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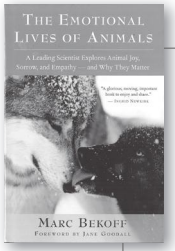

Those communities which included the greatest number of the most sympathetic members would flourish best and rear the greatest number of offspring.

— CHARLES DARWIN, *THE DESCENT OF MAN AND SELECTION IN RELATION TO SEX*

I've long been interested in play behavior. This might sound like a frivolous field of study — a number of my colleagues certainly told me so when I first started — but after years of examining videotapes of playing dogs, coyotes, and wolves and trying to understand why animals play the way they do, I have been led to ask a series of big and ultimately surprising questions: Do animals play fair? Do they negotiate agreements to play (as opposed to fighting or mating), and do those agreements require cooperating, forgiving, apologizing, and admitting when they're wrong, as well as trusting others? Are animals honest? If one breaks their agreement, do they consider that wrong? Are there consequences for doing something wrong? If animals demonstrate a dislike for getting the short end of the stick or being short-changed, does that indicate that animals have a sense of justice, of right and wrong, good and bad — does that mean, in other words, that animals are moral beings? And if animals can be shown to display a sense of justice along with a wide range of cognitive and emotional capacities, including empathy and reciprocity, does that make the differences between humans and all other animals a matter of degree rather than kind?

Finally, if all this is true, then is morality in fact an evolved trait? Does "being fair" mean being more fit — does being more virtuous improve an individual's reproductive fitness, while being less virtuous harm it? To put it anther way, do nice guys, gals, and their genes last longest? Do the nicest survive best?

These are indeed big, complicated, difficult questions, but mounting evidence points straight to the conclusion that there is "honor among beasts." While much of the research that's been aired widely deals with nonhuman primates, especially the work of Frans de Waal and his colleagues at Emory University in Atlanta, Georgia, there are also compelling data from studies on social carnivores that support the claim that moral behavior is more widespread among animals than previously thought. In *Primates and Philosophers: How Morality Evolved*, de Waal argues that human morality is on a continuum with animal sociality, though he isn't sure that animals are moral beings. However, he doesn't consider social play behavior.

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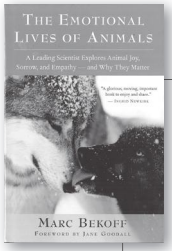

Based on my long-term detailed studies of play in social carnivores — including wolves, coyotes, red foxes, and domestic dogs — I believe we can make the stronger claim that some animals might be moral beings. Other ethologists (such as Nobel laureate Niko Tinbergen and the well-known field biologist George Schaller) certainly stress that we might learn more about the evolution of human behavior from studies of social carnivores than from studies of other primates because the social behavior and social organization of many carnivores resemble that of early hominids in a number of important ways (divisions of labor, food sharing, care of young, and intrasexual and intersexual dominance hierarchies). Given this, social carnivores may hold the key for unlocking the nuances of animal morality.

So how does play figure into discussions of morality? To begin with, when animals play there are rules of engagement that must be followed, and when these break down, play suffers. Animal play appears to rely on the universal human value of the Golden Rule — do unto others as you would have them do unto you. Following this requires empathy (feeling another's feelings) and implies reciprocity (getting paid back for favors assuming that others follow the same rule). Further, in the social arena, animals who don't play well don't seem to do as well as those who do play. Darwin might very well have been right when he speculated that more sympathetic individuals have more reproductive success — they survive better. By the end of this chapter, I propose that this means we should make another paradigm shift in how we understand animals and ourselves. "Survival of the fittest" has always been used to refer to the most successful *competitor*, but in fact *cooperation* may be of equal or more importance. It is likely that for any species individual survival requires both to some degree, while for social species (as opposed to asocial species) the balance may shift significantly, with the most cooperative individuals most often "winning" the evolutionary race.

