

The Components of Behavior

Behavior in animals can be attributed to two components: **innate behavior** that has a genetic basis, and **learned behavior**, which results from the experiences of the animal. Together they combine to produce the total behavior exhibited by the animal. It should also be noted that experience may modify certain innate behaviors. Animals behave in fixed, predictable ways in many situations. The

innate behavior follows a classical pathway called a **fixed-action pattern (FAP)** where an innate behavioral program is activated by a stimulus or **releaser** to direct some kind of behavioral response. Innate behaviors are generally adaptive and are performed for a variety of reasons. Learning, which involves the modification of behavior by experience, occurs in various ways.

Innate Behaviors

Reflex behavior

Simplest type of animal behavior. A sudden stimulus induces an automatic, involuntary and stereotyped response. Many reflexes are protective.

Kinesis

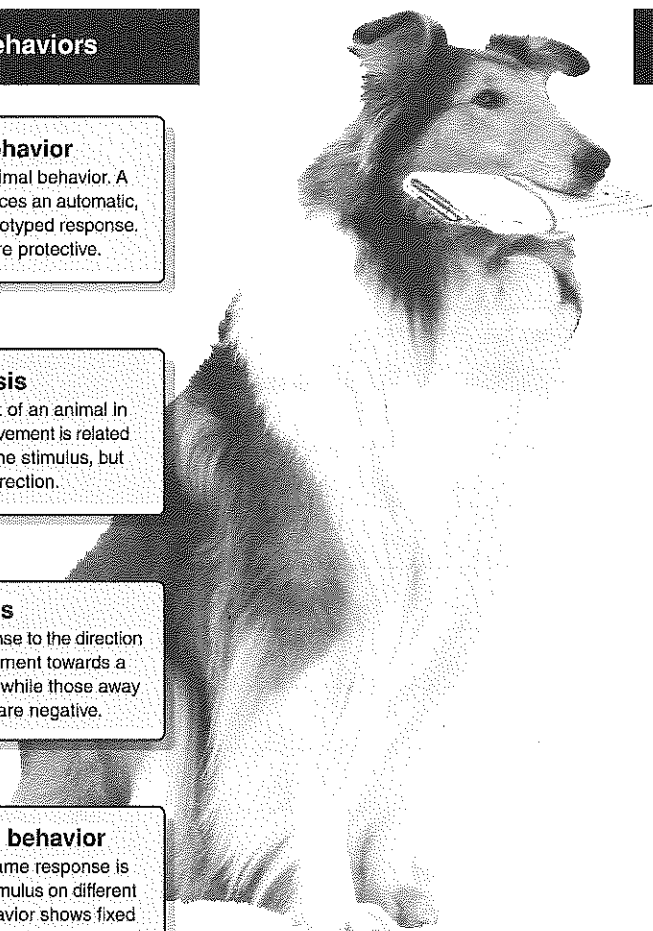
Random movement of an animal in which the rate of movement is related to the intensity of the stimulus, but not to its direction.

Taxis

A movement in response to the direction of a stimulus. Movement towards a stimulus are positive while those away from a stimulus are negative.

Stereotyped behavior

Occurs when the same response is given to the same stimulus on different occasions. This behavior shows fixed patterns of coordinated movements called fixed action patterns.



The complex behavior patterns exhibited by an animal

Learned Behaviors

Classical conditioning

Also called associative learning. Animals come to associate one stimulus with another.

Habituation

Response to a stimulus wanes when it is repeated with no apparent effect.

Insight behavior

Correct behavior on the first attempt where the animal has no prior experience.

Imprinting behavior

During a critical period, an animal can adopt a behavior by latching on to its first stimulus.

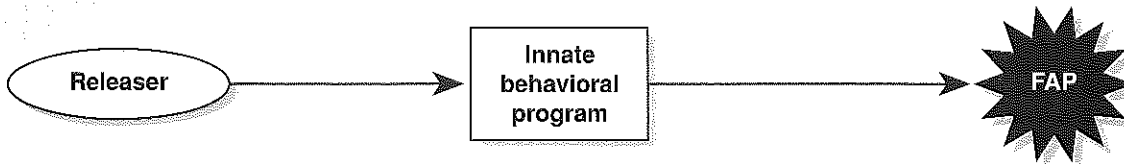
Operant conditioning

Also called trial and error learning, an animal is rewarded or punished after chance behavior.

Animal Behavior

Fixed Action Pattern

A **releaser** (sign stimulus) triggers the operation of an **innate behavioral program** in the brain that results in a **fixed-action pattern (FAP)**: a predictable, stereotyped behavioral response.



