



BLOCK 4
METHODS OF DATA COLLECTION

BLOCK 4 : METHODS OF DATA COLLECTION

Introduction

This is the last block of this unit and it consists of *three units*. The *first unit* deals with the various ways of collecting data in psychological research methods. You have already gone through the various research methods and research designs in third block of this course. In this unit, you will come to know about the various techniques which can be used for collecting data while using these research methods.

The second unit of this block deals with the meaning and ways of test construction in relation to psychological research. You will also be introduced with the concept of reliability, validity, norms and standardization of psychological tests.

The last unit of this course as well as block deals with the concept of research proposal, steps and relevance of report writing. You will also be introduced about the steps of writing a research proposal in this unit.



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UNIT 8 METHODS OF DATA COLLECTION: QUANTITATIVE AND QUALITATIVE*

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8.0 OBJECTIVES

With the help of this method, you will be able to:

- Explain the relevance of data collection;
- Describe the quantitative methods of data collection; and
- Elucidate the quantitative methods of data collection.

8.1 INTRODUCTION

The first unit of this block tries to explain the various methods of collecting data, with the help of various research methods used in the field of psychology. You have already gone through the various research methods and research designs in third block of this course. In this unit, you will come to know about the various techniques which can be used for collecting data while using these research methods.

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8.2 METHODS OF DATA COLLECTION

Different research techniques involve different ways of collecting data from the respondents or participants. Basically, the major methods of data collection are quantitative method and qualitative method of data collection. Both these methods have been explained in the following subsections.

8.2.1 Quantitative Methods of Data Collection

A data that can be counted and expressed in terms of numbers or quantity is called quantitative data. A researcher uses several closed ended questionnaires to collect quantitative data, and later on the scores collected from these data are analyzed and interpreted. It collects data in form of figures and numbers and is used to measure attributes, behaviors and other responses. Let us discuss about few of the quantitative methods of collecting data:

8.2.1.1 Quantitative Survey Method

It has been argued that surveys should be designed in such a way that helps in making accurate decisions. Predominantly there are three major ways which can be used as an instrument in collecting data with the help of survey research. They are being explained below:

- 1) **Sampling:** As discussed earlier, a sample is a representation of the population or universe selected for the study. The technique of sampling can in itself act as an instrument in collecting data in survey research. For example if the researcher wants to study the level of job satisfaction amongst the employees of an organisation, then the researcher can select and study the attitude of at least ten persons of each department of the organisation. In order to avoid any bias, the sampling can be done with the help of randomisation (a method of sampling which provides an equal chance for each subject to be involved in the study, which can be done with the help of lottery or fish bowl technique) or stratification (a method of sampling which categorizes the population in to various categories and subcategories and then conducting the research).
- 2) **Questionnaire:** Questionnaires are basically a kind of paper pencil and multiple choice test in which the individual needs to select the most suitable alternative. The researcher may collect data with the help of a questionnaire from a large number of samples at a single time. Questionnaires can be administered to the sample in three ways: (i) Mail survey (ii) Group administered questionnaire and (iii) household drop off survey. These are being discussed in detail below:
 - i) *Mail survey:* The researcher may forward a soft copy of the questionnaire to a large number of respondents through mail and can get the data collected from them at a single time. It is one of the relatively inexpensive, less time consuming and convenient method of getting responses. Yet, the questions which require on the spot response or detailed answer is difficult to be achieved through mail survey.
 - ii) *Group administered questionnaire:* It is one of the traditional methods of administering questionnaire. The researcher calls for a large number of respondents to be present at a stipulated time period as a group. Under such group settings, the respondents are asked to respond to a structured sequence of questions written in paper or questionnaire. The greatest advantage of this method is that the respondents can clarify their doubt regarding any question that has been asked by the researcher instantly.

- iii) *Household drop-off survey*: In this method, the researcher goes door to door to the respondents and personally hands over as well as collects the questionnaire from them. It is a kind of pick and drop facility which is provided by the researcher so that the researcher can answer the questions according to their convenience.

Difficulties and Issues of Data Collection Through Survey Research

If the researcher plans to go for a survey research, there are certain issues which he or she might have to understand and take full care. They are:

1) Issues on selecting the type of survey

One of the most critical decision for a researcher is to select the kind of survey that might be most appropriate or suitable for his or her study. The researcher should be aware of the kind of population that would be suitable for the study. Again, they should also be comfortable with the language of the selected population. The researcher should also analyse the geographic restrictions and try to find out which method can be most feasible for a dispersed population.

2) Issues on survey instruments

While constructing the survey, the researcher should have full knowledge of the suitability of the questions that would be asked to the respondents. The type of questions, clarity and specificity of the questions as well as the length of the questions are some of the controversial issues within a survey research.

3) Bias Issues

The researcher's bias and prejudices might have a significant influence on the findings of the survey research, so they should be fully aware of the repercussions of their bias. Their behaviour should be socially desired ones, he or she should not lose track and also should avoid false reports. In such a circumstance, issues of bias is really difficult but essential agenda in a survey research.

4) Administrative Issues

The cost, mode of survey, feasibility of the area selected, required time period are also important aspects which needs to be preplanned even before the advancement of the research.

8.2.1.2 Sociometry

Sociometry is one of the technique which is used to analyse and study the extent and nature of social relationship of individual within a group. It is a way to find out the personality related problems e.g. it help in identifying individuals who are isolated or rejected in a group. With the help of this technique, we can identify those individuals who do not like to friendly and want to be alone always (isolates) while there are individuals whom the group does not want to befriend (rejected). It is a technique which helps in understanding social behaviour and relationships. There are usually three types of sociometric techniques: (i) the nomination (ii) the social acceptance and (iii) the 'who's who' or 'guess who'. In the nomination techniques there are certain given criteria on basis of which the participants are asked to select the names of his/her peers against each criterion (e.g. names of three close friends). In the technique of social acceptance, the levels of social relationship are stated and the participant selects his/her sociometric choice. In

the 'Guess who' technique, the participant has to guess the name of the person on basis of certain descriptions mentioned of related/known individuals e.g. this is the person who knows your weaknesses. The sociometric data are presented in the form of a sociogram which shows attractions and repulsions within a group with the help of which, a researcher tries to find out the problems in to his/her group.

8.2.1.3 Attitude Scales (Rating Scales)

Rating Scales are used in observational studies to assess the quality of some experience or activity. Regardless of their objective, these scales are frequently used in either of two ways: To record behaviour at frequent intervals throughout a sample of social interaction, to rate the nature of the entire social events after it has completed. They are found in one or a combination of three basic forms:

1) Numerical Rating Scale

Numerical Rating Scales are employed by behavioural science researchers to record quantified observation of behaviour of individuals, the activities of an entire group, the change in the situation surrounding them and allied data. Although these scales are less reliable and provide more superficial information than category systems, they are sometimes relied upon for practical considerations. Numerical scales involve a series of points which depict varying extents of the dimensions being observed. The numerical scales are simple to construct, easy to use and convenient in data analysis. However, they are more susceptible to varied biases and errors than other types of rating scales.

2) Forced-Choice Rating Scale

The Forced-Choice Rating scale may be in varied forms. Usually, it presents two equally favorable statements about the observation of participant. The observer is required to choose only one of the two statements to describe him/her. Thus, she/he may be forced to indicate, whether the individual has more of one quality than another of the given pair. For example, "He is energetic" and "He is intelligent".

3) Graphic Rating Scale

The Graphic Rating Scale is in the form of a straight line representing a thermometer and presented either horizontally or vertically. The observer is required to make a judgment which frequently reflects either positively or negatively on the observation of participant.

Shortcomings of Rating Scales

Rating scales are susceptible to certain pitfalls:

- 1) **Halo Effect:** It refers to the tendency on the part of the observer to rate the observed on several qualities according to the general impression (or general mental attitude) s/he has about him/her. For example, if a person appears to be sociable, she/he may be rated as intelligent.
- 2) **Error of Leniency:** It is the tendency on the part of an observer to overestimate (or underestimate) the desirable qualities of the observed when she/he likes (or dislikes) him/her for certain reasons.
- 3) **Error of Central Tendency:** It takes place when the observer is unable to assign extreme ratings and thus, tends to provide moderate ratings to the observed participant/subject.

- 4) **Logical Rating Error:** It refers to the tendency on the part of the observer to assign ratings to the observed for qualities which appear logically related in his/her own mind (which may not be true otherwise).

8.2.1.4 Mechanical Observation

In several situation, Observation is conducted by mechanical devices rather than human beings. Mechanical Observation involves use of videotape, traffic counters and other machines for recording behaviour. Researchers tend to use a motion picture camera and time-lapse photography in some unusual observational studies. These techniques can be used in research to design store layouts and resolve problems relating to people or objects moving through different spaces over time. An example of a well-known research project involving Mechanical Observation is the AC Nielsen Television Index (NTI). It uses a Consumer Panel and Mechanical Observation to accomplish ratings for television programmer. They have selected a representative sample of 2000 households in the United States population. These households have agreed to install “people meters” in their homes and become the members of consumer panels. These meters monitor constantly, recording the time a television set is turned on, how long it remains on, which members of the households witness televisions and the channel choices. Thereafter, these data are fed to the company’s central computer via telephone lines.

This arrangement helps in obtaining programme ratings and demographic profiles of particular programme audience for advertisers and networks. Business researchers also tend to use other mechanical devices to assess physical and physiological reactions to different stimuli. These devices include: eye-tracking monitors, pupilometers, psychogalvanometers and voice pitch analysers. However, recently, with the development of systems such as optical scanners and bar codes, it is possible to research inventory levels, shipments, etc. in factories, warehouses and transpiration companies.

Self Assessment Questions I

Fill in the following blanks:

- 1) presents two equally favorable statements about the observed.
- 2) are used to record quantified observations of behaviour of individuals.
- 3) are basically a kind of paper pencil and multiple choice test in which the individual needs to select the most suitable alternative.
- 4) A data that can be counted and expressed in terms of numbers or quantity is called

8.2.2 Qualitative Methods of Data Collection

Qualitative data collection methods are the techniques used to collect textual or non- numerical data for research and analysis. This method of data collection is used when the researcher needs to collect any information related to knowledge, issues, relationships, cultural practices and any related aspects of the society and individuals. Few of the techniques of collecting data through qualitative method are as follows:

8.2.2.1 Projective Techniques

They are the indirect unstructured methods of investigation which uses projection/ responses of participants to find out the underlying motives, beliefs and urges. They are the techniques used to analyse personality of individuals. Some of the projective techniques are:

Word Association Test: The participant is given a list of words and he/she has to respond another word for each of the words given in the list e.g. fan- ceiling.

