

ENVIRONMENTAL MODIFICATION OF ANIMAL BEHAVIOUR (LPM-609)



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Environmental Modification of Animal Behaviour

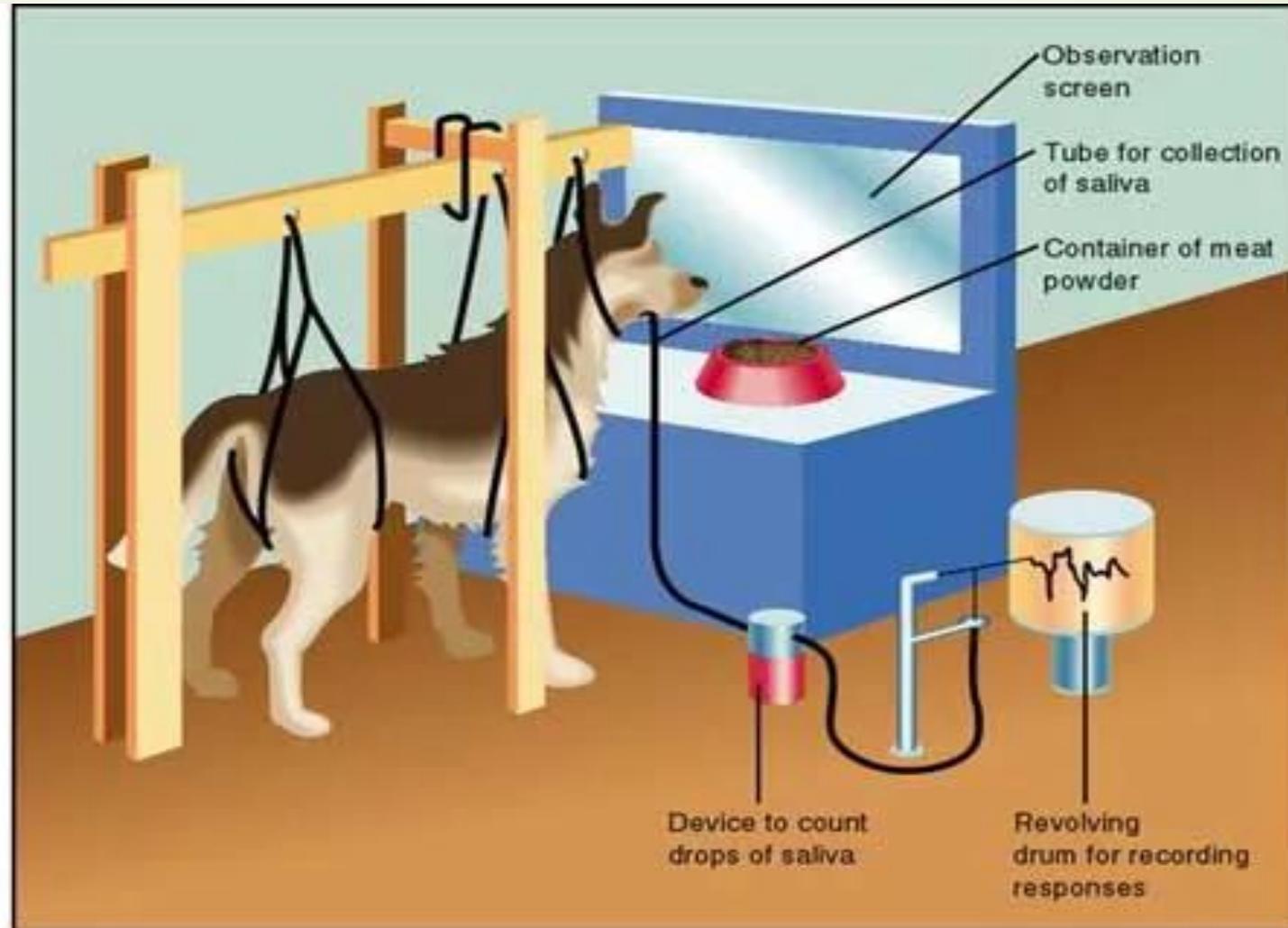
- There is a general trend in evolution towards a greater degree of behavioural adaptability.
- Such adaptability is highly characteristic of most successfully domesticated species.
- It depends primarily on possessing a variety of alternate behaviour patterns and consequent lack of fixed responses to specific stimuli.
- An animal may select the behaviour pattern which has proved successful and repeat it in a similar future situation with the capacity to learn from experience.

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- In vertebrate animals, the capacity for learning appears early in development and continues throughout life.
 - There are two basic methods of studying learning.
 - One is to consider behaviour as an effect of stimulation.
 - In the experiments of Pavlov (1927), the technique is to associate the behaviour response to a primary stimulus with a previously neutral stimulus, so that the behaviour is now produced by a new cause.

