

Planet of the ... Dogs?

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If you are a sci-fi fan, you know that Earth's future is pretty bleak. Forget global warming. The true doom of our species bides its time in our zoos and research facilities, plotting our downfall under our very noses. Yes, in a mere few thousand years, an evolutionary eyeblink, the apes — chimpanzees, gorillas, orangutans — will rise up and enslave humanity, building a complex (albeit warlike) society on the ruins of our own.

How will this scenario unfold? Can it be prevented? As psychologists, perhaps we should ask this: What is the boundary that the near-future apes in Pierre Boulle's novel *Planet of the Apes* and the subsequent films had to cross to become, well, human?

It is an interesting thought experiment because our nearest ape relatives, the chimpanzees and bonobos, share over 99 percent of our genes. Yet, (Boulle notwithstanding) somewhere in that 1 percent is a huge difference in social and behavioral complexity. It has sometimes been chalked up to complex tool use and language, but according to evolutionary psychologist Brian Hare (Max Planck Institute, Leipzig, Germany), the difference may be something more basic that has to do with our ability to solve social problems in cooperative contexts, which in turn may rest on a major shift in social emotions, especially fear, that occurred sometime in the last four million years, after our species diverged from one another.

Flexibly drawing inferences about the intentions of other individuals in order to cooperate in complex tasks is a basic part of everyday life that we humans take for granted. As Hare discusses in "From Nonhuman to Human Mind: What Changed and Why?" in the April issue of *Current Directions in Psychological Science*, this ability is usually explained in terms of theory of mind: an understanding that other individuals have intentions similar to our own.

But according to Hare, theory of mind is not unique to humans. Chimpanzees use social cues like eye gaze and face orientation to monitor others' behavior, infer motives of subordinate or dominant individuals, or even deceive them when competing for food. But it turns out that chimps are not very good at drawing inferences about others' mental states in cooperative situations — such as when an experimenter (or another chimp) helpfully points to hidden food. And even when trained through repetition to learn the meaning of such a helpful cue, they do not generalize their understanding of that cue to other, similar contexts. This is a skill that humans already display in infancy, and according to Hare, it seems to have evolved since the human lineage split from that of chimps a few million years ago.

So no need to flee to the hills or retreat into the sewers in fear of the ape scourge — at least not yet. Although chimpanzees may be brilliant at deceiving and competing with each other, a chimp civilization would quickly fall apart due to mutual mistrust, antagonism, and fear — their propensity to view each other as competitors and antagonists within a dominance hierarchy.

According to Hare, who has worked with a number of different animal species, to understand the “unique” human ability to use social cues cooperatively, we should look not just at our closest animal relatives but also at our best animal friends. Although chimps may fail to infer others’ mental states when cooperating, domestic dogs do quite well at such tasks. If you point to hidden food, dogs often grasp what you are trying to tell them. Puppies even do it without prior training, indicating that it is an innate ability and not simply one they acquire through contact with their owners.

How and when dogs acquired this ability provides an important clue about how our own ancestors may have acquired it.

Like chimps, wolves, from whom domestic dogs descended (in evolutionary terms, very recently), are similarly unable to read social cues in noncompetitive contexts — their flexibility in using social cues extends only so far. In other words, like humans, dogs’ communicative-cooperative abilities emerged only after they split from their nearest relatives.

What accounts for this piece of convergent evolution between humans and domestic dogs is nothing other than the process of domestication — the breeding of dogs to tolerate, rather than fear, human company.

In the late 1950s, at a research farm in Siberia, a Soviet geneticist named Dmitri Belyaev began raising an experimental population of foxes, bred on a single criterion: low fear and aggression toward humans. No other qualities (such as receptiveness to communication or training) were factors, and a control population was also bred, lacking this low-fear criterion.

After many generations, the experimental foxes now react just like domestic dogs to humans’ presence — barking and wagging their tails, for instance. And a number of unexpected, nonselected changes also occurred in the experimental population. According to Hare, who visited the research facility and tested the animals, they not only have floppy ears, curly tails, multicolored coats, and other physical characteristics similar to domestic dogs (despite the fact that none of these features were bred for), but the experimental fox kits react to cooperative-communicative social cues on par with domestic dogs and better than the control kits.

The crucial difference may be found in the experimental foxes’ brains, particularly alterations in systems (such as the limbic system) that mediate social emotions like fear and aggression. According to Hare, domesticated dogs’ ability to solve social problems may have emerged once the brain systems mediating fear were altered — and the same thing may have occurred in human evolution. Chimps, he says, are constrained in solving cooperative problems by their impulse to fear more dominant individuals and behave aggressively toward more subordinate ones.

“Taken together,” Hare writes, “the results on chimpanzee cooperation and their use of social cues support the hypothesis that evolution in human social problem solving, much like that of dog social problem solving, occurred after changes in our species’ social emotions lifted social constraints.” To test this hypothesis, Hare believes it will be necessary to work with bonobos, chimpanzees’ much-less-studied and much-more-cooperative relatives.

So put aside your fear of enslavement by the apes. The real threat to humanity may be sleeping quietly at

your feet as you read this article, dreaming not of chasing rabbits but of banding together with other members of his species to rule over their erstwhile masters with an iron paw.

For more about Brian Hare's research, see ["From Nonhuman to Human Mind: What Changed and Why?"](#) in the April 2007 issue of *Current Directions in Psychological Science*.