Completion Test: In this technique, the respondents are asked to complete sentences or stories.

Construction Techniques: The participants are given some pictures and they are expected to make story out of it.

Expression Techniques: Here, participants are asked to provide his/her attitude for each people.

8.2.2.2 Observation Method

This method varies according to the degree to which the observer actively participates in the scene. At one extreme the observer is a non participant. S/ he neither participates nor intervenes in any way as for example: a researcher or observer who is interested in studying children's social behaviour may stand outside a playground to observe. The observer observed but tries not to alter the situation in any way, for example – to get to know the intricacies of certain social phenomena like rituals, cultural way. The observer can be a participant as a friend or relative. Certain behaviours are difficult to be observed as they occur rarely or privately. It is confined to one particular group of people, setting, and activity.

8.2.2.3 Case Study

Case study provides a systematic and scientific way of perceiving or examining the events, collecting data, analysing information, and preparing a report. As a result the researcher may gain a sharpened understanding of why the instance happened as it did, and what might become important to look at more extensively in future research. Case studies lend themselves to both generating and testing hypotheses. In other words, case study should be defined as a research strategy, an inquiry that investigates a phenomenon within its real-life context. Case study research means single and multiple case studies, can include quantitative evidence, relies on multiple sources of evidence and benefits from the prior development of theoretical propositions. Case studies are based on evidence of quantitative and qualitative research. Single subject-research provides the statistical framework for making inferences from quantitative case-study data. According to Lamnek (2005) “The case study is a research approach, situated between concrete data taking techniques and methodologic paradigms.” In the past years, case study method was used in the field of clinical psychology to examine the patient's previous history regarding the person's mental health status. To know about the patient's physical and mental health, and to make an accurate diagnosis, it is very important to know about the patient's past and present health related as well as environmental related problems and issues.

- **Types of Case Study**

There are four types of case studies which are:

- 1) **Illustrative Case Studies:** These are primarily descriptive studies. They typically utilise one or two instances of an event to show what a situation is like. Illustrative case studies serve primarily to make it familiar and to give readers a common language about the topic in question.
- 2) **Exploratory (or pilot) Case Studies:** This type of case studies are performed before implementing a large scale investigation. Their basic function is to identify questions and select types of measurement prior to the main investigation. The primary pit fall of this type of study is that initial findings may seem convincing enough to be released prematurely as conclusions.
- 3) **Cumulative Case Studies:** These serve to aggregate information from several sites collected at different times. The idea behind these studies is that the collection of past studies will allow for greater generalisation without additional cost or time being invested on new, possibly repetitive studies.
- 4) **Critical Instance Case Studies:** These examine one or more sites for either the purpose of examining a situation of unique interest with little to no interest in generalisability, or to call into question or challenge a highly generalised or universal assertion. This method is useful for answering cause and effect questions.

Data based on information and details (in form of observation/ documentation/ recordings and so on) can be collected on basis of the type of case study a researcher is interested to work upon.

• **Uses of Case Studies**

There are different ways of using case studies, which are given below:

Writing Analysis of Case Study

The most careful analysis of a case study is probably obtained when it is made in writing. Case studies can be used as term papers with other related readings and bibliographies.

Panel of Experts

Although group members miss the advantages of participation, by listening to a panel of experts a case may be useful to them especially as an introduction to the case method. A variation of this technique would be to bring in a panel of experts to analyse a case after a group had already done so.

Analysis of Similar Case Studies

Another variation of case discussion is to collect data of incidents from the group members from their experience similar to the case under consideration. Generalisations drawn from the case under consideration may carry over to the experiences of other members.

Cross Examination

By cross examination group members with questions prepared in advance, they do careful thinking and preparation before entering into case study. This technique, is especially appropriate for use with cases containing a great deal of detail, gives the researcher many opportunities to ask individuals to defend their points of views in terms of the data presented.

8.2.2.4 Ethnography

The method is also known as 'ethnomethodology' or 'methodology of people'. As discussed earlier this type of research method basically intends to study culture through close observation and active participation. It focuses on studying socio cultural phenomena of a community. The ethnographer/ researcher collects information regarding the socio cultural phenomena from a lot of people belonging to the community under study. On behalf of their community, the participants also identify and provide the researcher some more respondents as a representative of their community (also known as chaining process). The data is therefore collected using a chain sampling in all empirical areas of investigation. The selected samples are re- interviewed in order to elicit deeper and ambiguous responses. The ethnographer stays within the community for months in order to gain more information through chaining process and collect data in form of observational transcripts and interview recordings. The analysis of data leads to development of theories for the socio cultural phenomena under study, only on basis of the views and perspectives of its respondents.

8.2.2.5 Grounded Theory

Unlike other methods of qualitative research, the grounded theorists do not believe in collecting data through taping and transcribing interviews as it is believed to be a waste of time in grounded theories. The process of grounded theories is far quick and faster as the researcher delimits the data by field-noting interviews and soon after generates concepts that fit with data, are relevant and work in explaining what participants are doing to resolve their main concern. Discussing about the theory before it is written up, drains the researcher's motivational energy.

Discussions and talks can either render praise or criticise, and both diminish the motivational drive to write memos that develop and refine the concepts and the theory (Glaser, 1998). Data is a fundamental property of the grounded theory which means that everything that gets in the researcher's way when studying a certain area is data. Not only interviews or observation but anything is data that helps the researcher in generating concepts for the emerging theory. Field notes can come from informal interviews, lectures, seminars, expert group meetings, newspaper articles, internet mail lists, even television shows, conversations with friends etc. It is even possible, and sometimes a good idea, for a researcher with much knowledge in the studied area to interview own self, by treating the interview like any other data, coding and comparing it to other data and generating concepts from it. Interviewing one's own self helps in gaining an insight from the knowledge that the researcher has at the conceptual level and grounded theory deals with nothing but the conceptual level data.

8.2.2.6 Discourse Analysis

Basically, the discourse analysis identifies the linguistic dependencies which exist between sentences or utterances. Anyhow, it is really difficult to define the concept of discourse analysis. Instead of categorising it under the different kinds of research methods, it can be alleged as one of the creative ways of approaching and thinking about a problem. Alternatively, it can be said to be a way of providing a tangible answer to problems based on scientific research. Eventually the method of discourse analysis helps in unveiling the hidden motivations behind a text or behind the choice of a particular method of research to interpret that text. Expressed in today's more trendy vocabulary, Critical or Discourse Analysis is

nothing more than a deconstructive reading and interpretation of a problem or text.

The method of discourse analysis evaluates the patterns of speech, such as how people talk about a particular subject, what metaphors they use, how they take turns in conversation, and so on. These analysts see speech as a performance. The analysts or the researchers of the discourse analysis believe that the speech performs an action instead of describing a specific state of affairs or specific state of mind. Much of this analysis is intuitive and reflective, but it may also involve some form of counting, such as counting instances of turn-taking and their influence on the conversation and the way in which people speak to others.

8.2.2.7 Diary Writing and Narrative Methods

Diary writing is one of the techniques by which the participants record daily activities and data through these diaries are collected with the help of longitudinal technique. It is a technique in which the responses and daily entries of participants are studied over a long period of time. The diary writing method are also known as experience sampling or ecological momentary assessment (EMA) as it provides the details of contextual information.

However, the trend of diary writing has also started now in form of note making in digital devices. They provide more substantial information including photos and videos as well.

Narratives refers to written or spoken words which are coded to extract required data and information from them.

8.2.2.8 Interview

Interview is a kind of face to face interaction which helps in providing more honest answers and responses from the sample, as the interviewer (the one who is interviewing i.e., the researcher) works directly with the respondent or the interviewee (the one who is being interviewed). Unlike questionnaires, the interviewer has an opportunity to ask follow-up questions. They are the best suitable methods for those questions which require opinions or impressions from the respondents. Interviews can be of different types as given below:

i) Structured interview

Structured interviews are those interviews in which the questions that are to be asked from the respondents are prepared and preplanned in advance by the researcher. The researcher imposes those prepared questions on the respondents serially and notes down the answers given by them.

ii) Unstructured interview

Interviews are said to be unstructured when the researcher conducts an interaction with the respondent in an informal atmosphere. Nothing is preplanned in advance. The response of the sample gives a clue to the researcher to ask the next question.

iii) Telephonic interview

In order to save time and money, the researcher may call the subjects or sample through telephone and ask them questions to collect data. This method helps in saving time and energy but the sample gets limited to only that part of the population who have the facility of telephones at their residences or offices.

Self Assessment Questions I

State whether the following statements are 'True' or 'False':

- 1) Interview is a kind of face to face interaction which helps in providing more honest answers and responses from the sample.
- 2) Case study provides a systematic and scientific way of perceiving or examining events, collect data, analyse information, and prepare a report.
- 3) The diary writing method identifies the linguistic dependencies which exist between sentences or utterances.
- 4) Discourse Analysis is one of the techniques by which the participants record daily activities and data through these diaries are collected with the help of longitudinal technique.

8.3 LET US SUM UP

In this unit, we have studied about the various techniques related to collecting data in psychological researches. Majorly, the data collection methods have been divided into quantitative and qualitative methods. Each of the technique can be used on basis of the research method selected by the researcher and the data required to be collected by them.

8.4 UNIT END QUESTIONS

- 1) Describe the quantitative methods of data collection.
- 2) Explain the case study as one of the relevant method of data collection.
- 3) Describe the different types of interview technique.
- 4) Discuss the process of data collection with the help of discourse analysis and grounded theory.

8.5 ANSWERS TO SELFASSESSMENT QUESTIONS

Self Assessment Questions I

- 1) Force Choice Rating Scale
- 2) Numerical Rating Scales
- 3) Questionnaires
- 4) quantitative data

Self Assessment Questions II

- 1) True
- 2) True
- 3) False
- 4) False

8.6 GLOSSARY

Quantitative Data : A data that can be counted and expressed in terms of numbers or quantity is called quantitative data.

Qualitative Data : The textual or non- numerical data collected for research and analysis.

Sampling : A sample is a representation of the population or universe selected for the study.

