

General Signs

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This essay contends that contemporary conditioning methods provide animals with the very "general signs" that John Locke said animals lacked in disclosing their thinking to us. The button presses of pigeons can reveal mental imagery, visual illusions, and abstract concepts -- if we are smart enough to teach these responses to animals and to carefully interpret their actions.

The interrelation between thought and language has been a central and enduring issue in philosophy and psychology. Of particular interest has been the possibility that nonhuman animals think. Although René Descartes and John Locke disagreed on other matters of animal intelligence (Wilson 1995), they did agree that animals are incapable of thinking or any other advanced cognitive feats.

Descartes denied animal thought because animals do not speak. "[T]he reason why animals do not speak as we do is not that they lack the organs but that they have no thoughts (Descartes 1646/1970, p. 207)." Locke, too, believed that animals were incapable of ideation or abstraction because they did not use words to divulge the operation those advanced cognitive skills. "I think, I may be positive ... that the power of Abstracting is not at all in them; and ... the having of general *Ideas*, is that which puts a perfect distinction betwixt Man and Brutes; and is an Excellency which the Faculties of Brutes do by no means attain to. For it is evident, we observe no foot-steps in them, of making use of general signs for universal Ideas; from which we have reason to imagine that they have not the faculty of abstracting, or making general *Ideas*, since they have no use of Words, or any other general Signs (Locke, 1690/1975, pp. 159-160)."

Putting aside the question of whether nonhuman animals can be taught a human language (Gardner and Gardner 1984; Pepperberg 1981), my essay concerns Locke's claim that animals lack any other "general signs" through which we might learn about their intelligence. Locke considered the matter closed; otherwise, he would at least have left open the possibility that new means might be devised which could divulge animal thought. But, the matter is not closed. In fact, the creative application of the trusted methods of classical and operant conditioning (Wasserman and Miller 1997) has flung the door wide open to a fresh, empirical understanding of animal cognition and perception (Wasserman 1993, 1997). These methods provide animals with quite "general signs" by means of which they can disclose their cognitions and perceptions to us.

Contrary to Locke's unsubstantiated denial, the use of these conditioning methods suggests that animals are capable of advanced cognition and abstraction. Further research suggests that animals experience many of the same perceptual illusions and mental images that we do. All of this scientific work forces us to reconsider the stale convention that thought without language is impossible.

Setting the agenda

The Darwinian revolution raised the possibility that there was mental continuity between human and nonhuman animals: that "the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind (Darwin 1871/1920, p. 128)."

Charles Darwin and the early comparative psychologists adduced support for this provocative hypothesis with numerous anecdotes of animal genius. But, that initial anecdotal evidence did not pass muster; it was of dubious veracity and replicability. The call thus came for more controlled and repeatable evidence. Answering these calls were the fledgling behaviorists, led by John Watson (1913).

For decades, critics (e.g., Griffin 1992) have falsely characterized behaviorism as a dry and conservative school of psychological science. But, behaviorism simply insisted on clear empirical evidence of the same psychological processes that had until then been studied only