

# *Social Apes in God's Image*

with Nancy R. Howell, "Embodied Transcendence: Bonobos and Humans in Community"; and Oliver Putz, "Moral Apes, Human Uniqueness, and the Image of God"

## MORAL APES, HUMAN UNIQUENESS, AND THE IMAGE OF GOD

by Oliver Putz

*Abstract.* Recent advances in evolutionary biology and ethology suggest that humans are not the only species capable of empathy and possibly morality. These findings are of no little consequence for theology, given that a nonhuman animal as a free moral agent would beg the question if human beings are indeed uniquely created in God's image. I argue that apes and some other mammals have moral agency and that a traditional interpretation of the *imago Dei* is incorrectly equating specialness with exclusivity. By framing the problem in terms of metaphor, following the work of Paul Ricoeur and Sallie McFague, I propose that the concept of the *imago Dei* could be extended to accommodate moral species other than our own.

*Keywords:* cognitive ethology; evolution; great apes; human uniqueness; image of God; moral agency; nonhuman animals

---

A possible rule of thumb for every biologist worth her salt could be: In case of doubt, read Darwin! If nothing else, one finds there the intellectual origins of many issues in biology still pondered by modern science and its sister disciplines, philosophy and theology. This is also true for perhaps the most exciting and controversial subject currently discussed in all three fields of inquest, the natural history of morality. Like Darwin then, thinkers today are concerned with essentially two pivotal questions: (1) whether morality could have evolved by means of natural selection (Katz 2000; de Waal 1996; 2006; Bekoff 2004) and (2) whether species other than our own also have moral agency (Cavalieri and Singer 1993; Hauser 2006).

Oliver Putz is a student at the Graduate Theological Union, 2400 Ridge Road, Berkeley, CA 94709; e-mail [oputz@ses.gtu.edu](mailto:oputz@ses.gtu.edu).

[*Zygon*, vol. 44, no. 3 (September 2009)]

© 2009 by the Joint Publication Board of *Zygon*. ISSN 0591-2385

[www.zygonjournal.org](http://www.zygonjournal.org)

Answers to both questions are of enormous relevance for theology, especially for theological anthropology, but the solution to the problem of moral nonhuman animals bears far greater ramifications. If animals possess the necessary and sufficient mental conditions enabling them to make moral decisions, it means not only that they have to be considered “persons” but also that they too are created in the image of God.

In this essay I argue that great apes are indeed capable of self-reflection and thus of moral decision-making, even though the differences between ape and human cognition are both real and significant. Moreover, I submit a proposal for how the doctrine of the *imago Dei* can be broadened to accommodate moral animals by applying metaphor, following the work of Paul Ricoeur and Sallie McFague.

#### PHYLOGENETIC CONTINUUM AND EVOLUTIONARY PARSIMONY

I begin by laying out some essential philosophical precepts underlying my argument, in particular the importance of assuming a phylogenetic continuum and with it evolutionary parsimony.

One of the central tenets of evolutionary biology is that life on earth is a continuum extending from the earliest organisms through diverse phylogenetic branches to the great variety of species alive today. In order to be persuasive, any assessment of the ethological data relevant to animal morality has to presuppose such a phylogenetic continuum. The problem is how to negotiate the continuity throughout discrete biological categories such as species.<sup>1</sup> No one doubts the great similarities of ape and human social behaviors, but equally obvious are those species-specific traits that set orangutans, gorillas, humans, bonobos, and chimpanzees apart from each other. How one evaluates the mental abilities of nonhuman animals in comparison to those of humans therefore depends largely on whether one emphasizes the similarities over the differences or vice versa.

Most biologists agree that humans and great apes share many behaviors, but there is considerable controversy over whether these homologous behaviors are based on the same underlying mental systems. Assigning to animals emotions such as sympathy, shame, or love or cognitive abilities such as reason, fairness, or self-awareness constitutes for many an unnecessary and ultimately misleading anthropomorphism. Stressing the differences between species, these researchers insist on cognitive parsimony—that is, behaviors must not be explained by higher mental capacities if they can be just as easily explained by lower mental processes (Kennedy 1992, 154; Kagan 2000, 48; Povinelli and Giambrone 2000, 9ff.).<sup>2</sup>

Others favor evolutionary parsimony, which posits that the underlying mental processes of the same behaviors are the same in closely related species (Goodall 1986, 592; Flack and de Waal 2000, 71; Bekoff 2006, 3). Accordingly, it is difficult to imagine that a bonobo embracing another

who was the victim of an attack is motivated by something other than the same empathy that would motivate a human under similar circumstances.