Diary Writing : The technique by which the participants record daily activities and data through these diaries are collected with the help of longitudinal technique.

Discourse Analysis : The method identifies the linguistic dependencies which exist between sentences or utterances.

Illustrative Case Studies : These are primarily descriptive studies. They typically utilise one or two instances of an event to show what a situation is like.

Exploratory (or pilot) Case Studies : This type of case studies performed before implementing a large scale investigation.

Cumulative Case Studies : These serve to aggregate information from several sites collected at different times.

Critical Instance Case Studies : These case study examine one or more sites for either the purpose of examining a situation of unique interest.

Interview : Interview is a kind of face to face interaction which helps in providing more honest answers and responses from the sample.

Structured interview : Structured interviews are those interviews in which the questions that are to be asked from the respondents are prepared and preplanned in advance by the researcher.

8.7 SUGGESTED READINGS AND REFERENCES

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UNIT 9 INTRODUCTION TO TEST CONSTRUCTION*

Structure

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- 9.2 Psychological Test or Measure
 - 9.2.1 Purpose of Psychological Test
- 9.3 Validity
 - 9.3.1 Types of Validity
- 9.4 Reliability
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- 9.8 Unit End Questions
- 9.9 Answers to Self Assessment Questions
- 9.10 Glossary
- 9.11 Suggested Readings and References

9.0 OBJECTIVES

After reading this unit, you will be able to:

- Define Reliability, Validity, Norms and Standardized Tests;
- Describe the process of test construction;
- Illustrate the different types of reliability and validity; and
- Explain the steps of constructing a standardized test.

9.1 INTRODUCTION

The present unit of this block deals with the meaning and ways of test construction with reference to psychological research. You will also be introduced with the concept of reliability, validity, norms and standardization of psychological tests. At the end of this unit, you will be explained about the various steps of constructing a standardized test.

9.2 PSYCHOLOGICAL TEST OR MEASURE

It basically refers to a self-report study where the answers or the responses are measured and combined to get a total score. Here we can interchange the usage

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of the words “test” and “measures” although the term “test” in common jargon refers to educational test or an exam with right or wrong responses, though, in most cases, there is no right and wrong answer in a psychological “measure”. Also, we can use the terms “scale” and “questionnaire” interchangeably and the both would imply to a set of question whose answers are combined to form a total score. The most important aspects therefore are (a) a set of questions for an individual to answer, and (b) a combined score that comes from measuring their answers. This set of questions in conjunction is known as a “scale,” “test,” or “measure.”

9.2.1 Purpose of a Psychological Test

There are two objectives of a test whether in education or psychology:

- An attempt to compare the same person on two or more aspects or variables of characteristics or trait.
- A comparison to be made between two individuals on the basis of a common trait. This test can either be qualitative or quantitative.

9.3 VALIDITY

It is apparent from the description of statistical inferences that all tests do not have a common degree of validity, it being completely dependent upon the extent to which it has been used to measure the same dimension; along with its norms in detail judgment based upon the test’s result is objective. For example, validity for intelligence tests may be attributed only to those tests that actually succeed in testing the individual’s level of intelligence. A test can be accepted as valid only to that degree to which it can correctly gauge the mentioned dimension of the participant, which it claims to measure. In this way, validity of a test is that quality on the basis of which the correctness or incorrectness of judgments based upon it is evaluated. For example, the validity of interest tests is less than the case of intelligence tests. Here there is a slight difficulty. Suppose for the moment, that the intelligence of some students was measured by one particular method. Now the validity of the test will depend upon whether the students tested do, in fact, possess the intelligence that they are indicated as possessing. The problem that arises here is how can one ascertain whether the students do or do not possess the dimension of intelligence as indicated by the above test. Evidently, there must be some independent criterion for deciding upon the validity of the particular test in question or tests in general. In this case, of the intelligence level of students, the examination results can be the basis for measuring the validity of the test. Generally speaking, it can be said that if there is a correlation between marks obtained at an examination and the result of the test, then the test is valid.

9.3.1 Types of Validity

As it is evident from the foregoing description, validity is a relative term, as no test can have complete validity. Hence, whenever a particular test is termed valid, or whenever the lack of validity of a test is in question, it is necessary to indicate the sense in which it is considered to be valid or invalid.

Apparently, validity is of many kinds. Psychologists have roughly accepted the following kinds of validity:

- 1) **Face validity:** It only focuses on the form of the test. Such validity is attributed only to the test which provides an item or subject that just appears to be valid.

- 2) **Content validity:** Another kind of validity is content validity in which the validity of the content forms the basis of the validity of the test. In order to obtain this kind of validity in a particular test, it becomes imperative that the items of the test achieve the objective for which they are originally designed. For example, content validity in the case of an intelligence test will be attributed only in the event of its succeeding in discovering all the factors that are concerned with intelligence.
- 3) **Factorial validity:** This is inclusive of the validity of the factors in the test and in order to judge whether a test has factorial validity, it is examined by the method of factor analysis, and a correlation between this result and the evident factor resultant of tests is established.
- 4) **Predictive validity:** This is the most popular form of validity. In this, results are obtained on the basis of a particular criterion, and the correlation between the scores and the criterion is established. In this, the choice of a criterion requires much care and attention. The coefficient obtained by this correlation between scores and criterion is called the validity coefficient. The validity coefficient varies between 0.5 and 0.8. A lower coefficient makes the test inapplicable and lacking in utility, while a higher coefficient is not normally obtained.
- 5) **Concurrent validity:** It resembles the predictive validity since in it, also, a correlation between the test and some definite standard is established. But, despite these common features, there are also some definite variations.

From the above analysis of the various kinds of validity, it is evident that validity exists in a particular context, or in other words, every test is valid for a particular objective and for a specific age group among individuals. It can just as well be invalid for a specific age group in individuals and in a particular context. Hence, to attribute validity to a test without qualification is completely unjustified and inaccurate. For the sentiment to have any value or meaning, it is essential to state the context and conditions in which it is applicable.

9.4 RELIABILITY

In addition to validity, it is essential that every test should possess definite element of reliability. It is only then that the conclusions of the test can be considered reliable and worthy of trust. The term basically refers to the extent to which a test can be relied upon, i.e. it gives consistency in scores even if it is tested on the same group after frequent intervals/ time gap.

Reliability of a test refers to the quality of the test that may inspire confidence and trust for the measurement. And this quality can be attributed to only that test which provides the same score every time it is performed on the same individual. Now, if some intelligence test yields one score for an individual at one time, and another at the same individual if it is applied to the same individual at a different time, it is too evident that such a test cannot be considered reliable and the reliability of a test is not a part of it, but is in its wholeness or completeness. Its reliability will considerably be weakened and decreased if even one part of it is injured in some respect. Hence, it is essential that the internal parts of a test possess internal consistency and uniformity. It is only on the basis of such a reliable test that guidance can be given.

9.4.1 Measuring Reliability

Reliability can be measured in the following four ways:

- 1) **Test retest method:** One method of gauging reliability is to perform the same test on the same group of individuals at two different occasions, and then the scores or results obtained are compared. For example a group of individuals can be subjected to the Binet intelligence test. Then later on the same group of individuals can again be subjected to the Binet intelligence test. If the results obtained in each case do not tally, then the tests cannot be considered reliable.
- 2) **Parallel form method:** In the parallel form of reliability, same group is provided two different tests measuring the same dimension or construct. Finally, the results scores of the two can be compared or corrected to judge the reliability of the test. Gulliksen has suggested that more than one parallel method be devised for greater accuracy. It is also known as equivalent form of reliability.
- 3) **Split half method:** The reliability of a test can also be judged by dividing the components of the test into even and odd times whose results can be individually obtained. Now the results can be compared between the groups to check the reliability of the test.
- 4) **Inter item consistency:** In this method of measuring the reliability only one method is applied at one time. The mutual relation between the scores obtained for each specific item in the test is observed. At the same time the relation between the marks obtained for one specific question and the marks obtained for the whole test is also ascertained. This method of measuring reliability involves considerable statistical. Skill correlation, psychologists Kuder and Richardson have devised some formulae for application in this method.

As has been indicated previously, the implication and meaning of reliability also changed the method of judging reliability. Hence, it is not sufficient to remark that a particular test is reliable. It is equally essential that the sense in which reliability is judged also be mentioned.

Of the above mentioned methods of judging reliability of psychological tests, the third one is the most prevalent and useful, since it is the most easy. In this method, the necessity of collecting the same group of individuals more than once is obviated. Reliability is known from the coefficient of reliability and this coefficient is known as the reliability coefficient.

In this manner, both reliability and validity are important qualities of tests. Validity is related to the scale or structure of the test while reliability is an attribute of its ability of costing.

Self Assessment Questions I

Describe the following in two-three lines:

- 1) Validity

.....
.....

2) Reliability

.....
.....

3) Psychological Test

.....
.....

4) Content Validity

.....
.....

9.5 NORMS

Norm refers to the typical performance level for a certain group of individuals. Any psychological test with just the raw score is meaningless until it is supplemented by additional data to interpret it further. Therefore, the cumulative total of a psychological test is generally inferred through referring to the norms that depict the score of the standardized sample. Norms are factually demonstrated by establishing the performance of individuals from a specific group in a test. To determine accurately a subject's (individual's) position with respect to the standard sample, the raw score is transformed into a relative measure. There are two purposes of this derived score:

- 1) They provide an indication to the individuals standing in relation to the normative sample and help in evaluating the performance.
- 2) To give measures that can be compared and allow gauging of individuals performance on various tests.

9.5.1 Types of Norms

Fundamentally, norms are expressed in two ways, developmental norms and within group norms.

1) Developmental Norms

These depict the normal developmental path for an individual's progression. They can be very useful in providing description but are not well suited for accurate statistical purpose. Developmental norms can be classified as mental age norms, grade equivalent norms and ordinal scale norms.

2) Within Group Norms

This type of norm is used for comparison of an individual's performance to the most closely related groups' performance. They carry a clear and well defined quantitative meaning which can be applied to most statistical analysis.

- a) *Percentiles (P(n) and PR)*: They refer to the percentage of people in a standardized sample that are below a certain set of score. They depict an individual's position with respect to the sample. Here the counting begins from bottom, so the higher the percentile the better the rank. For example if a person gets 97 percentile in a competitive exam, it means 97% of the participants have scored less than him/her.

