Chapter 6
Cooperation and the Evolution of Social Living: Moving Beyond the Constraints and Implications of Misleading Dogma: Introduction Part II

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> *"Evolution has produced a mind that evolves toward an appreciation of the vastness of our collective design, and emotions that enable us to enact these loftier notions. We are wired for good." (Dacher Keltner, 2009. p. 269)*

The chapters in this section offer fascinating insights into the social behavior and social organization of various primates. They emphasize the importance of long-term fieldwork on identified individuals for learning about the evolution and ecology of social behavior. As such, these essays are extremely valuable not only because they review current information but also because they go beyond mere paradigm and often lazy-thinking about the factors that influence group-living in free-ranging animals. To wit, and in the spirit of the other chapters in this forward-looking and very important book, the authors show that cooperation even among non-kin is very important in structuring the social organization of different species living in different environments. They emphasize that cooperation has not merely evolved to reduce aggression or as a reaction to competition but serves a significant, perhaps a leading role, in the evolution of social behavior and social organization. To simply put it, cooperation is *normal* behavior.

Across species, individuals have a need to belong to a group and this drives the evolution of cooperative group-living. The same can be said of humans. A number of recent books have been concerned with the importance and prevalence of human cooperation, goodness, and empathy. These include Dacher Keltner's *Born To be Good*, Jeremy Rifkin's *The Empathic Civilization* (2010), Frans de Waal's *The Age of Empathy* (2009), and *The Compassionate Instinct* (Keltner et al., 2010). It is important to correct the misleading "nature red in tooth and claw" views that dominate the literature and diminish cooperation and empathy to sideshows in the evolution of sociality (Bekoff, 2007, 2010; Bekoff and Pierce, 2009). Sheratt and Wilkinson (2009) see cooperation as being one of ten "big questions in ecology and evolution." It is safe to say that Charles Darwin (1871/2004) would also

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agree about the importance of cooperation in the evolution of group-living. Darwin would not have been the least surprised if he knew what we have discovered in the past decade or so about the emotional and moral intelligence in animals (Keltner, 2009; Bekoff, 2010). He believed that animals, like humans, could be moral beings. Darwin suggested that human morality is continuous with similar social behavior in other animals and he paid special attention to the capacity for sympathy, which he believed was evidenced in a large numbers of animals.

While we still have a lot to learn about cooperation in free-ranging animals, the chapters in this section provide a strong springboard for future research and for reassessing existing data in light of a paradigm shift that gives more attention to cooperation. While research on captive animals can provide important information on social behavior when field observations are difficult or impossible, unnatural social conditions (groups do not reflect the composition of natural groups in terms of the number of individuals present or age/sex ratios and the lack of opportunity for dispersal or integration of new members) and the atypical physical settings (small cages, individuals cannot hunt or do not have to defend themselves, territories, or food) in which animals are kept often preclude gathering relevant information on the importance of cooperation (Bekoff, 2010).

A brief summary of the chapters in this section reveals fascinating new information that challenges the current *zeitgeist*. Katherine MacKinnon and Agustin Fuentes note the importance of cooperation and altruism in the evolution of social complexity and social niche construction, and discuss the resurgence of group selection even among people who previously argued that it was not a factor in the evolution of social behavior (see also Bekoff and Pierce, 2009). They also discuss recent research on inequity aversion that shows that an individual's ability to sense and expect fairness in social interactions is also important for cooperative group-living. Individuals do not like being treated unfairly and will not do what is needed to maintain group cohesion if they sense inequity (Bekoff and Pierce, 2009).

