

# The Moral Lives of Animals

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## 1. Introduction

Do animals lead moral lives? What exactly might be meant by claiming that they do and how might we be able to establish that fact? This is the focus of the following, programmatic, paper. My aim is to establish a framework for answering these questions and suggest a direction for further investigation.

Much of the literature on animals and morals focuses on the moral *status* of animals. Do they need to be considered in *our* moral calculations and if so how? A related concern is the extent to which the moral status of animals suggests or dictates human attitudes towards them and human practices with respect to them. To borrow a phrase from Peter Singer, the question is should the circle that encompasses the moral community of human beings be expanded to include some if not all animals? If so, what criteria are relevant for determining who is or is not to be included in this expanded circle? Typical criteria include the capacity to feel pain, the ability to have and fulfill preferences, evidence of a degree of rationality or reflective capacity, and the capacity for a sense of self, among others. The point is that each of these approaches reflects what might be called an ‘anthropocentric perspective’ insofar as each singles out a capacity or set of capacities that human beings possess to serve as the hallmark of moral status. As such, with respect to other animals, a key underlying question seems to be what the implications of including or excluding animals in the ‘moral circle’ are *for us*? They are anthropocentric in another sense as well in that who counts as morally

relevant is determined by criteria that are set by some understanding of human conceptions of morality.

My approach is somewhat different. The question I am interested in exploring is this: To what extent can we get a handle on the moral lives of animals from the perspective of the animals themselves? Does it make any sense and, if so, what sense, to talk of animals as leading moral lives independently of questions about how and whether to factor them into our moral deliberations? In terms of Singer's 'expanding circle' metaphor we may put the question in the following way: Is there one moral circle that encompasses all those who warrant moral consideration or are there perhaps a number of (possibly overlapping) circles centered around different focal points? Does it, for example, make sense to talk of a moral community of wolves or elephants where the norms of these communities and the criteria for membership are determined by and reflections of the social dynamics of the respective groups? In contrast to the traditional anthropocentric perspective this approach might be labeled 'speciocentric.'

The plan of the paper is as follows. Section 2 is a brief summary of the main empirical and theoretical considerations that suggest that at least some non-human animals lead moral lives that can be appropriately characterized from a speciocentric point of view. Section 3 raises two questions that need to be addressed if the project of attributing moral lives to animals is to get off the ground. Section 4 explores the sense in which animals might be construed as moral agents. This discussion draws on some recent work by Geoffrey Sayre-McCord on the nature of normativity.<sup>1</sup> Section 5 is a discussion of a moral version of what is known as the 'logical problem' in the theory of mind literature. This material draws on some recent work by Robert Lurz.<sup>2</sup> Finally, section 6 contains some brief remarks on the potential implications for the treatment of animals that may live more or less rich moral lives.

## **2. The empirical and theoretical background**

Here I briefly summarize material that is dealt with more fully in 'The moral life of animals'.<sup>3</sup> The general empirical and theoretical support for attributing

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<sup>1</sup> Sayre-McCord, 2011.

<sup>2</sup> Lurz, 2011.

<sup>3</sup> Bradie, 2011.

moral sensibilities to animals derives from three sources: evolutionary theory, neuroscience and cognitive ethology.

The argument from evolutionary considerations has its roots in the work of Charles Darwin and George Romanes.<sup>4</sup> The basic idea is that human beings, other mammals and even more distant lineages have a shared evolutionary history. This history records the development of the shared underlying biological mechanisms that give rise to psychological and affective states. Different lineages may manifest those characteristics in different ways but the implication is that the differences between lineages are differences in degree and not differences in kind. The attribution of mental and affective states to animals was blocked by the rise and dominance of behaviorism in the first half of the 20<sup>th</sup> century. However, developments in neuroscience in the past 40 years have led some to challenge the behaviorist paradigm that rejects all attributions of mental or affective states to animals as anthropomorphism gone wild.

