Animal behavior

Konrad Lorenz

http://www.youtube.com/watch?v=eqZmW7uIPW4

From the nobel prize announcement for Lorenz, von Fritsch, and Tinbergen

- During the first decades of this century research concerning animal behaviour was on its way to being stuck in a blind alley.
- The vitalists believed in the instincts as mystical, wise and inexplicable forces inherent in the organism, governing the behaviour of the individual.
- On the other hand reflexologists interpreted behaviour in an one-side mechanical way
- behaviourists were preoccupied with learning as an explanation of all behavioural variations.
- The way out of this dilemma was indicated by investigators who focused on the survival value of various behaviour patterns in their studies of species differences. Behaviour patterns become explicable when interpreted as the result of natural selection, analogous with anatomical and physiological characteristics.
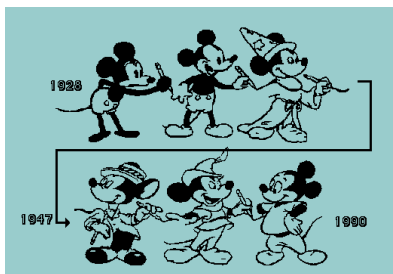

Ethology – the scientific study of behavior

- Lorenz's collaborator, Niko Tinbergen, argued that ethology always needed to include four kinds of explanation in any instance of behavior:

- Function — How does the behavior affect the animal's chances of survival and reproduction? Why does the animal respond that way instead of some other way?
- Causation — What are the stimuli that elicit the response, and how has it been modified by recent learning?
- Development — How does the behavior change with age, and what early experiences are necessary for the behavior to be displayed?
- Evolutionary history — How does the behavior compare with similar behavior in related species, and how might it have begun through the process of phylogeny?
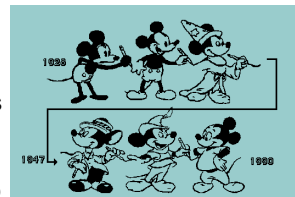

The "cute response"

- Lorenz theorized that certain "infantile features"—like big heads, large eyes, button noses, and round bodies—trigger a nurturing response in adults
- Evolutionarily, this makes us more likely to care for our offspring, but our preference for cuteness is so strong it spills over to other species.

- http://www.youtube.com/watch?v=3Ji0bvwXAvI&feature=player_embedded

---

An Evolved Mickey Down Through the Ages

Mickey's Transition from Rat to Human Baby

- His ears and head became much larger over time
- His nose became less sharp and pointy
- His eyes widened from two black dots to large, white, oval circles

What Attracts the Human Eye

Which pictures do you find more attractive?

Through the study of human behavior, people more often choose the left side

Baby Mickey

- Over the years Mickey "devolved" into an infant

Mickey- Then and Now

1928

1940

1994

1954

2005

Behavioral phylogeny

Present day lizard genera

Acanthocercus
Agama
Phrynocephalus
Lyriocephalus
Draco
Hydrosaurus
Lophognathus
Amphibolurus
Pogona
Ctenophorus
Anolis
Crotaphytus
Gambelia
Dipsosaurus
Iguana
Ctenosaura
Sceloporus
Uta
Urosaurus
Phrynosoma
Holbrookia
Uma
Microlophus
Leiocephalus
Nepthurus
Coleonyx
Diplodactylus
Pristurus
Varanus
Lampropholis
Sphenomorphus
Eumeces
Egernia
Carlia

Headbobs
■ Present
□ Absent

A behavioral phylogeny illustrating how the comparative method can be used in conjunction with a phylogenetic tree to map the evolutionay history of a behavior, in this case the evolution of headbob displays used in territorial defense by lizards.

Behavioral phylogeny

Brushed sheet webs
Terminal line webs
Irregular ground sheet webs
Irregular aerial sheet webs
Orb webs
Cob webs
Stereotyped aerial sheet webs
Bolas web
WEBLESS

Functions of communication

- agonistic interaction: everything to do with contests and aggression between individuals.
- courtship rituals: signals made by members of one sex to attract or maintain the attention of potential mate, or to cement a pair bond. ownership/territorial: signals used to claim or defend a territory, food, or a mate.
- food-related signals: many animals make "food calls" that attract a mate, or offspring, or members of a social group generally to a food source.
- alarm calls: signals made in the presence of a threat from a predator, allowing all members of a social group (and often members of other species) to run for cover, become immobile, or gather into a group to reduce the risk of attack.
- metacommunications: signals that modify the meaning of subsequent signals. The best known example is the play face in dogs, which signals that a subsequent aggressive signal is part of a play fight rather than a serious aggressive episode.

