Deconstructing the Moral Animal Stigma: A Study of the Scholarly Conversation on Biological Altruism*

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ABSTRACT

Forms of altruism such as kin selection, reciprocity, and group-selection altruism exist in a biological sense—but the question of whether "real" altruism, based on good intentions, exists in a measurable manner and is a human-exclusive trait, remains to be seen. Based on observations of primitive empathetical contagion behavior in mice, nonreciprocal interspecies altruism in cetaceans, and theory of mind behavior in Eurasian blue jays, certain nonhuman animals could be capable of complex empathetical acts that do not fall under the "standard" biological umbrella alongside kin selection, reciprocity, and group-selection. In reviewing these phenomena, this paper seeks to change the general societal understanding of empathetical cognition and emotional capacity in nonhuman animals, and to redefine the conceptual parameters of biological altruism.

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Tempting as it may be to interpret the behavior of other animals in terms of human mental processes, it's perhaps even more tempting to reject the possibility of kinship.

—Jennifer Ackerman, *The Genius of Birds*, 2017

Introduction

"Let me tell you of life-saving 'eels' in vinegar," writes scientist J.H. Elgie (1910) in his article, "Altruism in Animal Life," from the journal *Nature* (p. 489). The date is June 23, 1910, nearly a month after the passing of beloved Nobel Prize winner, German physician, and well-known founder of bacteriology, Robert Koch (Stevenson, 2021). Many scientists like Elgie are eager to further the threshold of bacterial knowledge. Under his watchful gaze, one of the "eels" Elgie is studying becomes stranded in a smaller vinegar drop. To Elgie's amazement, a few of the other bacteria cross the gap into the smaller vinegar droplet and push their comrade to the safety of the larger vinegar droplet. Elgie reports this as "the most singular thing it has ever been my lot to witness in the world of minute life" (p. 489).

There is a long track record of scientific speculation and observation of complex forms of potential empathetical animal behavior, with interpretations ranging widely. In *The Descent of Man*, Charles Darwin (1871) contested the idea that human beings are the only creatures on earth capable of conscience. "All [animals]," he noted, "have the same senses, intuitions, and sensations . . . they feel wonder and curiosity; they possess the same faculties of imitation, attention, memory, imagination, and reason, though in very different degrees" (Darwin, 1871, p. 48). Descartes, on the other hand, famously believed that animals are like "machines," lacking "feeling or awareness of any kind" (Cottingham, 1978, p. 1). Although it is all too easy to assign human qualities onto animals—something known as "anthropomorphism" in the scientific field—it seems equally harmful for scientific discovery to suffer under the yoke of what primatologist Frans de Waal calls *anthropodenial*, or the denial that humans and animals can also share qualities such as empathy and altruism (de Waal, 1999). If altruism can evolve and complexify in human beings, it could also potentially evolve and complexify in nonhuman animals. In exploring Mogil et al.'s (2006) experiment with empathy in mice, Pitman et al.'s (2016) observation of seemingly altruistic humpback whale behavior, and Ostojíc et al.'s (2013) experiment with theory of mind in Eurasian blue jays, one may find plausible evidence that some nonhuman animals have the capacity to employ altruism from an empathetical basis, redefining the scientific perception of biological altruism.

Biological altruism, defined by University of Bristol Philosophy of Science professor Dr. Samir Okasha (2013), is when an organism behaves in a way that benefits others at a cost to itself—that cost being *reproductive fitness*, or an animal's ability to reproduce and extend the limbs of its genetic lineage, furthering the reach of its family tree. Okasha believes that although there are plenty of examples of altruism in animals, and plenty of examples of humans behaving in ways that are biologically altruistic, human beings are the only kind that can defy the constraints of reproductive fitness and perform real altruism—altruistic actions based on conscious intent (Okasha, 2013).

A Stanford-published article of 2013, revised over the years as scientific discovery unravels nature's most tangled secrets, Okasha's "Biological Altruism" is an excellent short review of the evolution of altruism with its many facets and subgenres. However, it is an *anthropocentric*, or human-centered, article that leaves out the many documented examples of animals behaving in ways that are not so easily placed into neat altruistic subgenres. Furthermore, altruism itself is potentially a product of an evolved neurological reward system that is, inherently, a biological process for humans and nonhuman animals alike. The fact that this reward system still exists today may highlight the importance of altruism and its steadfast role in evolution. If altruism can bud on nearly every branch of the phylogenetic tree, it seems implausible that only human beings could adapt it in specific form.

