Animal Behavior

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Animals’ abilities to move create the possibility for copious interactions between organisms, giving rise to quite complex patterns of behavior. Animal behavior can come in the form of instincts and learned behavior. Instincts are inheritable, genetically coded behavior patterns that an animal possesses at birth. Learned behaviors are established and maintained as an animal responds to new situations. Learned behaviors are not passed down from parent to offspring genetically, but they can be taught.

**Instinctual Behavior**

Instinctual behavior can take the form of **simple reflexes** or **fixed-action patterns**. Simple reflexes are automatic responses to specific stimuli. Reflex behaviors do not originate from the brain in vertebrates. Instead, they are processed in the spinal cord. For example, if you touch a hot iron, the pain and heat receptors in your fingers send signals down a sensory neuron to your spinal cord, where a motor neuron is immediately stimulated to cause you to pull back your arm. The signal is actually sent to the brain after it has been acted on by the spinal cord—you do not perceive pain until the brain processes the information.

Fixed-action patterns are complex behaviors that, like reflexes, are triggered by a specific stimulus. The stimuli that cause fixed-action behavior are often more complex than the stimulus behind simple reflex behavior. Once triggered, fixed-action patterns often proceed to completion, even if the stimulus is removed. For example, female geese demonstrate a fixed-action pattern called egg rolling. If a female goose spots an egg outside of her nest, the mother goose will use her beak to roll the egg back into the nest. If the egg is taken away in the middle of this process, she will continue to move her neck and beak as if she were rolling an egg, even though the egg is no longer there. Fixed-action patterns do not need to be learned; they are present in an individual from birth.

Many animals, most notably birds, exhibit a special type of learned behavior called **imprinting**. Imprinting occurs when an animal quickly learns, during a short critical period, to recognize an individual, object, or location. The most common example of imprinting is the case of birds that can walk soon after hatching. Newly hatched infant birds must follow their mother to survive. Soon after they hatch, these birds go through a critical period during which they treat the first moving object they see as their mother. If the first organism a young bird sees is a pig, it will imprint the pig as its mother. Imprinting is nearly impossible to reverse.

**Learned Behavior**

Unlike instincts, which are present at birth, an individual organism learns some behavior over the course of its life. The simplest form of learning is known as **habituation**. Habituation occurs when a nonharmful stimulus that would normally cause an animal to respond is repeated over and over again until the animal learns to ignore it. The classic example of habituation is seen in the common garden snail. When its body is poked, a snail will withdraw into its shell. However, if it is poked repeatedly without any real harm done, the snail ignores the stimulus and ceases to retreat into its shell.

**Conditioning**, or **associative learning**, occurs when an animal learns to associate a specific stimulus with a set behavior. There are two types of conditioning: classical conditioning and operant conditioning. Classical conditioning is merely the association of a new stimulus with a stimulus that is recognized by instinct. The most famous example of classical conditioning is Pavlov’s dog. In an experiment, Russian scientist Ivan Pavlov would ring a bell a few moments before feeding a dog. Every time he fed the dog, he would first ring the bell. The sight and smell of food causes a dog to salivate instinctually. But after ringing the bell before feeding the dog a number of times, Pavlov discovered that the dog would salivate whether or not food was present. The dogs associated the sound of the bell with the stimulus of food.

Operant conditioning is sometimes called trial-and-error learning. It involves the establishment of a new behavior or the avoidance of an old behavior because of the association of a reward or punishment. For example, a rat will learn to press a lever in order to release its food. It learns a new behavior, the pressing of the lever, because it associates this behavior with a reward. Similarly, the rat can be trained to avoid a certain colored spot in its cage if standing in that spot becomes associated with a mild electrical shock. Normally the rat would have no reason to avoid such a spot, but because of the association of a punishment with this behavior, it stays away.

Both classical and operant conditioning can be undone if the association between stimulus and behavior or behavior and punishment/reward does not last. For example, if the rat presses the lever and no food comes out for several tries, it will cease to press the lever. This unlearning is called extinction.

**Circadian Rhythms**

Many animal behaviors, such as sleep and wakefulness, foraging times, and metabolic rate, operate according to daily cycles known as circadian rhythms. These rhythms can be traced to the periods of light and dark in the day, but the rhythms remain even if for a short time an animal cannot see the changing of the light. In other words, animals have a sort of internal clock that regulates their behavior.