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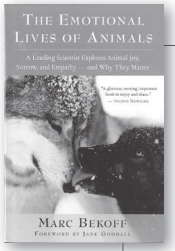

JEROME AND FERD:

Two Dogs at Play

A few years ago one of my students, Josh, called me and, with much excitement in his voice, told me the following story of watching his 120-pound malamute, Jerome, engaged in play:

> I saw the most amazing thing today at Mount Sanitas. Jerome wanted to play with a strange dog named Ferd who was about a quarter his size. Jerome bowed, barked, wagged his tail, rolled over on his back, leapt up, and bowed again, all to no avail. Ferd just stood there with surprising indifference. But about a minute later, while Jerome was sniffing a bush where a large mutt had just peed, Ferd strolled over and launched onto Jerome's neck, and bit him hard and was sort of hanging in midair, legs off the ground. I thought, this is it; Jerome will kill this little monster.
>
> And you know what? Jerome shrugged Ferd off like a fly on his back, turned around and bowed, and then took the little guy's head into his mouth and gently mouthed him. They then played for about half an hour, during which Jerome never ever was very assertive or unfair. He'd bite Ferd softly, roll over, paw at his friend's face, and swat him lightly. Then when things got rough, and Ferd backed off with his tail down and cocking his head from side to side — trying to figure out if he was a goner — Jerome would bow again and they'd play some more. Jerome seemed to know that he had to be nice and fair in order to play with his little buddy. Ferd knew what Jerome wanted, and Jerome knew what Ferd wanted, and they worked together to get it. Man, dogs are smart. I couldn't believe it.

Josh was a good student. He understood the "language" of animal play (which I describe further below), and so he was able to "read" this encounter and all of its internal communications. However, I'm willing to guess that anyone watching these two mismatched dogs would have been able to tell, after a few minutes, that they were playing and not fighting — just as we can tell at a distance whether two boys who are wrestling really mean to hurt each other or whether they are just kidding around. This is because, when animals play, they must *agree* to play. They must cooperate and behave fairly, and the language of cooperation is easy to recognize. Further, when cooperation and fairness break down, play not only stops, it becomes impossible. *Uncooperative play* is an oxymoron, and that is a large reason why play is such a clear window into the moral lives of animals.

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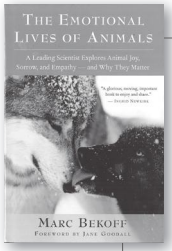

WHAT IS PLAY?

Most of my research on play has involved domestic dogs and their wild relatives, coyotes and wolves (that is, canids, or members of the dog family), so while I focus on the animals I know best in this chapter, there are ample examples from other animals that support my views on play and social morality. Young cats, chimpanzees, bears, and rats, to name only a few, love to play to exhaustion. Even as I'm writing this at six o'clock on a cool August morning, two red foxes are playing outside my office. They do this almost every day. One invites the other to play by bowing, the other responds, and then they wrestle, rear up on their hind legs and scream and box, chase one another, rest, and play some more. If one bites the other too hard, there's a brief pause during which they look at each other to make sure all is okay — that this is still play — and then resume romping. They're negotiating with each other to maintain the rules of fair play. So long as they keep negotiating, they feel comfortable playing very vigorously because they share a common goal and know that neither will try to beat up the other.

I think of play as being characterized by what I call the "Five S's of Play": its Spirit, Symmetry, Synchrony, Sacredness, and Soulfulness. The Spirit of play is laid bare for all to see as animals wildly run about, wrestle, and knock one another over. The Symmetry and Synchrony of play is reflected in the harmony of the mutual agreements to trust one another — individuals share intentions to cooperate with one another to prevent play from spilling over into fighting. This trust is Sacred. Finally, there's deepness to play, for animals become so completely immersed in it that I like to say they *are* the play. Play is thus a Soulful activity, an expression of the essence of an individual's being.

There's also incredible freedom and creativity in the flow of play. This is easy to see and amazing to watch. I refer to this as the "Six F's of Play": its Flexibility, Freedom, Friendship, Frolic, Fun, and Flow. As they run about, jump on one another, somersault, and bite one another, animals re-create a mind-boggling array of scenarios and social behaviors. It's difficult to believe that when animals are deep into play they can actually keep track of what they are doing, but they can. It's possible that animals are "practicing" and "rehearsing" important behaviors that will help them to survive. As animals play, it's not unusual to see known mating behaviors intermixed in highly variable kaleidoscopic sequences along with actions that are used during fighting, looking for prey, and avoiding becoming someone else's dinner. In no other activity but play do you see all of these attributes and behaviors occurring together.

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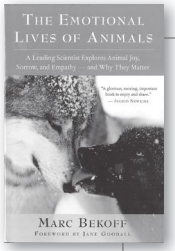

FUN, FUN, FUN:
Why Animals Play

Animals love to play because play is fun, and fun is its own very powerful reward. Dogs and other animals seek out play relentlessly, and it's very difficult to get them to stop; normal animals don't usually intentionally seek out activities they don't enjoy. The joy associated with play is so strong that it outweighs the possible risks, such as injury, depletion of energy and therefore compromised growth, and death by a perceptive predator. Young animals know how to play from the get-go, and when they don't, we take that as a sign there's possibly something wrong.