One's preference for cognitive or evolutionary parsimony depends largely on how great one considers the difference between humans and other animals to be. This is perhaps the most critical problem in behavioral biology today. In this essay I apply both phylogenetic continuity and evolutionary parsimony.

#### THE PROBLEM OF ANIMAL MORALITY

Aside from parsimoniously evaluating behavioral differences and similarities, what exactly is the problem with animal morality? Empirical evidence suggests that apes are capable of cognitive achievements that for a long time were thought to be reserved exclusively for humans. Apes make and use tools (Goodall 1986, 535ff.; Boesch and Boesch-Achermann 2000, 192; Ohashi 2006, 439), have culture (Whiten et al. 1999, 682; Biro et al. 2003, 221; McGrew 2004),<sup>3</sup> use plants for self-medication (Reynolds 2005, 41), have complex emotions (Aureli and Smucny 2000, 200), are empathic (Preston and de Waal 2002; O'Connell 1995, 408), and show altruistic behavior not only to conspecifics (Warneken et al. 2007, 0004). Perhaps most astoundingly, great apes show signs of self-cognizance and the ability to employ symbolic processes that operate on the basis of mental images rather than direct sensory-motor phenomena (Gallup 1985, 639; Menzel, Savage-Rumbaugh, and Lawson 1985).<sup>4</sup> The million-dollar question is whether these capabilities in animals constitute merely evolutionary antecedents for human morality or mark the presence of moral agency in nonhumans. The answer largely depends on how one defines morality.

Briefly, morality can be understood as the ability to make a decision between "right" and "wrong," "good" and "bad." This choice is made on the background of a code of conduct that is best understood in a normative sense. Accordingly, the content of morality is a code that, given specified conditions, would be put forward by all rational persons and not only by a local majority (Gert 2005). For the discussion of whether nonhuman animals have moral agency, the origin of this code is of no great importance. Whatever the content of morality, the question is whether or not animals can freely choose how to act. The focus therefore must be on the cognitive and affective capacities that enable moral decisions.

It is important not to confuse the notion of moral decision-making with the heuristic concept of choice central to many biological theories that view all behavior as the outcome of underlying fitness trade-offs. An individual acting selflessly out of a mechanistic motivation geared to increase inclusive fitness hardly acts morally, no matter whether its behavior is the result of kin selection or scorekeeping between group members. Its "choice" is a far cry from that of a self who weighs the pros and cons of her decision.

The psychological benchmark for animal morality is neither prosocial behavior nor fairness in a tit-for-tat reciprocity but rather the ability to reflect upon one's choices and their consequences. As such, moral agency presupposes self-consciousness and, ultimately, free will.<sup>5</sup>

What characterizes self-consciousness is first and foremost the fissure of the self into reflecting subject and reflected object. This division results in an internal self-symbolization in which the objective self symbolizes to the subjective self the undivided self as a whole. This internal self-symbolization is the foundation for all moral judgment because it enables free self-reflection. Without a divided yet reflective self there cannot be moral agency.

It has been argued that language is indispensable for self-reflection because it allows humans to construct meaningful worldviews based on interpretations of experiences (Gadamer [1960] 1990, 446). This seems convincing, given that only humans use one and the same system for both representing and communicating (Astington and Baird 2005, 6). But, as linguist Derek Bickerton points out, in order to represent and communicate something there first has to be comprehension of that which needs expressing. Bickerton makes the case that of the three components that make up human language—modality, symbolism, and structure—structure alone is what distinguishes human language from animal communication (2003, 80). Apes use such modalities as signs and vocalization (Pika and Mitani 2006, R191; Hopkins, Tagliabata, and Leavens 2007, 284), and they certainly have symbolic representation (Savage-Rumbaugh, Rumbaugh, and McDonalds 1985, 664; Goodall 1986, 33). However, when it comes to syntax apes reach their cognitive limits, most likely because of significant differences in the underlying neural substrates (Bickerton 2003, 82). Is syntax the threshold of self-consciousness and ultimately morality? I argue that it is not.