The evidence from neuroscience is extensive although the implications for attributing mental and affective states to non-human animals are still somewhat controversial. Two of the major figures advancing the view that the neuroscience strongly supports the view that animals do have minds and experience affects are Paul Maclean and Jaak Panksepp. The basic idea of Maclean's 'triune brain hypothesis' is that the evolved mammalian brain can be conveniently represented as the product of 3 developmental stages: A primitive reptilian brain located in the basal ganglia, an old mammalian brain located in the limbic system, and a new mammalian brain located in the neocortex.<sup>5</sup> The triune brain thesis argues for deep homologies between the brains of animals and the brains of human beings.<sup>6</sup> Neurological evidence points to deep structural similarities between the ancient brain systems that we share with other animals. In particular, the ancient structures are the neural source of basic qualitative *feels* or *affects*. Jaak Panksepp has identified seven primary limbic emotional action systems which, he argues,

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<sup>4</sup> Darwin 1981, 1998, 2000; Romanes 1882, 1885.

<sup>5</sup> Maclean, 1990.

<sup>6</sup> A recent discussion of the philosophical implications of the concept of homology for identifying psychological and behavioral traits across lineages can be found in a special issue of *Biology and Philosophy* edited by Ingo Brigandt and Paul Griffiths (2007, Volume 22, Number 5). Of especial interest are the articles by Marc Ereshefsky (2007) and Paul Griffiths (2007). Additional relevant resources include Griffiths (1996), Griffiths (2006), Matthen (1998), Matthen (2000), Matthen (2002),

are the basis of animal responsiveness and lie at the foundation of both emotional and cognitive states. In addition to this shared affective neurostructure, he has recently argued that mammals share brain structures that constitute what he calls “proto-selves” and “core selves.” Further study, he suggests, may reveal the basis for attributing a sense of self to a wide range of animals. It stands to reason, he argues, that animals with brain structures similar to those in humans not only react in ways that make them appear to have qualitative experiences similar to those of humans when the homologous brain structures are stimulated, but also that they do in fact have those experiences.<sup>7</sup>

The unregenerate behaviorists among you may object that the attribution of affects to non-human animals is unjustified anthropomorphism. Frans de Waal, among others, however, argues that it is not. de Waal argues that there is a double standard at work when charges of ‘anthropomorphism’ are tossed about.<sup>8</sup> On the one hand, researchers take cognitive differences between humans and other animals to justify the non-attribution of emotional and mental capacities to animals while, on the other hand, they ignore evolutionary evidence that suggests that animals and human beings have shared inherited brain structures associated with emotional and mental capacities. de Waal labels this blind spot “Anthropodenial,” which he characterizes as the *a priori* rejection of the importance of the fact that although non-human animals are not human, humans are animals.

The third line of relevant scientific findings comes from investigations by cognitive ethologists. In their book *Wild Justice*, Marc Bekoff and Jessica Pierce argue from the perspective of cognitive ethology that animals exhibit behaviors that are best interpreted as manifestations of empathy, cooperation, and a sense of fairness. In essence, “animals have morality”.<sup>9</sup> Bekoff and Pierce understand morality to be “a suite of interrelated other-regarding behaviors that cultivate and regulate complex interactions within social groups”.<sup>10</sup> However, these behaviors do not constitute morality in themselves; a certain level of cognitive and emotional sophistication is necessary. Bekoff and Pierce’s approach is data-driven, and they emphasize the need and importance of expanding research beyond non-human primates

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<sup>7</sup> Panksepp, 2005.

<sup>8</sup> de Waal, 2006

<sup>9</sup> Bekoff and Pierce, 2009.

<sup>10</sup> Bekoff and Pierce, 2009, ch. 7.

to other social mammals including hunting predators such as wolves, coyotes, and lions, as well as elephants, mice, rats, meerkats, and whales, among others. In addition, they emphasize the importance of studying animals in their natural habitats and not merely in the confines of laboratories where they are often asked to perform tasks in accordance with the interests and expectations of animal behaviorists, which may or may not reflect the interests of the animals themselves.

