

Animal communication

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INTRODUCTION

- Animal communication is the passage of information b/w two animals.
- The animal which sends is called **signaller** and the animal that receives signal is called **receiver**.
- Animal communication is also known as **Biological communication**.
- The study of animal communication is called **Zoosemiotics**
- The classical ethological view of communication was developed by Niko Tinbergen.



Niko Tinbergen

TYPES OF COMMUNICATION

- **Intraspecific communication**

- communication within a single species
 - Eg. Honeybee dance

- **Interspecific communication**

- Prey to predator
 - Eg. warning colouration in wasps
- Predator to prey
 - Some predators communicate to prey make them easier to catch, in effect deceiving them.
 - Eg. Angler fish
- Human/animal communication
 - During domestication of animals



BASIC COMPONENTS

- **Signaller** : An individual which emits signal.
- **Reciever** : An individual which recieves signal
- **Signal** : The behaviour emitted by the signaller
- **Channels** : A pathway through which normally a signal travels. (ie means of communication)
 - Visual
 - Auditory
 - Chemical
 - Tactile
 - Electrical
 - Suface vibration

VISUAL COMMUNICATION

- Information transmitted by visual means is called visual communication.
- The visual signals may be given by various means like
 - movement
 - posture or shape of the body
 - Facial expressions.
 - colour identification
 - light etc.
- Visual signals are used most often by species that are active during day.
- Light as a visual means is used in night.

EXAMPLES

1) Visual communication in Bees

- The worker bees communicate about food mainly by a dance language.
- It was decoded by Karl von Frisch in 1965.
- Bees mainly perform 2 types of dances.
 - Round dance - If source of nectar is less than about 100m away. Does not communicate the direction.



- Waggle dance - If source of nectar more than 100m away from hive. Communicates both distance and direction.

- **Round dance**

- Runs around in narrow circles, suddenly reversing direction to her original course.
- After the round dance has ended, she often distributes food to the bees following her.
- Essentially says "there is food closeby, get out and find the food, which smells like this."



- **Waggle dance**

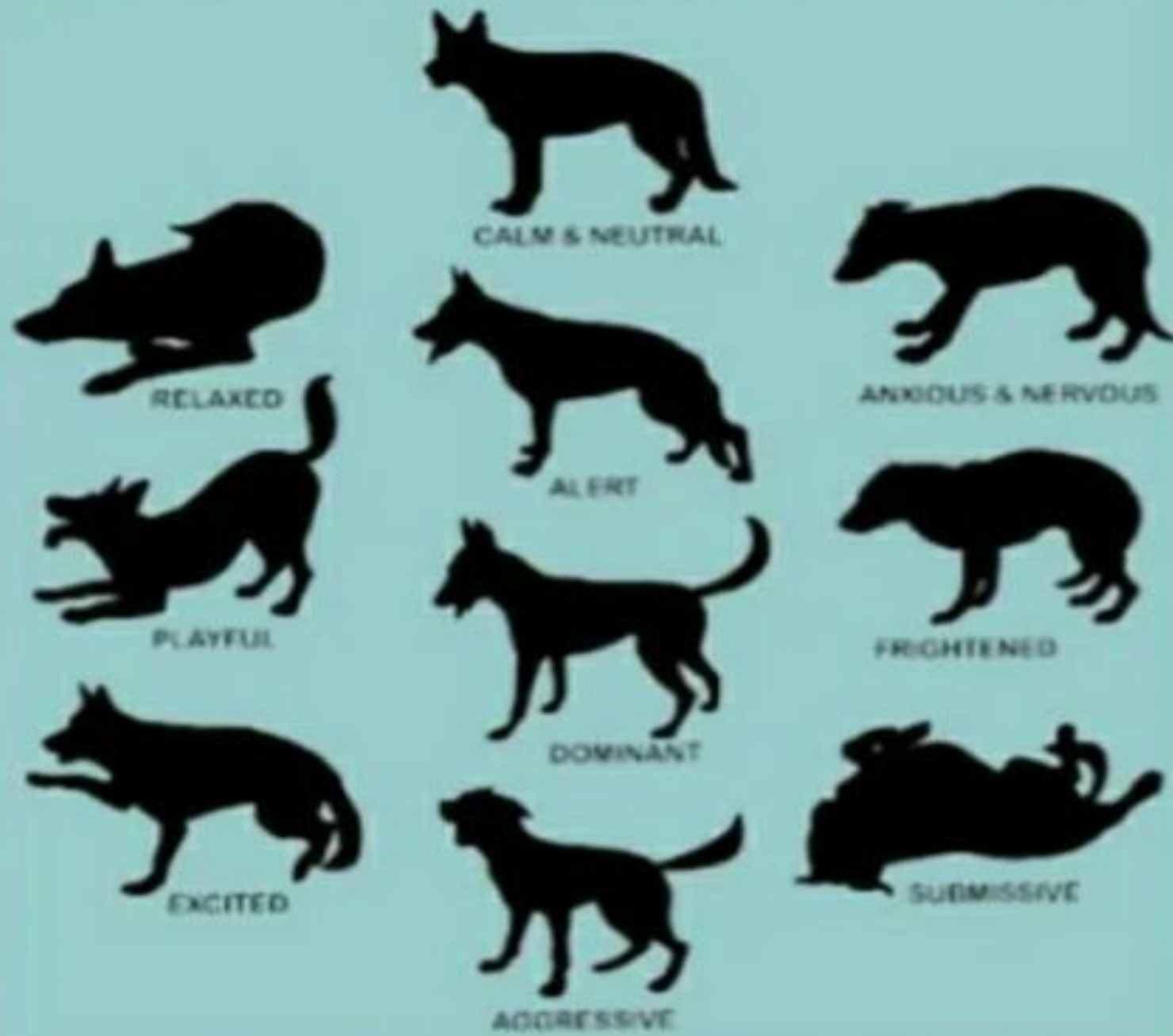
- Runs straight ahead for a short distance, returns in a semicircle to the starting point, runs again through the straight course, then makes a semicircle in the opposite direction to complete a full, figure-eight circuit.
- While running the straight-line course of the dance, the bee wags abdomen, vigorously sideways.
- The angle that the bee adopts, relative to vertical represents the angle in which food is found.