A definite benchmark for self-consciousness is theory of mind, that is, an individual's explicit understanding of the intentional or mental states of others (Premack and Woodruff 1978, 526; Tomasello and Call 1997, 229; Byrne and Whiten 1997, 8). Sanjida O'Connell (1995, 398) distinguishes four degrees of intentionality that correspond with particular abilities to "mindread."<sup>6</sup> At zero-order intentionality an individual is unaware of any subjective thought. At first-order intentionality the individual has a representation of something. At second-order intentionality it knows that another individual has the same representation. For O'Connell this level might already be connected to self-consciousness, where the individual knows that it knows. For third-order intentionality, an individual must know that another knows that the first individual knows. For O'Connell, this ability is indispensable for theory of mind. Third-order intentionality requires neither syntax nor language but comprehension of self and representation. Empirical evidence suggests that apes possess both.

## EVIDENCE FOR MORAL AGENCY IN ANIMALS

Language studies with bonobos and chimpanzees such as those using lexigrams or sign language have clearly demonstrated that apes are capable of symbolic representation. In both cases, individuals have learned a substantial vocabulary in a relatively short time and spontaneously combined words in structurally ordered sentences (Savage-Rumbaugh, Rumbaugh, and McDonalds 1985, 664). In a particularly elegant series of experiments, researchers around Tetsuro Matsuzawa of the Primate Research Institute of Kyoto University have demonstrated numerical competence in chimpanzees (Biro and Matsuzawa 2001). Animals show both cardinal and ordinal skills, including, in case of the female Ai, the concept of zero. Apparently apes are quite capable of associating arbitrary symbols with a class of episodes, objects, or actions, thus using true symbolic and not merely indexical representation.<sup>7</sup>

The fact that until recently displays of equal abilities were absent from field observations seemed to support the belief that apes could not develop complex symbol-based communication on their own. But this conclusion may have been too hasty. In a population of chimpanzees from Ngogo, Uganda, Simone Pika and John Mitani (2006, R191) observed referential gestural communication, where animals request grooming of specific body parts by exaggerated scratching of that area. This finding is significant not only because it suggests the use of symbols established by social convention by apes in the wild but also because it implies the ability to attribute mental states to others, as the recipient must infer the signaler's meaning.

Observational data from the field suggesting theory of mind in apes are corroborated by a slew of controlled experiments in the laboratory. Chimpanzees follow gaze direction to external targets and check back with the experimenter if they find nothing of interest there (Povinelli and Giambrone 2000, 23; Tomasello, Call, and Hare 2003, 153; Okamoto-Barth and Tomonaga 2006, 157). As Brian Hare and his colleagues have shown, chimpanzees also know what others can and cannot see. Hare placed a dominant and a subordinate male into competition over food, making one food item visible to only the subordinate individual while another was visible to both animals. In a significantly greater number of cases the subordinate would take the food not visible to the dominant competitor, thus avoiding violent conflicts (Hare et al. 2000, 780). Obviously, chimps understand psychological states; the question is which ones and to what extent.

For O'Connell the touchstone of theory of mind is third-order intentionality, where an animal knows that another knows that the first has a representation of something (a banana, for example). In a longitudinal study of 2,237 instances of empathic behavior in chimpanzees, O'Connell identifies third-order intentionality in numerous reports from the wild as well as captivity. A case in point is an incident related by Jane Goodall that

involves empathy leading to altruistic behavior. Washoe, an adult male chimpanzee, saw three-year-old female Cindy jump the fence of their enclosure and fall into a moat. Washoe, who was unrelated to Cindy, likewise jumped the fence and, despite his innate fear of water, stepped into the moat and pulled the drowning infant to safety (Goodall 1986, 378). Aside from its displaying theory of mind, this example is also interesting because it involves empathy, a cognitive trait that has been suggested to be a cornerstone of morality (Darwin [1871] 1907, 149; Hume [1740] 2000, 321). According to psychologist Lauren Wispé (1986, 318), empathy constitutes an attempt of a self-aware self to “comprehend unjudgmentally the positive and negative experiences of another self.”<sup>8</sup> Numerous cases of empathy involving third-order intentionality leading to selfless behavior have been reported in great apes. What makes them interesting for the discussion of animal morality is that they all apparently involve an individual reflecting upon the situation and acting in a way that is explainable by neither kin selection nor reciprocity.

