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Animal Minds

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Introduction

By Alice Jones ver. 6 - Mon, Feb 11, 2008 at 10:48:36 PM

By Alice Jones, *National Geographic* staff

Biologists as far back as Darwin have pondered whether animals can think and have feelings. It was the famed naturalist who proposed that animal minds (and human ones, of course) must have evolved as other traits had, developing the necessary skills to function in their particular environment. Not everyone agreed with this view, however. The predominant theory in the first half of the 20th century was behaviorism, the idea that animals are incapable of conscious decision-making and that all of their actions can be explained in terms of innate behavior.

Today the field of animal cognition has moved beyond behaviorism to embrace many new areas of study. Most of the work involves animals in captivity because so many variables are encountered in the wild. Some of the animals studied and the findings on their cognitive abilities are listed below.

Primates
Azy (orangutan) communicates through abstract symbols on a computer screen and has shown that he can understand another individual's perspective, a capability scientists call theory of mind.

Kanzi (bonobo) uses lexigrams to communicate, understands spoken English, and makes and uses stone tools.

Koko (gorilla) communicates using American Sign Language.

Momo (marmoset) learns through imitation and has a sense of object permanence—the knowledge that something out of sight still exists.

Aristides (ring-tailed lemur) can repeat arbitrary sequences on a computer screen and discriminate between quantities.

Birds
Alex (African gray parrot) counted, identified shapes and colors, and understood the concept of same and different.

Psychobird (western scrub jay) recalls the past, plans for the future, and understands the concept of deceptive behavior.

Uek and Betty (New Caledonian crows) can solve problems and use tools.

Other Animals
Dolphins understand grammar and syntax, show self-awareness, are creative, and recognize that instructions given on a television screen are representations of the real world.

"Betsy" and Rico (border collies) understand hundreds of words and the objects they represent.

Elephants have been shown to exhibit self-awareness and have long memories.

Sheep can recognize individual faces—human and sheep—and retain the recognition long-term.

Octopi use tools, exhibit play behavior, recognize individuals, and have distinct personalities.

African cichlids determine social ranking through observation, exhibits signs of logical reasoning.

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Monkey Talk

By Alice Jones ver. 2 - Mon, Feb 11, 2008 at 9:45:32 PM

Many animals have been observed using simple vocal signals among themselves. Now for the first time, scientists believe they have evidence of a nonhuman mammal combining signals to create entirely new meanings. Male putty-nosed monkeys in Nigeria have been observed stringing together calls of *pyow* and *hack*. Males of many monkey species commonly repeat *pyow* or *hack* for warning females and their young charges. Used alone, the call means a predator may be ready to attack, says researcher Klaus Zuberbühler. In sequence as the putty-nosed monkeys use them, he says, there might not be a specific danger, just the male's urge to get moving.

Putty-nosed monkeys repeat basic calls to sound an alarm:
Pyow: A leopard or other predator is lurking nearby.
Hack: An airborne predator, such as an eagle, is close.

They combine the calls to create a simple "sentence":
Pyow pyow hack hack hack hack. Let's leave this place and go elsewhere. —*Chris Carroll*

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Animal Watch

By Alice Jones ver. 2 - Mon, Feb 11, 2008 at 9:46:24 PM

Like any group house, honeybee hives can get too crowded. When a hive is simply bursting, the honeybee residents engage in a collective decision process that could inspire even the best-run commune. The queen and about half the hive fly to a tree and wait while scouts fan out to look for a new home. According to a study published in American Scientist, scouts that find good nesting spots compete against each other to recruit undecided scouts to their sites by doing a "waggle dance." Recruits will then inspect the site for themselves. If they like the spot, they too will waggle dance to advertise it. Once 15 or more scouts converge on a single site, they return to their queen and waiting hive mates. The scouts then press their vibrating thoraxes against the waiting bees to warm up the latter for flight. When all are ready, the whole group flies to its new home. The study notes that because each scout judges a site independently, only truly good sites attract more waggle dancers and end up being chosen by the group.

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Caller ID: The Birds

By Alice Jones ver. 3 - Mon, Feb 11, 2008 at 9:49:30 PM

If you hear a cell phone ring outdoors, you may be startled to discover that the "phone" has feathers. Master mimics, starlings were taught by the Romans to imitate human speech. Today their repertoire includes not only other birdcalls but also sirens, chain saws, horses whinnying—and the warbling of cell phones. Starlings as far apart as Denmark and Australia have learned the trick. Males re-create human sounds "especially at breeding time to attract a mate and hold territories," says Andrew South of Britain's Royal Society for the Protection of Birds. Starlings may not be alone. As cell phones proliferate, mockingbirds, mynahs, and other mimics are likely to get into the act.

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