Paul Garber and Martin Kowalewski discuss the importance of collective action and male affiliation in howler monkeys based on their field observations in Argentina. They note "there is a growing body of evidence that increased fitness benefits accrue to individual males and females that reside in a functioning, cooperative, stable, and affiliative group." It is important that we get out of the rut of giving cooperation and fairness secondary roles in the evolution of cohesive and smoothly functioning social groups. Garber and Kowalewski show that "resident males are highly tolerant of each other across a range of contexts including feeding, foraging, resting, and mating. It is likely that tolerance is achieved over time and through individual experience during frequent and predictable social interactions." Concerning the importance of group stability mentioned above, they also note that in another study of howler monkeys "males who were co-residents in the same group for over four years were more likely to engage in collective action . . ." compared to resident males who had not lived together for as long. Further, they conclude, "many forms of cooperative behavior among both kin and non-kin may be explained in terms of the mutual and reciprocal benefits that individuals receive maintaining coordinated,

strong, and predictable social bonds that enhance group cohesion." It is possible that individuals who live together learn what to expect from other individuals in different situations and develop theories of behavior and theories of mind about group members with whom they are very familiar. In my own fieldwork on coyotes living in the Grand Teton National Park (Bekoff and Wells, 1986), individuals were labeled as being fair or unfair players and were avoided by other group members based on how they were classified (Bekoff and Pierce, 2009). As a result of being avoided and not developing strong social bonds, coyotes who played unfairly tended to leave their group and suffer higher mortality—fairness was related to fitness.

Fieldwork on many species has shown that there is considerable plasticity in social behavior, a trait that is not always apparent in work on captive animals. Based on her long-term fieldwork on wild northern muriquis in Brazil, Karen Strier discovered that there is a good deal of within-species flexibility and that these primates "live in an unusually egalitarian society in which males are philopatric and the majority of females disperse from their natal groups prior to the onset of puberty." Strier's conclusion is one that we should all take to heart: "Local conditions can favor cooperation or competition at different times in an individual's lifetime. The ability to move between cooperative and competitive modes, and social plasticity in general, may be the underlying adaptation of primate evolution."

In our fieldwork on coyotes, we also noted that speaking about "the typical coyote" is misleading because of considerable within-species variability, a point made by Karen Strier and also by Mary Pavelka in her discussion of social cohesion in black howler monkeys. Following up on the work of renowned ethologist Robert Hinde who argued that "each relationship is a set in a nexus of other relationships, which mutually affect each other" with the social group "constituted by those relationships," Pavelka argues that the various social relationships among individuals hold the group together and are the mechanism of cohesion. Pavelka discovered that black howler monkeys engage in very few social interactions and have no visible social relationships, but they live in perhaps "the most cohesive of primate societies." How is this so? Pavelka argues that there are two possible alternative mechanisms "for social cohesion in species such as black howlers in which intragroup social interaction and opportunities for reciprocity and altruism are rare: behavioral synchrony and intergroup encounters." She observed that in more than 85% of scan samples, all group members were engaged in the same activity (inactive, forage, travel, social). Pavelka also argues that intergroup encounters consisting of howling bouts with adjacent groups might also be important for group cohesion. Social and cultural anthropologists have championed the "common foe" hypothesis as an important mechanism favoring sociality. However, Pavelka also notes that there are no "winners" or "losers" in these intergroup bouts and they "may have more in common with sporting events than with warfare in humans." Thus, competition over resources does not drive the bouts, and a major effect is to develop and maintain close social bonds within a group. This is a fascinating and novel suggestion that needs further comparative study.

Some Ideas for Future Comparative Research

Working toward a shared vocabulary: While we know more than we often realize about the central role of cooperation in the evolution of sociality, more data are needed and researchers in different disciplines have to agree about what they are writing about. Thus, we need a shared vocabulary, an idea I have been working on with my colleague and coauthor of *Wild Justice*, Jessica Pierce. The main reason we need a shared language for studying the evolution and expression of cooperation is that we need to be able to cross disciplinary boundaries and build bridges among different fields of study. The interest of researchers from diverse disciplines is what makes the study of cooperation so exciting and challenging. Some of the terms on which we might focus include cooperation, altruism, empathy, sympathy, justice, reciprocity, selfishness, moral emotions, moral cognition, intelligence, and morality. As it is, many of these terms have no shared meaning, and for example, philosophers and biologists tend to them quite differently (Bekoff and Pierce, 2009).

In terms of challenging presuppositions in science and philosophy (in addition to challenging the central tenet that cooperation is only a by-product of competition) Pierce and I also note that scientists and others should avoid looking for a linear, sequential view of the evolution of cooperative/altruistic/moral behaviors. Just as complex brains and cognition have evolved from simpler brains multiple times and independently, so perhaps have cooperative behaviors.

