

LESSON 1 INTRODUCTION TO ANIMAL BEHAVIOUR

Animal behaviour is an animal's observable actions. Although it can include simple reflex responses to stimuli we usually use the term behaviour to refer to more complex actions. As such, behaviour might comprise of a chain of actions where each action is dependent upon the previous one or it might be very complex pattern of actions such as those observed in dominance, aggression or courtship behaviours. Complex animal behaviour may involve cognitive processes such as learning or memory. Behaviour might also be influenced by genes and neurological, biological or chemical processes within the organism - such as by hormones.



Labrador Dog is a breed that is well suited to training as a guide dog for blind people. (there's a little bit of information about this under "genetics")

INTERPRETING ANIMAL BEHAVIOUR

Animal behaviour is more than just what an animal does. Although it might be a response to a stimulus, a reflex or a nervous system action, like humans, its behaviour may also link to what an animal thinks or feels. If a human raises an eyebrow it might suggest that they are being quizzical or disbelieving. However, we do not know this for sure by observing them. We just assume this because universally a raised eyebrow tends to mean this. However, this behaviour is not a normal action in a dog or other animal so we certainly couldn't imbue them with the ability to question things.

Smiling is a universal human behaviour. If a human smiles, we would most likely think they were happy and perhaps amused, friendly or welcoming. However, a human can also smile in a deceptive manner. A smile, therefore, does not necessarily mean they are

Suggested Tasks: ▼

Throughout this course you will be provided with suggested tasks and reading to aid with your understanding. These will appear in the right hand column. Remember: these tasks are optional. The more you complete, the more you will learn, but in order to complete the course in 20 hours you will need to manage your time well. We suggest you spend about 10 minutes on each task you attempt, and no more than 20 minutes.

happy - only that they are outwardly projecting this emotional state. If a monkey smiles, it is usually a sign of aggression, and it is also recognised as a sign of aggression by humans - rather than a “happy” smile. Apes grin and bear their teeth to show their opponent that they are expressing hostility.

Whilst there are similarities between human and animal behaviour there are also many differences. We cannot interpret how an animal *thinks* from observing their behaviour, but we can get a reasonable idea. When a dog “smiles” it is often a representation that they are “happy”, whereas if they bear their teeth they are most likely preparing to bite or attack. Often this behaviour is accompanied by a growl.

When attempting to understand animal behaviour, or human behaviour, through observations we should therefore adopt a degree of caution. Although we may have some understanding of the behaviour e.g. we think a human smiling means they are happy, or a monkey smiling means it is aggressive, we do not always know exactly what it means.

As outlined in the preface, when we observe animals we are very often tempted to ascribe human thoughts and feelings onto their behaviour. Most animal owners have probably done this at some time or other, and some may think of their animals in human terms all the time. In fact, it can be very difficult not to ascribe human characteristics and thought patterns to animals given we are so familiar with looking inwardly to understand our own behaviour. However, this anthropomorphism may actually hinder us from truly understanding animal behaviour for

what it is. One of the challenges of comparative psychology has been to study how animals behave and think without using human terms - to try and study them impartially without making human inferences.



Silkie chickens are a breed that have a tendency to be docile and easy to handle. There can be exceptions; but many other breeds are more likely to have flighty, noisy or aggressive birds.

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Suggested Tasks

Look online for videos of animal behaviour. Search for the phrase “Animal Behaviour Videos” or if you wish, add in the name of an animal you are interested in, for example: “Dog Behaviour Videos”.

Observe how they behave.

Consider, do they behave in the same ways as humans?

Can we interpret their emotions from their behaviour and facial expressions?

As we said, a smiling ape is showing aggression.

DESCRIPTIONS OF ANIMAL BEHAVIOUR

Given the problems associated with of attributing human characteristics to animals, animal behaviour has often been described in terms of:

- Patterns of movements - e.g. walking, fornicating
- Effect on the environment - e.g. feeding, hunting

Another way of describing animal behaviour which has been widely used is Lloyd Morgan's canon. Morgan suggested that any behaviour should be explained in terms of basic or lower psychological processes where it is possible to explain it in this way. He considered habits and learning to be lower level processes which were more primitive, whereas reasoning and understanding would be higher level processes. According to Morgan, animals were evolutionarily more primitive than humans and so had more primitive psychological processes. As such, their behaviour can always be described in terms of lower level psychological processes, which avoids the use of anthropomorphic terms.

However, it doesn't always make sense to describe animal behaviour in terms of lower level psychological processes. In fact, there are many examples of advanced animal behaviours which are best described in terms of higher level processes.

FACTORS THAT INFLUENCE BEHAVIOUR

There are many factors that influence behaviour in animals. Within psychology, there have been several debates over the years. One of these is the nature-nurture debate which considered the relative impact of nature (genetics) on behaviour and nurture (environment and upbringing). Some researchers argued that genetics had a greater impact on human and animal behaviour whereas others advocated that the environment was most influential. Today, most animal behaviourists would argue that behaviour is a mixture of the influences of both nature and nurture - that it is more feasible to talk in terms of a behaviour having perhaps a greater or lesser genetic or environmental influence. Some of the different factors that can impact upon the development of behaviour now follow.



Koala: Koalas mainly obtain water through their food intake (primarily eucalyptus leaves). Very rarely you will get to see a koala drinking water because they will generally prefer to stay protected from predators.

