

1) Why study cultural transmission in animals? Isn't culture the sort of subject that sociologists examine?

To the extent that socially learned or traditional behaviours contribute to the ability of animals to survive and reproduce in their natural environments, if we ignore the role of social interactions in behavioural development, our understanding of the origins of animal behaviour will be incomplete.

Of course sociologists, anthropologists and other social scientists have an interest in culture and tradition. However, those trained in the natural sciences often have techniques at their disposal that are not part of the normal analytical repertoires of those with backgrounds in the social sciences. Conversely, those trained in the social sciences sometimes have ways of looking at the world that are foreign to many natural scientists. Culture and tradition are sufficiently complex topics that we will need all available tools to make progress in understanding them.

2) Why study this sort of thing in rats?

Systematic observation of rat colonies living in different parts of the world indicate that rats from different areas differ remarkably in their behaviour. Some dive for fresh-water mussels in shallow streams. Others feed on fingerling trout, or sparrows, even ducks. Some of the most compelling evidence of a tradition in an animal is to be found in the work of Joseph Terkel. Terkel has studied extraordinary populations of wild rats that have learned how to take the seeds from pinecones in a way that permits a net energy gain when eating pine seeds. These rats live in forests where pine seeds are the only food available, and young rats learn how to open pine cones and eat the seeds found in them by interacting with adults of their colonies that have learned the trick from yet others.

The nice thing about rats, as Terkel has shown, is that you can study them in sufficient numbers under controlled conditions to answer all sorts of questions about how traditions are transmitted from generation to generation. These are questions about the development of behaviour that are much harder to ask and answer in animals more difficult and expensive to keep in captivity than are rats.

3) There is a good deal of contention about how to define culture in animals. What is your take on this issue? How does culture differ from social learning?

Personally, I don't like to use the term "culture" when referring to animal traditions. Calling animal traditions cultures, suggests that traditions in animals are fundamentally similar to cultures in humans, and I doubt that is the case.

Much of human culture rests on language, teaching and observing and copying the behaviour of others. Little of animal tradition appears to depend on similar processes. And, if behavioural mechanisms supporting 'culture' in animals and humans are different, there doesn't seem to be much to be gained by calling both culture, except, perhaps, to get the mass media to pay attention.

How do social learning and culture differ? The study of social learning is the study of the ways in which animals bias one another's behavioural development. Culture or tradition is a consequence of social learning when socially learned behaviours are sustained in a population.

3) Why is there such a strong bias toward studying culture and social learning in primates?

I'm somewhat uncomfortable with the current focus on primates in the study of culture. Of course, the apes are our closest living relatives, so if any animals share true culture with humans, it is likely to be chimpanzees, gorillas, or orangutans.

That said, a great deal of recent work in primatology seems to be designed to show that apes have all the intellectual capacities of humans. This is probably a necessary antidote to a preceding period when some asserted that primates, even humans, had the same intellectual capacities as rats. The truth probably lies somewhere in the middle.

In the meanwhile, much progress can be made examining simpler systems, such as rats, to get as broad a picture as possible of the causes and functions of animal traditions. It will then be much easier to determine in what ways chimpanzee traditions (or cultures) resemble traditions in rats and in what ways chimpanzee traditions (or cultures) resemble culture in humans.

4) Do biologists and psychologists tackle the study of social learning and culture in animals differently? If so, why?

The distinction between psychologists and biologists studying animal behaviour is becoming less meaningful over time as psychologists incorporate Darwinian thinking into their theories and research and biologists acquire the methodological sophistication traditionally associated with experimental psychology. Presently, psychologists tend to be more concerned with the causation and development of behaviour than do biologists, and biologists tend to focus more on the functions of behaviour than do psychologists. There's a difference in emphasis, rather than an absolute difference.

The problems we deal with are sufficiently complex to accommodate both approaches. As Niko Tinbergen made clear, we will have to understand development and causation, as well as function, if we are to have a complete science of animal behaviour.

