



# Kalahari classrooms:

how meerkats teach pups to hunt

**M**onday morning. In a classroom in Huddersfield, a woman tries to pass on the finer points of algebra to a rowdy class. On the other side of the world, a meerkat digs up a venomous scorpion, delicately bites off the sting and drops it in front of a hungry pup. These two events might seem to have no bearing on each other, but they are examples of the same thing: teaching. Humans are taught, often reluctantly, from childhood, but until recently we thought we were the animal kingdom's only educators. This year the verdict changed – first, a species of ant and then meerkats, everyone's favourite fluffy TV stars, were declared to be teachers.

We've known for decades that many animals can learn from each other. Food preferences, fear of predators and even choices of who to mate with can be passed on from one individual to another. However, in all of these cases, animals simply acquire information from more experienced individuals going about their daily business. In teaching, however, knowledgeable individuals

play an active role – they change their behaviour when pupils are present in a way which promotes learning. The first solid evidence that animals teach in this way came from a study on ants, where individuals who knew the route to a food source were found to give lessons to their colony mates. Meerkats go one step further – they do not just teach a snippet of information, like the route to a food source, they teach a vital skill: hunting.

Meerkat pups emerge from their burrow when they are about a month old and start to accompany the group on foraging trips. At first, they are comically incompetent – they toddle about like fluffy wind-up toys and are unable to find any food for themselves, relying instead on the food that adult group members, known as helpers, bring in response to their incessant begging calls. Yet over the course of the next two months, they must learn to fend for themselves. The desert is unforgiving, and any pup that does not acquire foraging skills quickly will not

We are not the only educators in the animal kingdom. This year scientists have found evidence that both ants and meerkats teach their young. Alex Thornton (right) explains.



survive for long. A major part of the transition to independence is learning how to handle prey. Meerkat diets are highly varied, and some of the items on the menu, like spiders, lizards and mice, will not give up without a fight. Scorpions, one of the favourite delicacies, pose an added problem: venom powerful enough to kill a human – scoffing one of these is no mean feat for a creature not much bigger than a grapefruit.

With my colleague, Katherine McAuliffe, I set out to find out how pups learn their hunting skills. We spent about two years living at a field site run by the University of Cambridge deep in the Kalahari desert. The site has been running for over ten years, and the meerkats are extremely used to people. They do not see us a threat, just as large but harmless animals, much like the wildebeest that roam the dunes. Because the meerkats are so used to us, we can walk among them, weigh them by enticing them onto scales with crumbs of hard-boiled egg and run field experiments which would not be possible with any other species. These advantages allowed us to follow the progress of over 100 pups from birth into adulthood and to investigate how they become efficient killers.

The key, it seems, is that helpers gradually introduce pups to live prey. A 30-day old pup, for example, is usually given dead scorpions, but as it gets older helpers increase the difficulty of the lesson by removing the sting from live scorpions and then presenting them to the pup. This gives the pup an opportunity to interact with live prey without the danger of being stung. If the scorpion escapes, helpers will often retrieve it so that the pup can try again. Finally, as pups approach independence, they are brought intact scorpions which they must kill themselves. Pups rarely find prey like scorpions and lizards for themselves, so helpers actively help pups to learn the skills they need by giving them opportunities to handle live prey. Experiments confirmed that pups' skills really do improve as a result of exposure to live prey – when we gave some pups

additional chances to practise handling live scorpions, they consistently did better than littermates who were only given dead scorpions or an equivalent amount of egg. Practice really did make perfect.

In the past we have assumed that teachers must understand something about their pupils' minds: they must be aware of pupils' ignorance and intentionally set about to correct it. Meerkats show us that teaching can be achieved through much simpler means. Pups' begging calls change as they get older,

much as children's voices do, and helpers change the way they present prey according to the calls they hear. Hearing the calls of young pups means 'kill prey before feeding pups', while hearing the calls of older pups means 'give pups live prey'. We were able to flip helpers' behaviour by playing them recordings of pups of different ages. Playing back the calls of three-month-old pups to a group with newly-emerged pups, for example, made helpers bring live prey to tiny pups who were incapable of handling it. The system breaks down when meddlesome researchers interfere, but using pups' calls as a cue to their age and experience allows meerkats to tailor their lessons according to pups' needs without knowing anything

about what pups know. This may not be that different to some types of human teaching. After all, a university lecturer need not know exactly what every student in the lecture hall knows – she can simply have one set of lectures for freshers and another for more knowledgeable third-years.

Studies of simple forms of teaching like those found in meerkats and ants are beginning to help us understand how teaching evolves, and the discovery that teaching occurs in such distantly related species raises the prospect that it might be more widespread than we realise. At a time when humanity is recklessly decimating the creatures with which we share our planet, it is worth reflecting that maybe we are not so different to other animals after all.

David Macdonald/Oxford Scientific Films



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The paper 'Teaching in wild meerkats' appears in the 13 July 2006 edition of the journal *Science*.

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