Where is the line to be drawn between animals that evince morality in this limited sense and those that do not? Bekoff and Pierce suggest that the line is shifting as more empirical evidence becomes available and as our philosophical understanding of what it means to be moral is modulated by reflection on the accumulation of scientific data especially data derived from field studies of animals interacting in their natural environments. Although their focus is on social mammals, there is a widening body of evidence that suggests that some birds have the wherewithal to constitute a moral community, in the sense of being capable of feeling and expressing relevant emotions, exhibiting co-operation, and the like.

Although they argue that the data strongly support the attribution of morality to animals, Bekoff and Pierce also argue that what constitutes morality has to be understood as species specific. Thus, what counts as morality for human beings may not count as such for wolves, for instance. Nevertheless, they argue, the fact that human standards of morality are not appropriate for wolves does not mean that wolves do not possess some sense of moral relationships that is exhibited in their own manifestations of empathy, cooperation and a sense of fairness. The net effect is that there is not one sense of moral community and that we humans, as allegedly prototypical moral agents, may expand our understanding of morality to include some organisms and exclude others. But the proper way to understand animal morality, they suggest, is to see that there are a number of distinct species-specific moral communities. Within these diverse communities, what counts as moral needs to be attuned to the characteristic features of the species themselves as opposed to being determined by considerations that derive from our own case. Indeed, even within species, different communities may develop different social practices, so that what is acceptable in one wolf pack, for example, may not be acceptable in another.

These considerations, taken together, are compelling support for the claim that at least some animals, especially the social animals, have moral lives.

The evidence is compelling but not conclusive. Putting aside behaviorist qualms there are still significant hurdles to be overcome before we can be confident in concluding that animals are moral creatures in their own right. To these qualms we now turn.

### **3. Two questions**

There is an extensive literature on the dual questions of whether animals have minds and whether, if they do, they have a ‘theory of mind.’ There are two fundamental issues: (1) Do animals have minds?, and (2) Given that they do, are they capable of attributing mental states to others and acting on those attributions? Parallel questions can be raised with respect to the moral lives of animals. (1m) Do animals have moral lives, that is, are they motivated by ‘moral’ considerations, properly understood? (2m) Given that they are, can they attribute moral motivations to others and act accordingly?

Robert Lurz, in a recent book, has identified two fundamental issues that need to be addressed in order to be in a position to answer questions about the mindreading capabilities of animals.<sup>11</sup> One is theoretical and one is experimental. Parallel issues have to be addressed in order to be in a position to answer questions about the moral lives of animals.

For our problem, the theoretical issue is this: What does it mean to attribute moral lives to animals? In particular, what does it mean to attribute moral motivations to animals? The empirical issue is this: How best can we test for the existence moral sensibilities and moral motivations in animals?

I do not have a good answer to either of these two questions but I think we can make some headway in identifying the key questions that need to be answered and in identifying what is the proper perspective for answering them.

### **4. Levels of agency**

To the extent that we attribute psychological and moral states to animals they are, in some sense, persons and not merely biological organisms. What, then, does it mean to attribute personhood to animals? We can adopt either

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<sup>11</sup> Lurz, 2011.

an anthropocentric or a speciocentric perspective on this question. From an anthropocentric point of view, something is a person if it has a sufficient number of properties that make it an entity *like us*. I am not sure what constellation of properties this would include but the fact that in some legal sense corporations can be persons shows that the applicability of the concept is not limited to living beings. The central ideas that legitimate the extension of the idea of personhood to corporations, for instance, are notions of agency and responsibility. Corporations can act as (legal) agents and can be held (legally) responsible for their actions. However, what degree of agency and responsibility they possess is conferred upon them by human beings and their social practices. What about the moral agency of animals? Is that to be construed as merely derivative as well? A speciocentric perspective would reject this way of understanding what it means for an animal to be a moral agent. To the extent that animals lead moral lives (as opposed to being merely factors in our moral calculations) we must be able to construe them as moral agents in their own right. Can this be done?

