acrobatics. D. J. Povinelli and J. G. H. Cant (1995, 400) suggest that the performance by arboreal ancestors of the great ape/human clade of “unusual locomotor solutions . . . drove the evolution of self-conception.” However, many nonprimate mammals also perform complex, flexible, and unusual acrobatic motor patterns when they move and when they play (locomotor-rotational movements; Wilson and Kleiman 1974), and ruling out the possibility that the performance of these behaviors is also important to the evolution of self-conception in nonprimates would be unwarranted. It also is possible that arboreal clambering or the performance of various acrobatic movements during play may be related more to the

evolution of (mere) body awareness (e.g., knowing one's place in space) than to a concept of self. R. Mitchell (2002) also uses the sense of body-ness in his kinesthetic-visual matching hypothesis to explain why some animals make self-directed movements toward a red dot placed on their forehead when they were sedated, the litmus test for studying self-awareness in animals (more on this below).

A sense of body-ness is necessary and sufficient for most animals to engage in the social activities that are needed in the social milieu in which they live. But a sense of body-ness is necessary but not sufficient for humans. For humans, we have the situation in which individuals typically know who they are, say, by name, and know that "this body" is me, Marc, or mine, Marc's. There is a sense of "I-ness" that is an extension of "mineness." Antonio Damasio (2001) refers to a sense of "I-self" that captures much of what I mean by a sense of "I-ness."

I believe that Jethro knew that he was *not* his dog buddy, Zeke. Furthermore, I do not think it mattered to him if he knew that *he* was Jethro, by name. Jethro and other animals know such facts as "this is my territory," "this is my bone or my piece of elk," "this is my mate," and "this is my urine." All Jethro had to know to get along in his dog world was that his was not another's body and some other facts about what was his and what was not his. He and other animals have a sense of possession or a sense of mine-ness, or body-ness, if you will. So, in this way they have a sense of self. This does not mean that Jethro is not as smart as another animal who might know *who* he is and can also reflect on this information; it means that he does just fine with the knowledge that he has. Jethro could communicate a wide variety of messages, socially interact in numerous and varied contexts, and enjoy life as a dog. So, too, can chimpanzees, rhesus monkeys, wolves, bears, crows, sweat bees, ants, and many other animals. Having said this, I also have no doubt that Jethro was a conscious being in that he was aware of the world in which he lived and could modify his behavior to adapt to different and novel situations. He also showed social self-awareness in that he was aware of his various and different relationships with others. Whether or not he had an introspective self and a theory of his and others' minds remains unknown. It surely would be premature to conclude that he did not.

To sum up briefly, it is useful to ask whether some animals to whom some of us attribute a rich sense of self could get along in their worlds with a more parsimonious sense of self, say, a sense of body awareness and mineness. I think they can. So too can human animals. We can get along in many situations if we do not know *who* we are but have at least a sense of mine-ness. An interesting question to ask is what we could do without a sense of self and what can we take away from other animals and still have individuals who are normally functioning members of their species.

"Me Tarzan, You Jane": What's In a Name?

Jack knows he does not know
Jill thinks she knows what Jack does not know, but
she does not know he does not know it.
Jack does not know
 Jill does not know he does not know,
and thinks she knows what he knows he doesn't.
(Laing 1970, 64)

We also can ask questions about possible relationships between perceptual consciousness and self-consciousness. While I believe that there are degrees of perceptual consciousness that are related to what animals had to do to adapt to their social and nonsocial environments, I am not sure that there is a direct link between perceptual consciousness and the having of some sense of self, including a sense of mine-ness. By degrees of perceptual consciousness I mean that while some species may be

programmed to respond to a class of stimuli within which there is variation in a fairly specific way, others may show more flexibility in their responses to stimuli that vary and be able to adjust their behavior in response to these nuances. Still, I do not see that even the most flexible of species is necessarily more self-aware than those that show less variability in behavior. Perhaps perceptual consciousness and self-consciousness are differences in kind rather than differences in degree. The quotation from Darwin cited earlier cautions against this claim, but available data do not allow for an unambiguous answer.