- b) *Standard Score*: It signifies the gap between the individual's score and the mean depicted as standard deviation of the distribution. It can be derived by linear or nonlinear transformation of the original raw scores. They are also known as T and Z scores.
- c) *Age Norms*: To obtain this, we take the mean raw score gathered from all in the common age group inside a standardized sample. Hence, the 15 year norm would be represented and be applicable by the mean raw score of students aged 15 years.
- d) *Grade Norms*: It is calculated by finding the mean raw score earned by students in a specific grade.

9.6 TEST CONSTRUCTION

Attention must be given to the below mentioned points while constructing a potent, constructive and relevant questionnaire/schedule:

- The researcher must first define the problem that s/he wants to examine, as it will lay the foundation of the questionnaire. There must be a complete clarity about the various facets of the research problem that will be encountered as the research progresses.
- The correct formulation of questions is dependent on the kind of information the researcher seeks, the objective of analysis and the respondents of the schedule/questionnaire. Whether to use open ended or close ended questions should be decided by the researcher. They should be uncomplicated and made with such a view that there will be an objective part of a calculated tabulation plan.
- A researcher must prepare a rough draft of the schedule while giving ample thought to the sequence in which s/he wants to place the questions. Previous examples of such questionnaires can also be observed at this stage.
- A researcher by default should recheck and if required make changes in the rough draft to improve the same. Technical discrepancies should be examined in detail and changed accordingly.
- There should be a pre-testing done through a pilot study and changes should be made to the questionnaire if required.
- The questions should be easy to understand the directions to fill up the questionnaire clearly mentioned; this should be done to avoid any confusion.

The primary objective of developing a tool is obtaining a set of data that is accurate, trustworthy and authentic so as to enable the researcher in gauging the current situation correctly and reaching conclusions that can provide executable suggestions. But, no tool is absolutely accurate and valid, thus, it should carry a declaration that clearly mentions its reliability and validity. Next, we will discuss how to develop a standardised tool/test.

9.6.1 Standardization of Psychological Tests

Standardization refers to the consistency of processes and procedures that are used for conducting and scoring of a test. To compare the scores of different individuals the conditions should be the same.

In case of a new step the first and major step in standardization is formulating the directions. This also includes the type of materials to be used, verbal instructions,

time to be taken, the way to handle questions by test takers and all other minute details of a testing environment.

Establishing the norms is also a key step for standardization. Norm refers to the average performance. To standardize a test, we administer it to a big, representative sample of the kind of individuals it was designed for. The aforementioned group sets the norms and is called the standardization sample.

The norms for personality tests are set in the same way as those set for aptitude tests. For both, the norm would refer to the performance of average individuals.

To construct and administer a test, standardization is a very important. The test is administered on a large set number of the people (the conditions and guidelines need to be the same for all). After which the scores are modified using Percentile rank, Z-score, T-score and Stanine, etc. The standardization of a test can be established from this modified score. Hence, “standardization is a process of ensuring that a test is standardized, (Osadebe, 2001)”. There are lots of advantages when a test is standardized. A standard test is usually produced by experts and it is better than teacher made test. The standardized test is highly valid, reliable and normalized with Percentile rank, Z-score, T-score among scores derived from others to produce age norm, sex norm, location norm and school-type norm. Generally, a standardized test could be used to assess, and compare students in the same norming group.

The normal process for administering standardization includes:

- 1) A calm, quiet and disturbance free setting
- 2) Accurately understanding the written instructions, and
- 3) Provisioning of required stimuli.

This makes the normative data applicable to the individuals being evaluated.

9.6.2 Classification of Standardized Testing

Norm-referenced Testing: It is used to measure the result or performance in relation to all other individuals being administered the same test. It can be used to compare an individual to the others.

Criterion referenced Testing: It is used for measuring the real knowledge of a certain topic.

For example: Multiple choice questions in a geography quiz.

9.6.3 Steps for Constructing Standardized Tests

A carefully constructed test where the scoring, administration and interpretation of result follows a uniform process can be termed as a standardized test. Following are the steps that can be followed to construct a standardised test:

Steps

- 1) Plan for the test.
- 2) Preparation of the test.
- 3) Trial run of the test.
- 4) Checking the Reliability and Validity of the test.
- 5) Prepare the norms for the test.
- 6) Prepare the manual of the test and reproducing the test.

- 1) **Planning** – There needs to be a systematic planning in order to formulate a standardized test. Its objectives should be carefully defined. The type of content should be determined for example using short/long/very short answers or using multiple type questions, etc. A blue print must be ready with instructions to the method to be used for sampling, making the necessary requirements for preliminary and final administration. The length, time for completing the test and number of questions should be fixed. Detailed and precise instructions should be given for administration of the test and also it's scoring.
- 2) **Writing the items of the test** – This requires a lot of creativity and is dependent on the imagination, expertise and knowledge. Its requirements are:
 - In-Depth knowledge of the subject
 - Awareness about the aptitude and ability of the individuals to be tested.
 - Large vocabulary to avoid confusion in writing. Words should be simple and descriptive enough for everybody to understand.
 - Assembly and arrangement of items in a test must be proper, generally done in ascending order of difficulty.
 - Detailed instructions of the objective, time limit and the steps of recording the answers must be given.
 - Help from experts should be taken to crosscheck for subject and language errors.
- 3) **Preliminary Administration** – After modifying the items as per the advise of the experts the test can be tried out on experimental basis, which is done to prune out any inadequacy or weakness of the item. It highlights ambiguous items, irrelevant choices in multiple choice questions, items that are very difficult or easy to answer. Also the time duration of the test and number of items that are to be kept in the final test can be ascertained, this avoids repetition and vagueness in the instructions.

This is done in following three stages:

- a) **Preliminary try-out** – This is performed individually and it helps in improving and modifying the linguistic difficulty and vagueness of items. It is administered to around hundred people and modifications are done after observing the workability of the items.
- b) **The proper try-out** – It is administered to approximately four hundred people wherein the sample is kept same as the final intended participants of the test. This test is done to remove the poor or less significant items and choose the good items and includes two activities:
 - Item analysis – The difficulty of the test should be moderate with each item discriminating the validity between high and low achievers. Item analysis is the process to judge the quality of an item.
 - Post item analysis: The final test is framed by retaining good items that have a balanced level of difficulty and satisfactory discrimination. The blue print is used to guide in selection of number of items and then arranging them as per difficulty. Time limit is set.

- c) **Final try-out** – It is administered on a large sample in order to estimate the reliability and validity. It provides an indication to the effectiveness of the test when the intended sample is subjected to it.
- 4) **Reliability and Validity of the test** – When test is finally composed, the final test is again administered on a fresh sample in order to compute the reliability coefficient. This time also sample should not be less than 100. Reliability is calculated through test-retest method, split-half method and the equivalent -form method. Reliability shows the consistency of test scores.

Validity refers to what the test measures and how well it measures. If a test measures a trait that it intends to measure well then the test can be said to be a valid one. It is correlation of test with some outside independent criterion.

- 5) **Norms of the final test** – Test constructor also prepares norms of the test. Norms are defined as average performance scores. They are prepared to meaningfully interpret the scores obtained on the test. The obtained scores on test themselves convey no meaning regarding the ability or trait being measured. But when these are compared with norms, a meaningful inference can be immediately drawn. .

The norms may be age norms, grade norms etc. as discussed earlier. Similar norms cannot be used for all tests.

- 6) **Preparation of manual and reproduction of the test** – The manual is prepared as the last step and the psychometric properties of the test norms and references are reported. It provides in detail the process to administer the test, its duration and scoring technique. It also contains all instructions for the test.

Self Assessment Questions II

Fill in the following blanks:

- 1) A blue print must be ready with instructions to the method to be used for sampling, making the necessary requirements for preliminary and final administration.
- 2) signifies the gap between the individuals score and the Mean depicted as standard deviation of the distribution.
- 3) refers to the typical performance level for a certain group of individuals.
- 4) is calculated by finding the mean row score earned by students in a specific grade.

9.7 LET US SUM UP

It can be summed up from the above discussion that psychological tests needs to be prepared in a standardized way. A test can be said to be a standardized one, if it is reliable, valid and has standardized norms. Different types of reliability and ways of measuring reliability were also discussed in the unit. At the end of the unit, you were also informed about the various steps of constructing a standardized test.

9.8 UNIT END QUESTIONS

- 1) What is a Psychological test? Explain it's purpose.

- 2) Write down the steps of test construction.
- 3) Explain the concept and ways of measuring reliability.
- 4) Describe the different types of validity.
- 5) Explain the concept and types of norms.

9.9 ANSWERS TO SELFASSESSMENT QUESTIONS

Self Assessment Questions I

- 1) It refers to the degree to which it can correctly gauge the mentioned dimension of the participant, which it claims to measure.
- 2) It refers to the consistency in scores even if it is tested on the same group after frequent intervals/ time gap.
- 3) It refers to a self-report study where the answers are measured and combined to get a total score.

Self Assessment Questions II

- 1) Planning
- 2) Standard Score
- 3) Norm
- 4) Grade Norms

9.10 GLOSSARY

Validity : It refers to the degree to which it can correctly gauge the mentioned dimension of the participant, which it claims to measure.

Reliability : It refers to the consistency in scores even if it is tested on the same group after frequent intervals/ time gap.

Psychological Test : It refers to a self-report study where the answers are measured and combined to get a total score.

Norms : Norm of a psychological test refers to the typical performance level for a certain group of individuals.

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UNIT 10 PREPARATION OF RESEARCH PROPOSAL AND RESEARCH REPORT WRITING*

Structure

- 10.0 Objectives
- 10.1 Introduction
- 10.2 Meaning and Concept of Research
 - 10.2.1 Purpose of Psychological Research
- 10.3 Preparing a Research Proposal
- 10.4 Research Report: Introduction, Definition and Report Format
 - 10.4.1 Format or Structure for Research Report
- 10.5 Significance of Report Writing
- 10.6 Preparation for Writing Research Reports
 - 10.6.1 Tips to Remember While Report Writing
- 10.7 Let Us Sum Up
- 10.8 Unit End Questions
- 10.9 Answers to Self Assessment Questions
- 10.10 Glossary
- 10.11 Suggested Reading and References

10.0 OBJECTIVES

After reading this unit, you will be able to:

- Explain the concept of research proposal and research report;
- Describe the meaning and purpose of preparing research proposal; and
- Elucidate the steps of writing a psychological research report.