Equally difficult as determining theory of mind in apes is demonstrating that they have self-consciousness. One experimental approach to the problem is the mirror self-recognition test, which in human infants has long been considered a reliable method to study the emergence of self-recognition. At 12 to 24 months of age human infants understand that they see themselves in the mirror and change from responding with social behavior (reaching out, laughing) to self-directed behavior (interest in the relationship of reflection and their own movements). When asked, these children will confirm that the person they see in the mirror is themselves (Inoue-Nakamura 2001, 297).

Like human infants, most animals mistake their mirror image for a conspecific and respond with some form of social behavior. However, in a series of experiments, Gordon Gallup demonstrated that adult chimpanzees recognize themselves in the mirror. After a habituation phase, Gallup's apes displayed self-directed behaviors, such as picking their teeth or checking their behinds. To confirm that the animals were making the connection between themselves and the mirror image, Gallup anesthetized them and applied a red mark to their eyebrows and one ear. Upon recovery, the chimps were presented with a mirror, and they showed clearly mark-directed behavior (Gallup 1970; Gallup et al. 1995). Since Gallup's seminal work, mirror self-recognition has been demonstrated in all great apes, even if, as in case of gorillas, more species-specific experimental designs were required (see Shumaker and Swartz 2002, 338).

There is much controversy about whether or not mirror self-recognition indicates self-consciousness. However, I think the case can be made that the cognitive processes underlying mirror self-recognition require a notion of self that goes beyond merely perceptual consciousness. In essence, an animal recognizing itself in the mirror externalizes its internal

self-symbolization, in which the objective self symbolizes the self to the subjective self, and transfers it to its mirror image. The same externalization characterizes theory of mind, only that now the transfer occurs not on the level of self-recognition in a mirror but in the assigning of a self to another individual based on the other's appearance and behavior. What characterizes theory of mind, then, is that the body and behavior of another act as an ontological symbol that represents the self of the observed individual to the observer.<sup>9</sup>

Marc Bekoff (2004) has studied animal play and identified the relationship of fairness and expectation as the basis of what he calls "wild justice." To Bekoff, they serve prosocial functions and are the mark of animal morality. I think that prosocial behavior is not necessarily moral, but fairness can certainly be the result of moral reasoning. In his study of the San Diego bonobos, Frans de Waal describes an interesting game that suggests self-consciousness and theory of mind as well as the ability to adhere to a code of conduct (1989, 195). In the game juvenile bonobos cover their eyes with either an object or their hand and then stumble around the climbing frame some 15 feet up in the air. This play requires individuals to agree on and play by rules—not to look unless one loses one's balance—and also the understanding that the others can see and judge whether or not one is truly covering one's eyes.

To summarize, I have argued that moral agency presupposes self-consciousness, comprehension, and representation and that both observational and empirical studies suggest strongly that apes possess these mental traits. Consequently, empathic and altruistic behavior, but also fairness in games as observed in bonobo play, can result from moral decision-making.

#### THEOLOGICAL RESPONSE TO MORAL AGENCY IN APES

How is moral agency in great apes to be squared with theological traditions of the *imago Dei*? The answer to this question lies in a careful differentiation between *specialness* and *exclusiveness*.

Theologians have proposed numerous interpretations of what it means to be created in the image of God, virtually all of which agree on human uniqueness over and against nonhuman animals. Most interpretations can be subsumed under one of three general categories: (1) substantive interpretations, in which the *imago* is a trait or property of the human being, most often associated with reason; (2) functional interpretations, in which the image of God is reflected in our actions, particularly our dominion over the earth; and (3) relational interpretations, in which the divine image is found in relationship with others (Herzfeld 2002, 10ff.). Notwithstanding their differences, all three models insist that human beings are the only species created special, that is, endowed with or capable of the divine image.



If my interpretation of the ethological data concerning mental abilities of great apes is accurate, such a narrow anthropocentric understanding of the *imago Dei* is inadequate. Apes are capable of love, of thought, and, according to Goodall, possibly even of experiences of religious dimensions.<sup>10</sup> This warrants a more inclusive interpretation of the *imago Dei*.