I do not know precisely what early humans knew about themselves as individuals, but I am reminded of the “Me Tarzan, you Jane” monologue in Tarzan movies in which a sense of primitiveness was implied. Two individuals meet, and Tarzan establishes that he is not Jane, suggesting that neither is the other. But this does not tell us much about what each knows about herself or himself, although each could perform difficult acrobatic moves and surely had a sense of body-ness.

Old Brains, New Bottlenecks. Perhaps the rich sense of self that humans have (or at least is potentially attainable by all humans) is an epiphenomenon of our having big and convoluted brains (Bekoff 2003). We have old brains in new bottlenecks—new technological and sociocultural milieus—so it is likely that our ancestors had a sense of self similar to that of modern humans, but one that was used in different ways because of cultural and technological differences between then and now. Perhaps the evolution of self was driven by social demand in that a rich sense of self—more than a sense of mine-ness—was needed in social groups in which individuals were not always visible, and when someone was needed he or she had to be summoned by a specific name. Perhaps there was individual variation and a reproductive advantage in the ability to respond to one’s name such that a cognitive ability centering on knowing who one was evolved.

MINDING ANIMALS: EVOLUTIONARY CONTINUITY

My approach to the study of animal consciousness and self (and also cognition in general and emotions) involves engaging in the practice I call “minding animals” (Bekoff 2002b). I use the phrase “minding animals” in two ways. First, it refers to caring for other animal beings, respecting them for who they are, appreciating their own worldviews, and wondering what and how they are feeling and why. The second meaning refers to the fact that many animals have very active and thoughtful minds. Minding animals entails asking questions about how animals sense their worlds and how they live in their social and nonsocial worlds. Great attention is focused on species and individual differences. By minding animals I and my colleagues can contribute to discussions of the evolution and ecology of consciousness and self.

Animals as a Way of Knowing. There are many ways of knowing, and the animals we study are among them. I make my living carefully watching animals and listening to the stories that they tell about their lives. I try as hard as I can to take their perspectives on their social and nonsocial worlds. I try to understand what they know about themselves and others. There has been much emphasis on nonhuman primates, but it is important to keep in mind that there are many animals other than our primate cousins. It is also important to remember that primatocentric claims and speciesist generalizations are based on very few comparative data derived from tests on very small numbers of nonhuman primates that might not even be representative of their species, for they have been raised—some would say pampered—in human environs. This is not to say that their less-pampered or wild relatives would not behave as they do, but we really do not know that this is the case in most instances. Furthermore, the range of tests used to obtain evidence of consciousness and self is also extremely small, most data sets have been generated from a small number of individuals that may have been exposed to a narrow array of behavioral challenges, and such tests are often biased toward activities that may favor apes over monkeys or members of other nonprimate species. And, much of the work that has been done on nonhuman primates

has involved only a few of the many extant species. We know so little about so many species that sweeping generalizations need to be offered with great caution.

The Need to Know and Behavioral Flexibility. When we study consciousness and self, it is essential to ask whether individuals have a need to know who they are in order to function as normal members of their species. *Behavioral flexibility* often is given as one of the main reasons why animals might need to process information consciously and perhaps to know who they are. Much research is being conducted on the neural bases of behavioral flexibility and consciousness, and this rich and growing field is a book unto itself. Researchers are discovering intriguing relationships between, for example, such variables as forebrain size and feeding innovations and behavioral flexibility in birds and between the size of the brain relative to the size of the body and behavioral flexibility and sociality in mammals. There is some truth to the claim that relative brain size and behavioral flexibility are positively correlated, but much more work needs to be conducted in this fascinating area (Bekoff 2002b).

ANIMAL CONSCIOUSNESS AND SELF-REFLECTION

An evolutionary, comparative, social, and ecological approach to questions about “self ” can help us along immensely concerning why various iterations of consciousness have evolved in different species—what different degrees of consciousness and selfhood are good for, what functions they (may) serve. My approach is in line with Darwin’s notions about evolutionary *continuity*—that differences among various species are often differences in degree rather than differences in kind.

