

## **METHODS IN PSYCHOLOGY**

### **2.1 Introduction**

In the previous chapter you have learnt about nature of psychology, what psychologists do, different branches of psychology etc. Now you can well understand the important place which psychology acquires among the other disciplines. As we know, psychology is the scientific study of behaviour and psychologists study behaviour by using scientific methods. In this chapter you are going to study about these methods.

### **2.2 Objectives**

After reading this lesson, you will be able to :

- describe briefly the techniques for collecting data;
- explain the steps involved in experimental method;
- describe the use of statistics in Psychology.

### **2.3 Techniques for collecting data**

Since psychology involves studying behaviour scientifically, psychologists, like scientists in biology, chemistry or any other scientific field need to collect data. Data is any fact or piece of information, which is processed through statistical process to come to any decision. Principal of a school might want to know the number Science, Commerce or Arts ratio group. He might also want to know the taking administration in the different streams. At a later stage he might want to select a student for the post of 'Head Boy' of boys and girls or 'Head Girl' of the school for which he would like to know the leadership qualities of the students. All such problems require

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the use of different methods of collecting and evaluating data :  
Psychologists have developed their own methods to meet their needs

The variety of methods used in modern psychology may be classified as :

- \* Non experimental
- \* Experimental

Each of the above methods have their own advantages and disadvantages, and the methods will be chosen on the basis of the kind of problem being investigated. If we wish to investigate the role of motivation in learning, we may select the experimental method. If, on the other hand we wish to study crowd behaviour, observational method will be required.

## 2.4 Experimental Method

In simple language, experiment is observation under conditions which we can control and vary. It was Wilhelm Wundt(1832—1920) who started the first psychological laboratory in 1879 at Leipzig. After this, psychologists began to develop the experimental method and today most of the psychological data are collected through well planned and scientifically conducted experiments. Experimental method is generally preferred above other methods because of its objective nature. The experimental psychologist is concerned about the study of relationship between changes in the conditions and the corresponding changes in behaviour. The experimental method helps psychologist establish cause-and-effect relationship.

When a teacher wants to know if recitation method will aid retention (of a poem) than silent reading she will proceed as follows :

### Forming a hypothesis

On the basis of his/her previous knowledge and researches, the experimenter forms a hypothesis i.e., s/he states a possible answer to the problem being studied. In the above case she may hypothesize that the recitation method is better for retention of a poem.

In order to understand the experimental method, one must be familiar with the concept of variables. "Variable is any measurable attribute of objects, things or beings ". Quantitatively measured variables are age, intelligence, number of trials and qualitatively measured variables are sex, religion, caste etc. In an experiment the experimenter is concerned with two kinds of variables :

- the independent variable and
- the dependent variable

Independent variables are manipulated by the experimenter (e.g. method of learning is the independent variable in the present case).

Effects of independent variable are observed on the dependent variable e.g. retention in the present example.

**Sampling of subjects :** The next step is to decide the population to be selected for the study and deciding on the method of selecting a sample. For example if one want to take the students of 10th class for the experiment he can not possibly go to all the schools. So he decides to take equal number of students of 10th class of one school. A sample represents the whole population. One has to decide which type of sampling method should be used out of the various methods. Some type of sampling are random sampling, cluster sampling etc.

**Control of extraneous variables :** There is a possibility that some other variables, like age, gender etc. can affect retention. All these variables have to be controlled. In order to do so the experimenter selects subjects of similar intelligence, age and of one gender only.

**Planning (design) the Experiment :** The experimenter will select a group of students, divide them in half and give them same material (poem in this case) to memorize. One group is instructed to read the material silently. This group is called the "control group". The other group recites the the poem loudly for the same amount of time. This group is the "experimental group". Retention of both the groups will be compared.

**Verifying the Hypothesis :** If the experimenter finds a significant difference in the amount retained by the two groups, he might infer that recitation method is superior aid for retention. These findings will prove the hypothesis.

