

CHAPTER 1 | MODULE 2

ANIMAL BEHAVIOR



MODULE 2

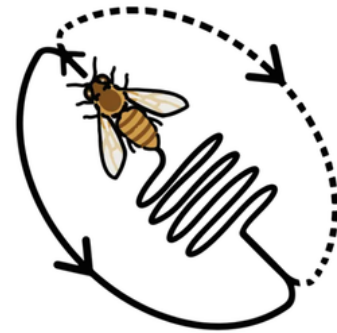
ANIMAL BEHAVIOR

What is Animal Behavior?

- Animal behaviors are carried out in response to internal stimulus → a change in the activity of an organism in response to a stimulus, an external or internal cue or combo of cues.
- It was first discovered by **Von Frisch** studied the **honeybee** communication and described the waggie dance
- The only action that is **innate** not **learned** [genetic factor] , it's a **Fixed action pattern**

What is a Fixed action pattern?

it is **instinctive** behavioral sequence that is highly stereotyped, and species characteristic produced by the **innate mechanism, in response to sign stimulus**

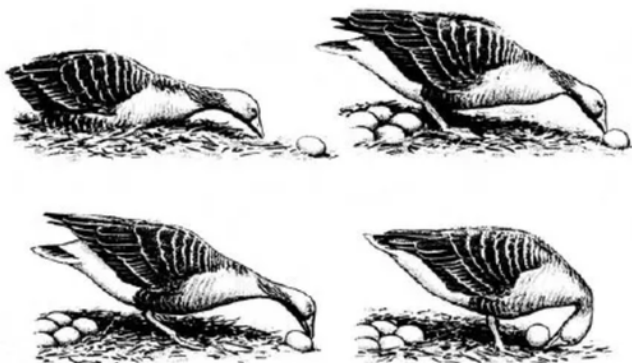


honeybee communication " the waggie dance "

Niko Tinbergen

Niko Tinbergen, pioneering researcher of animal behavior, studied the egg rolling behavior of the goose as an example of an FAP → caused by sign stimulus

- Niko Tinbergen → is **the researcher who discovered the Fixed action pattern**



If one of the goose's egg rolls away from nest, the goose automatically rolls the egg back to the nest - Egg rolling is considered a **sign stimulus**



the behavior of rolling any egg-like object near the nest back into the nest will be beneficial. However, it's a biological program that runs in response to a stimulus and can have unhelpful results under unusual circumstances.

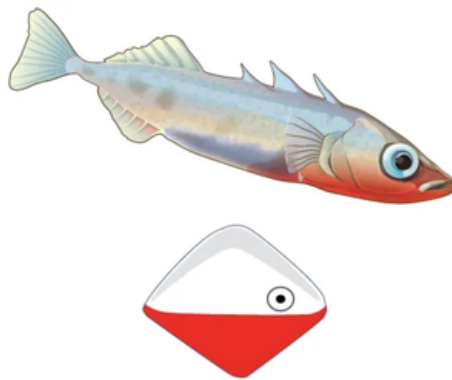
MODULE 2

ANIMAL BEHAVIOR

Male stickleback fish

another example is a **male stickleback fish spotting** another **nearby male**, He aggressively goes toward that male.

- The specific stimulus that triggers the fish is the **red belly coloration [sign stimulus]**
- scientists got a wooden plank and painted it red and they still kept hitting it

**What is a Learned Behavior?**

Learned behaviors are not inherited. They develop during an organism's lifetime as the result of experience and environmental influence.

BUT Innate behaviors are genetically hardwired and are inherited by an organism from its parents.

- **Habituation** is a simple learned behavior in which an animal gradually stops responding to a repeated stimulus.
- **Imprinting** is a specialized form of learning that occurs during a brief period in young animals—e.g., ducks imprinting on their mother.
- In **classical conditioning**, a new stimulus is associated with a pre-existing response through repeated pairing of new and previously known stimuli.
- In **operant conditioning**, an animal learns to perform a behavior more or less frequently through a reward or punishment that follows the behavior.
- Some animals, especially **primates**, are capable of more complex forms of learning, such as **problem-solving and the construction of mental maps**.