Now that I have put the cart before the horse, I suppose many readers will believe that they don’t have to read what I have to say. But bear with me, and perhaps I will write a few morsels that will stimulate serious reflection: *We are looking for “self ” in all the wrong places and on all the wrong faces.* I will not attempt to review all available literature, for there are many places one can go to get a read for the state of the art (e.g., Dawkins 1993; Parker, Mitchell, and Boccia 1994; de Veer and van den Bos 1999; Gallup, Anderson, and Shillito 2002; Mitchell 2002; Shumaker and Swartz 2002).

It is an understatement to note that there is a lot of controversy and turf defense surrounding many of the difficult issues that need to be considered in discussions of animal consciousness and selfhood. Some of the controversy turns on how consciousness is defined. We still do not have a good sense of what the words *consciousness*, *self*, and *self-identity* mean even for humans. And, as I noted above, some disputes center on the fact that because we never can know with certainty what animals are thinking or whether they are conscious, it is not worth studying this aspect of their behavior, for we will be able only to make better or worse guesses about their thoughts and conscious states (if any).

If being conscious means only that one is aware of one’s surroundings, many animals are obviously conscious. Simple awareness of this sort is called perceptual consciousness.

It is when people make the jump from simple awareness to questions of self-consciousness or self-awareness (I use these terms interchangeably for the sake of this discussion) in animals that the fur and feathers begin to fly. Many researchers argue that there are different degrees of consciousness. In addition to perceptual consciousness, there is also what some argue is a higher degree or level of consciousness, namely self-consciousness, an awareness of who one is in the world. For example, as long as my brain works normally, I know that I am Marc Bekoff, and I can be fairly certain that there are no other Marc Bekoffs who are exactly like me, with the same set of past experiences and future expectations. If something happens to me that I like or dislike, I know it is happening to me.

It is also possible that I may not know who I am but may be fully aware of something happening to my body. If I receive a blow to my head I may not know my name, but I am able to feel the pain that is caused

by my injury, and it would be wrong to make me suffer just because I do not know who I am. This happened to me after a serious bicycling accident. I did not know who I was or where I was, but I experienced great pain because I had knocked out three of my front teeth and most of the skin was peeled off one side of my face as I slid across asphalt. There also is little doubt that many other animals know when something painful happens to “this body” in the absence of knowing who they are in the way that normal humans know who they are.

The Red-Spot Technique: Mirror, Me? While it is not known whether other animals know *who* they are, some great apes have been shown to use their mirror image to groom parts of their bodies—their teeth and their backs—that they cannot see without the mirror. Some chimpanzees, but surely not all, also look into a mirror and touch a red spot that was placed on their foreheads when they were sedated. Some dolphins also respond to a spot on their foreheads as if they know that the spot is on themselves (Reiss and Marino 2001).

The ingenious red-spot technique was first used by psychologist Gordon Gallup and has been used widely on some great apes and a handful of monkeys, elephants, and dolphins. As Colin Allen (in a personal communication) aptly claims, this test spurred a “cottage industry” among primatologists with the general, though surely not final, word that chimpanzees get it, solitary orangutans get it, perhaps a few educated gorillas get it, but monkeys do not (although many species of monkeys live in social groups; for comparative data see Shumaker and Swartz 2002; Wise 2002). The few dolphins who have been tested do not touch their foreheads but rather orient their bodies in such a way that it looks as if they are trying to visually inspect the dot.

Some researchers offer a rich interpretation of what it means to pass the spot experiments and argue that this sort of self-directed behavior suggests not only that chimpanzees might have a sense of their own bodies but also that their response to the red dot means to them “This is me,” that they are self-conscious, they know “who” they are (see the quotations by Gallup cited earlier). Mitchell offers a less ambitious interpretation. He argues that humans and some apes (and perhaps dolphins) can match their kinesthetic (proprioceptive/somasthetic) experience of their body to a visual image of that experience and thereby can “recognize themselves” in mirrors. The individual recognizes that the visual display in the mirror is the same as its kinesthetic experience and infers that the mirror image is its own. Mitchell writes, “Kinesthetic-visual matching . . . is the recognition of similarity between the feeling of one’s own body extent and movement (variously called “kinesthesia,” “somasthesis,” or “proprioception”) and how it looks (vision)” (2002, 346).