A Scaffolding of Altruistic Terminology

According to Kendra Cherry of *Verywell Mind* (2021), psychologists have defined at least four fundamental types of altruism—*genetic* (acts that benefit family), *reciprocal* (acts based on mutual give-and-take), *group-selected* (acts based on group affiliation), and *pure* (acts involving some risk but no reward) (Cherry, 2021). *Mutualism* is another form of altruism existing in nature and, like reciprocity, involves both parties benefiting from the relationship, as in the case of remora fish, who pick parasites from the skins of sharks and in turn are protected from predators and not predated on by the sharks (Okasha, 2013). According to Okasha, all except for *pure* altruism are shaded beneath the umbrella of biological altruism, in which humans and nonhumans alike reside (Okasha, 2013).

It is important to note that in Okasha's hypothesis, the idea of *conscious intent* remains undefined, leading to the question of what it means to have "conscious intentions" behind an altruistic act. One interpretation of *conscious*, *pure*, or *real* altruism is that it is reliant on whether or not nonhuman animals have the capacity for empathy.

A Potential Baseline for Altruism—Empathy in Nonhuman Animals

In *The Genius of Birds*, Jennifer Ackerman (2017) proposes that empathy is "transforming another person's misfortune into one's own feeling of distress" (p.

134). An interesting example of possible empathy in animals lies in the case of the male Eurasian jay. An experimented conducted by Ljerka Ostojić (2013) and her team involved placing male and female jays in glass boxes facing each other. The female jays were fed one of two special treats: wax worms or mealworms. (In this example, wax worms can be imagined as the "dark chocolate equivalent" to jays, and mealworms can be imagined as the "fruit equivalent" in terms of the *specific satiety effect*—the feeling of eating too much of one food and choosing to switch to another.) The male jays observed which treat their female mates indulged in, and when reunited, chose to offer the treat their mates had not been eating—possibly intuiting the specific satiety effect (Ackerman, 2017). This intuition could be an example of what is called *theory of mind*—the capacity to imagine perspectives different from one's own (Ostojić et al., 2013).

Another empathetical example cited in *The Genius of Birds* (Ackerman, 2017) lies in the geese of the Konrad Lorenz Research Station in Austria. By measuring the heart rates of geese exposed to different stimuli such as thunder, passing vehicles, and the departing or landing of flocks, researchers were able to ascertain that "familial social conflict"—seeing or engaging a familiar goose in a social conflict—elicited the highest heart rate (Ackerman, 2017, p. 130). For scientists at Konrad Lorenz, this was enough to evidence "emotional involvement, possibly even empathy" (Ackerman, 2017, p. 130).

In one empirical conclusion, a study by Plotnik et al. (2014) found that Asian elephants touch each other's faces with their trunks to console each other. Consolation is of special interest to Ackerman (2017), who notes that it "implies a cognitively demanding degree of empathy" (p. 131).

Primitive forms of empathy have also been observed in some mice. In a study conducted by Jeffrey Mogil at McGill University, it was ascertained that mice are "more sensitive to pain" when they see a familiar mouse in pain (Miller, 2006, p. 1860). This, to the team, was evidence of what is called *emotional contagion*—a somewhat primitive form of empathy. These researchers see emotional contagion as a "steppingstone" towards the kind of complex empathy that evolved in human beings (Miller, 2006, p. 1861). It is possible that empathy has evolved, to some extent, in other animals beyond human beings, as neurobiologist Peggy Mason concedes. "To imagine that empathy just started de novo in primates," she notes, "seems biologically implausible" (Miller, 2006, p. 1860).

Altruism in Nonhuman Animals

If animals can feel empathetically, it is perhaps feasible to ask whether or not they can act altruistically outside of Okasha's biological definition. Ackerman (2017) reports that tits of different species "great, blue, and marsh" share among each other the latest gossip of food in the area (p. 111). Even chickadees, with brains only slightly larger than the seeds they eat, use a complex rolodex of songs to convey locations of predators and food, not only to their own species but to other birds who have picked up on their warnings (Ackerman, 2017).