MODULE 2

ANIMAL BEHAVIOR

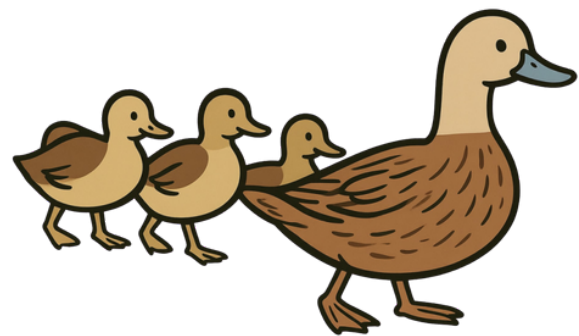
Learned Behavior

1 - Imprinting

→ happen in a critical period of time early in animal's life

Konrad Lorenz discovered that newly hatched geese would follow the first moving object they saw

. When ducklings hatch, they imprint on the first adult animal they see, typically their mother.



2 - Habituation

→ occurs when animals are exposed to same stimuli repeatedly, and eventually lose response to that stimulus

MODULE 2

ANIMAL BEHAVIOR

Learned Behavior : Conditioned behaviors

Conditioned behaviors are the result of associative learning, which takes two forms: **classical conditioning** and **operant conditioning**.



Classical conditioning

Type of unconscious or automatic learning by **pairing a new stimulus** with a **familiar one**, an animal can be conditioned to respond to the new stimulus

The most famous example of classical conditioning comes from **Ivan Pavlov's** experiments in which dogs were **conditioned to drool**—a response previously associated with food—upon hearing the sound of a bell.



MODULE 2

ANIMAL BEHAVIOR

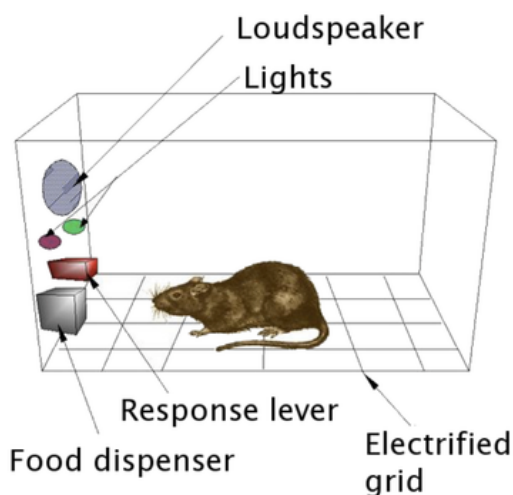
Learned Behavior : Conditioned behaviors

Operant conditioning : [trial and error]

basis of animal training, attributed to **B.F. Skinner**

animal learns [or, is conditioned] from its behaviors as it acts [operates] on the environment

rats in boxes containing a lever that would dispense food when pushed by the rat. The rat would initially push the lever a few times by accident and then would begin to associate pushing the lever with getting the food



Operant conditioning is trial and error conditioning. This is how we train animals. In this case, a system of rewards is the way the dog is trained: if he sits, he will get to eat.

MODULE 2

ANIMAL BEHAVIOR

Learned Behavior : Conditioned behaviors**Insight [reasoning or problem solving]**

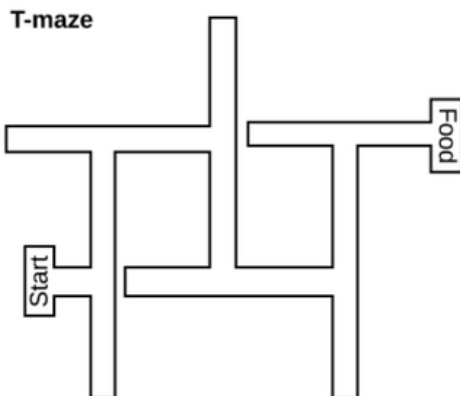
the use of past experience and reasoning to solve problems

A dog is in a room with a small gate to keep him from leaving, he pushes a box over near to the gate in order to stand up on it and jump over the gate

→ insight comes from **several trial and error** → **opperant conditioning**

EST question

Bat in maze , where the start point, end point and track, what should stay as it is for the shortest time possible → all are needed



MODULE 2

ANIMAL BEHAVIOR

Social behaviors

Cooperation

appear to occur mostly for direct benefit or between relatives. Spending time and resources assisting a related individual