A single technique based on solely visual cues such as the mirror test is not the only valid test of self-awareness. It is not species-fair, in that individuals of many species do not naturally make self-directed movements toward their head (gorillas tend to avoid eye contact) and often depend on cues other than visual stimuli in their social encounters. Thus, if animals “fail” this test it does not mean that they do not have some sense of self (Fox 1982; Bekoff 2002a, b; Mitchell 2002; Shumaker and Swartz 2002). Likewise, passing this test does not necessarily mean that an individual knows who he or she is. Whether this rich explanation for self-directed behaviors is warranted remains to be determined. Critics come from all camps. M. W. Fox (1982) argues that many animals are self-aware but that the red-dot test is too narrow, whereas C. M. Heyes (1994) claims that the red-dot test is invalid and that we ought to stop conducting these sorts of studies because there really is no way at all to come to terms with animal consciousness or the notion of animal selves. Mitchell’s kinesthetic-visual matching hypothesis (2002) offers a different mechanism by which individuals may perform self-directed movements toward a dot on their forehead that they can see only by looking in a mirror. My and most others’ caution about what self-directed responses to the spot indicate should not be taken to mean that some animals do not know who they are. We just do not know very much about animal self-awareness as of now.

Some may see my view concerning a rather impoverished sense of self in animals as being situated in that boring middle ground or as a cop-out. I do not see it that way, for I argue that animals get along quite well without a rich concept of self. I think that the “rich” or inflationary view is as weak and as misleading as the “poor” or deflationary view and that each stance removes emphasis from the project at hand—to try to figure out *what* other animals are capable of knowing (and doing) and *why*. I agree with colleagues who have argued that the social sense of self that many animals possess is very different from conscious self-awareness in humans (e.g., Seyfarth and Cheney 2000). This is not to say that the social sense of self is lower than or not as good as the richer (that is, human) sense of self, but rather that it works for the animals—it allows them to function in the social and nonsocial worlds within which they live. This also is not to say that in the absence of a rich sense of self animals do not experience their own pain and suffering and that we can do with them what we want. Body awareness is sufficient for them to feel pain and to suffer; even if animals (including humans) do not know who they are, this does not mean that they do not experience pain. I agree with Georgia Mason, who points out that there seems to be no good reason why self-awareness needs to be as a prerequisite for suffering, why “the (self-aware) feeling ‘I am suffering’ [should] be considered worse than the (not self-aware) ‘Something truly terrible is happening’” (1994, 57–58). Attributions of self can place one on a slippery slope and be self-serving in a speciesistic manner.

Odors, Sounds, and Self: Going beyond Vision. It is essential to expand studies of self-concept to include investigations of the role of sensory modalities other than vision for animals who cannot recognize themselves in a mirror, and also to determine whether and how cues from different modalities might interact with one another. Perhaps a sense of self relies on a composite signal that results from an integration of stimuli from different modalities. Numerous animals rely more heavily on auditory and olfactory stimuli than on visual input in many of their social encounters, and it is important to consider sounds and odors in studies of self. Mirrorlike visual images are absent in most field situations, but it remains possible that individuals learn something about themselves from their reflections in water (Salzen and Cornell 1968).

Odors and auditory clues are important in the worlds of many animals. Jethro and many other animals can easily differentiate between their own and others’ urine (and other scents), and birds readily know their own and others’ songs. In a field experiment I performed during five winters that involved moving Jethro’s urine (“yellow snow”) from place to place (Bekoff 2001), his sniffing responses differed when coming upon his own yellow snow as compared to his reaction to other dogs’ yellow snow. Of course, how this bears on what animals know about themselves remains unclear, but it is essential to stress that a visioncentric methodology is surely too confining given what is known about the sensory world of animals.

Summary. I favor a view that recognizes different degrees of consciousness and self-consciousness. I resist placing a higher value on animals who *seem* to be more self-aware than others. Knowing *who* you are is not necessarily better than knowing you are not another individual.

It is obvious that many animals are awake and aware of their surroundings and that they respond to changes in social and nonsocial stimuli with which they are confronted simultaneously and sequentially. Many animals also behave “as if ” they have a sense of self, that is, in a manner that shows that they have some sense of their own bodies and that they know that their bodies are not the bodies of others. Whether body-awareness also indicates self-awareness—that individuals know *who* they are—remains a mystery. Perhaps we are looking for self in all the wrong places or on all the wrong faces.