When animals play we can feel their deep joy. Play is contagious, and other animals feel the joy and glee as well. Research on mirror neurons (which I describe in chapter 5) supports the notion that individuals can feel the emotions of others, and this likely is the reason that an atmosphere of play spreads rapidly among animals in a group. In her book *On Talking Terms with Dogs*, Norwegian dog trainer Turgid Rugaas refers to play signals as "calming signals." Animals typically play only when they're relaxed, so the inherent joy and serenity in play often spreads to anyone who is watching.

Indeed, as we've already seen, animals and humans share many of the same emotions and same chemicals that play a role in the experience and expressions of emotions such as joy and pleasure. Recent research has also shown that when people are cooperating and being fair to one another, it feels good. Since play is dependent on cooperation and fairness, this may be another reason animals love to play. James Rilling and his colleagues have used functional Magnetic Resonance Imaging (fMRI) on humans to show that the brain's pleasure centers are strongly activated when people cooperate with one another. This important research shows that there's a strong neural basis for human cooperation: that it feels good to cooperate, that being nice in social interactions is rewarding. Also, researchers have identified a "trust center" in human brains called the caudate nucleus. Activity in the caudate nucleus is greatest when generosity is repaid with generosity. There's every reason to believe that the brains of animals share this trust center with us. In short, research is showing that we might actually be wired to be nice to one another.

If being nice feels good, then that's a good reason for being nice. It's also a good way for a pattern of behavior to evolve and to remain in an animal's arsenal.

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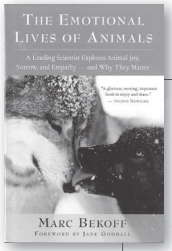

IT BEGINS WITH A BOW:

How Animals Play

We know that birds and many other species engage in social play, but as yet there are too few data from which to draw detailed conclusions about the nature of their play. But in my studies of dogs and other canids, I've learned that they use specific play signals to initiate and to maintain social play. Play is a voluntary activity, and it can't occur if individuals don't agree.

How do animals tell one another "I want to play with you"? Play frequently begins with a bow (which I describe in chapter 2), and bowing is repeated during play sequences so as to insure that play doesn't slip into something else, like fighting or mating. After each individual agrees to play, there are on-going, rapid, and subtle exchanges of information so that their cooperative agreement can be fine-tuned and negotiated on the run, so that the activity remains playful. It's important for players to express and to share their intentions to play.

As I've noted, when animals play they often use actions, such as predatory behavior, antipredatory behavior, and mating that are also carried out in other contexts. Because there's a chance that various behavior patterns that are performed during ongoing social play can be misinterpreted as being real aggression or mating, individuals use a bow to tell one another such messages as "I want to play," "This is still play no matter what I am going to do to you," and "This is still play regardless of what I just did to you."

In order to learn the dynamics of play, it's essential to pay attention to subtle details that can be lost or go unnoticed when, for instance, we are simply watching dogs in the park. Dogs and other animals keep close track of what's happening, so we need to also. My studies of play are based on careful observation and meticulous analyses of videotape. I watch tapes one frame at a time to see what the animals are doing and how they exchange information about their intentions and desires during play. This can be tedious work, and indeed, some of my students who were excited about studying dog play had second thoughts after seeing what it entailed.

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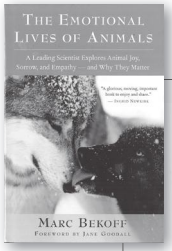

After many years of study, I've discovered that the "bow" isn't used randomly but with a purpose. For example, biting accompanied by rapid side-to-side shaking of the head is performed during serious aggressive and predatory encounters, and it can easily be misinterpreted if its meaning isn't modified by a bow. I was surprised to learn that bows are used not only right at the beginning of play to tell another dog "I want to play with you," but also right before biting, accompanied by rapid side-to-side head shaking, as if to say, "I'm going to bite you hard but it's still in play." Bows are also used right after vigorous biting, as if to say, "I'm sorry I just bit you so hard, but it was play." Bows serve as punctuation, an exclamation point, to call attention to what the dog wants.