Pavlov's Dog

- During the 1890s, Russian physiologist, Ivan Pavlov was researching salivation in dogs in response to being fed.
- He inserted a small test tube into the cheek of each dog to measure saliva when the dogs were fed (with a powder made from meat).
- Pavlov predicted the dogs would salivate in response to the food placed in front of them.
- But he noticed that his dogs would begin to salivate whenever they heard the footsteps of his assistant who was bringing them the food.

- ▶ When Pavlov discovered that any object or event which the dogs learned to associate with food (such as the lab assistant) would trigger the same response.



Pavlovian Conditioning

- Pavlov (1902) started from the idea that there are some things that a dog does not need to learn. For example, dogs don't learn to salivate whenever they see food. This reflex is 'hard-wired' into the dog.
- In behaviorist terms, food is an unconditioned stimulus and salivation is an unconditioned response. (i.e., a stimulus-response connection that required no learning).

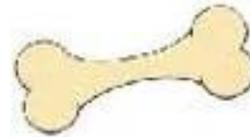
Unconditioned Stimulus (Food) > Unconditioned Response (Salivate)

- So the dog had learned an association between the metronome (Neutral Stimulus) and the food and a new behavior had been learned.
- Because this response was learned (or conditioned), it is called a conditioned response (and also known as a Pavlovian response). The neutral stimulus has become a conditioned stimulus.

Before conditioning

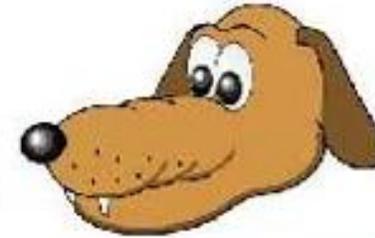
**FOOD
(UCS)**

**SALIVATION
(UCR)**



BELL

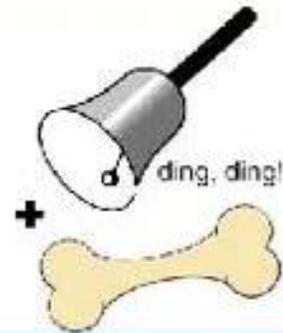
NO RESPONSE



During conditioning

**BELL +
FOOD
(UCS)**

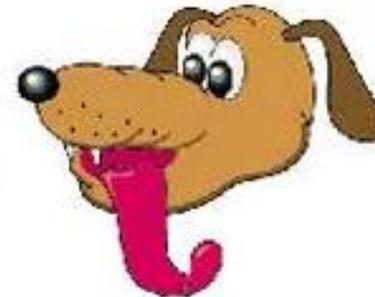
**SALIVATION
(UCR)**



After conditioning

**BELL
(CS)**

**SALIVATION
(CR)**



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- In the method of Skinner (1938), the behaviour is considered a cause which is modified according to the result it produces.
 - i.e. behaviour is modified according to its contingencies.
 - It seems that the same basic neural processes are associated with each, but the latter probably has wider application in the behaviour of animals acting under free situations.
 - These two techniques are respectively called “classical conditioning” and “operant conditioning”.

Developmental Changes in Animal Behaviour

- All vertebrate animals are born in an immature state and at first show patterns of behaviour which are suitable only for early life.
- Many domestic mammals and birds are quite precocious, but animals like sheep, cattle, and chickens do not complete their development of behaviour until much later in life.
- Young animals come into the world with a few well- developed patterns of behaviour, such a pecking in chickens or nursing in mammals.
- But most other behaviour patterns develop under the influence of post-natal environmental stimulation and are greatly affected by later learning (Cruikshank, 1954).

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- In some species, proper development of behaviour patterns depends upon the opportunity for play and social contact with others of their kind.
 - Play behaviour usually consists of immature forms of adult patterns of behaviour.
 - In such species as the monkey, playful behaviour is necessary in order to develop successful adult patterns of sexual behaviour (Mason, 1963).
 - It has the function of helping develop muscular strength through exercise.
 - Closely confined animals never show the muscular development and motor skill developed by those which live under more free conditions.

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- It should be remembered that no behaviour is inherited as such.
 - The only things which can be biologically inherited are the nuclei from the two parental germ cells plus the cytoplasm contained in the egg.
 - Capacity for behaviour develops through the process of growth and is organized by hereditary factors and the process of learning.
 - Behaviour develops and is differentiated under the influence of genetic and environmental factors, neither one of which can act independently.

