

1. Details of Module and its structure

Module Detail	
Subject Name	Psychology
Course Name	Psychology 01 (Class XI, Semester - 1)
Module Name/Title	Methods of Enquiry in Psychology – Part 2
Module Id	kepy_10202
Pre-requisites	Knowledge of scientific research
Objectives	To understand the important Methods of Enquiry used in Psychology: <ul style="list-style-type: none">• Experimental Method• Correlational Research• Survey• Case Study
Keywords	Experiment, Independent Variable, Dependent Variable, Extraneous Variables, Sample, Random Sampling, Control Group, Experimental Group

2. Development Team

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Experimental Method

Experiments are generally conducted to establish cause-effect relationship between two sets of events or variables in a controlled setting. It is a carefully regulated procedure in which changes are made in one factor and its effect is studied on another factor, while keeping other related factors constant.

In an experiment, **cause** is the event being *changed or manipulated*.

Effect is the *behaviour that changes because of the manipulation*.

Some Important Concepts in Experimental Research:

1. Variables

Variable is a factor which varies or changes in the experiment (Can change in Value) A stimulus or event which varies, that is, it takes on different values (or changes) and can be measured is a **variable**. An object by itself is not a variable. But attributes of the object are. For example, the pen that you use for writing is NOT a variable. But there are varieties of pens available in different shapes, sizes, and colour. All of these are variables.

The room in which you are sitting is NOT a variable but its size is as there are rooms of different sizes. Similarly, people of different races have different colours. People have started dyeing their hair in different colours. Thus, colour of hair becomes a variable. Variation can be in the quality or quantity of objects/events.

a) Independent Variable

Independent variable is that variable which is manipulated or altered or its strength varied by the researcher in the experiment. It is the effect of this change in the variable which the researcher wants to observe or note in the study.

Example: If researchers want to study the impact of noise on thinking ability, the variable to be manipulated is- Noise

b) **Dependent Variable** Dependent variable represents the phenomenon the researcher desires to explain. It is expected that change in the dependent variable will ensue from changes in the independent variable.

Example: the variable that is likely to change in the above example, due to presence of noise is- thinking ability,

c) **Control or Extraneous Variables**

These are other factors which may impact the cause and effect relationship so they are called ‘**Extraneous variables**’:

There are three major types of extraneous variables:

- **Situational** - These are aspects of the environment that might affect the participant’s behavior, e.g. noise, temperature, lighting conditions, humidity. Situational variables have to be controlled so they are the same for all participants.
- **Participant** - This refers to the ways in which each participant varies from the other, and how this could affect the results e.g. mood, intelligence, anxiety, nerves, concentration, personality.
- **Sequential**- The sequence related variables assume significance when the participants in experiments are required to be tested in several conditions. Exposure to many conditions may result in experimental fatigue, or practice effects, which may influence the results of the study and make the interpretation of the findings difficult.

These extraneous variables need to be controlled in an experiment so that a researcher is able to pin-point the cause and effect relationship between independent and dependent variables. Hence they are also called control variables.

II Experimental vs Control group

Experiments generally involve one or more experimental groups and one or more control groups.

An **experimental group** is a group in which members of the group are exposed to independent variable manipulation.

The **control group** is a group that is treated in every way like the experimental group except that

the manipulated variable is absent.

The **control group** is composed of participants who do not receive the experimental treatment. When conducting an experiment, people are selected randomly to be in this group. They closely **resemble** the participants who are in the experimental group, or the individuals who receive the treatment. While they **do not receive the treatment**, they play a vital role in the research process helping researchers to see if the independent variable had any impact on the behaviour of the participants.

For example:

In the Bib Latane and Darley experiment, the participants in the study were sent to three types of rooms. In one room no one was present (**control group**). In the other two rooms, two persons were already seated (**experimental groups**). Of the two experimental groups, one group was instructed not to do anything when smoke filled in the room. The other group was not given any instructions. After the experimental manipulation, the performance of the control group measured in terms of reporting of smoke was compared with that of the experimental group. It was found that the control group participants reported in maximum numbers about the emergency, followed by the first experimental group members where the participants were not given any instructions, and the second experimental group (consisting of confederates) reported the emergency situation, the least.