**Limitations of the Experimental Method :** The experimental method is very good for gathering scientific facts. But it also has limitations. The findings obtained from this may not apply to natural situations. Sometimes an experiment might prove unethical or dangerous for subjects. In some situations, experiment may interfere with the very thing that is measured

## **2.5 Non-Experimental Techniques**

Experimental method is the preferred method in psychology because it has greater precision but there are problems that cannot be subjected to experimental manipulation. Behaviour of people in a crowd cannot be brought to the laboratory, neither can we understand why a child breaks things in the class through experimental method. Different methods are used for different kinds of problems. Some of these non-experimental method.

### **Observation**

All sciences use observation to obtain facts. Observation the starting point of all sciences. It is a systematic and deliberate study of spontaneous occurrences, at the time they occur. But simply observing is not enough. One should know what one wants to observe otherwise a lot of important facts may be missed.

### **Introspection**

To introspect means to look within. This is the oldest method in psychology. It is a very important method to understand the feelings of pain, happiness, fatigue. If some persons go to see a movie they may have

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they may have liked the movie but others may have disliked the film; but they can understand their emotional response only by looking within. In introspection, attention is directed inwards to a particular purpose to find out what is happening in the mind. For eg you meet a school mate after years, you greet him by shaking hands—an act of friendly behaviour but inside you donot feel happy to meet him because he had bullied you in class.

**Survey:** These are used for study of social problems such as incidence of alcoholism, popularity of careers, causes of unsuccessful marriages, People cannot be manipulated to observe these problems. The psychologist goes into the field with prepared list of questions and interviews a set of people. For eg he may want to know how many people are buying a certain brand of tooth paste. The surveyer may sometimes face problems : like refusal of people to answer, biased answers, misleading answers etc.

**Case history method:** 'Case history' is a detailed compilation of data about a single individual. The psychologist gathers complete history, from infancy to present period in order to understand one's behaviour. This method is often used to study abnormal behaviour, behaviour of criminals, problem children or even to study the developmental pattern of personality. The focus is on the assets as well as the weaknesses of the person concerned.

**Correlational Research:** It is used to find out the relationships between two sets of factors/variables. We would use this method to find out the relationship of intelligence with scholastic achievent, of religiosity with spiritual well-being, language skills with examination performance etc. The strength of relationship can be represented by a correlation coefficient, which ranges from - 1.00 to + 1.00. A positive correlation indicates that as the value of one variable increases the value of the other also increases. A negative correlation tells that - as the value of one variable increases, the value of the other decreases. Correlational research does not demonstrate cause-and-effect relationship. But it gives new insights about data for planning experiments afterwards.

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### Intext Questions 2.1

1. What is a data ?

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2. What is a hypothesis ?

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### 2.6 Use of Statistics in Psychology

"Statistics is a branch of scientific methodology. It deals with collection, classification, description and interpretation of data obtained by conduct of surveys and experiments. The use of statistics in psychology depends

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upon :

- \* whether it is used for describing behaviour
- \* whether it is used for predicting behaviour.

When the statistics is used for describing behaviour, *descriptive statistics* is used. When it is used for explaining behaviour, *inferential statistics* is used.

**Descriptive statistics** are the numbers which are used to describe the dependent variable. The major descriptive statistics are the measures of central tendency (mean, median mode), measures of variation and correlation.

**Inferential statistics** is used in experiments or investigations which are designed to measure the causal effects of two or more variables. There are many inferential statistics 't' test is one of those.

#### **Functions of Statistics**

- (i) Psychological data can be presented briefly.
- (ii) Results obtained are more accurate and objective.
- (iii) Analysis and discussion are made more scientific.
- (iv) General conclusions can be arrived at.
- (v) Comparative studies are made possible e.g. comparing intelligence of two individuals.
- (vi) Relationship between two variables can be investigated by the help of correlation.
- (vii) Prediction about behaviors can be made.
- (viii) Representative sample can be selected.
- (ix) Statistics is important for all scientific investigations.

### **2.7 Methods in Statistics**

When a large set of data is collected, it is usually presented in a condensed form in a frequency distribution table making it more meaningful and understandable. Frequency distribution table is the primary stage of statistical analysis. Methods which are used to summarize the characteristics of the data over called measures of central tendency. These are the measures that depict the tendency of the distribution.

#### **(a) Mean**

Mean is the most popular and important measure of central tendency. It is also known as 'arithmetic mean'. For psychological research mean is very important because it provides the basis for calculating other statistics like standard deviation and correlation.

