



# **PSY 313**

# **Comparative Psychology**

## Course Manual

**Uchenna Onuoha**

# PSY 313

## Comparative Psychology

By

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Department of Psychology

University of Ibadan

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## Vice-Chancellor's Message

The Distance Learning Centre is building on a solid tradition of over two decades of service in the provision of External Studies Programme and now Distance Learning Education in Nigeria and beyond. The Distance Learning mode to which we are committed is providing access to many deserving Nigerians in having access to higher education especially those who by the nature of their engagement do not have the luxury of full time education. Recently, it is contributing in no small measure to providing places for teeming Nigerian youths who for one reason or the other could not get admission into the conventional universities.

These course materials have been written by writers specially trained in ODL course delivery. The writers have made great efforts to provide up to date information, knowledge and skills in the different disciplines and ensure that the materials are user-friendly.

In addition to provision of course materials in print and e-format, a lot of Information Technology input has also gone into the deployment of course materials. Most of them can be downloaded from the DLC website and are available in audio format which you can also download into your mobile phones, iPod, MP3 among other devices to allow you listen to the audio study sessions. Some of the study session materials have been scripted and are being broadcast on the university's Diamond Radio FM 101.1, while others have been delivered and captured in audio-visual format in a classroom environment for use by our students. Detailed information on availability and access is available on the website. We will continue in our efforts to provide and review course materials for our courses.

However, for you to take advantage of these formats, you will need to improve on your I.T. skills and develop requisite distance learning Culture. It is well known that, for efficient and effective provision of Distance learning education, availability of appropriate and relevant course materials is a *sine qua non*. So also, is the availability of multiple plat form for the convenience of our students. It is in fulfillment of this, that series of course materials are being written to enable our students study at their own pace and convenience.

It is our hope that you will put these course materials to the best use.



Prof. Isaac Adewole  
Vice-Chancellor

## Foreword

As part of its vision of providing education for “Liberty and Development” for Nigerians and the International Community, the University of Ibadan, Distance Learning Centre has recently embarked on a vigorous repositioning agenda which aimed at embracing a holistic and all encompassing approach to the delivery of its Open Distance Learning (ODL) programmes. Thus we are committed to global best practices in distance learning provision. Apart from providing an efficient administrative and academic support for our students, we are committed to providing educational resource materials for the use of our students. We are convinced that, without an up-to-date, learner-friendly and distance learning compliant course materials, there cannot be any basis to lay claim to being a provider of distance learning education. Indeed, availability of appropriate course materials in multiple formats is the hub of any distance learning provision worldwide.

In view of the above, we are vigorously pursuing as a matter of priority, the provision of credible, learner-friendly and interactive course materials for all our courses. We commissioned the authoring of, and review of course materials to teams of experts and their outputs were subjected to rigorous peer review to ensure standard. The approach not only emphasizes cognitive knowledge, but also skills and humane values which are at the core of education, even in an ICT age.

The development of the materials which is on-going also had input from experienced editors and illustrators who have ensured that they are accurate, current and learner-friendly. They are specially written with distance learners in mind. This is very important because, distance learning involves non-residential students who can often feel isolated from the community of learners.

It is important to note that, for a distance learner to excel there is the need to source and read relevant materials apart from this course material. Therefore, adequate supplementary reading materials as well as other information sources are suggested in the course materials.

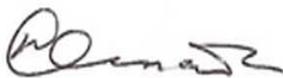
Apart from the responsibility for you to read this course material with others, you are also advised to seek assistance from your course facilitators especially academic advisors during your study even before the interactive session which is by design for revision. Your academic advisors will assist you using convenient technology including Google Hang Out, You Tube, Talk Fusion, etc. but you have to take advantage of these. It is also going to be of immense advantage if you complete assignments as at when due so as to have necessary feedbacks as a guide.

The implication of the above is that, a distance learner has a responsibility to develop requisite distance learning culture which includes diligent and disciplined self-study, seeking available administrative and academic support and acquisition of basic information technology skills. This is why you are encouraged to develop your computer skills by availing yourself the opportunity of training that the Centre’s provide and put these into use.

In conclusion, it is envisaged that the course materials would also be useful for the regular students of tertiary institutions in Nigeria who are faced with a dearth of high quality textbooks. We are therefore, delighted to present these titles to both our distance learning students and the university’s regular students. We are confident that the materials will be an invaluable resource to all.

We would like to thank all our authors, reviewers and production staff for the high quality of work.

Best wishes.



Professor Bayo Okunade  
Director

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# Credits

## Photo Credits

- Birds [ibc.lynxeds.com](http://ibc.lynxeds.com)
- Wolves [filmmakingnaturally.com](http://filmmakingnaturally.com)
- Vultures [www.underwater.org](http://www.underwater.org)
- Ants [www.theguardian.com](http://www.theguardian.com)

# Study Session 1 Introduction to Comparative Psychology

## Introduction

In this study session, you will be introduced to comparative psychology. You will also explore the importance of this branch of psychology. Finally, we will examine the contributions of pioneer psychologists in the field of comparative psychologists.

## Learning Outcomes

When you have studied this session, you should be able to:

- 1.1 outline the essentials of comparative psychology.
- 1.2 discuss the importance of comparative psychology.
- 1.3 discuss the contributions of key people to the field of comparative psychology.

### 1.1 Substance of Comparative Psychology

Psychology as a discipline has many different fields of study, one of which is comparative psychology. **Comparative psychology** is the branch of psychology concerned with the study of living things' behavior. Comparative psychology often utilizes the comparative method to study animal behavior. The comparative method involves comparing the similarities and differences among species to gain an understanding of evolutionary relationships. The comparative method can also be used to compare modern species of animals to ancient species.

The major behavioral patterns among animals studied by comparative psychologists include animal communication, learning, migration, orientation, reproductive behavior, and social behavior.