5) What's the most common misunderstanding in the study of social learning and culture in non-humans?

The view that if primates have traditions, those traditions are evidence of human-like intellectual capacities. Rats have traditions. Reef fish have traditions. Songbirds have traditions. Yet, no one proposes that because reef fish, canaries and rats have traditions, they have human-like intelligence. Clearly, existence of tradition in animals tells us little about their intellectual capacities, though lots of people seem to think it does.

7) How would you describe the relationship between human and non-human culture? Is this a graded continuum, or is there a chasm here that separates these two types of cultures by orders of magnitude?

The question of the degree of similarity between human and non-human animals is one that has bedeviled biology since the time of Darwin, and I doubt that I will be able to resolve it here. Animals are both amazingly similar to humans (for example, in genetics or anatomy) and amazingly different from humans (for example, in use of language or production of artifacts).

As far as culture is concerned, I have yet to be convinced that, even in chimpanzees, there is much beyond a superficial similarity between human and animal 'culture'. As I said before, until evidence of some deeper similarity is available, I prefer to talk about animal tradition and human culture, so that it is evident in our language that we don't yet know the extent to which non-human animals and humans share a capacity for human-like culture.

8) What do you see as the single most important component missing from our current evolutionary understanding of social learning and culture?

I think we don't know enough about why there is such great diversity in the behaviour of chimpanzee populations living in different parts of Africa. Primatologists have done an excellent job of cataloguing the differences, of creating a biogeography of chimpanzee behaviour, but so far, causes of the catalogued differences remain something of a mystery, at least to me.

For example, we know that chimps living just a few score miles apart at Gombe and Mahale in east Africa use quite different probes to dip for ants, and that they take ants off probes in very different ways. But are we sure that the species of ant are the same, that the soil from which the ants construct their mounds are the same, etc.? Maybe what some think of as cultural differences are just differences in what chimpanzees learn individually as a consequence of having to cope with different environments. We need to know more about the development of possibly traditional differences in chimpanzee behaviour before we accept the conclusion that the differences that have been discovered are social in origin.

9) It might sound like a strange question, given that we are talking about culture, but how do you think the various recent advances in molecular genetics like genome sequencing projects or development of knock-outs will affect our understanding of cultural transmission in animals?

At this point, the field is not really ready to proceed to a molecular level of analysis. I surely don't expect to see any 'culture genes' that one might insert into the drosophila genome to produce fruit flies that learn by observation or knock-out mice that would lack animal traditions for any interesting reason.

It is, of course, easy to produce knock-out mice that don't, for example, show social learning of food preferences of the sort my students and I have been studying in normal rats and mice for years. However, any number of uninteresting deficits can produce animals that can't learn food preferences socially. For example, the knock-out mice might just have a poor sense of smell or a poor memory. Indeed, the latter is the case with one strain of knock-out mice that fails to learn food preferences socially. That's why you have to have a rather deep understanding of the physiological and behavioural substrates of traditions before you can look at their molecular basis in a meaningful way.

10) If some animals have culture, does this have any implications for the "animal rights" community?

If, for example, it were to be shown that animal 'culture' rests on teaching or observation and copying of the behaviour of others, that would add some strength to arguments that we should treat animals humanely. However, there are already so many good reasons to be humane when interacting with animals -- not causing unnecessary pain, weighing the possible benefits to our own species and others against the suffering we inflict -- that I suspect any impact of the discovery of culture in animals would be marginal.

We already treat animals very differently depending on how much we think they are like us. However, our treatment of different species is often based more on intuition and perceived self-interest than on science. Consequently, even if it were proven that guppies have 'culture', I don't foresee humans changing their behaviour toward fish in any very noticeable way. After all, we have know for a very long time that our fellow humans have culture, but that knowledge hasn't done a great deal to improve our treatment of one another.

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