Behavioral Flexibility and Misrepresentation. The notion of behavioral flexibility is relevant to attributions of consciousness and self because it is connected to an organism’s monitoring of its own performance.

An organism that cannot detect when its states misrepresent its environment will be limited with respect to the adjustments it can make when those states are caused by abnormal or unpredictable stimuli.

D. R. Griffin placed consciousness high on the agenda of cognitive ethology and suggested that consciousness evolved to allow adaptively flexible behavior. According to this suggestion, adaptively flexible behavior provides evidence of consciousness. It also has been suggested that consciousness evolved in social situations where it is important to be able to anticipate the flexible and adaptive behavior of others. If this is true, complex social skills might be taken as evidence of consciousness. D. Piggins and C. J. C. Phillips (1998) have argued that because there are energetic costs to the evolution of different degrees of awareness due to the neural apparatus on which awareness depends, animals who live in variable environments will evolve increased awareness, whereas those who live in more stable environments will not. Their view is consistent with that of others who see conscious awareness as being involved in behavioral flexibility. Their ideas lend themselves to empirical study, and in that light they are important for future studies of conscious awareness in animals.

Along with behavioral flexibility, features commonly cited to support attributions of consciousness include the integration of information from multisensory—visual, auditory and olfactory—sources, and language skills. Some researchers have assumed that consciousness provides an organism with a means to gain knowledge or information about its environment. If this is so, perceptual capacities provide evidence of consciousness.

MOVING BEYOND PRIMATES: ARE WE ALONE?

The fascination with the notion of self among ethologists and comparative scientists has largely been engendered by work on mirror self-recognition in primates, but we need more research on other animals for whom the red-spot experiments are not appropriate, for species in which touching the forehead is not a natural act. We need species-fair tests that, while designed by humans, take into account the natural behavior of the animals that are being studied. The study of self in animals is in its infancy, and we can learn much by using new techniques on a wider variety of taxa.

We do not currently know which animals are aware of themselves and which animals are not. Perceived differences among species may be a result of using a single method that is not suited for all species. We also do not know much about the sense of self in wild animals, for research on self-awareness has been done on a very limited number of individuals who have lived in close contact with humans. Many of these captive animals have required extensive training. It may seem obvious to some humans that animals who are closely related to us or with whom we are familiar (gorillas or dogs, for example) are self-conscious, but we do not really know that this is so. Research in this area is exciting and challenging and leads to extremely interesting questions that might tell us about other aspects of behavior. Research in self-awareness will also inform arguments about human uniqueness.

If we pay attention to some basic and well-accepted biological ideas, especially evolutionary continuity, it is difficult to justify the belief that ours is the only species on this planet in which individuals are self-conscious. It remains possible that there are degrees of selfhood and that humans are just another point on a continuum of the evolution of self. Indeed, it is possible, as M. Hauser notes, that humans are unique in having the sense of themselves that they do, “to understand what it’s like to have a sense of self ” (2000, 112).

Perhaps some animals simply do not need to know who they are. Piggins and Phillips postulate that “humans possess a significantly increased level of awareness, facilitated in particular by the acquisition of language, but that generally animals possess a level of awareness that is appropriate to their need”

(1998, 181). Thus, while it may be useful for humans to know themselves by name (I surely find it so), Jethro likely did not have a need to know who he was in order to live a dog's life. Animals do not have to write autobiographies. Individual animals surely need to know that they are not another individual, but this does not mean that they need to be self-aware. Rather, it is necessary and sufficient only that they have a sense of their own bodies and body-awareness. Obviously, many animals are able to distinguish their own bodies—themselves—from others and represent themselves to themselves and to the world in this manner. Jethro knew that he was not Zeke, his buddy who visited him every day, and this knowledge was sufficient for him to get along well in the world of dogs.