- Communication is the sharing of information among animals.
- Learning concerns the gaining of knowledge or skill.
- Migration is the travel of large groups of animals.
- Orientation consists of the ways that animals position themselves in relation to light, heat, and other forces.
- Reproductive behavior concerns the mating habits of animals and the ways they care for their young.
- Social behavior includes such group activities as the flocking of birds or the hunting strategies of wolves. All of the above behavioral patterns form the core of comparative psychology which has generated interest and informed numerous research efforts in the field.

### 1.2 Importance of Comparative Psychology

Comparative psychology is an interdisciplinary field that blends psychological and biological approaches to the study of animal and human behavior. As such, it is relevant to many other areas of academic psychology, including developmental psychology, social psychology, individual differences and so on. Knowledge derived from the study of comparative psychology has implication for dealing with practical issues such as animal welfare, the conservation of wild population, and the management of captive populations among others.

In a global environment, knowledge of comparative psychology is important to psychologists, students' of psychology and other disciplines because it helps to broaden our understanding not only of human behavior, but that of animals too. With increasing understanding of animal behavior, we are better placed to appreciate differences and similarities between how man and animals behave. Indeed, studies using animals as samples have led to numerous discoveries about the way human beings are likely to behave under different conditions. Besides the usefulness of comparative psychology in determining differences and similarities between human and animal behaviors, comparative psychology also encompasses the study of differences and similarities in the behavior of animals of different species. For example, comparative psychologists may study how different species of animals such as dogs, birds, elephants and other animals raise their young. The interest could also be the study of the complete behavioral pattern of two or more related species. For instance, the feeding, mating, and other behavioral patterns of two cats may be studied.

#### Blue Box

1. Comparative psychology is the branch of psychology concerned with the study of animal behaviour using comparative method.
2. It is relevant to many other areas of academic psychology, including developmental psychology, social psychology, individual differences and so on.

3. Knowledge derived from the study of comparative psychology has implication for dealing with practical issues such as animal welfare.
4. It helps to broaden our understanding of human and animal behavior.

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## Activity 1.1 | Discussion

---

Allow 25 minutes

On course website, join other class members to discuss the following issue:

Why will you study comparative psychology?

See course calendar for schedule date.

---

## 1.3 Development of Comparative Psychology

Every discipline has its set of pioneers that have made major contributions to the development of the field. Some of the most influential people whose pioneering works have shaped the field of comparative psychology, includes:

- al-Jahiz, a 9th century Afro-Arab scholar who wrote many works on social organization of ants and animal communication and psychology (4).
- Ibn al-Haythan (the 11th century Arabic psychologist), who wrote the first book that details the effects of music on animals (*Treatise on the Influence of Melodies on the Souls of Animal*).
- Charles Darwin whose theory and evolutionary principles explains the factors that set humans apart, such as higher mental, moral and spiritual faculties.
- Douglas Spalding's who was called the first experimental biologist worked mostly with birds - studying instinct, imprinting, and visual and auditory development (7).
- Sir John Lubbock who was credited with first using mazes and puzzle devices to study learning.
- Ivan Petrovich Pavlov (1849-1936) was the first to describe the phenomenon referred to as conditioning in experiments with dogs.
- Irene Pepperberg who is noted for her studies in animal cognition particularly in relation to parrots, one of which is her comparative studies into the cognitive fundamentals of language and communication.
- John Broadus Watson (1878-1952) was an American psychologist who established the psychological school of behaviorism. Using the principles of behaviorism, Watson put the emphasis on external behavior of people and their reactions on given situations, rather than the internal, mental state of those people. In his opinion, the analysis of behaviors and reactions was the only objective method to get insight in the human actions. Further still, Watson vigorously promoted the idea that children had no inborn tendencies, but rather were shaped by their environments.
- Burrhus Frederic Skinner (1904-1990) also an American psychologist who pioneered work on experimental psychology and behaviorism (an approach which seeks to understand behavior entirely in terms of responses to stimuli).

## Summary

In this Study Session you learnt:

1. the meaning and essential attributes of comparative psychology.
2. the importance of this branch of psychology to knowledge development, which includes:
  - a) broadening understanding of human and animal behaviour, and
  - b) practical solution on animal welfare.
3. the contributions of pioneer psychologists.

## Self-Assessment Questions (SAQs) for Study Session 1

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

### SAQ 1.1 (tests Learning Outcome 1.1)

Define comparative psychology?

### SAQ 1.2 (tests Learning Outcome 1.2)

What will you ascribe as the most important value of comparative psychology?

**SAQ 1.3 (tests Learning Outcome 1.3)**

Identify the pioneers who achieved the following contributions?

<b>Pioneers</b>	<b>Contributions</b>
A. _____	wrote the first book that details the effects of music on animals.
B. _____	the first psychologist to describe the phenomenon referred to as conditioning in experiments with dogs.
C. _____	the first person using mazes and puzzle devices to study learning.
D. _____	psychologist who introduced the approach which seeks to understand behavior entirely in terms of responses to stimuli.

# Study Session 2 Animal Communication

## Introduction

In this Study Session, we will be examining communication in the animal world. Specifically, we will explore forms of communication and the functions that communication serves in the animal world.

## Learning Outcomes

- 2.1 explain animal communication.
- 2.2 highlight the functions of animal communication.
- 2.3 explain different ways by which animals communicate with members of their specie in the animal world.

## 2.1 Zoosemiotics

The study of animal communication is known as zoosemiotics. Animal communication refers to any behavioral pattern made by one animal which elicits or produces a change on the behavior of another animal, either immediately or at a later date.

## 2.2 Functions of Animal Communication

- a) To protect its territory: some species of animals have special ways they communicate which indicates that another animal is infringing on their territory.
- b) For Courtship: in order to attract a mate, or to sustain the attention of a member of the opposite sex, some species of animals often need to display some body parts, maintain a particular posture or give out specie-specific scents. Examples of animals that display spectacular courtship behaviors include manikins, geese and penguins.
- c) Calls for food: many animals make food calls that attract a mate, or offspring, or members of a social group to a food source. When parents are feeding offspring, the offspring often display begging responses which communicates to the parent that it's hungry and needs food. Calls for food as a form of communication is common among Altricial songbirds and honeybees.
- d) Alarm call: alarm calls are signals that are made when a threat is perceived from another animal considered a predator. This alarm call serves the purpose of notifying or calling the attention of other members of a social group to the impending threat; thereby allowing them take protective positions for their safety. The safety steps undertaken may require that the animals run for cover, become immobile or gather together into a group to reduce the risk of attack.