Genetic Differences in Animal Behaviour

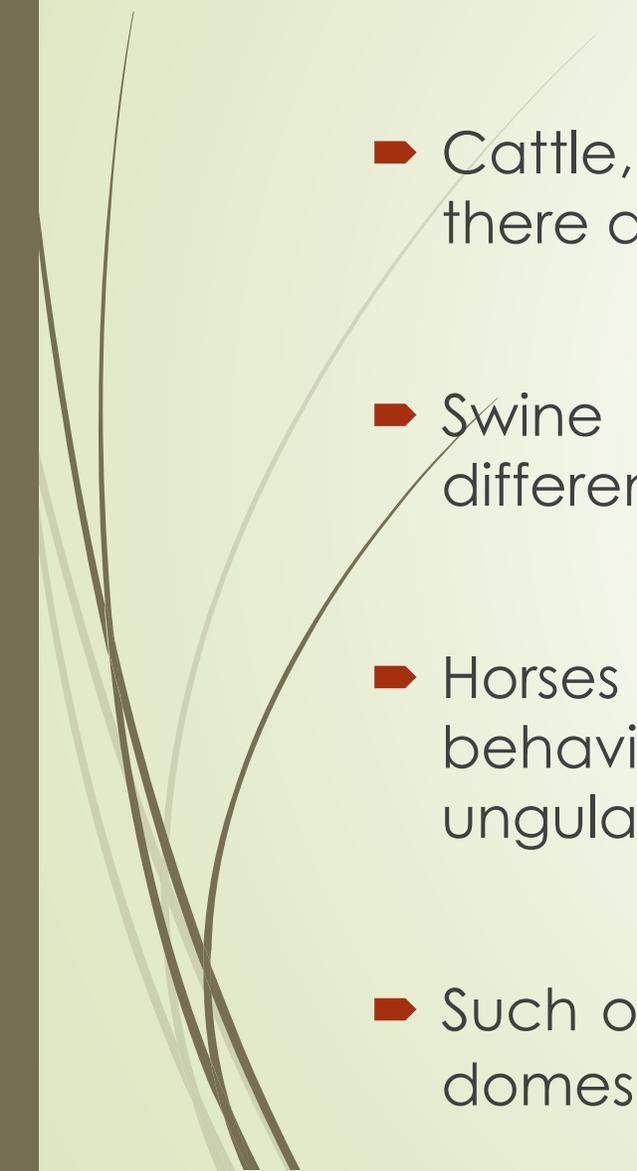
- Since behaviour is concerned with adjustment to changes in environmental conditions, a large part of behaviour variation is caused by differences in environmental stimulation.
- However, even when environmental stimulation is uniform, individuals still react differently from each other.
- Males act differently from females, and various breeds and strains of animals often differ from each other.
- Game cocks are much more aggressive than the roosters of other breeds of chickens.

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- Besides variation between individuals and breeds within a species, there are large differences in behaviour between species which are usually proportional to the relative taxonomic positions of the animals concerned.
 - Birds are very different from mammals and many of these differences are related to their primary methods of adaptation.
 - The structure of the whole class Aves is adapted for flight and this is reflected in their sense organs, body covering of feathers and small size and weight.
 - Their behaviour patterns related to flight is the rapid development of such behaviour.
 - Birds generally develop much more rapidly than mammals and consequently have less time to acquire learned behaviour.

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- Most mammals are terrestrial animals and many more of them are nocturnal in their habits than are birds.
 - Their sense organs tend to emphasize odour as well as vision and the body covering of hair permits much more behaviour involving direct body contact.
 - While visual stimuli are highly important in birds, they are much less so in mammals.

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- The important domestic birds belong to two orders, the Anseriformes and the Galliformes.
 - The Anseriformes includes the family Anatidae (ducks and geese) belonging to related genera. Consequently, their behaviour is relatively similar.
 - On the other hand, two important species of Galliformes (chicken and turkey) belong to two different families and their behaviour is quite different.

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- The common domestic mammals belong to several different orders.
 - and dogs are both **Carnivora**, but belong to separate families and their behaviour is quite dissimilar.
 - Rabbits (**Order Lagomorpha**) are not closely related to other domestic animals.
 - In the **Order Rodentia** there are several domesticated forms. Rats and mice belong to the family **Muridae**, but guinea pigs come from a different family.
 - The behaviour of guinea pigs is distinctly different from that of the more ordinary rodents.

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- The domestic mammals which are currently most important commercially are all members of one order, **Artiodactyla**, the even-toed hoofed animals.
 - Cattle, sheep and goats all belong to one family, the **Bovidae**, and there are many similarities between their behaviour.
 - Swine belong to a different family, the **Suidae**, and have distinctly different behaviour patterns.
 - Horses are classified in a different order, the **Perissodactyla**, and have behaviour patterns strikingly unlike those of the other domestic ungulates.
 - Such original differences in behaviour have continued to evolve under domestication.



THANKS