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Cricket is a very popular game in our country. Whenever any series is played people stick to their T.V. sets. Very often in the second part of the match a caption occurs on the TV screen as 'Run Rate'—Present and Run Rate—Expected. The Run Rate is the average score per over.

When these sorts of questions are asked, actually the 'mean' is being asked. The mean is the weighted average of all the raw scores. It is computed by totaling all the raw scores and then dividing by the number of scores together. For example if we have the 5 scores like

10, 20, 20, 40, 50, 10, 10

The mean can be computed with this method

$N$  (Number of scores) = 7

$$10 + 20 + 20 + 40 + 50 + 10 + 10 = \frac{160}{7} = 22.86$$

The mean is represented by  $\bar{X}$  (pronounce it "X bar")

Individual score is denoted by "X"

Total number is denoted by "N"

#### (b) Median

The median is the value that divides the group into two equal parts, one part comprising of all values greater and the other comprising of values are less than the median. Median is a positional average and is not affected by the magnitude of scores. It is easy to understand and calculate.

Example: the median for the following scores is 25 :

12, 20, 23, 23, 25, 26, 28, 35, 40

There are four scores below 25 and four above scores above 25.

#### (c) Mode

The mode is that score which occurs maximum number of times in a series of scores. The word mode has been taken from French language which means fashion, hence mode is the most frequent or 'popular' number. The mode in the following scores is 20 :

10, 15, 20, 20, 20, 35, 35

It is easiest to calculate. Mode is frequently used in business, weather prediction, fashion etc.

#### (d) Correlation

Correlation is a method of numerically showing how closely related are any two sets of variables. In a large number of instances two variables always tend to fluctuate in the same or in the opposite direction. When it is found out that a relationship exists it is called "correlation". When scores in one variable change in the same direction

as those in the other or in the inverse direction—correlation (relationship) is said to exist.

The score through which the psychologists express the relationship between two variables is called the co-efficient of correlation. It is an index which indicates the quality as well as quantity of relationship. With the variables three possible relationships are possible—positive, negative and zero/no relationship.

Magnitude of correlation ranges between - 1.00 to + 1.00. The range of correlation, coefficients can be interpreted in the following ways:

<u>Co-efficient</u>	<u>Relationship</u>
.00 to + .20	negligible
+.21 to + .40	low
+.41 to +.60	moderate
+ .61 to +.80	high
+.81 to +.99	very high
+ 1.00	perfect

This is a range of positive correlation. Similar range exists for negative correlation, which means scores in one variable change with the other in inverse direction.

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### **INTEXT QUESTIONS 2.2**

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1. What are the measures of the central tendency ?

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2. What is correlation ?

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3. How is statistics helpful ?

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### **Inferential Statistics**

When an experiment is specifically designed to measure the causal effects

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between two or more variables, Inferential statistics is used. There are many types of inferential statistics like t test, F-test etc.

### **What you have learnt**

- Experimental techniques help to find the cause and effect relationship.
- An experiment has various parts. It starts with a hypothesis which is the possible explanation. Variables are measurable attributes of objects, which the experimenter observes, manipulates, and controls.
- Experiments enable us to determine causes for behaviours.
- Statistics is used by the psychologists to judge the significance of research results.
- Non experimental techniques are used to obtain descriptions of behaviour. Some of the techniques are observation, surveys, case study, Introspection, correlation etc.
- There are various steps in the experimental method which have to be followed. They are stating the problem, forming of hypotheses, sampling, design of the study, material, controls, instructions, results and discussion and generalization.

### **Terminal Questions**

1. Why is data needed in Psychology ? How is it collected ?
  2. What are the different statistical method used in psychology ?
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### **Key to Intext Questions**

#### **2.1**

1. Data is any fact or piece of information.
2. A Hypothesis is a tentative explanation for behaviour.

#### **2.2**

1. mean, median, mode.
2. Correlation is a method of numerically showing the relation between two variables.
3. refer to section 2.6 to frame your answer.

### **Hint to Terminal Exercises**

1. Refer to section 2.3.
  2. Refer to section 2.5.
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