## 2.3 Ways by which Animal Communicates

There are different ways by which animals, like humans communicate with other animals in their environment, but we would consider three of them in this section. These are:

- i. bird song,
- ii. olfactory communication, and
- iii. display of distinct body parts.

### 2.3.1 Bird Song



Bird song is the best known and commonest form of vocal communication in the animal kingdom. In many species of animals, the male is the one that communicates this way mostly. Also in some other species, both male and females sing responsively in alternation to get the attention of other birds or to pass information to them. Here, the male might be the one to send the first signal by singing, followed by the female, or it could be in the reverse order. This form of two-way communication that occurs in alternation is known as duetting. Variants to bird songs include warning signs made by certain species of monkeys, territorial calls common among gibbons and mating calls made by frogs.

### 2.3.2 Olfactory Communication

This form of communication is common among some animals and involves observing scents for familiarity, mating or for some other purpose. Many mammals like elephants, cats and gorillas have glands that give out smells or odors that leave long-lasting impression such that when it is picked up by members of the species, it communicates certain information to the receiver. Often the scented substance is introduced into urine or sweat, on the ground or in animal feces. This form of communication is typical of golden hamster and cats have scent glands on their flanks, and deposit scent by rubbing their sides against objects; cats also have scent glands on their foreheads. Bees carry with them a pouch of material from the hive which they release as they reenter, the smell of which indicates if they are a part of the hive and grants their safe entry. It is important however to note that these peculiar smells are generated when the animals behave in specific ways. In other words, not every behavior of a scent emitting animal would generate scent.

### 2.3.3 Display of Distinct Body Parts

Some animals pass information to other animals by displaying certain distinct body parts. For instance, pecking is a means by which the mother Gull delivers food to her chicks. As a result, young Gull chicks are known to peck at everything that is brightly colored (mainly red, yellow, white or shining, high-contrast objects) in search of food, but the parent's beak is the only such object that will constantly yield food as a reward when pecked at.

## Summary

We have examined animal communication. In doing so, we highlighted the functions of animal communication and the various ways by which they communicate.

## Self-Assessment Questions (SAQs) for Study Session 2

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

### SAQ 2.1 (tests Learning Outcome 2.1)

Define zoosemiotics?

### SAQ 2.2 (tests Learning Outcome 2.2)

State at least three functions of animal communication?

### SAQ 2.3 (tests Learning Outcome 2.3)

Point out at least two ways you know that animals use to communicate.

## Study Session 3 Animal Social Behaviour

### Introduction

In the previous Study Session, we examined animal communication. In this Study Session, we will explore social behaviour of animals.

### Learning Outcome

When you have studied this session, you should be able to:

3.1 explain social behavior of animals.

### 3.1 Social Behavior

All animals, irrespective of their size and other characteristics relate to other members of their species. In microscopic organisms like amoeba, the social relationship occurs only during the short time it takes it to split into two. In other species, such as the social insects, social relationship is so necessary these insects cannot survive as individuals on their own. This is true also of humans, who are dependent on others until they reach maturity.

**Social behavior of animals** is the sum of inter-individual relationships among the members of that population (a population of hyenas, lions, rhinoceros, penguins and so on). It is not the same thing as the generic meaning of behavior which is the sum of all motor responses of an organism to all the external and internal stimuli acting upon it. The various groups of animals have peculiar social behaviors which can be used to distinguish between the groups. Behaviors involved in interactions among species are generally classified as agonistic behaviors, predator-prey behaviors and reproductive behaviors. These behaviors result in individual distance, also known as the "kick-kiss" distance.

#### Note

Social organization of some kind is common to all animals. However, the type of organization varies with the nervous system of the species.

Let us now consider the social behaviour of some animal species:

#### Wolves



Wolves are social animals and live in closely-knit **packs**. A typical wolf pack is a group consisting of a pair of adult wolves and their offspring of all ages. Wolf packs are usually organized to serve or perform specific functions for the group to which they belong, and the function can vary from hunting to rearing the young. The adult population in a wolf pack is not made up solely of members of one sex, but consists of both male and female wolves arranged in defined ways. The male and female leaders in the pack are known as the alpha pair. The alpha pair has the sole right to mate and reproduce in the group. The number of individual members in a wolf pack is determined by the abundance of prey it can lay hold on within its territory with some having as many as 30 wolves. Wolverines are strong and courageous fighters and are remarkably cunning.

#### Chimpanzees



Chimpanzees spend considerable time both in trees and on the ground. While on trees, chimpanzees make use of both hands and feet to move, or they swing by their arms from the branches of one tree to the branches of another. When chimpanzees want to go long distances, they do not travel on trees but instead move on ground. Chimpanzees can walk upright, but they more often lean on the knuckles of their hands and walk on all fours. Chimpanzees are active during the day searching for food, playing with their young and mating. At night they usually sleep in the trees in nests that they make out of branches and leaves.

Monkey behavior ranges from the friendly to the aggressive towards humans. Baboons are boisterous, cunning, and often fierce. They have been known to raid human settlements and sometimes attack humans.

### **Vultures**



Most vultures eat many different foods, including dead meat, garbage, and the waste of other animals. Vultures can remain in flight for long hours, soaring gracefully on long, broad wings. When one bird finds a dead or dying animal, others fly in from long distances away to feed on the animal as soon as it drops dead. When feeding, vultures obey a strict social order based on body size and strength of beak. This is the reason why vultures will always allow large mammals at the scene to eat first before they start eating.

### **Marsupials**

The social behavior of marsupials is thought to be generally less complex when compared to those of other placental mammals. Marsupials do not vocalize to the same extent as other mammals, and in most instances they exhibit limited levels of social organization. Many marsupials are solitary animals during their adult lives, and

their social interaction is primarily confined to temporary pair bonds. Among the most socially inclined marsupials are the whiptail wallabies, which form groups, called mobs, of 30 or more individuals that roam and feed together. Observations of animal social behavior however indicate that even the social structure of the whiptail wallabies is far less intricate than those of the placental mammals.

