

Inside the Animal Mind: Are Animals Intelligent? (Nature series)

Dog training. End product looks very 'smart' but training is laborious (trial and error) and is accomplished by simple operant conditioning: dog does the right thing, or a piece of the right thing, and it gets a reward. Training consists of rewarding successive approximations to the final behavior.

Mental maps. Who has them: cab drivers, rats in mazes, elephants looking for water in the mid-Sahara, rufous hummingbird (although all that is shown is that bird remembers where it visited previously), Clark's nutcracker. Brain scanning of cab driver shows that memories are located in the part of the brain called the hippocampus. [Other studies with animals have also implicated the hippocampus as the site of 'mental maps'.]

Clark's nutcracker (Grand Canyon). Harvests pine nuts over a 3-week period in September, caches ~ 30,000 nuts over a large area. [Why do you suppose bird doesn't make it easy on itself and put them all in one place?] It finds ~ 90% of them over the winter (when there ain't much food to be had).

Euen McPhail (the movie's token skeptic): Is the nutcracker a one-trick pony? Is this brain power devoted to just this one particular task? Can animal show the same intellectual capability in a variety of different mental tasks?

Insight. Chimps show insight (if imperfect execution) in the out-of-reach banana problem. Ravens (we suppose) show similar insight in figuring out how to steal fisherman's catch.

McPhail again: Why do we assume that these bright solutions are not the result of much previous trial and error on that and other similar kinds of problems?

Heinrich: hand-raised raven solves the food on a string problem the first time its presented to him (pulls up food, not rocks, solves crossed-strings problem).

Jane Goodall. She was the first to identify tool-using in animals, in the chimps at her famous Gombe field site. Chimps are shown fishing for termites with twigs, sometimes fashioning the twig into a better tool. Also shown is not very refined 'tool use' in fighting and threat displays. [Watch baby chimps – looks a bit instinctual wouldn't you say?]

New Caledonian crows. Fashion twigs to fish out grubs. [Not shown in movie is that these crows will also bend metal wires into hooks to fish out things in very unnatural lab setting. Check it out: <http://www.sciencemag.org/feature/data/crow/>. Kind of argues against the simple instinct hypothesis.]

Orangutans (Borneo) are great imitators.

McPhail again: Is this true imitation, or just trial and error? Has to be pretty good on the first or second trial.

Dolphins (with Lew Herman). Experiments with both another dolphin or a human as the 'demonstrator'. Dolphins are natural imitators (they get it right first time). [Still McPhail has a point, we should not just assume imitation has occurred. See blue tit milk-bottle opening story in lecture notes.]

Pearce on pigeon mind. Pigeon can learn concepts of 'tree' and of 'Picasso' vs. 'Monet'. [But why is single wispy tree on mountainside a 'tree' but ferns are not? The pigeon isn't a botanist after all. Would be nice to see the other exemplars. And why was bird rewarded for pecking to Matisse?] Pigeon gets some concepts readily that humans don't (area) and humans gets some readily that pigeons don't (equal to). Movie suggests that this is because we look for abstract solutions to these kinds of problems while pigeon doesn't.

Chimps (Sheba, with Sarah Boynton). Chimps can count, do arithmetic (we see $3+2=5$). [Note: some students think they see the experimenter cueing or guiding the chimp on these problems. What do you think?]

Alex the African Gray Parrot (with Irene Pepperberg). Note that Parrot has picked up Irene's Bronx accent. Alex can solve problems like "How many yellow balls?" (when there are 2 kinds of shapes and two kinds of colors). Later in the film: "What (kind of) matter?" (paper, wool, rock). [These are nice examples of modern use of teaching language to animals in order to study their general cognitive abilities.]

McPhail again: what's the mechanism for counting. We can perceive quantity directly up to about 7. [Again he's annoying but he has a point. I don't believe anyone has studied math in animals much beyond quantities up to 7 or so. In other words, animals may perceive the difference between 5 and 7 directly, but can they actually count?]

Chicken alarm calls (Chris Evans at the console). Calls for aerial vs. terrestrial predators.

Meerkat alarm calls. Calls for eagle, jackal, snake.

Dolphins/Herman again. Dolphins comprehend syntax in the sign language they've been taught. Dolphin can take the ball to the hoop or the hoop to the ball depending entirely on word order ('semantically reversible sentences').