

However, he provides a plausible theoretical account that can now begin to be tested by the empirical sciences. I am convinced that this magnum opus will encourage empirical scientists in the field of cognitive neuroscience to develop adequate methodologies and to perform experiments that

address this issue. This book is really a 'must' for anyone who is interested in empirical studies related to first-person issues or subjectivity.

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Letters

Chimpanzees versus humans: it's not that simple

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Povinelli and Vonk [1] argue that human beings have a theory of mind and chimpanzees do not. But this black and white picture is exceedingly misleading. We can add the necessary color – on the basis of reliable scientific findings using a variety of experimental methods – by recognizing that the generic label 'theory of mind' actually covers a wide range of processes of social cognition. As we documented in our article in the same issue [2], although chimpanzees almost certainly do not understand other minds in the same way that humans do (e.g. they apparently do not understand beliefs) they do understand some psychological processes (e.g. seeing).

There is nothing odd about this. Human children do not understand such things as beliefs until about four years of age. But between one and two years of age they clearly show, in a number of different experimental paradigms, that they understand such psychological processes as seeing, attending, desiring and intending. So do two-year-olds have a theory of mind? It is not a helpful question. The challenge in the study of both comparative and developmental social cognition is to go beyond global characterizations and attempt to specify in detail how organisms understand the psychological processes of other organisms.

Povinelli and Vonk have adopted a kind of derived behaviorism, that is, they note that organisms must observe behavior in order to attribute to it underlying psychological processes, and so it is always possible that the organism is simply making 'behavioral abstractions'. With regard to one of our food-competition studies in particular [3], Povinelli and Vonk point out some possible behavioral cues that the subordinate chimpanzee might have used to determine whether the dominant chimpanzee had seen food over which the two of them were competing (and use this information to decide whether to pursue that food). These are such things as: 'avoid food when a specific individual has previously oriented to it in its current location (and not in another location)'. How chimpanzees might have acquired such rules is not specified, nor is there any speculation about how they might understand them. But our most

serious objection is that Povinelli and Vonk ignore the control conditions in our first study in this series [4]. In one of those conditions, the food was hidden and the subordinate made its choice while the dominant's door was down: thus, there *was* no behavior to read. And still the subordinates went for the food that the dominant would not be able to see when her door was opened. In another condition, we put the food on the dominant's side of the barrier and allowed the subordinate to observe her behavior for some moments. When released, subordinates had no clue where the food was: that is, when given the chance to read behavior, they did not.

Some ad hoc explanation in terms of behavior and context reading is undoubtedly possible in these cases as well, and indeed Povinelli and Vonk despair that we will never be able to rule out all possible explanations based on behavioral cues in our experiments (indeed, this is probably also true when adult human beings are subjects; and Methodological Behaviorism institutionalizes this despair). Povinelli and Vonk's proposed solution is fine, and we agree with it, but it is nothing new. They propose experiments in which subjects are exposed to novel situations so as to rule out past learning experience as a potential explanation, but that is precisely what we, and many others, have been trying to do. For example, in one of our experimental conditions [3] we placed food behind a transparent barrier, of which our subjects had had no previous experience, to our knowledge. The subordinates were not fooled; they knew that it did not obstruct the dominant's visual access to the food. Perhaps this situation is not novel enough for Povinelli and Vonk, but in our opinion the novelty ought to stay within the bounds of principles of ecological validity. Thus, the specific experiment that Povinelli and Vonk propose as a preferable alternative to ours (interacting with buckets placed over their heads) has very low ecological validity. In fact, it has already been done with human children, and they fail until school age [5] (which must mean that four-year-olds do not have a theory of mind after all...)

Of course it is possible that human beings are the only species that understand any psychological processes in others, and we ourselves held this position not so very long

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ago [6]. But evidence is mounting that it is simply not the case. We cannot dismiss this evidence by noting that simpler explanations are hypothetically possible with no supporting evidence. And, to repeat our earlier, more general point, we are certainly never going to make progress on questions concerning the evolution and ontogeny of social cognition if we think in terms of a monolithic 'theory of mind' that species either do or do not have. We are beyond that now. It is time to turn up the microscope.

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