In an experiment, except for the experimental manipulation, other conditions are kept constant for both experimental and control groups. One attempts to control all those relevant variables which can influence the dependent variable. For example, the *speed* with which smoke started entering the rooms, the total *amount of smoke* in the rooms, *physical and other conditions of the rooms* were similar in case of all the three groups.

The distribution of participants to experimental and control groups has to be done **randomly**, a method which ensures that each person has an equal chance of being included in any of the groups. If in one group the experimenter had included only males and in the other group females, the results obtained in the study, could be due to the differences in gender rather than due to experimental manipulation.

In order to control relevant variables, experimenters use several **control techniques**.

- **Elimination:** Since the goal of an experiment is to minimise extraneous variables, the

best way to handle this problem is to eliminate them from the experimental setting. For example, the experiment may be conducted in a sound-proof and air-conditioned room to eliminate the effect of noise and temperature.

- **Constant:** Elimination is not always possible. In such cases, effort should be made to hold them constant so that their effect remains the same throughout the experiment.
- **Matching:** For controlling participant variables (eg psychological characteristics gender, intelligence fear, motivation) and background variables (such as rural/urban, caste, socio-economic status) **matching** is also used. In this procedure the relevant variables in the two groups are equated or are held constant by taking matched pairs across conditions of the experiment.
- **Counter balancing:** Counter-balancing is a technique used to minimise the sequence effect. Suppose there are two tasks to be given in an experiment. Rather than giving the two tasks in the same sequence the experimenter may interchange the order of the tasks. Thus, half of the group may receive the tasks in the order of A and B while the other half in order of B and A or the same individual may be given the task in A, B, B, A order. (refer to diagram 3 given below).
- **Random assignment:** Random assignment (as explained above) of participants to different groups eliminates any potential systematic differences between groups.

Example to explain control conditions

If a researcher is studying the effects of different pain medications of headaches, the researcher may give people who have headaches (the treatment groups) either A or B (these are the levels of the **independent variable**). S/he can then wait one hour and ask participants to rate the level of pain they are experiencing. If the amount of pain in one group goes down significantly more than the other, the researcher may conclude that A medication is more effective than the other in reducing headache pain.

However, one cannot conclude that any pill is more effective than giving nothing at all. Maybe there was a placebo effect, and simply getting a pill made people believe their pain was reduced. ***So the researcher should include another group - a control group - which is treated and exposed to everything the other groups are, except that they are given a placebo (maybe a sugar pill) instead of either A or B.***

Advantages of the Experimental Method

- Experiments can be repeated to test veracity and the results may be generalized and verified easily.
- It is a systematic, objective and scientific procedure.
- A strict control of variables allows researchers to establish a cause and effect relationship between variables

Limitations of the Experimental Method

- The experimenters may manipulate or report behavior that supports the hypothesis.
- It may not be possible to control or manipulated all extraneous variables.
- Another limitation of the laboratory experiment is that it is not always feasible to study a particular problem experimentally. For example, an experiment to study the effect of nutritional deficiency on intelligence level of children cannot be conducted as it would be ethically wrong to starve anyone.

Field Experiments and Quasi Experiments

If a researcher wants to have high generalization or to conduct studies which are not possible in laboratory settings, s/he may go to the field or the natural setting where the particular phenomenon actually exists. In other words, s/he may conduct a **field experiment**.

For example, a researcher may want to know which method would lead to better learning among students—lecture or demonstration method. For this, a researcher may prefer to conduct an experiment in the school. The researcher may select two groups of participants; teach one group by demonstration method and another group by the normal teaching method for sometime. S/ he may compare their performance at the end of the learning session. In such types of experiments, the control over relevant variables is less than what we find in laboratory experiments. Also, it is more time-consuming and expensive.

