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Introspection and anecdotes won't prove what animals are thinking and feeling

Commentary on [Safina](#) on *Animals Feel*

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Abstract: We review Part Three, “Whines and Pet Peeves,” of Safina’s book *Beyond Words: What Animals Think and Feel*. Part Three is concerned mainly with the evidence for Theory of Mind in nonhuman animals. Like Safina, we believe that animals have a Theory of Mind, and like Safina, we question the utility of such concepts. There are many studies that Safina could have used to support his argument, and although some are mentioned, he prefers to make his point mainly by relying on anecdotes and introspection. The end result, we believe, is to devalue the scientific process.

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<http://www.otago.ac.nz/psychology/research/otago028078.html>
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We will limit our comments to Part Three of Safina’s (2015) book *Beyond Words: What Animals Think and Feel*, though from a scan of the remainder of the book we feel the comments we make with respect to Part Three are applicable to the remainder of the book as well. In Part Three, “Whines and Pet Peeves,” Safina covers the main topic of Theory of Mind, and corollary topics including deception, self-recognition, and mirror neurons. The main tenet is that animals do have a Theory of Mind, and with this we have little disagreement. We also share with Safina an additional view, certainly not shared by all those that conduct research with animals, about the utility of constructs such as Theory of Mind. So on many levels we support the basic ideas promoted in Part Three, or at the least we recognize many of the issues raised by Safina and can attest to the fact that they are issues raised by scientists in the area.

Unfortunately, the similar views end at agreeing that animals do have a Theory of Mind and questioning the utility of such a construct. In the face of so much scientific evidence that Safina could use to support his case, he chooses instead to marginalize the scientific process by misrepresenting many of the studies, relying at times on secondary rather than primary sources, mistaking anecdote for data, and seeming to portray introspection as a valid technique.

Consider, for example, Safina's treatment of Premack and Woodruff's (1978) paper "Chimpanzee Problem-Solving: A Test for Comprehension." Safina starts off by saying "*With an impressive lack of human insight into what could be an appropriate context or meaningful to a chimp....*" He then briefly describes the experiment in which a chimpanzee was to choose a picture of a wick as the solution to a video problem of a human shivering by a heater, and concludes by saying "No, the researchers weren't kidding." In fact, the chimpanzee not only did well on the wick problem, but she scored 100% correct on every other problem that would have presumably elicited from Safina the same can-you-believe-the-experimenters-expected-the-animals-to-do-that reaction.

For example, the chimpanzee chose as a solution (a) the key when presented with a video of a human struggling to open a cage door, (b) connecting a hose to a faucet when presented with a video of a human struggling to wash down a dirty floor, and (c) plugging the cord of a record player into the wall when presented with a video of a human struggling to hear a record. Safina glosses over the purpose of the above experiment, which was to control for potential criticisms in a similar prior experiment in which the solutions chosen by the chimpanzee might have been based on physical matching. The fact that the chimpanzee performed so well on the second experiment was evidence that her choices were not based on physical similarities between the video and the pictures.

Even more incredibly, Premack and Woodruff's experiment offers ample evidence in support of the case Safina is trying to make. Yet we can only assume that Safina adopts this aren't-scientists-ridiculous approach because it makes for a better read. To many people it probably does. But it has one undesirable side effect, and that is to devalue the process of science, and that is a shame.

The superficial treatment of studies is manifested in other instances, such as the recounting of Petter et al.'s (2009) experiment on dogs detecting deception in humans. Of course we all recognize the danger of drawing conclusions based on negative findings. But Safina glosses over the important finding in that study that irrespective of whether the deceiver was a human issuing commands, a human pointing, or boxes, the difference between the number of times the dogs approached the co-operator and the deceiver was always around 20%. This casts some doubt on whether they inferred the intentions of the humans as opposed to relying on behavioural cues. The authors conclude that "Although the possibility that dogs inferred human intentions in experiment 1 and 2 cannot be absolutely ruled out, we feel that the most parsimonious interpretation of these findings is that dogs associated human and non-human cues with food and non-food outcome." Framing this experiment against the backdrop of a media-release title "Dogs are no mind readers" (we wonder how many people reading this passage in Safina's book thought that that was the actual title of the original article), and the unclear attribution that perhaps the scientists thought their animals were "clairvoyant" of course makes for an enjoyable read for some, but again devalues the science and fails to appreciate the more subtle issues at stake.