We need to go beyond primates: In order to understand the evolution of cooperation and other prosocial behavior patterns, we need to consider animals other than nonhuman primates, a point we stress in *Wild Justice*. For example, we know that mice show empathy and rats can be kind to one another (http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0050196). We began *Wild Justice* with these examples that clearly show how cooperation, empathy, and compassion can be found in diverse species:

> A teenage female elephant nursing an injured leg is knocked over by a rambunctious, hormone-laden teenage male. An older female sees this happen, chases the male away, and goes back to the younger female and touches her sore leg with her trunk. Eleven elephants rescue a group of captive antelope in KwaZula-Natal; the matriarch undoes all of the latches on the gates of the enclosure with her trunk and lets the gate swing open so the antelope can escape. A rat in a cage refuses to push a lever for food when it sees that another rat receives an electric shock as a result. A male Diana monkey who has learned to insert a token into a slot to obtain food helps a female who can't get the hang of the trick, inserting the token for her and allowing her to eat the food reward. A female fruit-eating bat helps an unrelated female give birth by showing her how to hang in the proper way. A cat named Libby leads her elderly, deaf, and blind dog friend, Cashew, away from obstacles and to food. In a group of chimpanzees at the Arnhem Zoo in The Netherlands individuals punish other chimpanzees who are late for dinner because no one eats until everyone's present. A large male dog wants to play with a younger and more submissive male. The big male invites his younger partner to play and restrains himself, biting his younger companion gently and allowing him to bite gently in return. Do these examples show that animals display moral behavior, that they can be compassionate? Yes they do.

So, in the future it is essential that researchers studying the evolution of social behavior in different species talk with one another and not think that the animals

they study are unique. Sure Darwin's ideas about evolutionary continuity mandate such a comparative approach to the questions at hand.

Social Play in Mammals

My long-term research on social play behavior points to the importance of not only studying animals other than nonhuman primates but also focusing on a behavior that many mammals perform but one that has not been factored into discussions of the evolution of cooperation, although it is a natural fit (Bekoff and Pierce, 2009; http://chronicle.com/article/Moral-in-ToothClaw/48800/; http://www.scientificamerican.com/article.cfm?id=the-ethical-dog). One of the clearest places to see how specific social rules apply is in animal play. Play has been extensively studied in social canids (members of the dog family) like wolves, coyotes, and domestic dogs; so it is a good example to use to examine the mechanisms of fair play (Bekoff, 1975, 1977, 1995).

Although play is fun, it is also a serious business. When animals play, they are constantly working to understand and follow the rules and to communicate their intentions to play fairly. They fine-tune their behavior on the run, carefully monitoring the behavior of their play partners and paying close attention to infractions of the agreed-upon rules. Four basic aspects of fair play in animals are as follows: ask first, be honest, follow the rules, and admit you are wrong. When the rules of play are violated, and when fairness breaks down, so does play.

When dogs and other animals play, they use actions like biting, mounting, and body-slamming one another, which are also used in other contexts, like fighting or mating. Because those actions can be easily misinterpreted, it is important for animals to clearly state what they want and what they expect.

In canids an action called a "bow" is used to ask others to play. When performing a bow, an animal crouches on his or her forelimbs. He or she will sometimes bark, wag the tail wildly, and have an eager look. So that the invitation to play is not confusing, bows are highly stereotyped and show little variation. Play bows are honest signals, a sign of trust. Research shows that animals who violate that trust are often ostracized, suggesting that violation of the rules of play is maladaptive and can disrupt the efficient functioning of the group. For example, among dogs, coyotes, and wolves, individuals who do not play fairly find that their invitations to play are ignored or that they are simply avoided by other group members. Long-term field research on coyotes living in the Grand Teton National Park, near Jackson, Wyoming, shows that coyotes who do not play fairly often leave their pack because they do not form strong social bonds. Such loners suffer higher mortality than those who remain with others.

