

Lecture Notes for Behavior/Responses to the Environment

Ethology: the study of how evolutionary processes shape inherited behaviors and the ways that animals respond to specific stimuli.

Behavior: an animal's response to a stimulus (internal or external)

- Nature vs nurture (genetic vs environmental factors)
- Allow for survival and reproduction (fitness)
- subject to natural selection

Proximate cause: how a behavior occurs or is modified

1. What was the stimulus to cause the behavior?
2. How does the "nurture" component affect behavior? How do the experiences during growth and development influence the behavior?

Ultimate cause: why a behavior occurs within the context of natural selection.

1. How does the behavior help the animal survive and reproduce?
2. What is the evolutionary basis of the behavior?

Behaviors can be innate or learned.

1. Innate behaviors are developmentally fixed.
 - Heredity, born behaviors, do not need to learn them; instinctive
 - Experience during growth and development has NO obvious impact on these
2. Learned behaviors depend on environmental influence.
 - Experiences DO affect these behaviors
 - Often have high variation in a population

Fixed action patterns (FAPs): a sequence of unlearned accounts directly linked to a stimulus

- actions are unchangeable
 - carried out to completion
 - triggered by a stimulus (external cue)
- Example: Stickleback fish.

Migration: a regular, long-distance change in location

- Triggered by environmental cues like sun's position, earth's magnetic field, celestial cues

Signal: a stimulus generated and transmitted from one animal to another in order to elicit behavior (animal communication)

Signals can be visual, auditory, tactile, electrical, chemical

- pheromones: chemicals emitted by members of a species that can affect other members of the same species.
 - stimulus response chains: when a response to a stimulus serves as the next stimulus for a behavior (seen in animal courtships)
 - body movement
- Example: waggle dance in bees

Directed movements: movements towards or away from a stimulus

- kinesis: a change in the rate of movement or the frequency of turning movements in response to a stimulus; non directional
- taxis: directional movement towards (positive) or away from (negative) stimulus
 - phototaxis = movement in response to light
 - chemotaxis = movement in response to chemicals
 - geotaxis = movement in response to gravity

Learning: the modification of behaviors based on experience.

Imprinting: a long-lasting behavioral response to an individual

- happens during a sensitive period of development (usually early in life)
 - imprinting usually occurs on the first individual encountered
- Example: ducks following mother or other

Spatial learning: establishing memories based upon the spatial structure of the animal's surroundings

- Some animals form a cognitive map or use landmarks as environmental cues
- Example: Birds finding hidden nests

Associative learning: the ability to associate one environmental feature with another.

- Example: associating monarch butterflies with a foul taste

Social learning: learning through observations and imitations of the observed behaviors

- Example: chimps breaking open palm nuts