Infant dogs and their wild relatives rapidly learn how to play fairly using play markers such as the bow, and their response to play bows seems to be innate. Pigs use play markers such as bouncy running and head twisting to communicate their intentions to play. Jessica Flack and her colleagues discovered that juvenile chimpanzees will increase the use of signals to prevent the termination of play by the mothers of their younger play partners. Researchers who study the activity always note that play is highly cooperative. I can't stress enough how important it is that play is carefully negotiated, that it is fine-tuned on the run so that the play mood is maintained. There are social rules that must be followed.

Across many different species there's little evidence that play signals are used to deceive others. Play signals are honest signals, and only very rarely are they used to hide aggressive intentions. Animals almost never say, "I want to play with you" and then, when the other animal is vulnerable, engage in a real attack. This is most likely because there are sanctions for lying. For example, I discovered that coyotes who bow and then attack are unlikely to be chosen as play partners, and they also have difficulty getting others to play. My field studies also have shown that this makes them more likely to leave their group, and this can lower their reproductive fitness.

It's simple: If a dog wants to play, he must ask first by bowing. If the other dog doesn't return the bow, she doesn't want to play, and the first dog must move on.

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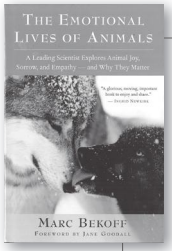

Other Play Markers: Role-Reversing and Self-Handicapping

The bow isn't the only signal used during social play; two other important ones are role-reversing and self-handicapping. Role-reversing and self-handicapping reduce inequalities in size and dominance rank between players, and they promote the reciprocity and cooperation that's needed for play to occur.

Self-handicapping (or "play inhibition") happens when an individual performs a behavior pattern that might compromise her outside of play. For example, a coyote might decide not to bite her play partner as hard as she can, or she might not play as vigorously as she can. Inhibiting the intensity of a bite during play helps to maintain the play mood. I once picked up a twenty-two-day-old coyote only to have him bite through my thumb with his needle-sharp teeth. His bite drew blood and it really hurt. The fur of young coyotes is very thin, and as I found out, an intense bite results in much pain to the recipient, as evidenced by the high-pitched squeals (the coyotes', not mine!). An intense bite is a play-stopper. In adult wolves, a bite can generate as much as fifteen hundred pounds of pressure per square inch, so there's a good reason to inhibit its force. I once foolishly tried to show a captive adult male wolf, Lupey, where his food was by pointing toward it, and he immediately showed me that he knew where it was by clasping his mouth over my extended forearm and squeezing ever so gently. I wore Lupey's teeth marks for two weeks, but he didn't break skin; we may not have been "playing," but he inhibited his bite anyway. With domestic dogs, one of the great advantages of making sure puppies play with other puppies is that they learn bite inhibition and will most likely never harm another.

Red-necked wallabies, kangaroos of a kind, engage in self-handicapping as well. Biologist Duncan Watson and his colleagues found that these playful creatures adjust their play to the age of their partner. When a partner is younger, the older animal adopts a defensive, flat-footed posture, and pawing rather than sparring occurs. Also, the older player is more tolerant of its partner's tactics and takes the initiative in prolonging interactions.

Fairness and trust are important in the dynamics of playful interactions in rats as well. Psychologist Sergio Pellis discovered that sequences of rat play consist of individuals assessing and monitoring one another and then fine-tuning and changing their own behavior to maintain the play mood. When the rules of play are violated, when fairness breaks down, so does play.

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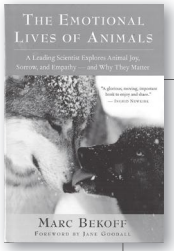

Role-reversing happens when a dominant animal performs an action during play that wouldn't normally occur during real aggression. For example, a dominant wolf might never roll over on his back during fighting, but he will do so while playing. In some instances role-reversing and self-handicapping occur together — a dominant wolf might roll over while playing with a subordinate dog and at the same time inhibit the intensity of a bite. Self-handicapping and role-reversing, along with play invitation signals, serve to communicate an individual's intention to play, and they are important in maintaining fair play.

FAIR IS GOOD:
The Benefits of Play

Play isn't an idle waste of time. Play is essential for an individual's mental and physical well-being. Play is brain food because it provides important nourishment for brain growth; it actually helps to rewire the brain, increasing the connections between neurons in the cerebral cortex. Play also hones cognitive skills, including logical reasoning and behavioral flexibility — the ability to make appropriate choices in changing and unpredictable environments.