As a working hypothesis and to broaden the array of animals in which the notion of self is investigated, I suggest that we perform more motivated studies of self in such highly social animals as gray wolves (*Canis lupus*), carnivores that live in packs in which coordination and efficiency in communicating among individuals is essential for activities such as playing, hunting, rearing young, defending and sharing food, and defending territory boundaries. It would be highly inefficient for an individual to have to guess all of the time what others are thinking or feeling. Understanding the psychological states of others would allow for accurate and flexible predictions of their behavior (Tomasello and Call 1997). Perhaps one would predict that a more highly developed sense of self would evolve in social carnivores as compared to solitary nonhuman primates, given what the former need to do in their social worlds. However, these sorts of predictions could possibly evolve in wolves and other animals by individuals knowing, in the absence of rich self-awareness, that they are not another individual, that their body is not that of another.

ETHICS AND THE STUDY OF SELF

“The data invoked for ape rights on the basis of their minds and behavior are invariably the fluffiest and least scientifically compelling data; where data are collected most rigorously, they point to the mental differences between us. Having three times as much brain does, it seem, make a difference” (Marks 2002, 186). In his sweeping dismissal based on an extremely superficial review of available data, including a plethora of quantitative “hard data” on questions dealing with minds and behavior (see for example Hauser 2000; Bekoff 2002a; essays in Bekoff, Allen, and Burghardt 2002), J. Marks actually sets up a much-welcomed challenge. Of course there are differences among species, but one would expect variations based on social, ecological, and other factors. However, there also are compelling similarities, even if relative brain size makes a difference in some aspects of behavior. Indeed, I know of no researcher who does not believe that relative brain size makes a difference. Just what these differences are, however, remains largely a mystery.

Whether or not one believes that there are no useful data in the study of animal minds, the having of a sense of self is often used as a criterion for assigning moral and legal standing to animals (Bekoff and Jamieson 1991; Wise 2002). Despite the supposed lack of hard data, it is clear that many animals have a parsimonious sense of self that allows them to function within the social and nonsocial milieus in which they live. Dale Jamieson (2002) points out that, because of the moral lessons associated with cognitive ethological studies, this science could become a subversive one in that strong and demeaning skepticism (speciesistic, for sure) might grow as we learn more about animal cognition, emotions, and self. But this does not have to be the case, because this knowledge can help us to develop better and more ethical research (see the Web site www.ethologicaethics.org). To this end, it is highly significant that the editors of the prestigious journal *Nature* concluded, “Given the passions raised by animal experimentation . . . the science of animal suffering and cognition should be given a higher priority” (*Nature* 2002, 351). Let us hope that future work will be noninvasive and employ various neuroimaging techniques that have been used to study self-reflection in humans (Johnson et al. 2002). A major challenge will be to integrate neurobiological data with behavioral observations (Colin Allen, personal communication).

If animals, including those who are routinely used for research, education, amusement, food, and clothing, are aware of not only their own but also the emotional states of others (as suggested by Preston and de Waal 2002 and others; see Bekoff 2002b), there are serious implications for considerations of their well-being. An additional dimension of awareness must be taken into account, because individuals enjoy and suffer not only their own but also others' feelings (Bekoff 2002b). Added to concerns about how animals are treated by humans in captivity and in nature, considerations of empathy compound an already challenging and contentious debate about the humane treatment of animals (Bekoff 2000; 2002c).

WHERE TO FROM HERE? BACK TO BASICS

The fact that it is difficult to design studies that bear on questions of self does not mean that some other animals do not have some sense of self. Some directions for future research include not getting fixated on a single method, going beyond primates, and not judging consciousness from forms we humans have and recognize.

Because we cannot see the minds of others, neural imaging is a very promising technique. Let me emphasize that methodology is a key issue—that we must take into account the animals being studied and not assume that one, or a few, different techniques provide the acid test for determining their cognitive capacities. But let me also emphasize that we do have the tools to do these studies, tools such as neural imaging that have worked for humans (e.g., Johnson et al. 2002). Damasio (2001) has made this clear in his discussion of how to access human feelings. The study of animal consciousness and self demands multilevel, multidimensional, and interdisciplinary analyses and cooperation, cooperation among people who often do not know of one another's work or who may not want to cooperate because they think some others' research is too "soft."