I believe this is possible when framing the problem in terms of metaphor. According to Paul Ricoeur (1976, 50), what characterizes a metaphor is its intrinsic tension of two opposing interpretations. In the attempt to interpret a metaphorical utterance literally, its absurdity is revealed, from which the metaphor obtains its result. In bringing together things that do not go together, metaphors reveal a previously unnoticed relation of meaning and, ultimately, new understanding. Overemphasis of either its similarity or dissimilarity renders a metaphor impotent.

In her book *Metaphorical Theology* Sallie McFague applies the notion of metaphor to theology and draws a close connection between metaphor and theological model. Models are “sustained and systematic metaphors” (1982, 67), and religious language consists of barely anything else. Central to all theological models is the biblical root metaphor of a personal deity who is in relationship with creation as its source and sustainer. To McFague, the objective of all theology is to provide new insightful metaphors and models that express this relationship with the divine in a meaningful way (McFague 1987, 32).

The model I want to apply to the problem at hand is the parental metaphor of God as mother and father. Embedded in it is a second metaphor of humanity as the child of God that simultaneously reveals our dependence on the divine and hints at the specialness of our species. But this filial metaphor does not necessarily entail that humanity is an only child, for specialness does not inevitably equate with exclusiveness. The love of a mother or father for a child is not lessened by the arrival of a second child. Neither can the presence of a new sibling diminish the rareness of the first-born. On the contrary, the uniqueness of either child is underlined by the peculiarities of its sibling, thus heightening the specialness of both. They are loved equally, though differently. And despite any shared inherited characteristics, both are unique in their very own way as they develop their own personalities in freedom. This diversity that is both creativity and affluence of expression ultimately also enriches the being of the parent from whom it originated. To confuse specialness with exclusiveness thus impoverishes the life of both child and parent.

I propose that it is not humanity alone that is wanted by God for its own sake, but rather the diversity of self-conscious expressions that emerge from an evolutionary process and in which the universe, to say it with Karl Rahner (1976, 193), comes to itself while God’s self-communication becomes realized. To share with great apes in the *imago Dei* is neither removing human beings from our special relationship with God nor releasing us



from our special responsibility toward the earth as a highly technological species. It is an expression of the abundant presence and richness of God's self-communication in the world.

## NOTES

A version of this essay was presented at a symposium on Bonobos and Theological Anthropology during the annual meeting of the American Academy of Religion, San Diego, California, 19 November 2007. This study was funded by a STARS Research Planning Grant. I thank Jill Byrnit, Adrian O'Keefe, John Braverman SJ, Braden Molhoek, Marilyn Matevia, and Marie George for reading and discussing an earlier version of this paper. Their suggestions were of great help.

1. The concept of biological species itself is currently being debated by evolutionary biologists. Some consider it the only ontological taxonomic category that defines itself; others think of it as merely an epistemic category. One particularly helpful way of thinking about biological species is to view them as an epiphenomenon of sexual reproduction. However, the issue remains unresolved.

2. Cognitive parsimony is also known as Morgan's Canon, named after nineteenth-century British psychologist C. Lloyd Morgan, who in 1894 wrote: "In no case may we interpret an action as the outcome of the exercise of a higher psychical faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale" (Morgan 1894, 53). For a recent discussion of cognitive parsimony see de Waal 2006, 61ff.

3. Culture is notoriously difficult to define. One famous definition is William McGrew's "the way we do things" (2004, 25). Here, I employ another definition according to which a "cultural behavior is one that is transmitted repeatedly through social or observational learning to become a population-level characteristic" (Whiten et al. 1999, 682).

4. This conclusion is admittedly controversial. Numerous psychologists, biologists, and philosophers interpret the data quite differently and deny apes symbolic representation or complex cognitive capabilities enabling apes of intelligence, language, thought, or theory of mind. See for example Tomasello and Call 1997; Povinelli 2000.