In a recent paper responding to claims in the literature that attribute moral agency to animals, Geoffrey Sayre-McCord asks ‘Just what is it to be a moral agent?’<sup>12</sup> In effect, what is the nature of normativity? In his analysis, Sayre-McCord identifies several levels of ‘agency’ where an agent is understood to be something capable of representing its environment and acting on the basis of those representations.<sup>13</sup> These are, in order of increasing sophistication, (1) ‘stimulus-response agents who ‘represent the world as being a certain way and then respond directly’<sup>14</sup>; (2) ‘planning agents,’ which are basically stimulus-response agents with the extra capacity to identify alternative courses of action and act in accordance with some plan of action. Sayre-McCord characterizes these agents as ‘decision-theoretical’ agents whose behaviors can be adequately modeled by decision theory<sup>15</sup>; (3) ‘strategic agents’ are agents who attribute designs and plans to others and act accordingly. Their behavior can be modeled by game theory; (4) ‘norm-governed agents’ are ‘strategic agents . . . [who] introduce rules for behavior with which they are disposed to conform and disposed to enforce in various ways’<sup>16</sup>; and finally, (5) ‘rational agents,’ that is, strategic norm-governed

<sup>12</sup> Sayre-McCord, 2011, 2.

<sup>13</sup> Sayre-McCord, 2011, 5.

<sup>14</sup> Sayre-McCord, 2011, 5.

<sup>15</sup> Sayre-McCord, 2011, 5.

<sup>16</sup> Sayre-McCord, 2011, 7.

agents who are ‘able to represent the different options as better or worse, as right or wrong, or as justified or not and . . . [are] able to act on the basis of such normative representations.’<sup>17</sup>

On Sayre-McCord’s account, truly moral agents need to be able to have a capacity for second-order reflection on first order states. That is, truly moral agents need not only follow norms but be capable of recognizing that they are following norms and be capable of using this reflective insight to guide their actions. This is a high bar for non-human animals to pass. Whether they are capable of passing it depends on how sophisticated their mental and psychological capacities are. Many who are willing to allow that some animals have sophisticated psychological states are reluctant to attribute reflective second-order capacities to them. Sayre-McCord, for one, allows that some animals are capable of rising to the level of norm-governed agents but he resists attributing any rational, and hence, truly moral, agency to them.

The distinction between norm-governed agents and rational agents roughly parallels Kant’s distinction between acting in accordance with duty and acting *from* duty. Indeed, this is the central theme of Sayre-McCord’s analysis.<sup>18</sup> His main project is to provide a Kantian account of rational agency freed from the metaphysical baggage of Kant’s own account.<sup>19</sup> For our present purposes, the question is: ‘Is norm-governed agency good enough for *non-human* moral agency? It is clear that many cognitive ethologists see the structured behavior of social animals as manifesting norm governed behavior. Some, perhaps sympathetic to the idea that such behavior doesn’t rise to the Kantian level of moral agency, are content to qualify such animals as ‘proto-moral’ beings. I don’t want to haggle over labels here but merely want to suggest that the resistance to qualifying animals as ‘truly’ moral may reflect a subtle anthropocentric bias. If we view human morality as one manifestation of a shared evolved set of homologous social enabling mechanisms, then the peculiar feature of rational reflectivity, as Sayre-McCord understands it, looks more like a refinement of a capacity that is shared among many lineages rather than as a defining characteristic. If so then we can tentatively accept norm-governed agency as moral agency enough and move on to the empirical question of how to establish whether any animals do live moral lives, so understood.

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<sup>17</sup> Sayre-McCord, 2011, 7.

<sup>18</sup> Sayre-McCord, 2011, 2.

<sup>19</sup> Sayre-McCord, 2011, 2.

