

ANIMAL BEHAVIOUR

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(BSc PART I)

- Animal behaviour includes all the ways animals interact with other organisms and the physical environment.
- Behaviour can also be defined as a change in the activity of an organism in response to a stimulus, an external or internal cue or combo of cues.
- To fully understand a behaviour, we want to know what causes it, how it develops in an individual, how it benefits an organism, and how it evolved.
- Some behaviours are innate, or genetically hardwired, while others are learned, or developed through experience. In many cases, behaviours have both an innate component and a learned component.
- Behaviour is shaped by natural selection. Many behaviours directly increase an organism's fitness, that is, they help it survive and reproduce.

What is behaviour?

Broadly speaking, animal behaviour includes all the ways animals interact with other members of their species, with organisms of other species, and with their environment.

Behaviour can also be defined more narrowly as a change in the activity of an organism in response to a stimulus, an external or internal cue or combination of cues.

For example, your dog might start drooling—a change in activity—in response to the sight of food—a stimulus.

Behavioural biology is the study of the biological and evolutionary bases for behaviour. Modern behavioural biology draws on work from the related but distinct disciplines of ethology and comparative psychology.

- Ethology is a field of basic biology, like ecology or genetics. It focuses on the behaviours of diverse organisms in their natural environment.
- Comparative psychology is an extension of work done in human psychology. It focuses largely on a few species studied in a lab setting.

Behavioural biology also draws on many related areas of biology, including genetics, anatomy, physiology, evolutionary biology, and, of course, neurobiology—which traces the neural circuits that underlie animal behaviour.

Causes that trigger behaviour

- In hibernation, an animal goes into a den or burrow, reduces its metabolic rate, and enters a state of inactivity during the winter, conserving resources while conditions are harsh and food is scarce. Environmental cues often trigger hibernation behaviour.
- Estivation is similar to hibernation, but it occurs during the summer months. Some desert animals estivate in response to dry conditions. This shift helps them survive the harshest months of the year. The snails in the photo below climb to the tops of fence posts to estivate.
- Migration is a behaviour in which animals move from one location to another in a seasonal pattern. For instance, monarch butterflies living in the northern and central United States migrate to Mexico in the autumn, where they spend the winter. Environmental cues that trigger the autumn migration include air temperature, day length, and food availability.

When we are trying to understand how a behaviour develops and how it arose evolutionarily, one important question is whether the behaviour is genetically preprogrammed

Innate vs. learned behaviours

(or acquired through experience)

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

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

Behavioural biologists have found that many behaviours have both an innate and a learned component. So, it's generally most accurate for us to ask to what extent a behaviour is innate or learned.

Mostly innate behaviours

There are some examples of behaviours that are really and truly hardwired. These behaviours take place in a highly predictable way in response to the right stimulus, even if the organism has never before encountered that stimulus.

For example, an adult salamander will swim perfectly if it's placed in water, even if it never saw water when it was young and has never watched another salamander swim. In this case, the behaviour of swimming can only be explained as something genetically preprogrammed in the salamander.

Similarly, you—or any human—will rapidly jerk your hand away if you touch a very hot object. This response is a reflex that's hardwired in the circuits of your sensory and motor neurons and doesn't even involve your brain.

Partly innate, partly learned behaviours

An organism is genetically programmed to develop a behaviour, but the form the behaviour takes depends on the individual's experience.

One example is the learning of a song by a zebra finch or other songbird, as we saw above. All male zebra finches will begin listening to and learning song at about the same age and practicing and producing song at a slightly later age. Although this pattern is genetically determined, the exact features of the song a bird sings will depend on the songs it hears during its learning period.

Another, more familiar example is language acquisition in humans. Babies are preprogrammed for language learning, but which language they learn depends on what they're exposed to during their plastic, or formative, period.

Mostly learned behaviours

In other cases, behaviours are largely dependent on experience—they're learned—and can't be fully explained by genetic preprogramming.

For instance, if a rat receives a food reward each time it pushes a lever, it will quickly learn to push the lever in order to get the food. Similarly, if a cow gets an electric shock each time it brushes up against an electric fence, like the one below, it will rapidly learn to avoid the fence.