5. Among philosophers the status of free will is a highly disputed and notoriously difficult issue, and advances in the neurosciences have not yet helped to resolve it. Nonetheless, I think that we can accept the existence of our volitions without resorting to such compromises as dualism or compatibilism. Most humans share the experience of consciously making up their mind to do something and then doing it. The assertion that this experience is merely an illusion that ignores the fact that every event needs an antecedent sufficient cause puts the cart before the horse. In order to argue this way one first has to freely decide that the world is deterministic in nature. But to deny the existence of free will on the basis of an intrinsically free act is paradoxical and in the end a futile argument. I therefore opt to err on the side of universal human experience and presuppose free will.

6. O'Connell takes these categories from Daniel Dennett (1988, 185).

7. A classic case for indexical representation was the ringing of a bell that for Pavlov's dogs indicated the arrival of food. The dogs connected the two events as related, but that does not mean that the bell became a symbolic representation of food that the dog could use in communication or reflection.

8. As such, it differs distinctly from sympathy, which is a "heightened awareness of another's suffering as something to be alleviated" (Wispé 1986, 318). Wispé offers an example of how to envision this difference: A therapist should be empathic with her client, but sympathy would be detrimental in the therapeutic effort (1986, 319). De Waal's example (1996, 41) is somewhat of a reversal of Wispé's. He points out that a torturer is empathic with his victim but certainly not sympathetic. David Hume actually speaks of "sympathy" in his *Treatise of Human Nature*, but, given Wispé's definition, I think it is closer to what I here call empathy. Compare particularly Book 2, Part 2 Section 12, 6 and 7 (Hume [1740] 2000, 255–56).

9. This is no less than Karl Rahner's *Realsymbol* (real symbol), where the human body is symbolizing the human being (Rahner [1959] 1961, 306).

10. Goodall describes how the chimpanzees she studied would show what she speculates to be awe as they came to a waterfall in the Kakombe valley. The chimpanzees displayed slow,

rhythmic motions along the riverbed, picked up and threw rocks and branches, and swung out on vines over the stream. This behavior that served no apparent "biological purpose" could last for ten minutes or more. Goodall suggests that such experiences of awe could have been the origins of religions that emerged once our ancestors had language to discuss them (Goodall 1999, 188ff.).

## REFERENCES

- Astington, Janet W., and Jodie A. Baird. 2005. "Introduction: Why language matters." In *Why Language Matters for Theory of Mind*, ed. Janet W. Astington and Jodie A. Baird, 3–25. Oxford: Oxford Univ. Press.
- Aureli, Filippo, and Darlene Smucny. 2000. "The role of emotion in conflict and conflict resolution." In *Natural Conflict Resolution*, ed. Filippo Aureli and Frans B. M. de Waal, 199–223. Berkeley: Univ. of California Press.
- Bekoff, Marc. 2004. "Wild justice and fair play: Cooperation, forgiveness, and morality in animals." *Biology and Philosophy* 19:489–520.
- . 2006. *Animal Passions and Beastly Virtues: Reflections on Redecorating Nature*. Philadelphia: Temple Univ. Press.
- Bickerton, Derek. 2003. "Symbol and Structure: A Comprehensive Framework for Language Evolution." In *Language Evolution*, ed. Morten H. Christiansen and Simon Kirby, 86–93. Oxford: Oxford Univ. Press.
- Biro, Dora, Noriko Inoue-Nakamura, Rikako Tonooka, Gen Yamakoshi, Claudia Sousa, and Tetsuro Matsuzawa. 2003. "Cultural innovation and transmission of tool use in wild chimpanzees: Evidence from field experiments." *Animal Cognition* 6:213–23.
- Biro, Dora, and Tetsuro Matsuzawa. 2001. "Chimpanzee numerical competence: Cardinal and Ordinal Skills." In *Primate Origins of Human Cognition and Behavior*, ed. Tetsuro Matsuzawa, 199–225. Tokyo: Springer.
- Boesch, Christophe, and Hedwige Boesch-Achermann. 2000. *The Chimpanzees of the Tai Forest: Behavioural Ecology and Evolution*. Oxford: Oxford Univ. Press.
- Byrne, Richard W., and Andrew Whiten. 1997. "Machiavellian Intelligence." In *Machiavellian Intelligence II: Extension and Evaluations*, ed. Andrew Whiten and Richard W. Byrne, 1–23. Cambridge: Cambridge Univ. Press.
- Cavalieri, Paola, and Peter Singer, eds. 1993. *The Great Ape Project: Equality Beyond Humanity*. New York: St. Martin's.
- Darwin, Charles. [1871] 1907. *The Descent of Man and Selection in Relation to Sex*. New York: A. L. Burt.
- Dennett, Daniel. 1988. "The Intentional Stance in Theory and Practice." In *Machiavellian Intelligence: Social Expertise and the Evolution of Intellect in Monkeys, Apes, and Humans*, ed. Richard W. Byrne and Andrew Whiten, 180–202. Oxford: Clarendon.
- de Waal, Frans B. M. 1989. *Peacemaking among Primates*. Cambridge: Harvard Univ. Press.
- . 1996. *Good Natured: The Origins of Right and Wrong in Humans and Other Animals*. Cambridge: Harvard Univ. Press.
- . 2006. *Primates and Philosophers: How Morality Evolved*. Princeton: Princeton Univ. Press.
- Flack, Jessica C., and Frans B. M. de Waal. 2000. "Any Animal Whatever: Darwinian Building Blocks of Morality in Monkeys and Apes." *Journal of Consciousness Studies* 7:1–29.
- Gadamer, Hans-Georg. [1960] 1990. *Wahrheit und Methode. Grundzüge einer philosophischen Hermeneutik*. Tübingen: J. C. B. Mohr (Paul Siebeck).
- Gallup, Gordon G. 1970. "Self-awareness in primates." *Science* 67:417–21.
- . 1985. "Do minds exist in species other than our own?" *Neuroscience and Biobehavioral Reviews* 9:631–41.
- Gallup, Gordon G., Daniel J. Povinelli, Susan D. Suarez, James R. Anderson, Jürgen Lethmate, and Emil W. Menzel. 1995. "Further reflections on self-recognition in primates." *Animal Behaviour* 50:1525–32.
- Gert, Bernard. 2005. "The Definition of Morality." In *The Stanford Encyclopedia of Philosophy*, Fall 2005 ed., ed. Edward N. Zalta. <http://plato.stanford.edu/archives/fall2005/entries/morality-definition/>.