At some point on the phylogenetic scale, we reach a point where moral behavior fails to exist. Sayre-McCord's analysis suggests that this point is high up, namely at the level of the human. Those sympathetic to the traditional analyses tend to agree. My analysis suggests that the dividing line lies lower down at the level of manifestations of sociality which are based on shared homologies. Is the difference between us to be attributed to a mere conflict of intuitions or is there something more to be said in favor of one approach rather than another? Sayre-McCord starts from the presumption that humans are the proto-typical moral agents and constructs an analysis on that basis that winds up focusing on the peculiar attributes that constitute the basis of human morality at least as construed from a broadly Kantian perspective. The starting presumption of the present analysis is that moral lives are grounded in the shared evolutionary homologies that manifest themselves in social behaviors across a range of related lineages. From this point of view, human morality is but one manifestation of a set of homologous behaviors and practices shared among a wide spectrum of related lineages.

## 5. The logical problem

Turning to the question of how to empirically test whether or not animals lead moral lives, we confront what has been labeled in the mind reading literature as the 'logical problem.' The mind reading problem is this: Is there any way to empirically distinguish between (1) animals that are mind readers, that is, animals that act in light of their attribution of intentional states to others, and (2) animals that are acting on behavioral cues but who do not attribute intentional states to others? The problem arises, in part, because, in the absence of language, the attribution of mind reading to animals is determined solely by their behavioral responses to environmental situations. In a recent book, Robert Lurz argues that all previous experimental results that suggest that some animals are mind readers are compromised by a failure to rule out the hypothesis that the observed behaviors can be explained equally well by a 'behavior-reading' hypothesis to the effect that the animals are responding to behavioral cues and are not attributing mental states to either other conspecifics or to the experimenters.<sup>20</sup>

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<sup>20</sup> Lurz, 2011, ch. 2.

Some take this failure to be able to discriminate between cases of mind-reading and cases of behavior-reading to be an insurmountable barrier to the unequivocal attribution of mind reading to organisms that cannot communicate their thoughts and intentions through the use of language that is intelligible to us. Lurz, however, argues that it is possible to design experiments that will be able to discriminate between the two hypotheses and he proposes several, as yet untested designs, that he claims will yield different predictions depending upon whether the tested animals are mind-readers or not. I do not want to pursue this here but rather to formulate the analogous problem for determining whether or not non-human animals live moral lives.

The logical problem for the moral lives question boils down to this: Is it possible to experimentally distinguish between animals that are acting in accordance with moral norms and animals that are behaving as *if* they were but for whom no moral considerations, *per se*, are relevant? If we allow, for the sake of argument, that morally motivated animals are norm-governed in Sayre-McCord's sense then what we want to know is whether the behavior of the animals is directed by (first-order) moral motivations or whether the characterization of their behavior as norm-governed is imposed upon their behavior by the ethological investigators.

This problem dogs much, if not all, of the cognitive ethology data that suggests that many social animals exhibit behaviors that can be interpreted as a result of the animals acknowledging and enforcing social and moral norms within their respective communities. Unlike Lurz, I do not have any good sense that these alternative accounts are empirically distinguishable. If they are not, then the claim that animals lead moral lives will remain in limbo despite the suggestive evidence from evolutionary considerations and the neuroscientific data. However, I am persuaded by the work of the cognitive ethologists that any decisive conclusions one way or the other must be the result of investigations *in situ* where experiments and observations are set up to reflect the conditions and expectations of the animals under investigation and *not* the expectations of alien investigators (that is, us).

## 6. Some moral implications

If we assume, for a moment, that at least non-human animals do lead moral lives of a sort, what are the implications for our understanding of the nature and function of human morality and of our treatment of non-human animals?

If the argument of this paper is on the right track it leads to the conclusion that the capacity for human morality is one manifestation of the social nature of our species, a nature that is, in turn, one manifestation of a shared inheritance that spreads across a wide spectrum of biological lineages and which manifests itself in a variety of ways. Thus, attempts to distance humans from other animals on the basis of the alleged fact that humans, as moral agents, are qualitatively different from the other animals, must be resisted. Even if it is conceded that the human capacity for morality is intimately connected with the human capacity for reason which other animals may or may not possess, this merely goes to show that different organisms manifest their moral proclivities in different ways. The speciocentric point of view suggests that any attempt to isolate the one defining and separating feature of any trait or capacity on the basis of the special circumstances and characteristics of any one species is misguided. This is not to deny the obvious, namely, that sociality and moral behavior manifests itself in different ways in different lineages, but merely to challenge the hubris of adopting one preferred perspective as the correct one. This, I take it, is a corollary of adopting a general Darwinian approach to the evolution of species.