Animals engage in two activities that help create an equal and fair playing field: self-handicapping and role-reversing. Self-handicapping (or "play inhibition") occurs when individuals perform behavior patterns that might compromise them outside of play. For example, coyotes will inhibit the intensity of their bites, thus abiding by the rules and helping to maintain the play mood. The fur of young

coyotes is very thin, and intense bites are painful and cause high-pitched squeals. In adult wolves, a bite can generate as much as 1,500 pounds of pressure per square inch, so there is a good reason to inhibit its force. Role-reversing happens when a dominant animal performs an action during play that would not normally occur during real aggression. For example, a dominant wolf would not roll over on his back during fighting, making himself more vulnerable to attack, but would do so while playing.

Play can sometimes get out of hand for animals, just as it does for human beings. When play gets too rough, canids keep things under control by using bows to apologize. For example, a bow might communicate something like, "Sorry I bit you so hard—I did not mean it, so let us continue playing." For play to continue, it is important for individuals to forgive the animal who violated the rules. Once again there are species differences among young canids. Highly aggressive young coyotes bow significantly more frequently than dogs or wolves before and after delivering bites that could be misinterpreted.

The social dynamics of play require that players agree to play and not to eat one another or fight or try to mate. When there is a violation of those expectations, others react to the lack of fairness. For example, young coyotes and wolves react negatively to unfair play by ending the encounter or avoiding those who ask them to play and then do not follow the rules. Cheaters have a harder time finding play partners.

It is just a step from play to morality. Researchers who study child's play have discovered that basic rules of fairness guide play and that egalitarian instincts emerge very early in childhood. Indeed, while playing, children learn, as do other young animals, that there are right and wrong ways to play and that transgressions of fairness have social consequences, like being ostracized. The lessons children learn particularly about fairness are also the foundation of fairness among adults.

The parallels between human and animal play, and the shared capacity to cooperate and to understand and behave according to rules of right and wrong conduct, are striking. They lead us to believe that animals are morally intelligent. Morality has evolved in many species, and unique features of human morality, like the use of language to articulate and enforce social norms, are simply modifications of broadly evolved behavioral patterns specific to our species.

The study of animal play thus offers an invitation to move beyond philosophical and scientific dogma and to take seriously the possibility that morality exists in many animal societies. A broad and expanding study of animal morality will allow us to learn more about the social behaviors that make animal societies so successful and so fascinating, and it will also encourage us to reexamine assumptions about human moral behavior. That study is in its infancy, but we hope to see ethologists, neuroscientists, biologists, philosophers, and theologians work together to explore the implications of this new science. Already, research on animal morality is blossoming, and if we can break free of theoretical prejudice, we may come to better understand ourselves and the other animals with whom we share this planet.

The Compassion Footprint and the Jen Ratio: The Bigger, Challenging, and Real Picture

We are born to be good: My work on the notion of the "compassion footprint" developed in *The Animal Manifesto* (see also Bekoff, 2008) and that of Dacher Keltner's ideas about the Jen ratio overlap in many different ways and are related to the "big picture" that emerges from these and other essays in this book. Keltner and I agree we will learn a lot about the evolution of cooperation, goodness, fitness, and compassion by going beyond humans and paying attention to how other animals negotiate their social interactions. In many instances, one could substitute the word "animal" where Keltner wrote about humans in *Born To be Good*, and "humans" where Marc wrote about animals (recognizing of course that we are all members of the animal kingdom and should be proud of that commonality) in *The Animal Manifesto*. Keltner uses the Confucian concept of *Jen*, which refers to "kindness, humanity, and reverence" to discuss our "good nature" and offers the concept of the *Jen* ratio to "look at the relative balance of good and uplifting versus bad and cynical in life."

Basically, the Jen ratio is the balance of good and bad in one's life and as the value of one's Jen ratio increases so does the humanity and meaningfulness in their life. The Jen ratio can be likened to a ratio between one's compassion footprint and their carbon footprint. One's compassion footprint is composed of the kindness and respect she or he adds to the world by doing things to protect animals or not doing certain things that harm them, whereas one's carbon footprint can be viewed as something "bad" in the world. As we expand our compassion footprint and reduce our carbon footprint, we increase global Jen. We can perhaps look at the analyses done by Robert Sussman et al. (2005) to operationalize the Jen ratio and the compassion footprint.