- Goodall, Jane. 1986. *The Chimpanzees of Gombe: Patterns of Behavior*. Cambridge: Belknap, Harvard Univ. Press.
- . 1999. *Reason for Hope: A Spiritual Journey*. New York: Warner.
- Hare, Brian, Josep Call, B. Agnetta, and Michael Tomasello. 2000. "Chimpanzees know what conspecifics do and do not see." *Animal Behaviour* 59:771–85.
- Hauser, Mark D. 2006. *Moral Minds: How Nature Designed Our Universal Sense of Right and Wrong*. New York: Ecco/HarperCollins.
- Herzfeld, Noreen L. 2002. *In Our Image: Artificial Intelligence and the Human Spirit*. Minneapolis: Fortress.
- Hopkins, William D., Jared P. Tagliatalata, and David A. Leavens. 2007. "Chimpanzees differentially produce novel vocalizations to capture the attention of a human." *Animal Behaviour* 73:281–86.
- Hume, David. [1740] 2000. *A Treatise of Human Nature*. Ed. David F. Norton and Mary J. Norton. Oxford: Oxford Univ. Press.
- Inoue-Nakamura, Noriko. 2001. "Mirror self-recognition in primates: An ontogenetic and a phylogenetic approach." In *Primate Origins of Human Cognition and Behavior*, ed. Tetsuro Matsuzawa, 297–312. Tokyo: Springer.
- Kagan, Jerome. 2000. "Human Morality Is Distinctive." *Journal of Consciousness Studies* 7:46–48.
- Katz, Leonard D., ed. 2000. *Evolutionary Origins of Morality: Cross-Disciplinary Perspectives*. Thorverton, U.K.: Imprint Academic.
- Kennedy, John S. 1992. *The New Anthropomorphism*. Cambridge: Cambridge Univ. Press.
- McFague, Sallie. 1982. *Metaphorical Theology: Models of God in Religious Language*. Philadelphia: Fortress.
- . 1987. *Models of God: Theology for an Ecological, Nuclear Age*. Philadelphia: Fortress.
- McGrew, William. 2004. *The Cultured Chimpanzee: Reflections on Cultural Primatology*. Cambridge: Cambridge Univ. Press.
- Menzel, E. W. Jr., S. Savage-Rumbaugh, and J. Lawson. 1985. "Chimpanzee (*Pan troglodytes*) spatial problem-solving with the use of mirrors and televised equivalents of mirrors." *Journal of Comparative Psychology* 99:211–17.
- Morgan, C. Lloyd. 1894. *An Introduction to Comparative Psychology*. London: W. Scott.
- O'Connell, Sanjida M. 1995. "Empathy in chimpanzees: Evidence for theory of mind?" *Primates* 36 (3): 397–410.
- Ohashi, Gaku. 2006. "Behavioral repertoire of tool use in the wild chimpanzees at Bossou." In *Cognitive Development in Chimpanzees*, ed. T. Matsuzawa, M. Tomonaga, and M. Tanaka, 439–51. Tokyo: Springer.
- Okamoto-Barth, Sanae, and Masaki Tomonaga. 2006. "Development of joint attention in infant chimpanzees." In *Cognitive Development in Chimpanzees*, ed. T. Matsuzawa, M. Tomonaga, and M. Tanaka, 155–71. Tokyo: Springer Verlag.
- Pika, Simone, and John Mitani. 2006. "Referential gestural communication in wild chimpanzees (*Pan troglodytes*)." *Current Biology* 16:R191–92.
- Povinelli, Daniel J., ed. 2000. *Folk Physics for Apes: The Chimpanzee's Theory of How the World Works*. Oxford: Oxford Univ. Press.
- Povinelli, Daniel J., and Steve Giambone. 2000. "Escaping the Argument by Analogy." In *Folk Physics for Apes: The Chimpanzee's Theory of How the World Works*, ed. Daniel J. Povinelli, 9–72. Oxford: Oxford Univ. Press.
- Premack, David, and Guy Woodruff. 1978. "Does the chimpanzee have a theory of mind?" *Behavioral and Brain Sciences* 4:515–26.
- Preston, Stephanie D., and Frans B. M. de Waal. 2002. "Empathy: Its ultimate and proximate bases." *Behavioral and Brain Sciences* 25:1–72.
- Rahner, Karl. [1959] 1961. "Zur Theologie des Symbols." In *Schriften zur Theologie* IV:275–311. Einsiedeln: Benziger.
- . 1976. *Grundkurs des Glaubens: Einführung in den Begriff des Christentums*. Freiburg i. Br.: Herder.
- Reynolds, Vernon. 2005. *The Chimpanzees of the Budongo Forest: Ecology, Behaviour, and Conservation*. Oxford: Oxford Univ. Press.
- Ricoeur, Paul. 1976. *Interpretation Theory: Discourse and the Surplus of Meaning*. Fort Worth, Tx.: Christian Univ. Press.