But some of the most important benefits of play are social — play helps the individual and the group to get along together. Social play relies on, and also teaches, trust, cooperation, niceness, fairness, forgiveness, and humility. Dogs and their relatives aren't alone in the tactics they use in play. Recent research on nonhuman primates has shown that punishment and apology play important roles in maintaining cooperation.

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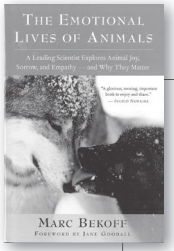

Why do animals carefully use play signals? Why do they engage in self-handicapping and role-reversing? It's plausible to argue that during social play, immature individuals learn ground rules about what behavior patterns are acceptable to others — how hard they can bite, how roughly they can interact — and how to resolve conflicts in a situation that is safe, enjoyable, and nonthreatening. This is similar to the reasoning behind why human children are encouraged to play organized sports: it teaches them how to behave, how to cooperate and resolve conflicts in a setting where the stakes are not high. Through their behavior, animals show us that they place a premium on playing fairly and trusting others to do so. There are codes of social conduct that regulate actions that are and aren't permissible. What could be a better atmosphere in which to learn about the social skills underlying fairness and cooperation than during social play, where there are few penalties for transgressions? It's also possible that individuals might generalize codes of conduct learned while playing with specific individuals to other group members and to different situations, such as sharing food, defending resources, grooming, and giving care.

Play is not only fun. It's a useful behavior. And studies of play indicate that animals actively cultivate a sense of fairness and cooperation by playing. This becomes even clearer in instances where play breaks down.

GETTING A BAD REPUTATION:
The Costs of Breaking Trust

When animals are not having fun, animals won't play. Animals who don't play often can't interact with others because they don't know how to tell their friends what they want and they can't understand what their friends want. They're not socialized. They can't function as card-carrying members of their own species because they haven't learned how to communicate with others. The consequences of the inability to play well start small but possibly grow quite large.

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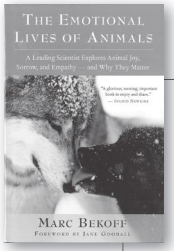

For instance, dogs don't tolerate noncooperative cheaters, who may be avoided or chased from play groups. When a dog's sense of fairness is violated, there are consequences. While studying dog play on a beach in San Diego, California, for her doctoral dissertation in cognitive science, Alexandra Horowitz observed a dog she called Up-ears enter into a play group and interrupt the play of two other dogs, Blackie and Roxy. Up-ears was chased out of the group, and when she returned, Blackie and Roxy stopped playing and looked off toward a distant sound. In a fooling behavior, Roxy began moving in the direction of the sound, and Up-ears ran off following their line of sight. Having gotten rid of Up-ears, Roxy and Blackie immediately began playing once again.

Of much more importance to biologists, however, is how differences in the performance of a given behavior, such as play, influence an individual's reproductive success. Do differences in play and variations in fair play affect an individual's reproductive fitness? If we want to know whether a sense of fairness or morality evolved because it's adaptive in its own right — because it improves an individual's, and thus a species', chance for survival — then we should be able to show that more "virtuous" individuals are more fit and have more offspring than less virtuous individuals (as Darwin indicated). If play and fairness are inextricably linked (as they seem to be), then is it true that individuals who play well do better reproductively than those who don't? It's almost impossible to directly link fair play with an individual's reproductive success or fitness, but it's also extremely difficult to show with great certainty that the performance of *most* behaviors is directly and causally coupled to reproductive success. However, my students and I have collected some intriguing data on captive and wild coyotes that indicate a relationship between play and fitness.

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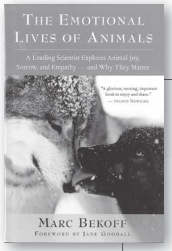

Dogs, coyotes, and wolves are fast learners when it comes to fair play. There are serious sanctions when they breach the trust of their friends, and these penalties might indeed become public information if others see an individual cheating on his companions. Biologists call these penalties "costs," which means that an individual might suffer some decline in his or her reproductive fitness if they don't play by the expected rules of the game. Our fieldwork on coyotes has revealed one direct cost paid by animals who fail to engage in fair play or who don't play much at all. I found that coyote pups who don't play as much as others because they are avoided by others or because they themselves avoid others are less tightly bonded to other members of their group. These individuals are more likely to leave their group members and try to make it on their own. But life outside the group is much more risky than within it. In a seven-year study of coyotes living in Grand Teton National Park in Wyoming, we found that more than 55 percent of yearlings who drifted away from their social group died, whereas fewer than 20 percent of their stay-at-home peers did. Was it because of play? We're not sure, but information that we collected on captive coyotes suggested that the lack of play was a major factor in individuals spending more time alone, away from their littermates and other group members.