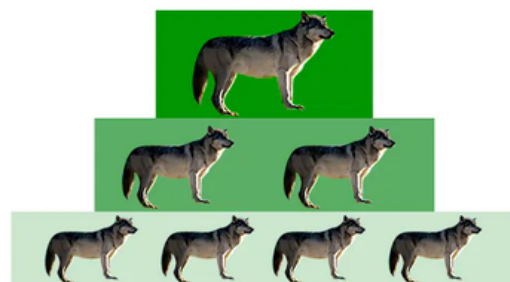
Agonistic

aggressive behavior, Includes threats or actual combat among individual animals. whether about food, mating, shelter, or territory



Dominance Hierarchy

type of social hierarchy that arises when members of animal social groups interact, creating a ranking system. Top ranked animals to resources without conflict from another animal.



Animal behavior where some individuals have higher social rank and more privileges

MODULE 2

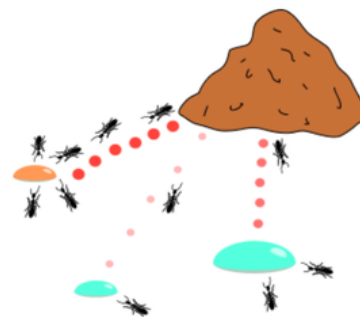
ANIMAL BEHAVIOR

Social behaviors

Phermones

a pheromone is a chemical that an animal produces which changes the behavior of another animal of the same Spp. , it play a role in sexual attraction and copulatory behavior

pheromone trails laid down by ants to direct others in the colony to sources of food. When a food source is rich, ants will deposit pheromone on both the outgoing and return legs of their trip, building up the trail and attracting more ants.



Altruism [selection]

A behavior that reduces an individual's reproductive fitness (the animal may even die) but increases the fitness of the group or family.

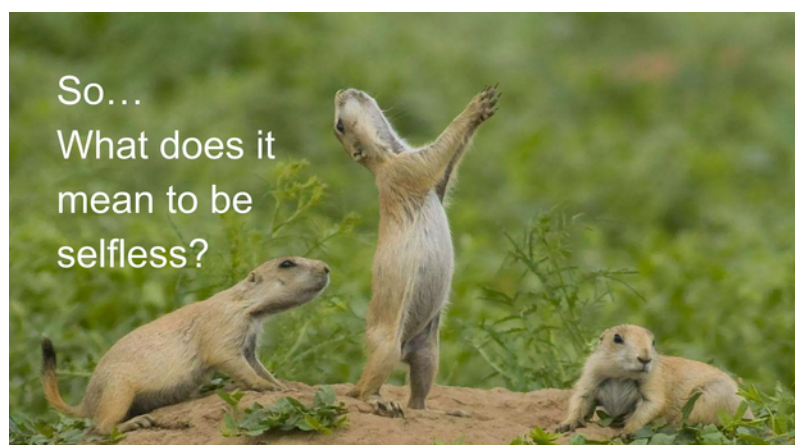
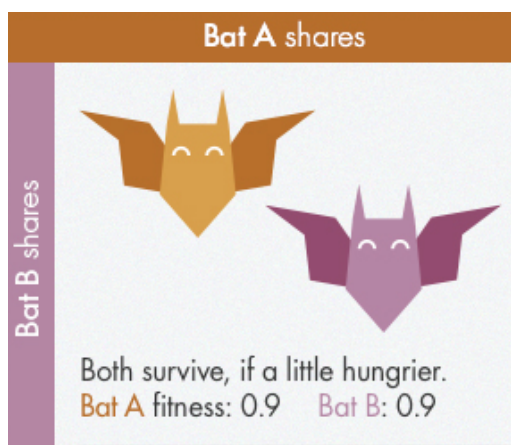
kin selection occurs when an animal engages in self-sacrificial behavior that benefits the genetic fitness of its relatives

- The idea is that by helping relatives survive and reproduce, an animal indirectly ensures that shared genes are passed on to the next generation.*

Alarm calls Certain animals, like squirrels and apes, give alarm calls to warn relatives of predators.

While calling may draw attention to themselves (risking death), it increases the survival of related group members.