2) Postures

- Some mammal species give specific signals by the position adopted by head, ears & tail.
- Eg. Flattened ear – fear/ suspicion
- Wagging of tail – Complete submission.
- Retraction of lips to display teeth - threat display.

CANINE BODY LANGUAGE



3) Facial expressions



interest



excitement

Wildlife Art Company



playful



frightened

4) Colours and Displays

- During mating season the male **goldfinch** has a bright yellow body
- The **gila monster**'s bright orange colored splotches are a warning to predators that it is poisonous and they should back-off.
- When an animal exhibits a behavior that can be seen by other animals, it is called a **display**.
- Male **fiddler crabs** wave their giant claw to attract female fiddler crabs.
- **Male peacock** exhibits a visual display as part of its courtship rituals.



5) Light (Bioluminescence)

- Certain insects and deep sea fishes communicate via their light signals.
- Luminous insects are glow worms and their relatives the fireflies.
- Eg. of light producing fish includes Anglerfishes



Glow worms



Anglerfishes



Fireflies.

AUDITORY COMMUNICATION

- Sending information from one member to another by sound production is called auditory signal or **bioacoustic signal**.
- Sound is a good means of communicating over long distances both in air and water.
- It may have a vocal origin or it may be produced by some other organs
- For eg. Calls of mammals and birds – vocal origin ; sound produced by crickets is rhythmic oscillation of forewings.
- Sound is more effective signal at night and darkness
- It can go around obstacles that would interfere with visual signals.
- It is better than visual signals in getting attention of a receiver.

EXAMPLES

- **Deathwatch beetle** signal to each other by producing clicking sound made by tapping their head against wood.
- **Red squirrels** will make a series of loud rattles and screeches to warn off intruders.
- The **bottlenose dolphin** has a wide range of vocalizations. Each dolphin also has its own unique whistling sound that it uses to identify itself.
- Male birds sing a song during breeding season.



Deathwatch beetle



Red squirrels



Bottlenose dolphin

TACTILE COMMUNICATION

- Information transmitted in the form of **physical contact** (touch signal) is called tactile communication.
- Antennae of ants, termites and honeybees are involved in this process
- Eg. 1) **Female primates** often hold and frequently cuddle their young. Helps in establishing a bond
- 2) **Termites** – blind workers totally depend on his phenomenon.



Two worker *ants* in tactile communication

ELECTRICAL SIGNALS

- It is a means of communication in some fishes.
- **Torpedo (Electric ray)**, and sharks (*Scyliorhinus caniculus*) have electro receptors that they use in communication.



- Sharks detect the electric field produced by prey flatfish that are buried in the sand by a specialized organ called the **ampulla of lorenzini**.
- Electric fish communicate information about species identity and sex by discharging electric field.

SURFACE VIBRATIONS

- In some animals information may be communicated by patterns of surface vibrations.
- Eg. Water spider send out ripples of certain frequency and receptive female respond by moving towards the source.
- Cannibalistic male spiders vibrate threads of web of his prospective partner communicating that it is not a prey.



FUNCTIONS OF COMMUNICATION

- **Agonistic interaction** – threat displays during competition over food, mates or territory
- **Mating rituals** – to attract and maintain the attention of potential mate
- **Ownership/territoriality** – to claim or defend territory
- **Food-related signals** – to lead members of a social group to a food source
- **Alarm calls** – to warn of a threat from a predator

RECENT TRENDS

Communication in walnut sphinx caterpillar (Journal of experimental biology, Jan issue, 2012)

- Dr. Jayne Yack of Carlton University in Ottawa, found that the **walnut sphinx caterpillar** has a special way of communication with its predators.
- Make a squeaking **sound that fends off attacking birds** like Warblers .
- Sound is made **by blowing air out of two holes found in the abdominal spiracles.**
- It was found that they are mimicking the alarm call of another predatory bird.



CONCLUSION

- Animals do communicate which involves information transfer from the sender to a receiver.
- They can convey their needs, desires and reactions to the environment via some sophisticated signaling of their own.
- No animals have however evolved the sophistication of the human language - communication system.
- The understanding of animal communication is essential for understanding the animal world in general.