10.1 INTRODUCTION

The present unit deals with the concept of research proposal, steps and relevance of report writing. In this unit, you will also be introduced about the steps of writing a research proposal.

10.2 MEANING AND CONCEPT OF RESEARCH

Research refers to a study done scientifically with utmost care and in detail about a certain problem or issue. It is achieved by converting the problem into a question and conducting the research to find the answers.

Research can be done, in any field, from medical, social, psychological to economical, financial, engineering, etc. We know that in order to start research we must first have a problem, that problem will lead us to a question. This question must be answerable, for example, a cancer researcher will be asking the question “how can I cure cancer?”, but this problem is too vague to conduct a study or a

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test, hence the question must be in answerable form, for example “Does exposure to chemotherapy kill cancer cells?”

The presence of a question creates a constant urge to seek an answer; it will create the desire to seek an explanation and thus lead to research.

10.2.1 Purpose of Psychological Research

The need to understand and learn human behavior leads to psychological research. This can encompass the thinking, feelings, behavior of people or combination of these. Its objective is to gain an understanding of human behavior. This research and the knowledge that is gained from it, flows down from the scientists to the society and helps to alter it. This is a constant process and continuously researches are conducted. For example, if we look at the research on rehabilitation of criminals then we may refer to the is Zimbardo's prison experiment.

To be more precise, we use psychological research for measuring, describing and categorizing the behavior of humans. This leads to differentiation of normal and abnormal behaviors and generally it is the latter that is more researched and has more interesting research topics. These are then put in categories and provided with a diagnosis which can be described as a group of prevalent thoughts, behaviors and feelings that happen simultaneously.

For example, in the case people are suffering from depression, researches suggest that exercise and therapy reduce the emotions associated with depression (like, sadness or lack of self-worth or guilt, etc.)

10.3 PREPARING A RESEARCH PROPOSAL

The objective of a research proposal is to showcase and give justification for the importance of conducting research on a specific problem and the methods to be used for conducting that research. The elements for the design and the process for doing the research are ruled by benchmarks that exist in the most important discipline where the problem resides, hence its guidelines are more challenging but less conventional as compared to a normal project proposal. They contain in-depth literature reviews and should also have a definite layout. Further the research proposal also explains the methodology in detail for conducting it, in line with the academic field and also a declaration of the expected results that can be achieved after the study is completed.

The intention of a research work is to ensure that people are convinced about its importance as well as the competence of the researcher. A research proposal must contain all the major elements of the process and should be detailed enough so that the study can be easily evaluated by the readers. Without taking into consideration the field and methodology of research, the proposal should answer the what, why and how of the research (what is the objective, why should it be done and how should it be done).

There should be sufficient time and energy given in preparation of research proposal as it is an important part of the application process.

There are 6 P's for the preparation of a research proposal:

- Project – Why should anybody invest in your project?
- Person – Why should you be chosen for the research project?
- Preparation – What have you done for the preparation of the research and do you require any further training?

- Place – Why do you want to conduct this research at this particular institution?
- Passion – Do you reflect enough passion for executing an original research through the plan that you have provided?
- Precision – Do you give your reader a very transparent, easy to understand plan that is time-bound and concise?

The qualities of a research proposal are:

- Original – It should include the unanswered question that your research seeks to explain?
- Feasible – It should demonstrate the extent, duration and the resources that is intended to be used are practical and achievable.
- Contextual – It should identify with any existing work or previous works.
- Rational – It should point out the existing issues and complications in the current situation.
- Ownership – As a researcher, you need to state your qualities to undertake a research and project yourself as a future research leader.
- Benefit – It need to mention the impact of the research on the society as a whole.
- Further training – It should mention if any further enhancement of skills is required and how do you plan to do that.
- Passion – It should exhibit an interest in your field of research by giving relevant examples.

Self Assessment Questions I

State whether the following statements are ‘True’ or ‘False’:

- 1) The objective of a research proposal is to not to showcase and give justification for the importance of conducting research on a specific problem.
- 2) Feasibility refers to demonstrate the extent, duration and the resources that you intend to use are practical and achievable.
- 3) The need to understand and learn animal behavior leads to psychological research.
- 4) The intention of a research project is to ensure that people are convinced about its importance as well as the competence of the researcher.

10.4 RESEARCH REPORT: INTRODUCTION, DEFINITION AND REPORT FORMAT

In most cases, a research is a written document and its utility is dependent on its presentation to those who are supposed to act on its outcomes. This written document known as a research report must contain all the key attributes of the research. It acts as a mode of communication between the researcher and his/her audience and preserves the work for any future and further research. In a lot of instances the research outcomes are not acted upon due to poor presentation and thus it is not an easy task but an art. The researcher needs to have in-depth

knowledge, be creative and use his/her experience, expertise to execute the same. This can be both time consuming and costly.

10.4.1 Format or Structure for Research Report

There is no single format that suits all reports and it depends on certain factors. A format that creates a good impression with lucidity should be chosen. A report must be systematically written and carefully bound to look attractive.

It can be divided into 3 parts:

I. Part 1 (Formality)

- i) Cover page
- ii) Title page
- iii) Statement
- iv) Index (brief contents)
- v) Table of contents (detailed index)
- vi) Acknowledgements
- vii) List of tables and figures used
- viii) Preface/forwarding/introduction
- ix) Summary report

II. Part 2 (central part or main report)

Following aspects should be a part of the report:

- 1) Introduction
- 2) Objective
- 3) Problem statement
- 4) Literature review
- 5) Methodology
- 6) Data Interpretation
- 7) Conclusions and suggestions
- 8) Delimitations
- 9) Citations
- 10) Appendices

They are explained in detail as below:

1) Introduction

Introduction is the path that takes the reader from a general topic to the specific area of enquiry. It sets the extent, context and importance of the research by providing a summary of the background information and understanding of the topic, explaining the need of the research by putting across the research problem which is supported by a set of questions, explaining the research methodology, providing the expected results of the study and illustrating the structure of the research paper.

An introduction answers the below mentioned questions for a reader:

What was the document I just read?

What is the need of investigating this topic?

What was known about the topic before this study?

What will be role of this study to enhance new methods of understanding the problem?

As per Reyes, “there are three overarching goals of a good introduction: 1) ensure that you summarize prior studies about the topic in a manner that lays a foundation for understanding the research problem; 2) explain how your study specifically addresses gaps in the literature, insufficient consideration of the topic, or other deficiency in the literature; and, 3) note the broader theoretical, empirical, and/or policy contributions and implications of your research.”

A good introduction is very important to create a good first impression. The beginning of the introduction provides its reader with rationale of your arguments, the standard of researcher done and also supports the validity of the conclusions and applicability of the findings. To create a positive impression, the introduction must be concise, nicely written and engaging. The conclusion of all introductions must be done with a small paragraph outlining the layout of the rest of the paper.

- ***Structure and Approach of Introduction***

An introduction refers to a comprehensive start of the research paper that answers the following for the reader:

What am I reading?

Why should I go through this?

What is the point of consideration or focus?

The structure of the research lays the base on which the research problem is explained and can be depicted as an inverted triangle. The top tier would have broader aspects of the research which would narrow down to more particular information that would outline the backdrop, finally arriving at the specific problem and the logic for studying it, and, wherever possible, details of the potential results your research can unearth.

The common phases linked to writing an introduction are as follows:

- 1) Establish the scope of research by accentuating the significance of the topic, and/or stating general aspects of the topic, and/or providing an outline on the existing research on the topic.
- 2) Indicating a niche by contradicting an existing belief, and/or pointing out to limitations in an existing research, and/or conceiving a research problem, and/or taking forward the traditions of a discipline.
- 3) Placing your study inside the research niche by expressing the objective of your research, stating the important aspects of the study, explaining the important outcomes and proving an overview of the constructs included in research.

- 2) **Purpose of study**

A research is a study with a direction and focus so that a researcher must lay down his/her hypothesis and provide the background of the problem. Hypothesis refers to a tentative statement that indicates towards the nature of the problem. S/he should be able to collect data, analyze the data and check the hypothesis. S/he should be able to explain the need of his/her study in advancing knowledge and eradicating the problem. Secondary source must be used for data review to provide explanation to the problem statement.

3) **Significance of Study**

The term research can be broken down into two, ‘re’ and ‘search’, and hence a researcher must put forth any previous study in a new manner or must propose a new theory. S/he must provide reference to any previous work done on that topic and state how his/her work would be different and relevant from the earlier studies. The problem statement must provide an explanation to the existing details of the topic and the method s/he would use to conduct his/her research.

4) **Review of Literature**

Research is an ongoing process and a researcher cannot shy away from any previous work done on his/her topic. His/her work should begin with making a note of all previous works published or unpublished and set guidelines of his/her research by reviewing the literature. The information of the earlier work must be collected and listed as follows:

- 1) Author
- 2) Title
- 3) Publisher
- 4) Year of publication
- 5) Objectives
- 6) Conclusion

This will help him/her to differentiate his/her study from the rest and s/he should outline the common attributes and differences honestly. The researcher should explain to the reader how his/her work is different from others and s/he should be open to challenge the conclusions of any previous work.

S/he should point out the crucial issues missed and state how his/her study addresses to them.

You can refer to the “five C’s” of literature review to help you to frame one:

- **Cite:** Specifying or citing helps highlighting the literature relevant to your research problem.
- **Compare:** The researcher should compare all the previous works, and study the arguments, the methodology used, the theories proposed and the outcomes given.
- **Contrast:** S/he should find out the differences in all those works and look for any controversies, disagreements or debate.
- **Critique:** A researcher should look at the arguments that are more convincing, the theories that seem to be more valid, the methodologies that appear appropriate.
- **Connect:** It should funnel down to how the researcher’s study differentiates or enhances any existing work.

5) **Methodology**

Research methodology primarily refers to method of collecting data. There are two basic sources: primary and secondary. The former is collected in field by a questionnaire or interview while the latter relies on library work. It should mention the procedure of data collection, the sampling method and the research procedure being used. Methodology must state the various attributes of a problem that are under study in order to generalize about the phenomena. The scale used

for measurements must be described besides the multiple concepts applied in the study. In case of primary data collection, a copy of the questionnaire must be provided in the appendix.