Keltner and I argue it is in our nature to be cooperative, good, kind, and fair. We know it feels good to be nice. We are often filled with warm feelings when we cooperate. Neural imaging research on humans by James Rilling (Chapter 17, this volume) shows that mutual cooperation is associated with activation of the brain's reward-processing centers, the dopamine system. Our brain releases dopamine when we cooperate, giving us instant pleasurable feedback and reinforcing the behavior. This is significant research for it posits that being nice is rewarding in social interactions and might in itself be a stimulus fostering cooperation and fairness.

Is it rational to argue for inherent goodness? Renowned biologist and writer Matt Ridley convincingly shows that there are reasons to be a rational optimist despite global negativity. In his book *The Rational Optimist* (2010) Ridley argues that we can get out of the messes we have created because people are kinder and fairer than most believe. Mass media hype concentrates on our battles and the negativity we bring to the world, and on occasion notes our goodness and kindness, usually tagged on to the end of news broadcast.

People often criticize the idea that nonhuman and human animals are basically good by looking at the data collected on competition and aggression in animals. Surely, humans and other animals can be mean to one another. And yes, Jane

Goodall (1986) did observe what could be construed as warlike behavior when a group of male chimpanzees systematically hunted down and killed individuals in another group. However, Goodall only observed this once in 50 years of research.

In *Beyond Revenge* psychologist Michael McCullough (2008) writes, "After many years of believing that chimpanzees were mostly peace-loving and docile . . . naturalists began to publish case after case in which chimpanzees from one community went out of their way to seek out the members of other chimpanzee communities, and then to maim and kill them." But available data are actually quite slim because of small sample sizes and a good deal of variability among different communities of chimpanzees. To wit, in their review of comparative rates of violence in chimpanzees and humans Harvard anthropologist and chimpanzee expert Richard Wrangham et al. (2006) note, "the relatively small sample size and great variation among sites renders imprecise any estimate of violence-related mortality rates for chimpanzees as a species."

What do the data tell us? After carefully analyzing the social interactions of various primate species, primatologists Robert Sussman and his colleagues came to the conclusion that the vast majority of social interactions are affiliative rather than agonistic or divisive. Grooming and bouts of play predominate the social scene, with only an occasional fight or threat of aggression. In prosimians, the most ancestral of existing primates, an average of 93.2% of social interactions are affiliative. In New World monkeys who live in the tropical forests of southern Mexico and Central and South America, 86.1% of interactions are affiliative, and likewise, for Old World monkeys who live in South and East Asia, the Middle east, Africa, and Gibraltar, 84.8% are affiliative. Unpublished data for gorillas show that 95.7% of their social interactions are affiliative. After about 25 years of research on chimpanzees, Jane Goodall noted in her book *The Chimpanzees of Gombe* ". . . it is easy to get the impression that chimpanzees are more aggressive than they really are. In actuality, peaceful interactions are far more frequent than aggressive ones; mild threatening gestures are more common than vigorous ones; threats per se occur much more often than fights; and serious, wounding fights are very rare compared to brief, relatively mild ones." These do not appear to be animals whose social lives are defined mainly by conflict. It is not really a dog-eat-dog world because dogs do not eat other dogs.

So, while human and nonhuman animals can be nasty, they are predominantly good (http://greatergood.berkeley.edu/article/item/expanding_our_compassion_footprint/), and we should keep this in mind when we interact with friends and strangers. When one dismissingly says, "Oh, you are acting like an animal" the correct response would be "Thanks for the complement."

The challenges for the future are not only to get people to think about our goodness but also to act on it and do things that expand our compassion footprint and increase our Jen ratio. If we believe we are inherently good, then it will be easier to be proactively compassionate for the greater good.

The essays in this section and in the book as a whole will help us correct the false message that has been put out concerning the behavior of nonhuman animals and will allow for the development of models that have realistic assumptions. We need to put out the message that is emerging from comparative research that emphasizes

the importance of cooperation, one that will have wide-ranging implications for how we view other animals and ourselves. Nature "red in tooth and claw" runs counter to what we are rapidly learning about human and other animals.

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