- Savage-Rumbaugh, Sue, Duane M. Rumbaugh, and Kelly McDonalds. 1985. "Language learning in two species of Apes." *Neuroscience and Biobehavioral Reviews* 9:653–65.
- Shumaker, Robert W., and Karyl B. Swartz. 2002. "When traditional methodologies fail: Cognitive studies of great apes." In *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition*, ed. Marc Bekoff, Colin Allen, and Gordon M. Burghardt, 335–43. Cambridge: MIT Press.
- Tomasello, Michael, and Josep Call. 1997. *Primate Cognition*. New York: Oxford Univ. Press.
- Tomasello, Michael, Josep Call, and Brian Hare. 2003. "Chimpanzees understand psychological states—the question is which ones and to what extent." *Trends in Cognitive Sciences* 7 (4): 153–56.
- Warneken, Felix, Brian Hare, Alicia P. Melis, Daniel Hanus, and Michael Tomasello. 2007. "Spontaneous altruism by chimpanzees and young children." *Public Library of Science Biology* 5 (7): e184. doi:10.1371/journal.
- Whiten, A., J. Goodall, W. C. McGrew, T. Nishida, V. Reynolds, Y. Sugiyama, C. E. G. Tutin, R. W. Wrangham, and C. Boesch. 1999. "Cultures in chimpanzees." *Nature* 399:681–85.
- Wispe, Lauren. 1986. "The distinction between sympathy and empathy: To call forth a concept, a word is needed." *Journal of Personality and Social Psychology* 50 (2): 314–21.