It is tempting to argue, as Okasha does, that while it is not immediately apparent that this altruistic act is good for the reproductive fitness of the individual chickadee (as it is a great risk for a chickadee to vocally alert its presence to a predator), this is a form of *group-selection* altruism, which ensures the reproductive fitness and survival of the *group* as a whole (Okasha, 2013). However, group-selection altruism typically refers to altruistic actions within a group of animals of their own species, as in the case of Vervet monkeys, which, like the chickadee, use alarm calls to warn the rest of their group of an approaching predator (Okasha, 2013). In Ackerman's great, blue, and marsh tits, we find that those of different species, who in normal biological circumstances might be in competition, instead share valuable information, undermining the idea that biological "cost and benefit" altruism is the only form of altruism practiced by nonhuman animals (Ackerman, 2017).

In cetaceans (dolphins and whales), there are several compelling examples of nonreciprocal interspecies altruism, in which animals from different species altogether perform altruistic acts, despite there being no kin-based relationship between them and no obvious reward. A 2022 study on white-beaked dolphins had Kastelein et al. witnessing dolphins cooperating "on [their] own initiative" to herd a harbor porpoise towards a veterinary treatment area in their pool enclosure, as well as assisting newly arrived harbor porpoises in swimming (Kastelein et al., 2022). In this case, the animals acted on their own volition without the prospect of reward, an act that was independent of genetic relationships and of other easily packaged forms of biological altruism.

Another example of cetaceans potentially performing acts of nonreciprocal interspecies altruism was observed by Pitman et al. (2016), who studied 115 recorded interactions in which humpback whales harassed killer whales attacking various seals (Pitman et al., 2016). The team concluded that there was "no apparent benefit" for the humpbacks to interfere with the attacks, as the humpbacks often traveled hundreds of miles from their natural breeding and feeding grounds, and often did so with their young, which are natural prey for killer whales (Pitman et al., 2016, para. 1). Since it endangers the young, the act represents a risk to the reproductive fitness of the humpbacks and has no apparent benefit or reward. From this, the team determined that "interspecific altruism, even if unintentional . . . could not be ruled out" (Pitman et al., 2016, para. 1).

The Controversy of Empathy and Altruism in Nonhuman Animals

As the untangling of nature's empathetical and altruistic secrets is still a relatively new process, skepticism from those in tangential scientific fields is to be expected and is understandable. "We can explain behavior separate from the way humans think," argues anthropologist Holly Dunsworth in an interview with *The Guardian* concerning anthropomorphism in the modern age (Milman, 2016, para. 6). Psychologist Patricia Ganea agrees that while anthropomorphism is a natural way of explaining animal behaviors, the effects can lead to an inaccurate understanding of nature that can cause someone to misinterpret the actions of a wild animal (Milman, 2016).

Conversely, aforementioned primatologist Frans de Waal believes that anthropodenial is an attempt to "build a brick wall" to "separate humans from the rest of the animal kingdom" (Ackerman, 2017, p. 23). Dr. Mark Bekoff (2008) notes in his book *The Emotional Lives of Animals* that we as scientists must continue to reassess our relationship with animals, asking difficult questions and changing our behavior to match what is true rather than what is believed. "Humanocentrism is what plagues the study of emotional arguments, and it's also a large reason why animals are treated by such varying standards," he argues. "Why are we so special?" (Bekoff, 2008, p. 43).

In some ways, de Waal's "brick wall" serves a valuable purpose in protecting science from misinformation; however, sometimes a brick wall—inaccessible, structurally immovable—should instead be a door or a window through which scientists can look. In this sense, the wall between biological and "real" altruism obstructs the view that "real" altruism is measured only in philosophical standards, and all altruism is inherently biological. Even conscious, intentioned acts of altruism have a biological source and benefit—that of neurological reward response. In an article published by the *Journal of Social and Biological Structures* on altruism and the internal reward system, biologist James Danielli surmises that the mechanisms of the internal reward system include "the release of mood-controlling substances in the brain. . . such as the opioid peptides" (Danielli, 1980). In other words, performing altruistic acts releases a response similar to the euphoria of opioids. S.G. Post (2005) also postulated in his article "Altruism, Happiness, and Health" that there is a strong association between altruism and longevity in terms of health and wellness (p. 66). In short, even "real" or "pure" altruism has a biological benefit that influences reproductive fitness in human beings, negating any "real" difference between real and biological altruism.