What, then, are the implications for the human treatment of non-human animals? I take it, as a given, that independently of whether animals qualify as moral agents of a sort, given that they are sentient there is a *prima facie* reason for not inflicting gratuitous pain on them. What then does the recognition that they are capable of leading moral lives add to this? For starters, it does not mean that they need to be included in ‘our moral community,’ however that is understood. This is due to the fact that, although our shared evolutionary heritage binds us together, our evolutionary histories are sufficiently different to mean that, in some sense, we are more or less alien to each other. That said, the fact that they are moral beings in their own right means, I should think, that we owe it to them to be more sensitive to their needs and interests and overall well-being. One practical implication is with respect to the construction of zoos and animal parks. These institutions are,

for the most part designed with our interests and not the interests or well-being of the animals in mind. At the very least, the construction of such facilities should strive to recreate as closely as possible the natural environments of the animals. Similar considerations apply to efforts to preserve wild habitats and shelter them from human despoilment. Here the issues are complicated due to the fact that human interests driven by economic and political considerations are often at odds with the interests of populations of wild animals. There is no easy formula for resolving such conflicts but an increased awareness of the moral capacities of animals should weigh in as a relevant consideration in our deliberations about what to do or what to tolerate in particular circumstances. Exactly what further accommodations need to be made in reshaping human attitudes towards and treatment of animals hinges on the results of future empirical investigations that bring to light the hitherto hidden moral lives of animals.

More generally, if the speciocentric perspective is correct, what does the resulting moral landscape look like? From an anthropocentric point of view, there is one moral community and who gets included is a function of a set of centrally determined criteria. From a speciocentric perspective, however, there are any number of different and potentially disjoint moral communities with different criteria for inclusion. How are we to understand the inter-relationships between these different communities? The fact that, as human beings, we may be inclined to be sensitive to the well-being of non-conspecifics by no means entails that the members of other moral communities are or should be so inclined. One might even argue that, given the speciocentric point of view, human beings may have no particular obligations to non-conspecifics.<sup>21</sup> If this is so, then it may be the case that shifting from an anthropocentric to a speciocentric perspective has no obvious implications for how humans should treat non-conspecifics. I am inclined to think that this is not the case on the grounds that, to the extent these non-conspecifics have more capacities that are similar to our own but manifested in different ways, they deserve some further consideration than traditional approaches to animal welfare would countenance. Is this a retreat to anthropocentrism as one reviewer suggested? I think not, since the key point of difference between the anthropocentric and the speciocentric points of view is not that we should not deem other creatures worthy or not of moral

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<sup>21</sup> The importance of addressing the architecture of the speciocentric moral landscape was urged by an anonymous reviewer.

consideration based on *our* values but rather that we should not decide whether other beings lead moral lives based on criteria which are drawn from our own case and appropriate for us.

## 7. Conclusion

Three lines of empirical evidence suggest that the capacity for human morality is one manifestation of homologous traits that are shared by other social organisms. The interpretation of the significance of this evidence is complicated by the fact that protocols for evaluating the evidence from the subject's point of view rather than from a human-centered point of view are still somewhat primitive. In addition, there are important philosophical reservations about the very idea of attributing moral sensibilities and moral lives to animals on the grounds that exercising moral behaviors requires mental and rational capacities that are beyond the capabilities of non-human animals. I have suggested that this reflects an anthropocentric bias that needs to be replaced by what I have called a 'speciocentric' point of view. The question of whether animals lead moral lives in their own right and if so how rich those lives are is, nonetheless, far from settled. Reconceptualizing what it means to be a moral being is a necessary precondition for entertaining the very idea that animals are capable of leading moral lives. In the end, whether they are and to what extent will rest on detailed empirical evidence drawn from the study of the activities of animals in their natural habitats.