We do not yet have enough information for making such claims as "chimpanzees have a sense of self, but monkeys, dogs, and fish do not." Much research is also needed to identify those behavior patterns that are instances of consciousness and self. Whether language is a necessary prerequisite for self-consciousness remains debatable. Some see this move as reserving self-consciousness and self-reflection only for humans.

We also do not have the slightest notion of the extent of individual variation within species of senses of self and whether or not this variation, if it exists in measurable amounts, means anything at all about future reproductive fitness. Perhaps a sense of self is an epiphenomenon of other traits, one that is not subjected to direct selection. Not all behavior patterns have direct fitness consequences.

I hope that I have given a fair overview of what we know and what we do not know about animal consciousness and animal selves. By coming to terms with the cognitive (and emotional) lives of other animals we will come to understand and appreciate them for the awesome beings they are, not for the beings we want them to be.

NOTE

I thank Jethro, who died during the preparation of this essay, for his companionship and for tolerating my asking him if he had a sense of self. I also thank Colin Allen for his input to just about all of my ideas about animal consciousness, many of which are taken from our book *Species of Mind* (Allen and Bekoff 1997). He above all has pushed me and many others to come clean with what we mean when we speak of consciousness and self. Richard Ashmore invited me to the symposium at Rutgers University at which an early draft of this paper was presented and also provided very useful input. Dale Jamieson has discussed many of these issues with me and has continued to ask, "What do you all really mean when

you talk about self-awareness?" While neither Allen nor Jamieson agrees with all of my conclusions, it is difficult in some places to know what is mine, what is theirs, and what is ours. I thank them for grounding me, for introducing me to relevant philosophical literature, and for putting up with my incessant questions.

REFERENCES

- Allen, Colin, and Marc Bekoff. 1997. *Species of Mind: The Philosophy and Biology of Cognitive Ethology*. Cambridge: MIT Press.
- American Zoologist. 2000. "Animal Consciousness: Historical, Theoretical, and Empirical Perspectives." *American Zoologist* 40:833–921.
- Animal Welfare. 2001. "Consciousness, Cognition, and Animal Welfare." *Animal Welfare* 10 (Supplement): S1–S251.
- Bekoff, Marc. 2000. *Strolling with Our Kin*. New York: Lantern Books.
- . 2001. "Observations of Scent-marking and Discriminating Self from Others by a Domestic Dog (*Canis familiaris*): Tales of Displaced Yellow Snow." *Behavioural Processes* 55:75–79.
- . 2002a. "Animal Reflections." *Nature* 419:255.
- . 2002b. *Minding Animals: Awareness, Emotions, and Heart*. New York: Oxford Univ. Press.
- . 2002c. "Empathy: Common Sense, Science Sense, and Well-Being." *Behavioral and Brain Sciences* 25:26–27.
- . 2003. "Old Brains in New Bottlenecks: Why We Seek Nature's Wisdom." *Environmental Values* 12:1–2.
- Bekoff, Marc, Colin Allen, and Gordon M. Burghardt, eds. 2002. *The Cognitive Animal: Empirical and Theoretical Aspects of Animal Cognition*. Cambridge: MIT Press.
- Bekoff, Marc, and Dale Jamieson. 1991. "Reflective Ethology, Applied Philosophy, and the Moral Status of Animals." *Perspectives in Ethology* 9:1–47.
- Damasio, Antonio. 2001. "Fundamental Feelings." *Nature* 413:781.
- Darwin, Charles. [1871] 1936. *The Descent of Man and Selection in Relation to Sex*. New York: Random House.
- Dawkins, Marian S. 1993. *Through Our Eyes Only?* San Francisco: Freeman.
- de Veer, M. W., and R. van den Bos. 1999. "A Critical Review of Methodology and Interpretation of Mirror Self-recognition Research in Nonhuman Primates." *Animal Behaviour* 58:459–68.
- Fox, Michael W. 1982. "Are Most Animals 'Mindless Automaton'? A Response to Gordon Gallup, Jr." *American Journal of Primatology* 3:341–43.
- Gallup, Gordon G. Jr. 1998. "Can Animals Empathize? Yes." *Scientific American* 9 (4): 66–71.
- Gallup, Gordon G., J. R. Anderson, and D. J. Shillito. 2002. "The Mirror Test." In *The Cognitive Animal: Empirical and Theoretical Aspects of Animal Cognition*, ed. M. Bekoff, C. Allen, and G. M. Burghardt, 325–33. Cambridge: MIT Press.
- Hauser, Marc. 2000. *Wild Minds: What Animals Really Think*. New York: Henry Holt.
- Heyes, Cecilia M. 1987. "Cognisance of Consciousness in the Study of Animal Knowledge." In *Evolutionary Epistemology*, ed. W. Callebaut and R. Pinxten, 105–36. Amsterdam, the Netherlands: D. Reidel.
- . 1994. "Reflection on Self-recognition in Primates." *Animal Behaviour* 47:909–19.
- Jamieson, Dale. 2002. "Cognitive Ethology at the End of Neuroscience." In *The Cognitive Animal: Empirical and Theoretical Aspects of Animal Cognition*, ed. M. Bekoff, C. Allen, and G. M. Burghardt, 69–75. Cambridge: MIT Press.
- Johnson, S. C., L. C. Baxter, L. S. Wilder, J. G. Pipe, J. E. Heiserman, and G. P. Prigatano. 2002. "Neural Correlates of Self-reflection." *Brain* 125:1808–14.
- Laing, R. D. 1970. *Knots*. New York: Vintage Books.