Research methodology must be written well and organized logically because even though the research has not yet begun but the reader must have the faith to go forward with it. At this juncture, the reader does not have the liberty to judge the out comes. If the methodology applied was a correct one, thus s/he should be convinced of your choice and that it would lead to the correct solution of the problem.

As a researcher you may use the examples from literature review for explaining the overall research design. Examine the methods used by other researchers to collect data and also if there is a better way to do the same.

As a researcher you need to have clarity on your approach to gather information, the technique for its analysis and the tests to validate the same. While describing the methods, ensure the following:

- *Specify*: Mention the procedures that will be undertaken for the research and the methods of interpretation of results. The methodology is not only a list of processes but also provides a defense as to why these processes are the best way to find an answer to the problem.
- *Predict and accept*: You need to predict about any likely roadblocks and risks in conducting your research well in advance and describe your solutions for the same. There is no perfect method and it is beneficial to acknowledge the shortcomings beforehand instead of being pointed out by a reader.

6) Interpretation and Analyzing of data

Generally the primary data needs to be interpreted systematically. The tabulation should be complete in order to infer any conclusions. Not all questions are useful for writing a report, thus a researcher must choose or combine them in conjunction with the objectives of the study. Analyzing the data is the heart of the research problem. The data gathered in field is used to reach conclusions of the study. To meet the objective of the research and provide solutions a researcher must analyze the data and this is the most significant part of his/her research.

7) Conclusions/suggestions

Whatever conclusions s/he draws, the researcher must have an underlining logic supported by statistics. The generalization of hypothesis and its basis must be a part of the report with all the proofs supporting the theory if proposed. The limitations of the study must also be mentioned.

A conclusion is a reiteration of the significance of the proposal and gives a summary of the complete research. The entire section should not exceed a couple of paragraphs and should emphasize only on the importance of your research and how it is distinct and how it enhances any existing knowledge.

A reader, after going through the conclusion, should be able to infer the rationale behind the study, its purpose, and the reason for the choice of a specific method, the implications from the research and how the research fits into the broader aspects of the research problem.

8) Preliminary Suppositions and Implications

Due to the reason that you don't necessarily have to conduct a study and examine the result, you cannot escape mentioning the analytical process and the possible

outcomes. The reason behind this section is stating your belief in how your research will, change, improve and enhance knowledge in the area of your study. Based on the goals and potential outcomes of your study you have to describe their effect on future research, practice, hypothesis, type of intervention, impact on policies, etc.

While working out the implications, consider the following:

- Effect of the results on the hypothesis of the study.
- Suggestions for future research from the potential results.
- Implication of the research on the practitioners at their workplaces.
- Implication of results on the forms of intervention.
- Contribution of results towards socio-economic problems.
- Implication of results on policymaking.
- Benefit of the study on individuals and groups.
- Scope of improvements from the research.
- Ways of implementing the results and innovations it involves.

NOTE: It is important that this section does not go through mere speculation, personal opinions or is constructed without evidence. The main reason of this is to point out the holes in the existing literature and suggestions to fill those through your research.

9) **Delimitations of the Study**

Delimitations outline the attributes that determine the theoretical framework of your research and limit its scope. They are ascertained by thoughtful inclusions and exclusions for investigating the research problem. To put it simply, you must explain to the reader as to what is your research and why is s/he studying it and you should also explain the reasons for rejecting any alternate methods that could have been used for the study.

Clearly, the selection of the research problem is the first component. An example of a delimiting statement can be, “Although many factors can be understood to impact the likelihood of young people to vote, this study will focus on socioeconomic factors related to the process of voting in elections.” The purpose is not to write down every delimiting factor, but to underline why past researched topics connected to the issue were not addressed.

Examples of delimiting choices:

- Your research objectives.
- The questions you answer through your research.
- The aspects and attributes of the event under study.
- The method of research.
- Its time period.
- Alternative theoretical frameworks.

You should clearly demonstrate the intended outcome of your research as well as also mention the aspects that the study will not cover. For the latter, the exclusions should be understood as, “not interesting”; “not directly relevant”; “too problematic because...”; “not feasible,” and the like.

NOTE: Delimitations implies that the initial selections or choices that were made for the study are not to be confused with the noting down the shortcomings of your study. It should not be viewed as inherent limitations of the study.

10) Citations

For any research paper with a scholarly inclination it is imperative to mention the sources that the researcher has used. This can be presented in two forms:

References – It is the list of only the literature that is used in the research proposal or study.

Bibliography – It is a comprehensive list of everything that has been referred to while doing research those that are cited in the study or proposal.

You can choose either but this section proves that you did enough homework and your work is not a duplication of somebody’s research but an enhancement to any existing study.

Begin your citations on a new page titled “References” or “Bibliography”. There are specific formats (like APA) for tabulation of this and whichever is predominant or approved in your organization, the same can be used. This list has to be arranged alphabetically and should be shown in the appendix. Books, articles and projects should follow each other in the listed order.

11) Appendices

It contains information that does not have direct usage in data analysis but provides an understanding to the background of research.

10.5 SIGNIFICANCE OF REPORT WRITING

Until the research report has been presented the research is deemed incomplete, which makes report writing one of it’s the most important component. Even if the hypothesis is analytical, the research study is beautifully designed and executed and the findings are path breaking, they hold no significance until they are successfully communicated. This underlines the importance of a research report. There might be some who do not consider it as important but the academic world as a whole considers this as an essential part of research. A researcher can seek guidance of experts for this as this is a significant part and any help should be welcomed.

10.6 PRECAUTIONS FOR WRITING RESEARCH REPORTS

A good research report is the one that effectively communicates the findings to its readers.

The following precautions must be observed for the same:

- 1) Length: It should be adequate, long enough to cover all aspects and short enough to keep the reader engaged.
- 2) Interesting: Should be able to keep the reader hooked and maintain his/her interest.
- 3) Simple: Avoid technical jargon and abstract terms.
- 4) Prominence to findings: Most readers want to gain quick knowledge of the topic so the findings must be prominently mentioned. Pictorial representations like chart and graphs can also be used to showcase important results.

- 5) The layout must meet the objective of the research and should be appropriate.
- 6) Error free from grammatical mistakes.
- 7) Structured: The subject matter must be presented in a logical way and the structure should assimilate all individual analysis in a coherent manner.
- 8) Original: The report should aim at providing a new solution or add to the existing knowledge about the research problem.
- 9) A report must mention implications to policy and forecast the probable future of the topic under study while mentioning the need for any further research.
- 10) Appendices: All technical data of the report must be enlisted
- 11) Bibliography: It is very important to mention all the sources consulted for the report.
- 12) Index: A report should be indexed well and it is considered as an important part of the report
- 13) A report should look good in appearance.

10.6.1 Tips to Remember While Report Writing

- Be unbiased.
- Write in past tense as the study has already been completed
- Use active voice wherever possible. Avoid: “It was found that...” instead use: “Smith (1993) found that...”
- Be concise, express yourself in brief. Avoid: “In his study, which was performed in 1993, Smith was surprised to find that...” Write: “Smith (1993) found that...”
- No slang to be used.
- Use minimally the terms “I”, “me”, and “my” and phrases “I feel” or “I think”, etc.
- Literature Review should have transition sentences.
- Read your paper out loud.

Self Assessment Questions II

Fill in the Blanks:

- 1) Research report should avoid and
- 2) is the list of only the literature that is used in the research proposal or study.
- 3) is a comprehensive list of everything that has been referred to or cited in the study or proposal.
- 4) is the path that takes the reader from a general topic to the specific area of enquiry.

10.7 LET US SUM UP

It can be concluded from the above discussion that psychological research is a scientific process and preparing of research proposal involves certain standard procedures. The concept, format and steps of writing a research report in psychology, were also discussed

10.8 UNIT END QUESTIONS

- 1) Write down the purpose of Psychological Research.
- 2) Discuss the concept and relevance of a research proposal?
- 3) Write down the format of research report?
- 4) What is the significance of report writing?

10.9 ANSWERS TO SELFASSESSMENT QUESTIONS

Self Assessment Question I

- 1) False
- 2) True
- 3) False
- 4) True

Self Assessment Question II

- 1) technical jargon and abstract terms
- 2) References
- 3) Bibliography
- 4) Introduction

10.10 GLOSSARY

Research: It refers to a study done scientifically with utmost care and in detail about a certain problem or issue.

Research Report Documented research with the help of which future researcher can act on its outcomes.

References – It is the list of only the literature that is used in the research proposal or study.

Bibliography – It is a comprehensive list of everything that has been referred to or cited in the study or proposal.

10.11 SUGGESTED READINGS AND REFERENCES

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BA PSYCHOLOGY

BPCC-105 Psychological Research Guidelines on Practicum

(2 Credits)



**Discipline of Psychology
School of Social Sciences
Indira Gandhi National Open University**

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1.0 INTRODUCTION

The BA Programme offered by the University will introduce you to the laboratory component in the courses offered by the Discipline of Psychology. To complete the course BPCC-105 General Psychology, you must complete one Tutor Marked Assignment, attend practicum sessions (sessions are mandatory), write the term end examination for theory and practical components separately.

Laboratory component is of 2 Credits. In this, you will learn how to administer tests and conduct experiments in a controlled condition, that is in a laboratory setup at your Study Centre. The test and experiments will be carried out on a human participant and you will be the experimenter or test administrator. At times, this situation may also be reversed as during the course you will carry out practicals amongst your classmates. The tests and experiments are related to various topics that you have read or about to read in the theory component of BPCC-105. While doing lab work, you will be directly supervised by your academic counsellor. You will follow a standard procedure for administration, scoring and interpretation of the result and findings. You will also learn about ethical issues as they apply in laboratory work.

As you must have learned that psychology is a science of human behaviour. It aims at understanding various phenomena of human mind and behaviour. The purpose of understanding is description, explanation, prediction and control of behaviour, and the application of various techniques for the betterment of life. But how these goals are achieved? These goals are achieved through scientific research as a first step and then the research results are applied in real life settings. Psychologists have developed certain methods and procedures over the years to understand behaviour. These methods are studied in the branches of psychology especially devoted to the experiments, methods and research in psychology. The first such branch is Psychometrics which literally means measurement of psychological variables. It includes everything related to the measurement of psychological constructs. The more specific branches are Experimental Psychology and Psychological Testing. Experimental psychology, as the name suggests, is focused more on experimentation in psychology. Psychological testing is more focused on psychological tests developed to study various mental abilities, personality traits, and other related aspects of behaviours. Psychological tests are scientifically designed instruments for psychological measurement of constructs.