Although behavior can certainly be explained separately from human thought, as anthropologists like Dunsworth maintain, some behaviors could also be explained *similarly* to human thought. It may be a mistake to overlook the specific acts of altruism in animals, especially in a nonreciprocal, interspecies sense, in which there is no genetic or relationship basis nor a conceivable basis for reward. With this in consideration, acts of altruism in humans and nonhumans could be multifaceted—based on acts of cost-benefit *and* acts of conscious intention, as in the case of the male Eurasian blue jays employing altruistic acts both from a standpoint of conscious intention (intuiting a female's specific desires) and of reproductive fitness (doing so to ensure genetic lineage) (Ostojíc et al., 2013).

The idea that altruism could complexify in nonhuman animals is not rooted in mere speculation. Other forms of complex cognition, such as *vocal learning*, *spatial awareness*, *theory of mind*, and even *deceptive caching*, have evolved convergently across the taxa (Krupenye et al., 2019). In a review published in *Cognitive Science*, Krupenye et al. (2019) attested with their social intelligence hypothesis that some nonhuman animals, including corvids like the Eurasian blue jay, share foundational social cognitive mechanisms with humans, and that social cognition evolved in response to the demands of social living. If these complex cognitive behaviors could evolve in distantly related animals via convergent evolution, it is conceivable that in the right environmental or social context (such as gregariousness, as in whales, primates, and birds), altruism could continue to evolve in nonhuman animals in a way that surpasses normal "biological" parameters and crosses over into more complex forms, such as nonreciprocal and interspecies.

A New Frontier – Further Experimentation with Altruism

One novel methodology that could perhaps answer some questions about the neurological reward system and what complex behavior such as *theory of mind* and *emotional contagion* look like in the mind of a nonhuman animal, particularly in the case of monitorable nonhuman laboratory animals such as mice and Eurasian blue jays, is by monitoring radioactivity in the brain using Positron Emission Tomigraphy, or PET scans (Pendergraft et al., 2021). In this process, which has already been utilized by Pendergraft et al. (2021) for experiments pertaining to different neurological processes in corvids, the radiotracer 17F-fluorodeoxyglucose (FDG), a chemical analogous to the glucose brains typically use as fuel, is injected into the body. When regions of the brain increase in activity, they "eat" or consume more FDG, which leaves behind a trace of its radioactivity on those regions. The PET scan harmlessly measures the levels of radioactivity in the brain region, showing where parts of the brain "lit up" during the engagement of an activity or when exposed to certain stimuli (Pendergraft et al., 2021). This methodology could ethically and harmlessly measure the neural activity in the brain when Eurasian blue jays engage in theory of mind or when mice engage in emotional contagion, effectively mapping out the regions of the brain responsible for complex empathy and perhaps even conscious intent in an altruistic action.

Conclusion

Altruism has a clear, fundamental, biological basis and importance, persisting in its various forms despite a long evolutionary history in which it could have been discarded. It has been observed from whales in the ocean to tiny microorganisms swimming in droplets of vinegar. It is worth speculating whether it is an adaptation that under the right constraints can grow more complex in nonhuman animals, as it has in human beings. Do nonhuman animals such as wild cetaceans receive a neurological benefit when they perform acts of nonreciprocal interspecies altruism? If so, is that reward system a convergently evolved trait? What were the environmental or social constraints to elicit such an adaptation? Are they the same environmental and social constraints that allowed human beings to adapt complex forms of cognition? To notate empathetical acts as what separates us from nonhuman animals echoes the distant Cartian hypotheses of the 1600s and, perhaps more importantly, could be like building a brick wall between the human past and the human present where there could instead be a window for scientists to peer through and garner a better understanding of our history.

Philosopher Thomas Kuhn observed that scientists sometimes get stuck viewing topics a certain way, even as they test and speculate with hypotheses. This makes the deconstruction of one paradigm and the rebuilding of another "a messy and uncertain process" (Wilson, 2015, p. 35). Unraveling the biological basis of empathy and altruism is a massive undertaking, and developing classification systems, such as terminology and differentiation, is a necessary part of it. However, it is important to continue to explore the line between what scientists understand about altruism and what still remains to be seen. Although it is necessary for some studies to classify separations between nonhumans and humans, caution should be taken in taking those classifications as law. There are clearly exceptions to the rule, and evolutionary adaptations continually add more bends to the rules with each generation of life. To truly practice science is to forget what we think we know and find out what is true—to escape from potential biases and explore what might be missing. In doing so, we may learn more about ourselves, and the creatures we live alongside.

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