Many variables cannot be manipulated in the laboratory settings. For example, if you want to study the effect of an earthquake on children who lost their parents, you cannot create this condition artificially in the laboratory. In such situations, the researcher adopts the method of **quasi** (the Latin word meaning “as if”) **experimentation**. In such types of experiments, the independent variable is selected rather than varied or manipulated by the experimenter. For

example, in the experimental group we can have children who lost their parents in the earthquake and in the control group children who experienced the earthquake but did not lose their parents. Thus, a quasi experiment attempts to manipulate an independent variable in a natural setting using naturally occurring groups to form experimental and control groups.

III) Correlational Research

In psychological research, we often wish to determine the relationship between two variables for prediction purposes.

For example, you may be interested in knowing whether “the amount of study time” is related to the “student’s academic achievement”. This question is different from the one which experimental method seeks to answer in the sense that here you do not manipulate the amount of study time and examine its impact on achievement. Rather, you simply find out the relationship between the two variables to determine whether they are associated, or covary or not. The strength and direction of the relationship between the two variables is represented by a number, known as correlation coefficient. Its value can range from +1.0 through 0.0 to –1.0.

As you can see, the **coefficient of correlation is of three types: positive, negative, and zero.**

a) A **positive correlation** indicates that as the value of one variable (X) increases, the value of the other variable (Y) will also increase. Similarly when variable X decreases, a decrease in Y too takes place.

Example ; It is found that the more time the students spend on studying, the higher was their achievement score. Also the less they studied, the lower was their achievement score. This type of association will be indicated by a positive number, and the stronger the association between studying and achievement, the closer the number would be to +1.0. You may find a correlation of +.85, indicating a strong positive association between study time and achievement.

b) A **negative correlation** tells us that as the value of one variable (X) increases, the value of the other (Y) decreases.

For example, one can hypothesise that as the hours of study time increase, the number of hours spent in other activities will decrease. The more time one spends at parties the lesser time you

devote to studies Here, you are expecting a negative correlation, ranging between 0 and -1.0 . Thus, a correlation of $-.85$ would indicate a strong negative association between partying and studying.

It is also possible that sometimes no correlation may exist between the two variables.

d) This is called **zero correlation**. Generally, it is difficult to find zero correlation but the correlations found may be close to zero, e.g., $-.02$ or $+.03$. This indicates that no significant relationship exists between two variables or the two variables are unrelated. For example we would probably not expect to find a relationship between number of hours spent studying Physics and height; knowing how much someone studies does not tell us anything about how tall he or she is.

IV Survey Method

Survey research came into existence to study opinions, attitudes and social facts. They were used to finding out facts such as the literacy rate at a particular time, religious affiliations, income level of a particular group of people, etc.

They were also used to find out the attitude of people towards family planning, the attitude towards giving powers to the *panchayati raj* institutions for running programmes related to health, education, sanitation, etc. However, they have now evolved into a sophisticated technique.

Terms used in surveys:

Population - The individuals that we are interested in drawing a conclusion about e.g.; Indian Adults or African Americans.

Sample – It is a sub-set of individuals drawn from the larger population.

Kinds of sampling

- **Representative sample** is one that reflects the important characteristics of the population for which the procedure is. Eg A researcher wants to study whether young adults are

conscious towards sustaining the environment. Consequently the researcher should conduct the survey using teenagers.

- **Random sample** in which every member of the population has equal probability of being chosen to participate in the survey. Eg A researcher studying helping behaviour at a public places approaches any person regardless of age or gender who visits park, movie hall, shopping malls or a gym.
- **Biased sample** in which the sample is not representative of the population from which it is drawn, one or more members of the population are favored over others.
- Eg Choosing college students only for a study on gender differences in levels of aggression at the work place

The survey research uses different techniques for collecting information. Included among these techniques are: *personal interviews, questionnaires and telephonic surveys*.

a) The interview method

The interview method is one of the most frequently used methods for obtaining information from people. It is a purposeful activity conducted to derive factual information, opinions and attitudes, and reasons for particular behaviour, etc. from respondents. It is generally conducted face-to-face but sometimes it can also take place over the phone.