Experiments in psychology make use of different instruments/apparatus to study different cognitive, affective or behavioural aspects such as sensation, perception, attention, memory, learning and other such processes. They mainly focus on studying the cause and effect relationship between independent and dependent variable. Experiments mainly focus on studying cause and effect relationship between independent and dependent variables. The participant has to be active during the experiment as she/he not only performs on a task but is also vigilant in observing one's own mental activities while performing the task and reporting it to the experimenter. This is also known as 'introspective report'.

On the other hand, psychological tests can be classified into various types on the basis of administration, time limit, nature of items. This will be described in detail in later section. Psychological tests can be used in different settings like schools, hospitals, organisations and welfare organisations. They can also be used for research purpose. They are not only used to diagnose mental disorders,

but may also be used to select individuals for different jobs, to determine career choice and grades, etc. Tests are also used to assess personality and adjustment pattern. Tests are administered in a standardized manner and includes assessment of some mental process, trait or characteristic. The main characteristics of a good test are that it should be reliable, valid, possess good norms and should be appropriate for the persons's age, cultural, linguistic and social background. A good psychological test is always a standardized test, which means that the test follows a uniform and systematic procedure of administration and scoring. It also has a manual in which the reliability, validity and the norms are provided.

As part of this course, you will learn the administration of tests related to personality and also experiments based on cognitive processes, like perception and learning. As an experimenter/test administrator, you will make use of different apparatus and test materials (test booklet, manual, and scoring keys) to study different aspects of human behaviour.

2.0 PRACTICAL IN BPCC-105 (2 CREDITS)

Any two standardized tools for measuring:

- 1) Aptitude (e.g. Differential aptitude test)
- 2) Interest (e.g. Vocational Interest Inventory)
- 3) Attitude (e.g. social distance)

Two practicals are to be conducted in the psychology laboratory. From the above three, any two needs to be conducted and written in proper format (as mentioned in the guidelines) in the Practicum Notebook. The Practicum Notebook should include a title page (format given in Appendix I) and a certificate (Appendix II). This notebook is to be assessed by the concerned academic counselor. Actual conduction of practicals and reporting it in practical note book (internal assessment) carries 50% weightage and the Term End Examination of Practical including viva- voce (external assessment) carries 50% weightage.

3.0 PROCEDURE TO BE FOLLOWED BY ACADEMIC COUNSELLOR

For Experiments in Psychology

- 1) You may refer to some of the books given as follows:
 - Experimental Psychology by L. Postman & J. P. Egan
 - Experiments in Psychology by S. M. Mohsin
 - Experimental Psychology with Advanced Experiments (2Vols.) by M. Rajamanickam
- 2) Explain the experiment in detail to the learners.
- 3) Introduce the experiment in terms of:
 - Historical background
 - Hypothesis/es

- Independent and dependent variables
 - Control and experimental conditions
 - Administration
 - Scoring
- 4) After the introduction of the experiment, demonstrate to the learners how to conduct the experiment.
 - 5) The demonstration will include the following:
 - Preparation for the experiment, for instance, keeping the material (instrument/ apparatus, stimulus words/ list, stopwatch) ready.
 - Establishing rapport with the participant, making him/her feel comfortable
 - Explaining the experiment (procedure, time limit, precautions)
 - Taking informed consent for undergoing the experiment and informing the participant that the experiment findings will remain confidential.
 - Taking permission to record the session, wherever applicable.
 - Explaining the instructions to the learners.
 - Clearing all doubts in the mind of the participant about the experiment.
 - The experiment is conducted on the participant.
 - 6) Explain the scoring procedure to the learners.
 - 7) Explain how to discuss the data.
 - 8) Ask learners to conduct the experiment on each other in pairs and monitor the same.
 - 9) The learners will now conduct the experiment and do the scoring.
 - 10) The learners will have to write a report of the experiment in the practicum notebook which will be evaluated by the academic counsellors.

For Psychological Tests

- 1) Go through the manual of the test thoroughly.
- 2) Explain the test in detail to the learners in the class.
- 3) Introduce the test in terms of:
 - History of the Test
 - Author
 - Development of the test
 - Features of the test (e.g. no. of items, dimensions, reliability, validity)
 - Administration
 - Scoring
 - Interpretation

- 4) After the introduction of the test, demonstrate to the learners how to administer the test.
- 5) The demonstration of administration will include the following:
 - a) Preparation for the test, for instance, keeping the test material (test booklet, answer sheet, stopwatch) ready.
 - b) Establishing rapport with the participant, making him/her feel comfortable
 - c) Explaining the test (procedure, time limit, precautions)
 - d) Taking informed consent for undergoing the test and informing the participant that the test findings will remain confidential.
 - e) Taking permission to record the session, wherever applicable.
 - f) Reading the instructions for test administration from the manual and showing it to learners as to from where they have to read the instructions.
 - g) Clearing all doubts in the mind of the subject about the test administration.
 - h) The participant takes the test.
 - i) Taking the answer sheet from the participant after completion of the test.
- 6) Explain the scoring procedure (as given in the manual) to the learners.
- 7) Explain how to interpret the data.
- 8) Ask learners to administer the test on each other in pairs and monitor the same.
- 9) The learners will then administer, score and the results.
- 10) The learners will have to write a report of the experiment in the practicum notebook which will be evaluated by the academic counsellors.

4.0 IMPORTANT INFORMATION FOR THE LEARNER

- 1) **Practicum Counselling Sessions:** You are advised to contact your Study Centre with regard to schedule of counseling sessions for the Practicum Course. You may also visit the website of your Regional Centre, where the schedule of sessions is displayed. Unlike counseling sessions of other courses in the programme, the sessions organized for this course are mandatory. Thus, you should attend all the sessions and, in these sessions, your academic counselor will teach you how to conduct and administer experiments and tests. You will clarify all your doubts arising while pursuing this course from your academic counselor. There is weightage given to attendance in evaluation also (refer to evaluation scheme, under 'Evaluation'). The number of counselling sessions allocated for practicum course are 02 sessions (01 session is of 03 Hours duration).

2) **Writing of Practicum Notebook:** As mentioned above, you will be conducting and administering experiments and test in the Practicum course. You will thus, record the procedure of two practicals in the practical notebook. The notebook should be handwritten, in the format mentioned at point No.3, and checked by the academic counselor under whose guidance you have conducted practicals.

3) **Format for Writing Practical Notebook**

The academic counsellor will introduce the following format which you have to follow while preparing the practicum notebook.

- **Title:** This heading will mention the ‘title’ or ‘name’ of the practical e.g: 16 PF / Muller-Lyre Illusion.
- **Aims/ Objectives:** This section will consist of the main objectives or purpose of the practical. For example, if you are performing a test on ‘16 PF’ then the basic objective of the test will be: ‘To assess the personality of the participant using 16 PF’.
- **Hypothesis/es (written in case of experiments only):** A tentative statement about the cause and effect relationship between the independent and dependent variables, is to be mentioned.
- **Introduction:** Here, the historical background of the test/ experiment is mentioned. The concept is defined and discussed. For example, in case of 16 PF, the historical background of 16 PF is described. The concept of personality is defined and the theories related to it are discussed, with a special focus on Cattell’s personality theory.
- **Description of the Test/ Experiment:** Under this, the details with regard to the test experiments are mentioned, like author of the test, basic purpose of the test, number of items, dimensions/ factors included in the test, time limit, reliability, validity, and scoring.
- **Material Required:** The material required for the administration of the test (or experiment) is mentioned. For example, in case of 16 PF, the test booklet, answer sheet, scoring key, pencil, eraser are required.
- **Participant’s Profile:** This will consist of all the detailed information about the participant, like, name of the participant (optional), age, gender, educational qualification and occupation.
- **Procedure and Administration:** The following sub headings are included here;

Preparation: The material required for conduction of the test/ experiment, like, test booklet, apparatus or instrument, answer sheet, stopwatch are kept ready.

Rapport: You have to mention that rapport was created with the participant and that she/he was well informed about the details of the test/ experiment.

Instructions: Instruction as given in the test manual/ experiment are included here.

Precautions: Precautions, if any, to be considered while administration of the test/ experiment are mentioned under this sub-heading.

Introspective Report: After completion of the test/ experiment by the participant, an introspective report is to be taken, that is, the participant's feeling and constraints faced by him/her while undergoing the test/ experiment is mentioned under this sub-heading in first person.

Scoring and Interpretation: After the participant completes the test, the answer sheet is to be scored with the help of the scoring key and the data is to be interpreted with the help of the norms given in the manual. The scores can then be mentioned and interpreted under this heading. For experiments, the findings are to be analysed and mentioned here.

Discussion: You have to discuss the result based on the interpretation. It may be further analysed in the light of the introspective report. In case of experiments, the results may be supported by existing studies conducted in the field.

Conclusion: Under this heading, you have to conclude the findings of the test or the experiment.

References

The books, websites and the manual referred to by the learner are mentioned in American Psychological Association (APA) format.

References (APA Style)

References have to be written in APA format. These should be alphabetically listed.

Books

Anastasi, A. (1968). *Psychological Testing*. London: MacMillan Company.

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Websites

<http://www.mcb.co.uk/apmfirum> (accessed on 2.3.2011)

- 4) You will keep the photocopy of the practicum notebook before submitting it at the study centre. Acknowledgement (Appendix 3) may also be taken while submitting the notebook.

5.0 EVALUATION

- 1) **Term End Examination (TEE) Form and Exam Fee:** You will have to deposit separate exam fee for the TEE of Practicum Course. The exam fee is Rs. 200/-. Kindly check the latest fee amount applicable from www.ignou.ac.in (it is subject to revision).
- 2) **TEE:** Total marks for Practicum Examination will be 100 marks (Internal assessment is 50 marks and External assessment is 50 Marks). Internal assessment refers to actual conduction of Practicals and reporting them in the practical notebook in the prescribed format. External Assessment refers to conduction/ administration of Practicum on exam day and appearing in Viva- Voce. TEE for the course will be organized at the Study Centre.
- 3) **Conduction of TEE:** You will conduct the practicals and submit practicum notebook to the academic counsellor and get it corrected before the Practicum Term End Examination. You will bring notebook at the time of examination. The examination will be conducted at the respective study centres. The duration of the examination will be of 3 hours. During the examination, you will conduct the practical and submit the answer sheet. The practical will be allotted to you by the way of lottery system. You will then collect the test material and start conducting the practical. You need to bring one participant on the day of exam, on whom the test/ experiment will be conducted. Once you finish conducting the practical, write the findings in the answer sheet. This will be followed by viva-voce. The participants may leave after the conduction of practical is over.