### Ants



The most distinguishing trait of ant behavior is sociability. Ants do not act individually they behave according to the needs of the colony in roles dictated by the caste into which they are born. The major social unit is the colony, which forms a nest.

### Summary

In this Study Session, we explained the social behaviour of selected animals. These animals include: ants, vultures, chimpanzees and wolves.

### Self-Assessment Questions (SAQs) for Study Session 3

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

#### SAQ 3.1 (tests Learning Outcome 3.1)

Describe how any animal specie socialize?

# Study Session 4 Animal Migration Behavior

## Introduction

In this Study Session, we will explore animal migration behaviour. We will also look at how animal adapt during migration; and the various types of animal migration.

## Learning Outcomes

When you have studied this session, you should be able to:

- 4.1 discuss the rationales behind animal migration.
- 4.2 explain how animal adapt during migration.
- 4.3 explain types of migratory behaviors common to animals.

## 4.1 Why Animals Migrate

Animals migrate for many reasons but the most common one has to do with the need to take advantage of food, shelter, and water that vary with seasons, or life stage. Climatic studies have shown that the availability of food and water can vary throughout the year. For instance, the lack of insects and leaves in the winter in Europe and other temperate regions of the earth lead to reduction in food supply during winter for most animals. Some environments have a rainy and a dry season that are very different with more rain at one time and low rain at another. Similarly, changes in temperatures between the seasons which makes some areas getting very cold or very hot motivates some species of animals to migrate to more clement regions. Sometimes, migration may be embarked upon for safety reasons. In this case, migration is not about getting food but about staying safe. Perceiving that their young may be exposed to predators, some animal species go to special breeding grounds to keep their young safe when they are especially vulnerable. During winter in temperate regions, deep snow make animals come to the surface of the water to reduce cold, making them more visible and easier to catch by predators.

## 4.2 Adaptations for Migration

Migratory animals that travel long distances have special adaptations to help them get to there destinations. Birds, for instance have wings that allow them to fly long distances, their bodies are especially light (they have hollow bones) allowing them to stay high in the air, and they don't have unnecessary weight to carry around. Geese gather themselves and form a "V" shape, an arrangement that is said to decrease the wind drag on all the birds along both sides. Also, birds add on extra fat stores to give them enough energy for long flights north and south, because they do not eat during the migration. Similarly, whales stock up well on food in the northern seas before heading south for the winter, because they don't eat on the way. Whereas birds depend on their wings for flight, land animals must rely on their legs and feet to get them where they need to go as they migrate from one region to another. The migration of Wildebeest and zebra between Kenya and Tanzania at certain periods of the year is said to be the longest and largest migration in the world.

## 4.3 Types of Migration

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### Activity 4.1 | Reading

---

*Allow 25 minutes*

#### Introduction

Human beings have been noted to move from one part of the globe to the other, or within the same geographical location (e.g. within a country) either to return after some time or never to return again in some cases. This type of movement common among man for the purpose of meeting certain objectives is known as migration (emigration-move into another country or immigration-move out of a country). Similarly too, some type of movement has been observed among animals and this movement from one region to another occurs at certain periods of the year.

#### Task

1. Study the article on "Types of Migration Behaviour", [linked here \(Appendix 1\)](#).
2. Highlight the factors that inform animal migration.
3. Which animal travels farthest?

#### Discussion

The article informed that migration is popular among animals that can travel across long and far distances. Animal migration may occur due to the following reasons:

- i. changes in seasons
- ii. changes in temperature
- iii. altitude
- iv. reproduction

Generally, birds are known to migrate more than other animals as some species of birds can travel between continents at certain periods of the year.

---

## Summary

Thus far, we have:

- discussed the reasons for animal migration;
- explained how animal adapt during migration; and
- explored types of migratory behaviors common to animals.

## Self-Assessment Questions (SAQs) for Study Session 4

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

### **SAQ 4.1 (tests Learning Outcome 4.1)**

What is the rationale behind migration?

### **SAQ 4.2 (tests Learning Outcome 4.2)**

Why is animal migration successful?

### **SAQ 4.3 (tests Learning Outcome 4.3)**

Mention five types of animal migration known to you.

# Study Session 5 Animal Learning I: Habituation

## Introduction

In this Study Session, we will consider a form of learning known as habituation, and also see how it is used by animal trainers to train dogs.

## Learning Outcomes

When you have studied this session, you should be able to:

- 5.1 define learning
- 5.2 define habituation.
- 5.3 point out the importance of habituation.
- 5.4 highlight the effectiveness of habituation.
- 5.5 point out spontaneous recovery.

## 5.1 Learning

**Learning** is a characteristic feature of living beings, animals included. The most popular definition describes learning as a more or less permanent change in the behavior of an organism as a result of interaction with the environment. This definition distinguishes learning-based behavior change (which is a deliberate and conscious effort to imbibe something new) from short-term behavior changes such as sensitization, fatigue, and sensory adaptation. Consequently, only changes that have long lasting effect and are a result of deliberate effort can be referred to as learning.

## 5.2 Habituation

**Habituation** is an extremely simple form of learning in which an animal, after exposure to a stimulus, stops responding to subsequent exposures to the stimulus. That is, habituation describes a type of learning in which there is a gradual decrease in responsiveness to a stimulus as a result of repeated exposure to that stimulus. This happens as sensory systems in the brain stop sending signals to the brain in response to a continuously present or frequently repeated stimulus (Cohen et al, 1997). For example, the first time a dog hears a door slam it may startle in response to the slam 'sound'. However, when it hears the same slam over and over again, it will gradually startle less and less until, finally, it exhibits little or no startling response to the sound. The dog is said to have habituated (become "used") to the sound from the point when it no longer startles to the door slam.