- Marks, J. 2002. *What It Means to Be 98% Chimpanzee: Apes, People, and Their Genes*. Berkeley: Univ. of California Press.
- Mason, Georgia. 1994. "Review of F. Wemelsfelder, 'Animal Boredom: Towards an Empirical Approach of Animal Subjectivity.'" *Animal Welfare* 3:57–60.
- Mitchell, Robert. 2002. "Kinesthetic Visual Matching, Imitation, and Self-recognition." In *The Cognitive Animal: Empirical and Theoretical Aspects of Animal Cognition*, ed. M. Bekoff, C. Allen, and G. M. Burghardt, 345–51. Cambridge: MIT Press.
- Nature*. 2002. "Rights, Wrongs and Ignorance." *Nature* 416:352.
- Piggins, D., and C. J. C. Phillips. 1998. "Awareness in Domesticated Animals—Concepts and Definitions." *Applied Animal Behaviour Science* 57:181–200.
- Povinelli, Daniel J., and J. G. H. Cant. 1995. "Arboreal Clambering and the Evolution of Self Conception." *Quarterly Review of Biology* 70:393–421.
- Premack, David, and G. Woodruff. 1978. "Does a Chimpanzee Have a Theory of Mind?" *Behavioral and Brain Sciences* 1:515–26.
- Preston, Stephanie D., and Frans B. M. de Waal. 2002. "Empathy: Its Ultimate and Proximate Bases." *Behavioral and Brain Sciences* 25:1–74.
- Reiss, Diana, and Lori Marino. 2001. "Mirror Self-Recognition in the Bottlenose Dolphin: A Case of Cognitive Convergence." *Proceedings of the National Academy of Sciences* 98: 5937–42.
- Salzen, Eric A., and James M. Cornell. 1968. "Self-Perception and Species Recognition in Birds." *Behaviour* 105:44–65.
- Seyfarth, Robert M., and Dorothy L. Cheney. 2000. "Social Awareness in Monkeys." *American Zoologist* 40:902–9.
- Sheets-Johnstone, Maxine. 1998. "Consciousness: A Natural History." *Journal of Consciousness Studies* 5:260–94.
- Shumaker, Robert W., and Karyl B. Swartz. 2002. "When Traditional Methodologies Fail: Cognitive Studies of Great Apes." In *The Cognitive Animal: Empirical and Theoretical Aspects of Animal Cognition*, ed. M. Bekoff, C. Allen, and G. M. Burghardt, 335–43. Cambridge: MIT Press.
- Tomasello, Michael, and Josep Call. 1997. *Primate Cognition*. New York: Oxford Univ. Press.
- Wilson, Susan C., and Devra G. Kleiman. 1974. "Eliciting Play: A Comparative Study." *American Zoologist* 14:341–70.
- Wise, Stephen M. 2002. *Drawing the Line: Science and the Case for Animal Rights*. Cambridge, Mass.: Perseus Books.