- Distinguish between innate and learned behaviors: _____

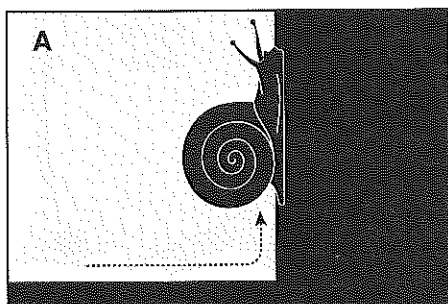
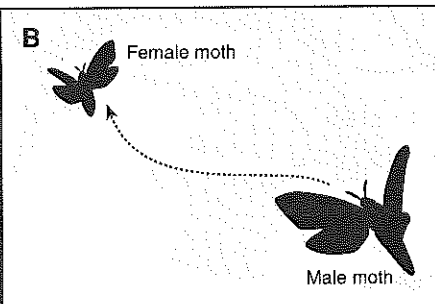
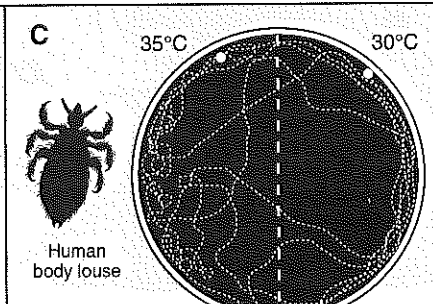

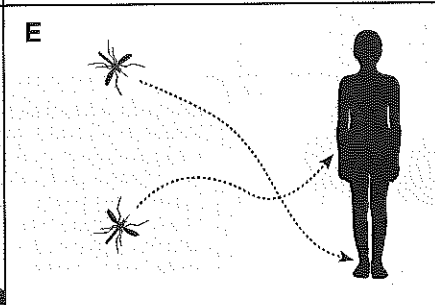
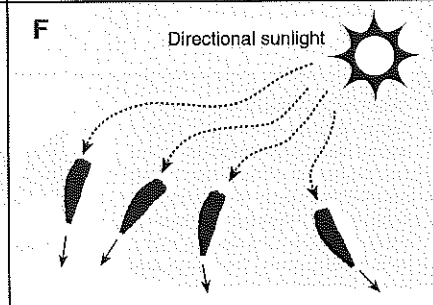
- (a) Explain the role of releasers in innate behaviors: _____

- (b) Name a releaser for a fixed action pattern and the animal involved, and describe the behavior elicited: _____

Simple Behaviors

Taxes and kinesis are examples of **orientation behaviors**. Such behaviors describe the way in which motile organisms (or gametes) **position** themselves and move in response to external cues (stimuli). Common stimuli are gravity, light, chemicals, and temperature. Some animals and many protozoa respond to certain stimuli simply by changing their rate of movement or by randomly turning without actually orientating to the stimulus. These movements are called **kineses** (*sing.* kinesis). In contrast, **taxes** (*sing.* taxis) involve orientation and movement directly to or

away from one or more stimuli, such as temperature. Taxes often involve moving the head (which carries the sensory receptors) from side to side until the sensory input from both sides is equal (a **klinotactic response**). Note that many taxic responses are complicated by a simultaneous response to more than one stimulus. For example, fish orientate dorsal side up by responding to both light and gravity. Male moths orientate positively to pheromones, but use the wind to judge the direction of the odor source (the female moth).

		
<p>When confronted with a vertical surface, snails will reorientate themselves so that they climb vertically upwards.</p>	<p>A flying male moth, encountering an odor (pheromone) trail left by a female, will turn and fly upwind until it reaches the female.</p>	<p>In a circular chamber, lice make relatively few turns at 30°C, but many random turns at 35°C.</p>
		
<p>Spiny lobsters will back into tight crevices so that their body is touching the crevice sides. The antennae may be extended out.</p>	<p>At close range, mosquitoes use the temperature gradient generated by the body heat of a host to home in on exposed flesh.</p>	<p>Blowfly maggots will turn and move rapidly away from a directional light source.</p>

1. Distinguish between a **kinesis** and a **taxis**, describing examples to illustrate your answer: _____

2. Giving an example, describe the adaptive value of simple orientation behaviors such as kinesis: _____

3. Name the physical stimulus for each of the following prefixes used in naming orientation responses:

- (a) Geo- _____ (b) Hydro- _____ (c) Thigmo- _____
- (d) Photo- _____ (e) Chemo- _____ (f) Thermo- _____

4. For each of the above examples (A-F), describe the orientation response. Indicate whether the response is positive or negative (e.g. positive phototaxis):

- (a) A: _____ (b) B: _____
- (c) C: _____ (d) D: _____
- (e) E: _____ (f) F: _____

5. Suggest what temperature body lice "prefer", given their response in the chamber (in C): _____