Types of Interviews:

Structured or standardised	Unstructured or non-standardised
The questions in the schedule are written in predetermined sequence	The interviewer has the flexibility to take decisions about the questions to be asked and the sequence in which questions are to be asked.
The interviewer has little or no liberty to make changes in the wordings of the questions or the order in which they are to be asked.	The wording of the questions can be changed as per requirement.
The responses to these questions are also, in some cases, specified in advance as close-ended questions	There are no specific responses to these questions which are called open-ended questions

For example, if the researcher wants to know about the happiness level of a person, s/he may ask: How happy are you? The respondent may reply to this question the way s/he chooses to answer.

b) Questionnaire Survey

The questionnaire is the most common, simple, versatile, and low-cost self-report method of collecting information. It consists of a predetermined set of questions. The respondent has to read the questions and mark the answers on paper rather than respond verbally to the interviewer. It is the most common, simple, versatile, and low-cost self-report method of collecting information verbally to the interviewer. They are in some ways like highly structured interviews. Questionnaires can be distributed to a group of persons at a time who write down their answers to the questions and return to the researcher or can be sent through mail.

Generally, two types of questions are used in the questionnaire: ***open-ended and closed-ended***.

- The questionnaire is used for collecting background and demographic information, information about past behaviour, attitudes and opinions, knowledge about a particular topic, and expectations and aspirations of the persons. Sometimes a survey is conducted by sending the questionnaire by mail. The main problem of a mailed questionnaire is poor response from the respondents.

Advantages

- Surveys provide a high level of general capability in representing a large population. Due to the usual huge number of people who answers survey, the data being gathered possess a better description of the relative characteristics of the general population involved in the study.
- Surveys can be administered to the participants through a variety of ways. The questionnaires can simply be sent via e-mail or fax, or can be administered through the Internet. Nowadays, the online survey method has been the most popular way of gathering data from target participants.
- Using the survey, researchers are able to collect data **quickly and efficiently from thousands of** people around the globe.

Disadvantages

- Data gathered through surveys cannot be used to draw conclusion about cause and effect relationships between variables.
- Surveys rely on participant self-reports which can be distorted by factors such as social desirability, bias or peoples inaccurate perceptions of their own behavior.

IV) Case Study

In this method, the emphasis is given on in-depth study of a particular case. For example case studies of terrorists might help identify others who are prone to violence. Researchers focus on cases which can provide critical information or new learning on less understood phenomena.

The case can be an individual with distinguishing characteristics (for example, a patient showing psychological disorders) or a small group of individuals having some commonality among them (for example, creative writers like Rabindra Nath Tagore, and Mahadevi Verma), institutions (for example, poorly or successfully functioning school or a corporate office), and specific events (for example, children exposed to devastation by tsunami, war or vehicular pollution, etc.).

A case study employs multiple methods for collecting information, such as interview, observation, and psychological tests from a variety of respondents who can provide useful information.

It is a valuable research tool in the field of clinical psychology and human development.

Freud's insights led to the development of psychoanalytic theory, while Piaget developed his theory of cognitive development on the basis of observations of his three children.

Case studies have been conducted to understand the pattern of socialisation of children.

For example-S. Anandalakshmy studied aspects of childhood in a weavers' community in Varanasi.

Evaluation of the Case Study Method:

Advantages:

- Case studies provide detailed in-depth depictions of people's lives.
- They sometimes lead the way to new theories and treatments for psychological disorders.

Disadvantages:

- While generalising on the basis of individual cases, one needs to be very cautious.
- The problem of validity in a single case study is quite challenging.
- Information should be collected using multiple strategies from different sources of information by a number of investigators.
- Careful planning of data collection is also very necessary.