Vampire bats regularly vomit blood and donate it to members of its group who have failed to feed that night, ensuring they dont starve



MODULE 2

ANIMAL BEHAVIOR

Communication

Animals communicate using **signals** which include **visual, auditory, or sound based**; **Chemical**, involving **pheromones** ; or **tactile, touch based** ; or **olfactory, smell based** cues ; or **gustatory, taste based**

Communication behaviours can help animals find mates, establish dominance, defend territory, coordinate group behavior, and care for young



AUDITORY

birds use sounds to convey warnings, attract mates, defend territories, and coordinate group behaviors.



VISUAL

Gesture and posture are widely used visual signals. For instance, chimpanzees communicate a threat by raising their arms, slapping the ground, or staring directly at another chimpanzee.

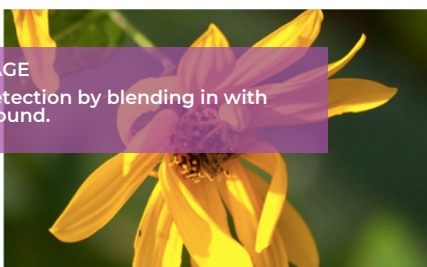


TACTILE

in many primate species, members of a group will groom one another—removing parasites and performing other hygiene tasks

Mimicry and camouflage

Camouflage is when a species can change their colours or patterns **to match its environment to blend in**, chameleon , **Mimicry** is when a harmless creature makes itself look dangerous, they mimic **a more dangerous spp.** and it makes other animals afraid to eat them



CAMOUFLAGE

avoiding detection by blending in with the background.



"Don't eat, toxic!"



"Don't eat, smelly!"

MIMICRY

copy, another species' aposematic coloration—though they themselves may not be bad-tasting or toxic



Bumblebee (actually stings)



Robber fly (bumblebee mimic)

MODULE 2

ANIMAL BEHAVIOR

Communication**Taxis**

Taxis is a form of movement behavior that involves movement toward or away from stimulus

this movement can be in response to light known as phototaxis, chemical signals, known as chemotaxis, or gravity, known as geotaxis

positive phototaxis / Negative phototaxis

Example:

a worm that gets away from light → **Negative phototaxis**

Plant bending away from light → **Negative phototropism**

WBCs go to infectious agents or toxin in case of infection → Positive chemotaxis

Bacteria move toward glucose → **Positive chemotaxis**

Vertebrates and chordates

Fish, Amphibians, Reptile, Mammal, Birds



MODULE 2

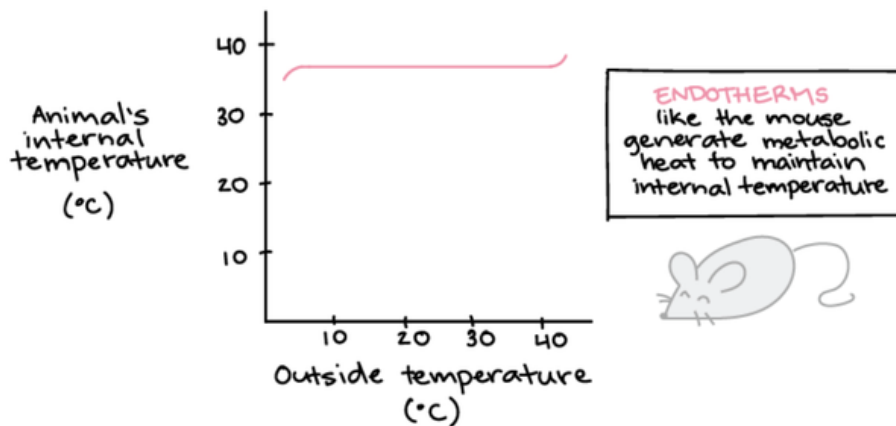
ANIMAL BEHAVIOR

Ectotherms & Endotherms

Endotherms (e.g., mammals, birds)

Mammal and bird → Endotherms [can balance their body temperature]

- Generate heat internally through metabolism.
- Body temperature remains constant, even when the environment changes.
- Can stay active in cold conditions because they produce their own heat.
- Example: A bird keeps warm in winter by burning more energy (food).



Ectotherms (e.g., fish, amphibians, reptiles)

Fish, Amphibians, reptile → Ectotherms [Cold blooded], They control their basal metabolic rate

- Rely on external heat (like the sun or warm surfaces).
- Body temperature changes with the environment.
- Are less active in cold since they can't heat up internally.
- Example: A lizard basks in the sun to warm up and becomes sluggish when it's cold.