Don't misunderstand us. We believe all studies should be criticised, torn apart, and searched for flaws. We don't engage in these behaviours to devalue science, however, but to improve on it, so that the experiments get repeated and are done better than the first time. This is the subtle but critical issue that Safina fails to convey. Safina does have a solution, one that

the non-scientist reader will surely accept – the age old tried-and-true scientific method called “introspection.” In fact, Part Three is so rife with examples of introspection that at times we wondered whether we were reading an updated version of Romanes’s (1883) seminal work *Animal Intelligence*.

Consider the passage on pages 251-252. Safina recounts taking his two dogs, Chula and Jude, out for a beach run. When one of the dogs disappeared into the woods and then re-appeared further down the beach, the author interprets this behavior as the dog anticipating where the author would have been had he continued to walk along the beach. This passage is little different from the passage that appears in Romanes’s book where a dog was believed to understand the difference between the chord and an arc of circle:

“A small terrier used to start a rabbit nearly every morning, at the end of the shrubbery next the house, and hunt him through the whole length of it to the other end, where the rabbit escaped into an old drain. The dog then appears to have come to the conclusion that the chord of a circle is shorter than its arc, for he raised the rabbit again, and instead of following through the shrubbery as usual, he took the short cut to the drain, and was ready and in waiting on the rabbit when he arrived, and caught him.” (Romanes, p. 461)

There are, of course, many other examples of anecdotes and introspection in Part Three, most centered on Safina’s two dogs, Chula and Jude. But as we’ve often heard said, anecdotes can never serve as more than a starting point. At some point you have to conduct an experiment, either in the laboratory or the field, and subject the hypothesis to the rigors of experimentation. And you must abide by Morgan’s law of parsimony that all things being equal you must select the simpler option, even when you believe something more sophisticated is going on, and even though the most parsimonious interpretation may well be wrong.

As we write this commentary a colleague has forwarded a video of a pigeon flying at very low levels amidst fast moving cars on a highway (<https://youtu.be/d6wPpvACQIg>). Why would a pigeon engage in such behavior? It’s fun to think about these things, and perhaps even, secretly, engage in some introspection. We might have thought, to borrow a phrase from Romanes, that *“nothing can well be more expressive of sportive glee than many of [this pigeon’s] movements”* (p. 247). Maybe the pigeon is in a sporty mood. Maybe (and this would be interesting) it’s playing. It certainly looks to us like the bird is having fun. We know if we humans could fly, the adrenaline junkies among us would definitely be darting in and out of moving cars on the highway, taunting them with our amazing skills. Clearly if that’s what we would do then that is what the pigeon must be doing. Unfortunately, that’s the problem with introspection: it gets you nowhere. We are reminded by a colleague that it is common for racing pigeons to fly as low as the bird in this video. Could it be possible, as our colleague suggests, that the bird has figured out drafting? We would love to know why the bird is engaging in this behaviour, but we are very busy, so let’s just go with sportive glee.

There were parts of Safina’s book that we really enjoyed. And from time to time Safina does a reasonably good job of relaying the existing science, such as on page 259 when he discusses moray eels, and pages 261-262 where he uses the available scientific data to

bolster the case for the Theory of Mind. We wish Part Three had more such examples that drew from the existing literature. And there are so many studies that could have been used to support the case Safina wishes to make. Emery and Clayton's (2001) work on the caching strategies of scrub jays while either being observed caching or caching in private is probably some of the best, if not the best evidence for Theory of Mind in nonhuman animals, yet it received little more than a mention.

For the above reasons, Part Three seems more a desire to criticise the few that don't believe animals have a Theory of Mind than to relay the findings of those that do. We understand the need to market a book to a wide audience, but we wish that Safina had done that by relying more on the science and less on introspection and anecdote.

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