## 5.3 Importance of Habituation

Habituation is considered very important, particularly because it enables animals to filter the large amounts of information received from the surrounding environment. Animals, like humans are exposed to a large amount of stimuli daily as they go about their daily activities in their environment. But not all of these stimuli are important to the survival of the organism; therefore it becomes necessary that the animal should discriminate between stimuli in their order of importance so that it does not expend energy in an attempt to get used to all stimuli. By habituating to less important signals, an animal can focus its attention on the most important features of its environment which has direct relevance on its survival. Viewed in this sense, habituation may be considered adaptive (because it allows animals to save their attention for more important stimuli in the environment). A good example of this is seen among species that rely on alarm calls to convey information about the presence of predators within their territory. After a while, the animals stop giving alarm calls when they become familiar with other species in their environment that turn out not to be predators. In this case, habituation is an important component of "not crying wolf" when non-threatening animals come close.

Humans have also habituated to a number of stimuli in the environment. For instance, people living near military barracks have got used to gun shot sounds and no longer get frightened when they hear gun shots unlike individuals who live far from barracks, who are easily frightened at gun shot sounds. Dog trainers also make use of the principles of habituation to train dogs to increase their attention span to important components of the environment during training sessions.

## 5.4 Is Habituation Effective?

People keep wondering whether habituation as a form of learning is actually effective. But when properly applied, habituation has been shown to improve effectiveness particularly among dogs during training sessions. Dogs, like other animals are normally frightened of, or interested in, things that are new to them. Detector dogs, for instance, are expected to carry out their duties in environments that feature very distracting and sometimes

intense stimuli, such as loud explosions. Through habituation, a working dog can be taught to learn to respond minimally to irrelevant stimuli and pay attention to the task at hand. For example, a detection dog trained in completely quiet, secluded environment devoid of human activity may initially have difficulty concentrating on a search task when commanded to evacuate a building with people inside it (e.g. a classroom full of students). However, once the dog is exposed to performing search tasks in environments full of people, its ability to concentrate on specific tasks will improve even in the presence of people. That is, at this time, the dog is no longer distracted by the presence of people in the environment and is able to do the task better.

Let us consider the following facts about habituation. Firstly, habituation as a form of learning proceeds at **different rates** in animals, but it is most effective and rapid with stimuli that are mild or moderate. However, it can be very difficult to produce habituation to intense or frightening stimuli. A fearful dog exposed repeatedly to a very intense stimulus, such as a running car engine at close range, is likely to respond more intensely to this type of stimulus in the future instead of less intensely.

Secondly, habituation is most efficient when the *stimulus exposures and training sessions are well separated* in time. For example, a dog habituates more easily to gunshots when they are spaced out at intervals of 15 or 20 seconds, and when the training sessions are separated by 24 hours. The opposite procedure, which entails exposing the dog to rapid series of gunshots several times a day, may lead to increased fear of the noise.

Thirdly, habituation can be accelerated by pairing a strong pleasant stimulus with another stimulus such as fear-inducing stimulus. To again use the previous example, if the dog is frightened of a running car engine, its fear can be offset by presenting it with a strong pleasant stimulus like food. This procedure is called **counter-conditioning**, and should be combined with the use of hierarchies of intensity. This is because, if the dog is very afraid of the car engine, it will ignore the food when it is close to the engine- (because it will be too afraid to eat). Therefore counter-conditioning is conducted at distances progressively closer and closer to the engine, beginning initially at a distance sufficient enough to allow the dog's anxiety to be easily offset by its pleasure at being presented with food. At each stage of the hierarchy (i.e. distance from the car engine), it is essential that the trainer uses the dog's behavior as the measure of when to proceed to the next stage, so that counter-conditioning proceeds at a pace suited to the individual dog.

## 5.5 Spontaneous Recovery

That an animal has become habituated to a particular stimulus does not mean that it can no longer respond to a sudden encounter to the same stimulus in the future. Fear responses for instance, are very durable and persistent and can reemerge even after extensive habituation has taken place. This is because habituation includes certain short-term processes that tend to "wear off" after a few minutes or hours, and it is normal for a habituated response to re-appear to some extent between training sessions. Thus, a dog may exhibit no fear of a stimulus by the end of one day's training session, yet show recovered fear at the beginning of the next session. This phenomenon is called **spontaneous recovery**. For example, a dog habituated to a loud noise such as that from a blender, may display some fear the next time it encounters the blender. It is important to understand that even when habituation and counter-conditioning are correctly applied, the fear response will often re-emerge. However, from session to session there should be less and less spontaneous recovery of the fear response.

At this point, it is important to state that habituation may actually decrease rather than increase an organism's effectiveness, because effective performance depends upon a certain level of interest in, and responsiveness to, environmental stimuli. A dog that is relatively new to detection work, for example, may deliver very intensive and focused search behavior because it is stimulated and excited by the new learning situation. But after more experience, the dog may become sluggish and appear bored from work overload or from performing routine job. To prevent this from happening, it is advisable that varieties be introduced into the dog's daily routine. To achieve this, a detector dog should be trained in as many different locations as possible, and a variety of different reward objects and games should be used as re-inforcers.

### Blue Box

Learning is a more or less permanent change in the behavior of an organism as a result of interaction with the environment.

Habituation is a form of learning in which an animal, after exposure to a stimulus, stops responding to subsequent exposures to the stimulus.

Spontaneous recovery is the reappearance of a response (a Conditioned Response) that had been extinguished. The recovery can occur after a period of non-exposure to the Conditioned Stimulus. It is called spontaneous because the response seems to reappear out of nowhere.

## Summary

In this Study Session, we discussed the concept of learning. We went further to examine the importance and effectiveness habituation, a form of learning in which an animal, after exposure to a stimulus, stops responding to subsequent exposures to the stimulus. We closed the session with an exploration of spontaneous recovery.

## Self-Assessment Questions (SAQs) for Study Session 5

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

### SAQ 5.1 (tests Learning Outcomes 5.1 and 5.2 and 5.5)

Define the following terms:

- learning
- habituation.
- Spontaneous recovery

### SAQ 5.2 (tests Learning Outcome 5.3 and 5.4)

Highlight the importance and effectiveness of habituation.