Genetics

Genetic information is passed on from generation to generation. We have known for some time that physical characteristics are transmitted to offspring through DNA. Matching pairs of chromosomes found in the nucleus of living cells are formed of long strings of DNA molecules. DNA contains information about how an animal should develop. A section of DNA which contains information about a specific type of development is known as a gene.

There is growing evidence that in addition to the transmission of physical characteristics, genes might also contain information which can influence the behaviour of animals and humans. For instance, a lot of research has recently been carried out into how certain genes can affect humans in terms of obesity and alcoholism. Laboratory studies of animals such as rats, dogs and mice have found behavioural symptoms that resemble those of humans with these conditions.

There is still much debate about how genes affect behaviour. One of the main issues with this debate is confusion about which behaviours may have been inherited and which are most likely learnt. It has also proved difficult to isolate specific genes which influence a specific behaviour fully and inevitably.

For example, although we may be able to isolate a particular gene, or a group of genes, that leads to a certain coat colour in a breed of dog, it is more difficult to say that a certain gene will result in a certain type of behaviour. That said, some behaviours may be more prevalent in particular types of breed. For instance,

whilst some dog breeds may have a tendency towards being more aggressive e.g. German Shepherd (alsation), others breeds are a lot more passive e.g. labrador. Although alsations and labradors are both more intelligent dog breeds, the preferred breed to train as a “seeing-eye” dog would be a labrador due to the lower aggression.



Furthermore, identifying a gene that influences a particular behaviour does not mean that the behaviour is inevitable. For example, let's say we found a gene for shyness, it would not necessarily mean that a person with the gene would automatically be shy. It would mean that in certain environmental conditions e.g. in a confrontational situation such as in a jail the gene could be “turned on” and the person could behave shyly rather than act aggressively which might be observed in the behaviour of some other prisoners. The development of any behaviour, therefore, is due to the complex interactions of factors in the environment and genetics. As the environment changes, so does a human's, or animal's, reaction to it.

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Suggested Tasks

Carry out a search online and look more into the characteristics of different breeds of dogs. For example -

Pointers and English Springer Spaniels are thought to be good dogs to sniff out drugs and narcotics.

The Belgian Malinois is thought to be good for sniffing out explosives and prostate cancer.

Heritability

How strong the influence of genes is on an animal's behaviour is measured by heritability. This is the fraction of variation of a trait amongst individuals in a population. Heritability can be measured from zero to one. The smaller the variation in the population, the greater the value of the fraction will be. So, in a given population of ten dogs, if each dog has a tendency to mark their territory excessively, we would say that there is little variation in their behaviour. This would suggest that there is a greater degree of heritability underlying the behaviour.



Murray Grey is a polled (ie no horns) breed of cattle. Inbreeding polled cattle tends to preserve this desirable characteristic of no horns; but might also create some undesirable characteristics too.

As such, if an animal breeder wishes to breed dogs that are quieter, they could choose dogs where the heritability of barking behaviour has a lower fraction value. This indicates that there is more variation in their behaviour, and the chances are improved that they will be able to breed quieter dogs.

Heritability is therefore an important consideration for breeders of animals who want to select particular characteristics they want to increase in offspring. For example, a horse breeder may want to breed faster horses. A dog breeder may want to breed more intelligent dogs, stronger dogs, or quieter dogs. A cattle breeder may wish to breed cows with a smaller ratio of fat to meat.

It is generally easier to determine the heritability of physical characteristics such as coat colour, texture, or eye colour than it is to determine behaviours, such as intelligence, which is controlled by a large number of genes.

Many, many studies have looked at animals and humans and found heritability for virtually every trait ever studied, but the levels of heritability vary.

In summary, the way an animal behaves is influenced by its genetic makeup, which is a factor that cannot normally be changed. An animal cannot be trained to act in a way completely different than what its genetic blueprint dictates. To understand animal behaviour properly, it is important to understand the basics of genetics.

Phenotypes & Genotypes

When two animals breed their offspring inherit half their genes from each parent. This ensures that there is variation amongst offspring because there are many possible pairings of genes. Furthermore, some genes are dominant and will always be expressed if they are matched with a recessive gene. For instance, brown eye colour is dominant over blue eye colour in humans.

The full range of genetic potential that an organism inherits is called the genotype.

- **Genotype** - the potential inherited characteristics of an organism i.e. the genetic blueprint an animal is born with.



The genotype is the internal code of inheritable information that all living organisms carry. It is the “blueprint” or instructions used for building a living creature. Half of the genes come from the male, and half from the female, so each parent is able to contribute some

genetically controlled characteristics to the offspring. The genotype is fixed throughout the life of the organism. This information can be used to influence breeding characteristics.

However, the environment influences the expression of genes. Factors such as the availability of food and water, nutrition levels, stress, rearing, and so forth play a role in how an organism develops. Therefore, the genotype can develop in different ways within the restrictions of the genotypic information. This expression of genes is what is called the phenotype.

Unlike genotypes, phenotypes are not fixed but are continually changing and evolving in response to ever changing environmental influences. Phenotypes are the outward appearance of organisms.

- **Phenotype** - what an animal looks like i.e. the physical characteristics an animal develops as a result of their genes and their interaction with the environment.

The genes from both the male and female parents hold the critical information that is used to produce the outward physical body of the offspring (the phenotype). For example, a particular group of horses may all be brown (same or similar phenotype) but probably have different genotypes, and therefore will produce foals with some different coat colours.

Organisms with identical genotypes will normally have different phenotypes, even if the phenotype is very similar. For example, identical twins are 100% genetically similar, but they are still