Though all the evidence is not in, it seems quite likely that breakdowns in social play negatively affect individuals, and by extension their social groups. In social species at least, natural selection seems to weed out cheaters, those who don't play by the accepted and negotiated rules. Conversely, animals, including humans, survive and thrive better when they play fair and learn the group's moral codes for behavior. It sure is starting to look like morality evolved because it's adaptive.

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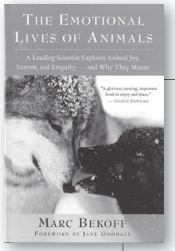

THE "BIG QUESTION":
Is Morality Inherited?

They [animals] have the ingredients we use for morality.

— FRANS DE WAAL, "HONOR AMONG BEASTS"

The idea that morality may have evolved over millions of years isn't new, nor is the notion that animals share many of these behaviors. Charles Darwin proposed that human moral sentiments were a product of the evolutionary process, and he speculated about moral sentiments in animals. But it wasn't until recently that scientists gave these questions serious and sustained attention. What is emerging now is a fascinating tapestry of research into the biology of morality. We're beginning to recognize the role of morality in the lives of other species and to piece together the neurophysiological roots of moral emotion and cognition — roots that we share with other species.

Darwin's view is that morality is a natural extension and outgrowth of social instincts. Early theories of kin selection and reciprocal altruism among animals have now blossomed into a much wider inquiry into the pro-social behavioral repertoire: fairness and equity, empathy, reputation, punishment and forgiveness. At the same time, neuroscience is exploring the ethical brain: as we've seen, it is becoming clear that many moral behaviors originate in emotional centers in the brain — a neural architecture that humans share with other animals.

All of this research is confirmed by our studies of animal play. There seems to be strong evolutionary selection for playing fairly because most if not all individuals benefit from adopting this behavioral strategy, which fosters group stability. Numerous mechanisms have evolved as a result: play invitation signals, variations in the sequencing of actions performed during play when compared to other contexts, self-handicapping, and role-reversing. All these behaviors have evolved to facilitate the initiation and maintenance of social play in numerous mammals — to keep others engaged — so that agreeing to play fairly and the resulting benefits of doing so can be readily achieved. The observation from the field that play is rarely unfair or uncooperative surely indicates that natural selection acts to weed out those individuals who don't play by the rules.

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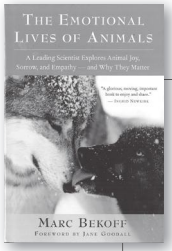

This sort of egalitarianism in animals is thought to be a precondition for the evolution of social morality in humans. From where did it arise? Truth be told, we really do not know. Studies of the evolution of social morality are among the most exciting and challenging projects that we face. However, given the evidence so far, if one is a good Darwinian and believes in evolutionary continuity, it is premature to claim that *only* humans can be empathic and moral beings. At a minimum, this constitutes the safest, most cautious approach, even as research points ever more strongly toward a more "radical" notion about evolution.

ANOTHER PARADIGM SHIFT:

Survival Depends on Cooperation, Not Competition

I believe that at the most fundamental level our nature is compassionate, and that cooperation, not conflict, lies at the heart of the basic principles that govern our human existence. . . . By living a way of life that expresses our basic goodness, we fulfill our humanity and give our actions dignity, worth, and meaning.

— HIS HOLINESS THE DALAI LAMA,
UNDERSTANDING OUR FUNDAMENTAL NATURE

We believe that most donkeys, if given the chance, would fashion a world without violence. Like St. Francis of Assisi, they would remake the natural world into a proverbial garden of Eden, where the lion and the lamb lay side by side. . . . We wonder how much the innocence, vulnerability and gentleness of [those two] donkeys may have effected Tolstoy, the peace-loving giant of world literature.

— MICHAEL TOBIAS AND JANE MORRISON, *DONKEY*

Some might call the Dalai Lama an optimist, but there are increasing scientific data to support His Holiness. Indeed, the time has come to revise our notions about what "survival of the fittest" really means.

