

Methods of studying Animal Behavior

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Introduction

- **For a layman, watching the activities of animals is the study of animal behavior.**
- Study of animal behavior is different from casual watching of activities of animals.
- Behaviorists study their subject animal with some objectives and draw some inferences to establish some theories of animal behavior.

Approaches to Behavioral Studies

- Vitalistic Approach
- Mechanical Approach
- Ethological Approach

Vitalistic Approach

- This accounts for behavioral activities of animals and attempts to relate to change in environment.
- It discards any study of animal outside its natural environment
- It is essentially non-scientific.

Mechanical Approach

- ❑ This is an experimental approach and involves the study of particular aspects of behavior under controlled conditions in a laboratory. Sometime it is not considered authentic.
- ❑ This technique is used extensively in psychology and was pioneered by **Ivan Pavlov**.

Ethological Approach

This is the contemporary approach to behavioural investigations and attempts to explain responses observed in the field in terms of the stimuli eliciting the behavior.

Ethologists for Vitalistic Approach-

- Jane Goodwall worked on chimpanzee.
- Dr. Dian Fossey spent nearly 20 years among mountain gorillas in Africa.
- George Adamson with his wife Joy were specially interested in lioness.
- Dr. Salim Ali was famous for bird watching.

Ethogram

The ethogram is a written description of behavior in clear, complete and concise manner

OR

Set of comprehensive descriptions of the characteristic behaviour patterns of a species/ population/ individual prepared consistently is called ETHOGRAM.

Measurement of Behavior

Measurement of behavior is the assignment of numbers to animal's behavior. In general, there are four scales of measurement:-

1. **Nominal scale**- Numbers are used as labels and no ranking is possible. Each number functions as a label attached to animal.
2. **Ordinal scale**- Scores can be assigned to the observations in such a way that the rankings obtained are meaningful but the intervals between the ranking need not be defined.

Measurement of Behavior

3. **Interval scale**- It measures the property of number but here the number assigned to animals tell us that the animals labelled by them are distant from each other and they also tell us how much different one animal is from the other in respect of measured characteristics.

4. **Ratio scale**- The measurement may be ranked and the intervals are meaningful. As the ratio shares with the interval scale, the properties of number and equality of intervals can be applied statistically.

Difficulties in the study of animal behavior- not easy task in wild

1. Different individuals of same species behave differently. Even the same individual do not respond exactly in the same way in different time of day/ different months of the year/ different seasons.
2. The study of behavior is difficult because it consists of numerous units occurring one by one in sequence with a very fast speed.
3. We use our sense organs to study animal behavior and interpret them in our own way which may be wrong.

4. While studying animal behavior, we tend to put ourselves in the subject animal, thinking that the subject animal feel in the same way like us. The interpretation of the behavior of animals thinking in human terms is called **anthropomorphism**.

5. Ethologists face a lot of problems in studying animals in their habitat due to dangerous animals, bad weather, poor food and above all monotony.

Precautionary Measures for studying animals in wild

- Observer should hide himself in bushes or caves or watch from tower. So, it is necessary to fit binocular ,lens of camera, telescope, video or digital camera etc.
- Animals should not be acquainted with observer so that their behaviour may not be influenced and modified.

Tools Used in the Study of Animal Behavior

The primary tools of ethologists are their eyes and ears to locate wild animals. Binocular is simple tool for observation of animals . Recent advances in technology have assisted.

Tools used in the study of animal behavior

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graph TD; A[Tools used in the study of animal behavior] --- B[Foot Print]; A --- C[Radio-telemetry]; A --- D[Infra-red photography]; A --- E[Mini tape recorder]; A --- F[Satellite telemetry system and tracking radar];
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Foot Print

Radio- telemetry

Infra-red photography

Mini tape recorder

Satellite telemetry system and
tracking radar

- 1. Foot Print-** Animals (especially mammals) are located individually in jungles by its foot prints. Tigers, bears are identified by their peg marks.
- 2. Radio-telemetry-** Mini radio transmitter is fitted in a suitable part of wild animals. Now the animal is free. The observer traces the animal having receiver and notes the behaviour.
- 3. Infra-red photography-** For slow moving activities (moulting in insects), fast moving activities (bird flights). Also used by ethologists.
- 4. Mini tape recorder-** It is also used for recording sounds and their subsequent analysis using sound spectrographs.
- 5. Satellite telemetry system and tracking radar-** They have employed successfully in following the migration of locusts, turtles, birds and mammals. Satellite receives the signal, send the picture and data to earth, computer analyze the data.