## References

- Allen, C., Bekoff, M., 1997, *Species of Mind: The Philosophy and Biology of Cognitive Ethology*, Cambridge MA, The MIT Press.
- Bekoff, M., Pierce, J., 2009, *Wild Justice: the moral lives of animals*, Chicago, The University of Chicago Press.
- Berridge, K. C., 2003, Comparing the emotional brain of humans and other animals. In: Davidson, R. J., Goldsmith, H. H., Scherer, K. (Eds.), *Handbook of Affective Sciences*, Oxford, Oxford University Press, 25-51.
- Brigandt, I., and Griffiths, P. (Eds.), 2007, *Biology and Philosophy*, 22, No. 5.
- Bradie, M., 2011, The Moral Lives of Animals. In: Beauchamp, T., Frey, R. G. (Eds.), *The Oxford Handbook of Animal Ethics*, Oxford, Oxford University Press.
- Darwin, C., 1981, *The Descent of Man and selection in relation to sex*, Princeton, Princeton University Press.  
-- 1998, *The expression of the emotions in man and animals*, 3rd edn., Oxford, Oxford University Press.  
-- 2000, *On the origin of species: A facsimile of the first edition*, Cambridge MA, Harvard University Press.
- de Waal, F., 2005, *Our Inner Ape*, New York, Riverhead Books.  
-- 2006, *Primates and Philosophers: How Morality Evolved*, Princeton, Princeton University Press, The University Center for Human Values Series.
- Ereshefsky, M., 2007, Psychological Categories as Homologies: Lessons from Ethology. *Biology and Philosophy*, 22, 659-674.
- Griffiths, P., 1994, Cladistic Classification and Functional Explanation. *Philosophy of Science*, 61, 206-226.  
-- 1996, The Historical Turn in the Study of Adaptation. *British Journal for the Philosophy of Science*, 47, 511-531.  
-- 2006, Function, Homology and Character Individuation. *Philosophy of Science*, 73, 1-25.  
-- 2007, Evo-Devo Meets the Mind: Toward a Developmental Evolutionary Psychology. In: Sansom, R., Brandon, R. N. (Eds.), *Integrating Evolution and Development: From Theory to Practice*, Cambridge MA, The MIT Press, 195-225.
- Lurz, R., 2011, *Mindreading Animals: The Debate over What Animals Know about Other Minds*, Cambridge MA, MIT Press.
- MacLean, P., 1990, *The triune brain in evolution*, New York, Plenum Press.
- Matthen, M., 2000, What is a Hand? What is a Mind? *Revue Internationale de Philosophie*, 4, 653-672.  
-- 2002, Human Rationality and the Unique Origin Constraint. In: Ariew, A., Cummins, R., Perlman, M. (Eds.), *Functions: New Essays in the Philosophy of Psychology and Biology*, Oxford, Oxford University Press, 341-372.

Panksepp, J., 1998, *Affective neuroscience: the foundations of human and animal emotions*, New York, Oxford University Press, Series in affective science.

-- 2005, Affective consciousness: Core emotional feelings in animals and humans. *Consciousness and Cognition*, 14, 30-80.

Panksepp, J., Northoff, G., 2009, The trans-species core SELF: The emergence of active cultural and neuro-ecological agents through self-related processing with subcortical-cortical midline networks. *Consciousness and Cognition*, 18, 193-215.

Romanes, G. J., 1882, *Animal Intelligence*, London, Kegan Paul, Trench, & Co.

-- 1885, *Mental Evolution in Animals*, London, Kegan Paul, Trench & Co.

Sayre-McCord, G., 2011, Rational Agency and the Nature of Normative Concepts, at:  
<http://philosophy.unc.edu/people/faculty/geoffrey-sayre-mccord/on-line-papers/Rational%20Agency%20and%20the%20Nature%20of%20Normative%20Concepts.pdf/view>