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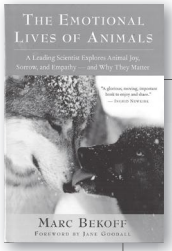

So far, most of the research on cooperation has focused on humans. As it turns out, humans aren't as selfish and self-centered as we're sometimes made out to be. Ernst Fehr and his colleagues have discovered that when treated fairly, many people will voluntarily cooperate with one another and also punish those who don't cooperate. They call this "strong reciprocity," and they show that it can lead to "almost universal cooperation in circumstances in which purely self-interested behavior would cause a complete breakdown of cooperation." They note that people are willing to punish individuals who behave unfairly to a third person.

There's also evidence that humans have a natural tendency to be altruistic. Felix Warneken and Michael Tomasello discovered that infants as young as eighteen months of age will help people in need, such as when they're searching for a lost object. Young chimpanzees also will do this. What's very interesting about this study is that young children, while still in diapers and not very skilled in using language, will only help retrieve a lost object when they believe that a person needs the object to complete a task. For example, they would only retrieve a clothespin if it seemed to have been dropped unintentionally by the researcher, but not if it was clearly thrown on the ground deliberately. Children can understand through body language when something is needed or not, and they help only if there is a need.

Research with animals shows similar findings. Obviously, as we've seen throughout, when it comes to play, cooperation is required, and almost every piece of communication is aimed at maintaining that cooperation. But cooperation seems to predominate in a wide range of social situations. Primatologists Robert Sussman and Paul Garber report that for diurnal prosimians, such as lemurs, New World monkeys, and great apes, the vast majority of social interactions are affiliative rather than agonistic or divisive. Grooming and bouts of play predominate in the affiliative category. For the prosimians, an average of 93.2 percent of social interactions are affiliative, and the numbers for the New World monkeys and Old World monkeys are 86.1 and 84.8 percent, respectively. Unpublished data for gorillas show that 95.7 percent of their social interactions are affiliative.

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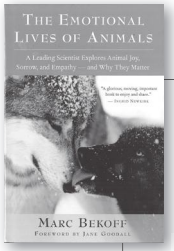

Clearly, if these numbers can be repeated among other species, competition does not drive animal behavior; cooperation and friendliness aren't simply sideshows to aggression and fighting. Indeed, it almost seems trite to write about cooperation in animals, because everyone knows that animals cooperate with one another and it's obvious why they do so: if the group works together, then each individual's chance for survival improves. However, much of evolutionary theory is based on competition among individuals rather than on cooperation, and for some people this has meant that cooperation must be a by-product of competition that is not directly selected for in evolution. In this view, animals only cooperate because if they were competitive all of the time it would be difficult to form and to maintain stable social groups. For example, it would be impossible to have a stable wolf pack in which all of the males were top wolf or alpha individuals who always competed with one another. Cooperative interactions have to back competitive encounters so that the group will be cohesive and stable over time.

This "survival of the fittest" mentality, which pervades so much thinking and theorizing, is increasingly not supported by current research as being the prime mover in evolution. For a long time, cooperation has been ignored because of this ideological bias, but the recent deluge of research papers and other essays on cooperation indicate that the tide is changing. In fact, the more we look for cooperation, the more we discover its presence. Animals certainly still compete, but cooperation is central in the evolution of social behavior, and this alone makes it key for survival. When animals cooperate, they're doing what comes naturally, and cooperation relies on established, well-maintained social standards of behavior — that is, moral codes. This is what should become the starting point for evolutionary theory and the basis for our discussions about the lives of animals.

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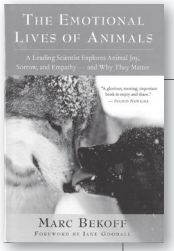

Some ecologists take this even further. They wonder if, when studying "ecological interactions" — that is, encounters among different species of animals and interactions between animals and trees and plants — it makes more sense to concentrate on positive ecological interactions rather than on competition and predation. These researchers have been called "renegade ecologists" by more mainstream scientists, and they argue that there is more to ecology and the evolution of communities than just competition and predation. They maintain that a process called "facilitation" readily works alongside competition and provides a balance to its mechanisms that is important in the evolution of community structure. However, it's one thing to say that cooperation within a group of individuals, for example a wolf pack or a troop of baboons, is beneficial — that all wolves benefit more by helping one another than by competing with one another — but is cooperation an essential component of an entire forest or ecosystem? It's an intriguing notion, one on which I'm sure His Holiness the Dalai Lama would like to see more research.