Altmann's methodology applied to studies in wild (1974)

Ad libitum sampling

Focal animal sampling

Scan sampling

All occurrence sampling

Sequence sampling

One zero sampling

Ad libitum sampling-

- Select a species.
- Live with members of the group in their habitat for a required period.
- Behaviour of interest is noted.

Focal animal sampling-

- Highest priority is made for selected animals. Relation between mother and infant of rhesus monkey in nature – Ethogram is prepared.
- Different methods are adopted to identify the particular group - Natural marking
 - Physical alterations are made in animal such as cutting feathers, horns, tails, ear etc. – set free – observed by several methods.

Scan sampling-

- Several individuals of a species observed one after the other in quick succession in pre-determined interval. Eg. Activities of Hanuman langur in group for foraging in respect of time (day/ week/ month).
- 3 criteria—
 - Activities we are interested in
 - Time duration for scan depending upon the size of group.
 - Duration of interval.

All occurrence sampling-

- Only one behaviour is taken into account and recording of all concerned units is done carefully-
Agonistic \ Amicable
- It is possible if three factors exists-
 - Observation conditions are adequate.
 - Behaviours have been carefully defined so that they are easily recognised.
 - Behaviours do not occur more often than the observer can note them.

Sequence sampling-

- The attention is focussed on a chain of behavior of an individual.
- Observation is done right from the beginning to the end of behaviour. E.g. Courtship Behavior.

One zero sampling-

- Only the two extreme ends of a behavior is studied.
- Whether behavior occurs (one) or not (zero) during sampling.
- This method has following five features:
 1. In each sample period, the occurrence or no occurrence is scored.
 2. Behaviour of one or two individuals is recorded in each sample period.
 3. Occurrence refers to either an event or a state.
 4. The sample periods are generally short.
 5. Results are presented as frequencies.

Experimental study of Behavior

Neuroanatomical

Neurophysiological

Neurochemical

1. NEUROANATOMICAL STUDY-

- Oldest and crude method.
- Certain region of the brain are destroyed and their function is deduced from the deviated behavior.
- Ablation/ lesion may be made by knife cuts/ chemicals. Eg. Wernick's area in brain is responsible for speech.
Can talk properly but speech is not coherent.
Broca's area in brain is responsible for speech.
- Now-a-days – Stereotaxic instruments available – sophisticated instrument – for recording superficial neural stimulation.

2. NEUROPHYSIOLOGICAL STUDY

- The discovery that the messages in nervous tissue travel in the form of electric current led to a less crude and injurious –Base of neurophysiological method.
- The first successful recording of brain waves from the skull of man done by **Berger** in 1929.
- Recording of the bioelectrical impulses in brain is done by Electroencephalogram(EEG).
- **Following four type of electric brain wave have been recorded in the brain of human beings:**
 - i. Alpha waves (α waves)**
 - Produced from parietal and occipital lobes.
 - Waves produced when person is at rest with eye closed. Man is awoken but in relaxed mode.
 - ii. Beta waves (β waves)**
 - Produced from frontal lobe when brain is stimulated by sensory input or mental activity.
 - Waves occur at the time of thought and normal daily alertness.

iii. Theta waves (θ waves)

- Produced from temporal and occipital lobes when a person is under emotional stress.
- Associated with earliest stage of sleep, hallucination and creativity.

iv. Delta waves (δ waves)

- Produced during sleep

TYPES OF WAVES	FREQUENCY (Hz)
Alpha waves	10-12
Beta waves	13-25
Theta waves	5-8
Delta waves	1-5

3. NEUROCHEMICAL STUDY

- Neurons are affected more selectively in their activity by local application of drugs, neurotransmitter blocking agents and hormones.
- By the drugs/ chemicals given orally/ by injections, behaviour of animal is deviated.

Eg. Clinical and psychoactive drugs– Tranquilizers, sedatives to fight insomnia and depression.

LSD– lysergic acid diethylamide– stimulate mental state feeling of hallucination.

Behavioural studies in the usual case yield time series data. Data obtained from a complete records of the events at fixed interval of time and applied for behavioural studies is known as statistical method.

Further Readings

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Thank you