Is animal communication language?

- Human languages can be broken down into meaningful elements such as words
- In general, animal utterances are responses to external stimuli, and do not refer to matters removed in time and space.
- Human language is largely learned culturally, while animal communication systems are known largely by instinct.
- In contrast to human language, animal communication systems are usually not able to express conceptual generalizations.
- Human languages combine elements to produce new messages

Do animals have language?

- They certainly have signals, as do humans
- In the case of Jackdaws, their calls appear to be genetically determined since both German and Russian jackdaws give the same calls
- Often these signals reflect moods
- In humans there are also such "mimetic" signals such as yawning, smiling, wrinkling the brow

In many instances animal signaling is much more sophisticated than in humans

- Can humans using body language alone easily indicate to other humans that he/she is going home vs. going on a long journey
- Jackdaws accomplish this via body language
  - One jackdaw will fly up to a tree branch and perch without causing the whole flock to also follow
  - But in other cases, the jackdaw will fly off to travel a distance and the others will follow.
- Lorenz argues that the transmitting and receiving apparatus for animals can be more efficient than in humans

transmitting and receiving apparatus for animals can be more efficient than in humans

- Example: dogs knowing when human is leaving room to do something mundane vs. to take the dog on a walk
- Lorenz's dog Tito would bite the posterior people who got on Lorenz's nerves.
  - This would happen even if Tito was under the table and could not see faces and gestures.

Dogs and horses that can count or do math

- The dog watches the human intently and probably realizes when the right number of barks have been given
- Horse paws ground, doesn't appear to be looking at the human, but actually horses have acute peripheral vision and can detect even slightest movements
- Interesting experiments
  - Showed dog cards with a math problem. On the back was the wrong problem. The owner of the dog saw the wrong problem and would always answer the problem incorrectly.
  - Another dog that could "speak" using morse code was given a rag impregnated with scent from a female dog in estrus. The dog sniffed the rag with great interest, wagged tail and whined. When asked what was in the rag, the dog read the owner and tapped out "cheese"

Dogs show learned signals

- i.e. going outside signals
- Dogs don't do this when no humans are around
- In birds there are certain types of calls to reflect their mood but will do them even if there are no other birds around.

Eye test

- http://glennrowe.net/BaronCohen/Faces/EyesTest.aspx

Grey parrot

- One parrot would say good morning and good evening only at the correct time of day.
  - It would also say "Na, auf Wiedersehen" whenever someone left to go home. Even if someone tried to leave in a stealthy way
- Another parrot lived with a bird named "Hopfchen", but when "Hopfchen" died, there was no other bird for 9 years. After 9 years another bird of the same species was brought home and the bird repeatedly called "Hopfchen" "Hopfchen"

Grey Parrot "Alex"

- Irene Pepperberg research
- model rival technique –
  - two trainers, one to give instructions, and one to model correct and incorrect responses and to act as the student's rival for the trainer's attention
  - parrot tries to reproduce the correct behavior.
- Parrots and primates live in "societies" in the wild, this is different than a "herd"
- Vocabulary of 150 words
- names of 50 objects- could describe their colors, shapes and the materials they were made from.
- He could ask for things—and would reject a proffered item and ask again if it was not what he wanted.
- He understood, and could discuss, the concepts of "bigger", "smaller", "same" and "different".
- He could count up to six, including the number zero (and was grappling with the concept of "seven" when he died).
- http://www.youtube.com/watch?v=ldYkFdu5FJk

Cockatoo "snowball"

- http://www.youtube.com/watch?v=cJOZp2ZftCw
- research at Neurosciences Institute, La Jolla to determine whether truly synchronizing his body movements to the music
  - as opposed to simply mimicking or responding to visual clues from humans present in the room at the same time.
- Snowball's favorite piece of music was played to him at several different tempos and his reactions recorded on video for later analysis.
  - The results showed that Snowball was capable of spontaneously dancing to human music and also that he could adjust his movements to match the tempo of the music (albeit to a limited extent), a behavior previously thought only to occur in humans

- Betta spawning http://www.youtube.com/watch?v=rK0m_awMOWQ

- Dragonfly larvae
- http://www.youtube.com/watch?v=A9Q8gUTmyd8
- http://www.youtube.com/watch?v=iGPMzmgiS6k
- http://www.youtube.com/watch?v=txPVgmDJ-as

Dytiscus larvae

- http://www.youtube.com/watch?v=FWhIBeSkf44
- http://www.youtube.com/watch?v=haswBVaZhko

Face recognition test

- http://www.bbc.co.uk/science/humanbody/sleep/tmt/instructions_1.shtml