# Study Session 6 Animal Learning II: Classical and Instrumental Conditioning

## Introduction

We commenced exploration of learning in the previous Study Session; specifically, we focused on habituation. We will go further on our study by examining another form of learning described as classical conditioning.

## Learning Outcome

When you have studied this session, you should be able to:

6.1 distinguish classical conditioning from instrumental conditioning.

## 6.1 Classical Conditioning

**Classical conditioning** is the learning of emotional and reflexive responses through the formation of mental associations between stimuli. For example, a dog can learn fear of a veterinary clinic in the following way: If the dog has never before been in the clinic, the stimuli of the clinic (such as its look, smell, and sound) should be neutral or meaningless. However, after the dog is restrained by technicians and injected with a needle, it may associate the look, smell, and sound of the vet clinic with physical restraint and the pain of the injection, so that the next time it is taken in for a procedure the clinic stimuli are no longer neutral because they now acquire the power of eliciting fear in the dog.

In classical conditioning (also called Pavlovian conditioning), animals learn a relationship between two events or stimuli. One of these stimuli is a "neutral" or unimportant stimulus that the animal would normally pay little attention to. This stimulus is called the *conditioned stimulus*, or CS, because it can generate strong behavior only as a result of conditioning. The other stimulus is a biologically important stimulus that an animal naturally pays a lot of attention to (e.g. food). This stimulus is called the unconditioned stimulus, or US, because it can generate strong behavioral responses without any conditioning.

### 6.1.1 The structure of classical conditioning:

#### Before conditioning

Stimulus:

CS (bell)

US (food)

Response: Ear-twitch, interest, head-turn. UR (salivation)

#### After conditioning

Stimulus:

CS (bell)

US (food)

Response: CR (salivation)

In the classical example, the Russian scientist Ivan Pavlov taught dogs to salivate in response to the ringing of a bell. Pavlov did this by repeatedly pairing a bell (CS) and some food (US), presenting them close together in time. A naive dog normally responds to the ringing of a small bell by merely twitching its ears or looking towards the noise. However, a piece of food can cause the dog to show a great deal of strong behavior like excitement, salivation, digging and pawing, chewing and eating. This very strong behavior caused by exposure to a US is called the unconditioned response, or UR. Through classical conditioning, the CS and the US become associated in the dog's "mind", so that behavior (unconditioned response or UR), that is naturally triggered by the US (e.g. salivation, excitement) comes to be triggered to some degree by the CS also. When a CS develops the ability to trigger behavior that is normally caused by a US, this learned response is called the conditioned response, or CR. In Pavlov's experiment, the dog eventually learned that the bell predicted food, and began to salivate in response to the bell (CR) only.

Not everything an animal learns through classical conditioning is desirable. For instance, if a harsh correction is given the first time a chain choke collar is placed on a working dog, it will probably show inhibition and anxiety the next time a chain collar is placed on its neck. This type of undesirable classically-conditioned responses can be weakened or even abolished by presenting the CS repeatedly without pairing it with the US, causing the CR to gradually decrease in strength.

This process of extinction is just like habituation, except that in habituation an **unlearned** response is gradually abolished, whereas in extinction a **learned** response is gradually abolished. For example, suppose a dog has been

trained to become aggressive when it hears gunfire (by association of the sound of gunshots with the opportunity to bite), but in its new job as a detection dog this response is undesirable. Here, a previously trained response has become a behavior problem. The remedy is not simple, but a first step is to produce some extinction of the aggressive response by putting the dog in a neutral situation and firing a gun repeatedly until the animal's arousal response to the gun decreases. It is important to state that extinguishing a learned behavior does not mean that it has been unlearned or wiped out, even though the behavior may no longer be expressed. Learning can produce permanent changes in the brain that are not reversed by extinction. Thus, a behavior thought to be extinct may suddenly reappear, especially with a change in the context (environment) of training.

## 6.2 Instrumental Conditioning

Instrumental conditioning is another method by which animals learn. It is the learning process through which an animal's behavior is changed by the consequences, or results, of behavior. For example, if a puppy approaches and sniffs a cat, and the cat spits and scratches the puppy's nose, the puppy is less likely to approach the next cat it sees. The behavior, (approaching a cat), has been modified by its consequence, (a painful experience). This is an example of punishment, a consequence which is likely to reduce approach behavior of the dog to cats in the future. A contrasting example goes as follows: if a dog chews at the door of its wooden crate house and the crate bursts open, then the dog is more likely to chew at the crate in the future. The behavior, crate chewing, has been modified by its consequence, freedom. This is an example of reward, also called reinforcement. In both examples of instrumental learning above, an association is formed between **a behavior and a stimulus**, and this is a central distinction between instrumental conditioning and classical conditioning. Classical conditioning involves formation of an **association between two stimuli**. Instrumental conditioning procedures emphasize formation of a response-stimulus association, for example between the act of sitting and some pleasant stimulus like a piece of food.

## Summary

### Self-Assessment Questions (SAQs) for Study Session 6

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

#### SAQ 6.1 (tests Learning Outcome 6.1)

Distinguish classical conditioning from instrumental conditioning.

# Study Session 7 Animal Cognition

## Introduction

### Learning Outcome

When you have studied this session, you should be able to:

7.1 point out cognitive processes in animal species.

### 7.1 Areas of Study in Animal Cognition

Given the broad program of animal cognition, of looking for the animal analogs of human cognitive processes, the areas of study in animal cognition follow more or less from those in human cognitive psychology. However, progress in the different areas has been variable. Among the fields of interest are:

#### 7.1.1 Attention

Animal research has focused on animals' ability to distribute attention between different aspects of a stimulus, and on visual search. As in humans, it appears that sharing attention between stimulus features reduces the capacity to detect any one of them even in animals, though there are some ecologically relevant visual search tasks at which particular species show remarkable abilities. Pigeons for instance, have been shown to have an extraordinary capacity to pick out grain from substrate.

#### 7.1.2 Categorization

The pioneering research by Richard Herrnstein generated interest that has led to significant amount of research on birds' ability to discriminate between categories of stimuli. The result of the research on the ability of birds to categorize objects shows that birds are quick to learn this kind of task easily, and to transfer correct responses readily to new instances of the categories (some species of birds can differentiate between grain size).

#### 7.1.3 Memory

The categories that have been developed and used to analyze human memory including short term and long term have equally been applied in the study of animal memory. Striking similarities have been found between human short term memory and that of monkeys. However most progress has been made in the analysis of spatial memory, partly in relation to studies of the physiological basis of spatial memory and the role of the hippocampus, and partly in relation to scatter-hoarder animals (e.g. Clark's nutcracker, and certain squirrels) whose ecological niches require them to remember the locations of thousands of caches, often following radical changes in the environment.

#### 7.1.4 Tool and Weapon Use

Some species of birds, such as the woodpecker finch commonly found in the Galapagos Islands have been discovered to use tools as an essential part of their foraging behavior. Further, it is known that many a times, these behaviors are quite inflexible, thereby meaning that it cannot be used effectively in new situations. However, other animal species are now known to be capable of more flexible tool use. A well known example is the observation made by Jane Goodall when she reportedly saw chimpanzees engaged in what may be referred to as "fishing" for termites in their natural habitat. In addition, captive great apes have been noted to use tools effectively in their search for food and in other activities, just as several species of corvids have been successfully trained to use tools in controlled experiments, or use bread crumbs for bait-fishing. Recent research finding show that chimpanzees in the fongoli savannah sharpen sticks to use as spears when hunting. Besides humans, chimpanzees are the only animal species with documentary evidence of systematic use of weapons.

#### 7.1.5 Reasoning and Problem Solving

Closely related to tool use in animals is the study of reasoning and problem solving ability. It is clear that animals of quite a range of species are capable of solving a range of problems that are argued to involve abstract reasoning. Modern research has tended to show that the performances of Köhler's chimpanzees, who could achieve spontaneous solutions to problems without training, were by no means unique to that species, and that apparently similar behavior can be found in animals usually thought of as much less intelligent, if appropriate training is given. Studies indicate that causal reasoning has been observed in New Caledonian crows.

### 7.1.6 Mathematics

Animals also show arithmetic ability to some extent as some animal species are noted to have the ability to distinguish between different amounts and to perform rudimentary counting. There is some research evidence showing that elephants are capable of performing simple arithmetic tasks and rhesus monkeys can count. Interestingly too, young chimpanzees have known outperform human college students in tasks requiring remembering numbers. Also, ants are able to use quantitative values and transmit this information to other ants. Ants of several species are able to estimate quite precisely numbers of encounters with members of other colonies on their feeding territories.

### 7.1.7 Consciousness

The sense in which animals can be said to have consciousness or a self-concept has been hotly debated in the scientific community. The best known research technique in this area is the mirror test devised by Gordon Gallup. In the mirror-test technique, an animal's skin is marked in some way while it is asleep or sedated, and when it awakens it is allowed to see its reflection in a mirror. The animal's response after it views itself in the mirror is used to arrive at conclusions on consciousness and self-concept. If the animal spontaneously directs grooming behavior towards the mark that was made on its skin that is taken as an indication that it is aware of itself. Self-awareness, by this criterion, has been reported for chimpanzees and also for some other great apes, like the European magpie, and elephants. The mirror test has however attracted controversy among some researchers because it is entirely focused on vision, the primary sense in humans, while other species rely more heavily on other senses such as the olfactory sense as in dogs.

## Summary

In this Study Session, we examined cognitive abilities in animals. We also discussed type of cognitive abilities alongside areas of research studies.

## Self-Assessment Questions (SAQs) for Study Session 7

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

### SAQ 7.1 (tests Learning Outcome 7.1)

Highlight at least five areas of cognitive process in animal species.

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## Appendix 1: Types of Migration Behaviour

Different migration behaviors have been identified among animals, and these include the following:

### 1) **Seasonal migration**

This is the type of migration that occurs mainly as a result of changes in seasons. When the weather condition changes and is no longer favorable, many animal species tend to move to places where their survival is guaranteed. Most migration behaviors are seasonal.

### 2) **Latitudinal migration**

This type of migration involves the movement of animals from region to the other as a result of changes in temperature. The typical example of an animal that exhibits latitudinal migration is the geese that migrates southward during the winter to return when winter is over. In the northern hemisphere, the winters are colder as you move north and warmer as you move south. On the other hand, summers in the north can be rich in food, especially in the far north where summers are short, but the days are very long. By moving from north to south and back to north again, geese experience changes in climatic conditions and remain in the location that offers the most suitable condition, only to move again from there once the climate is no longer favorable.

### 3) **Altitudinal migration**

When animals change position by moving from higher altitudes to lower ones, they are said to engage in altitudinal migration. Altitudinal migration describes movement of animals up and down major land features such as mountains, valleys and so on. For example, while food may be plentiful in alpine meadows in summer, the winters will be colder and have more snow as you move higher up. Many animals take advantage of the summers by moving to higher altitudes, and then move to lower more moderate elevations during the winter. Dall sheep, for instance, are seasonal, altitudinal migrants that spend summers near the top of mountain ranges and then winter at lower elevations where there is less snow and food easier to find.

### 4) **Reproductive migration**

Some animals change locations when they want to bear their young. This type of migration is known as reproductive migration. A mother crocodile or wilder beast may migrate from one area to the other to bear its young because the new area offers better security and protection from predators for the young. The movement can also be due to the availability of good shelter for the young. Further more, safety may also mean the presence of conducive habitat suitable for the proper development of the young at this time than when it is older. A typical example of a reproductive migrant is Salmon. Salmon are reproductive migrants that start their lives in freshwater streams, move to the open ocean for their adult lives, then return to their home stream to lay eggs.

### 5) **Nomadic migration**

When animals move from one location to the other, sometimes from a known location to an unknown one, they are said to engage in nomadic migration. Because this type of movement is not restricted to known areas only, it is sometimes referred to as wandering behavior.

### 6) **Removal migration**

When animals move to a place and do not return back to their initial home, this is referred to as removal migration. Removal migration may occur because resources are no longer available, or have become scarce. For instance, when resources such as food, water or shelter become depleted or scarce in a particular area, animals living in that area will migrate to other places. Environmental changes such as forest fire, flooding, invasive plant species or human development may precipitate removal migration also. Another cause of removal migration is over population. This happens when the resources have not changed, but the animal population in a place gets too big necessitating that many of them leave to find food, water and shelter elsewhere. Locusts are a good example of insects that engage in large scale removal migration.

### 7) **Partial migration**

The most common type of migration among animals is partial migration. Partial migrant means that some, but not all, members of a species move away from their breeding grounds during the non-breeding season. Species like Red-tailed Hawk, Herring Gull, and Golden Eagles are partial migrants over much of their North American range.

### 8) **Complete migration**

The movement of practically all members of specie (birds or other animals) from one geographical area to another during non-breeding season is known as complete migration. The migration is complete because all members are involved in the movement. Researchers have observed that many North American birds are complete migrants. Complete migrants travel incredible distances, sometimes more than 15,000 miles (25,000 kilometers) per year. The wintering areas for most complete North American migrants are South and Central America, the Caribbean basin, and the southern most United States. Arctic terns are complete migrants that spend all year in summer by alternating sub-polar regions in the northern and southern hemispheres.

## Notes on the Self-Assessment Questions (SAQs) for Study Session 1

**SAQ 1.1** – Comparative psychology is the study of similarities and differences in behavioral organization among living beings, from bacteria to plants to humans. The discipline pays particular attention to the psychological nature of human beings in comparison with other animals.

**SAQ 1.2** – What can be easily ascribed as a major significance of comparative psychology is its applicative value in other fields such as medicine, ecology, and education.

**SAQ 1.3** –

- A. Ibn al-Haythan is an 11th century Arabic psychologist who wrote the first book that details the effects of music on animals (*Treatise on the Influence of Melodies on the Souls of Animal*).
- B. Ivan Petrovich Pavlov (1849-1936) was the first to describe the phenomenon referred to as conditioning in experiments with dogs.
- C. John Lubbock was the first man to use mazes and puzzle in the study of learning.
- D. The approach which seeks to understand behavior entirely in terms of responses to stimuli is known as behaviourism. Burrhus Frederic Skinner (1904-1990) was the American psychologist who pioneered work on behaviourism and also, experimental psychology.

## Notes on the Self-Assessment Questions (SAQs) for Study Session 2

**SAQ 2.1** – Zoosemantics refers to the study of behavioral pattern made by one animal which elicits or produces a change on the behavior of another animal.

**SAQ 2.2** – Animal communication can be used to:

- a) protect territory;
- b) attract mate for courtship;
- c) signal food source; and
- d) raise alarm.

**SAQ 2.3** – Although animals don't talk or use hand signals the way we do; they however still communicate with one another. Let us take note the different ways in which animals communicate:

- i. bird song,
- ii. olfactory communication, and
- iii. display of distinct body parts.
- iv. scent marking by spraying urine

## Notes on the Self-Assessment Questions (SAQs) for Study Session 3

**SAQ 3.1** – Social isolation in early life could impair the development of animals. In ants for instance, role is based on needs of the colony and the cast they are born into. Ant-workers exhibit career-changing tendencies throughout their lifetimes. Younger workers tend to be kept nearest the queen, serving as nurses, while hunting and gathering responsibilities fall to the most elderly ants.

## Notes on the Self-Assessment Questions (SAQs) for Study Session 4

**SAQ 4.1** – In general, migration is the annual movement of animals between their breeding grounds and wintering sites. Migration occurs in response to changing seasons and is predictable and repeated each year.

You should note that migration is not the only type of animal movement. Some animals travel long distances foraging for food. Some animals move to new locations as soon as they are old enough to venture beyond the location where they were born. Such movement is called dispersal. Animals may also move out of an area at unpredictable times due to harsh conditions or limited resources (this is called irruptions or invasions).

**SAQ 4.2** – Migratory animals have special adaptations to help them get to their destinations. Birds, for instance have wings that allow them to fly long distances, and they don't have unnecessary weight to carry around. Geese gather themselves and form a "V" shape, an arrangement that is said to decrease the wind drag on all the birds along both sides. Also, birds add on extra fat stores to give them enough energy for long flights, because they do not eat during the migration. Similarly, whales stock up well on food in the northern seas before heading south for the winter, because they don't eat on the way.

**SAQ 4.3** – The types of migration include:

- 1) Seasonal migration
- 2) Latitudinal migration
- 3) Altitudinal migration
- 4) Reproductive migration

- 5) Nomadic migration
- 6) Removal migration
- 7) Partial migration
- 8) Complete migration

## Notes on the Self-Assessment Questions (SAQs) for Study Session 5

### SAQ 5.1 –

- **Learning** is a relatively permanent change in behaviour.
- **Habituation** is a form of learning in which an organism decreases or ceases to respond to a stimulus after repeated presentations.
- **Spontaneous recovery** is the reappearance of a conditioned response after a delay or period of lessened response.

### SAQ 5.2 –

- i. Habituation enables animals to filter the large amounts of information received from the surrounding environment.
- ii. By habituating to less important signals, an animal can focus its attention on the most important features of its environment which has direct relevance on its survival.

## Notes on the Self-Assessment Questions (SAQs) for Study Session 6

**SAQ 6.1** – Classical and instrumental conditionings are two important concepts central to behavioral psychology. Let us examine how they differ. While classical conditioning involves formation of an association between two stimuli; instrumental conditioning procedures emphasize formation of a response-stimulus association

## Notes on the Self-Assessment Questions (SAQs) for Study Session 7

**SAQ 7.1** – We don't know what you have considered, but your list might include the following:

- i. Attention
- ii. Categorization
- iii. Memory
- iv. Tool and Weapon Use
- v. Reasoning and Problem Solving
- vi. Mathematics
- vii. Consciousness

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