The practicum answer sheets will be corrected by the external examiner and the viva-voce will also be conducted by the external examiner.

Dates for Term End Examination of Practicum

| Admission Cycle | Date Range for TEE of BPCC-105 |
|-----------------|--------------------------------|
| June TEE | 1 July to 14 August |
| December TEE | 1 January to 15 February |

The dates for TEE of BPCC 105 will not appear in the datesheet provided by SED, IGNOU. For this, please contact your respective study centres.

- 4) **Passing Marks for Practicum:** Minimum passing marks in the course is 35. There is no re-evaluation in TEE of Practicum.
- 5) **Scheme of Evaluation:** The following evaluation methodology will be followed for TEE:

| INTERNAL | Marks | EXTERNAL | Marks |
|-----------------------------------|-----------|--------------------------------|-----------|
| Attendance | 05 | Conduction | 20 |
| Conduction of test/ experiment | 30 | Evaluation of answer script | 10 |
| Practicum Notebook | 15 | Viva-Voce | 20 |
| TOTAL | 50 | TOTAL | 50 |

External evaluation will carry 30% weightage and internal evaluation will carry 70% weightage.

6.0 A BRIEF GUIDE TO PRACTICALS

Principles of psychological testing

We all are familiar with the term testing. We grow up taking various tests at our school, tests for our physical fitness, or tests for our selection in sport teams or tests for recruitment, and the like. You must have also attempted tests in some magazine or newspaper which rates you on friendship scale – how friendly you are to others or an interest test – what do you want to do in leisure time or what do you want to be in life, or how active you are in taking initiatives etc. the list can go on. One very common example of test is appearing for examination in school. This type of test is called achievement test. In achievement test previous learning or what has been learnt is measured. This is only one type of various tests under the umbrella of testing. But if you think about psychological testing, your mind will take you to the topics like intelligence, personality, attitude, creativity, learning, and memory etc.

Here, we will briefly explain what a psychological test is and its types; and then we will discuss principles related to administration, scoring, interpretation and report writing.

Psychological test

In general terms test is any procedure used to measure a factor or assess some ability. Included in this are intelligence test, which yields IQ (Intelligence Quotient) measures, aptitude test, which measure potential in some area, various personality tests which assess aspects of personality style, belief systems and attitudes. More specifically, a psychological test can be defined as ‘a standardized instrument designed to measure objectively one or more aspects of a total personality by means of samples of verbal or nonverbal responses, or by means of other behaviours’ (Freeman 1965: 46).

Thus, a psychological test

- Is a standardized instrument
- Objectivity is one of the characteristics of a standardized instrument.
- Measures one or many psychological attributes- mental ability, personality, interest, attitude, aptitude, etc.
- Measurement is done through verbal or non-verbal responses.
- Sample of behaviour may be observed or studied through psychological tests.
- The test results are given in terms of scores or categories.

A brief overview of the early developments in testing

Scholars date the history of testing back to 2200 BCE with the examination of Chinese officials to determine their fitness for office. This rudimentary type of testing was refined during Han Dynasty around 202 BCE - 200 CE.. Five topics were tested: civil law, military affairs, agriculture, revenue and geography. The system of Chinese examination took its final shape in 1370 when proficiency in the Confucian classics was emphasized. But the established system was abolished in 1906. Psychological testing is believed to have started with the work of Francis Galton on individual differences. The concept of individual differences is a basic

concept underlying psychological testing. Francis Galton (1822-1911) was the first scientist to undertake systematic and statistical investigation of individual differences. He demonstrated that individual differences exist in human sensory and motor functioning, such as reaction time, visual acuity and physical strength. James McKeen Cattell extended Galton's work. Cattell also coined the term mental test in 1890. Before Galton, there were other important works in the history of psychology, but difference in human abilities was not focused upon until the work of Galton. Weber (1795-1878) experimented on weight discrimination, vision, hearing and the two point-point threshold. Fechner (1801-07) contributed significantly in the understanding of relation of mental processes to physical phenomena (for example, how the change in the intensity of sound will affect the auditory perception). Wilhelm Wundt (1832-1920) who established the first psychological laboratory in 1879 in Leipzig, Germany, was working on the measurement of mental processes years before. In 1862 he experimented with thought meter to measure the speed of thought.

Thus, psychological testing developed from two lines of enquiry:

- One based on the measurement of individual differences by Darwin, Galton and Cattell
- The other, based on the work of the German psychophysicists – Weber, Fechner and Wundt.

Modern psychological tests were constructed in response to the needs of classifying the mentally and emotionally handicapped. The Seguin Form Board Test (1866) was developed by O. Edward Seguin (1812-1880) to educate and evaluate the mentally disabled. An important breakthrough in the creation of modern tests came at the turn of the twentieth century with the publication of intelligence test by Alfred Binet and T. Simon in 1905. With the time more developments were seen in the field of testing with a range of testing devices like personality tests, performance tests, aptitude tests, interest inventories, educational achievement and multifactor tests etc.

As a learner of psychology, are suggested to read more on the development of psychological testing—how it was started, what were the landmarks in the history of psychological testing. Here, we are giving a brief overview of the early developments:

Table 1: A Summary of Early Landmarks in the History of Testing

| | |
|-----------|--|
| 2200 B.C. | Chinese begin civil service examination |
| A.D. 1862 | Wilhelm Wundt uses a calibrated pendulum to measure the ‘speed of thought’ |
| 1884 | Francis Galton administers the first test battery to thousands of citizens at the International Health Exhibit |
| 1890 | James Mckeen Cattell uses the term mental test in announcing the agenda for his Galtonian test battery |
| 1905 | Binet and Simon constructed the first intelligence test |
| 1914 | Stern introduces the concept of IQ or intelligence quotient- the mental age divided by chronological age |

| | |
|------|--|
| 1916 | Lewis Terman revises the Binet-Simon scales, publishes the Stanford-Binet. Revisions appear in 1937, 1960, and 1986. |
| 1917 | Robert Yerkes spearheads the development of the Army Alpha and Beta examinations used for testing World War I recruits |
| 1917 | Robert Woodworth develops the Personal Data Sheet, the first personality Test |
| 1920 | Rorschach Inkblot test published |
| 1921 | Psychological Corporation- the first major test publisher- founded by Cattell, Thorndike and Woodworth |
| 1927 | The first edition of the Strong Vocational Interest Blank published |
| 1939 | Wechsler-Bellevue Intelligence Scale published. Revisions published in 1955, 1981 and 1997. |
| 1942 | Minnesota Multiphasic Personality Inventory published |
| 1949 | Wechsler Intelligence Scale for Children published. Revisions published in 1974, 1991 |

Adapted from: Psychological Testing by R J Gregory 2004: 51

Types of Tests

Tests can be categorized on the basis of administration, the behaviour they measure, mode of response and on the basis of the structure of the test. On the basis of test administration, there are two types of tests: Individual tests and Group tests. The tests which can be given to one person at a time are known as individual tests. Group tests can be administered to more than one person at a time by a single examiner. If we categorize tests according to the type they measure, these tests are put under a broad category: ability tests. Ability test measure skills in terms of speed, accuracy or both. For example, in the test of mathematical ability, the more problems you solve accurately within the time limit, the more will be your score. Ability is a broad term which encompasses aptitude tests, intelligence tests and achievement tests. Achievement tests measure previous learning, like how much has been learnt in English in one year by six grade learners can be measured by term end examination. Aptitude tests measure potential for acquiring a specific skill, for example how much can be learnt by a person in music if s/he is given specific training is the person's musical aptitude. Intelligence tests measure a person's general potential to solve problems, to adapt to changing circumstances and to benefit from experience. All the above three types of tests are inter related; sometimes these tests are included under the tests of human ability. Personality tests measure traits, temperaments and dispositions. Personality tests can be categorized on the basis of the structure of the test. Whether the test is clearly structured like a questionnaire or it is semi-structured or uses unstructured stimulus. Unstructured or semi- structured tests are commonly known as projective tests. The test stimulus in projective tests is ambiguous, like ink-blots in Rorschach inkblot test.

On the basis of time constraint in the test, if the test has simple items and has a time limit, then it is a speed test. On the other hand, a power test may have a generous time limit but with difficult items. Tests may also be classified on the basis of nature of items or content of items used. In this category, a test may be a verbal test, nonverbal test, performance test, or non-language test. A verbal test is a paper-pencil test. In non-verbal test, language is only used in instructions, figures and symbols are used in items. In a performance test, the human participant performs on a task rather than answering questions. Such tests do not use language in the test, but instructions may be given by using language, gestures, or pantomime. In non-language test, the test does not use any form of written, spoken or reading communication. Instructions are usually given through gestures and pantomimes. Such tests are administered to people or children who cannot communicate in any language. Test may also be objective and subjective. In objective test there is a specific response to be given (True/False) and the scoring process is free of personal judgement or bias. Subjective test consists of items such as essay questions or responding to inkblots, where there is less specific response. The scoring may thereby, be influenced by personal attitude of the scorer. Tests can also be classified as achievement tests, attitude tests, interest tests and personality tests.

We will discuss some tests in later sections. It should be clear to you by now, that psychological tests are mainly used to assess individual differences in various human abilities and personality. The most common uses of tests are classification, diagnosis and treatment planning, self-knowledge, program evaluation and research.

Basic Principles of Psychological Testing

By principles of psychological testing we mean the basic concepts and fundamental ideas that underlie all psychological tests. Reliability, validity, test administration and standardization are some of the fundamental concepts, that we will discuss here.

a) Reliability

Reliability is consistency. The reliability of a test is its ability to yield consistent results. A good test should be reliable – that is, it should give similar results whenever a person takes it. It should give similar results even if different persons administer and score it. Reliability is not an all or none matter, it is a matter of degree. ‘In more technical terms, reliability refers to the degree to which test scores are free of measurement errors’ (Kaplan and Saccuzzo 2009: 22). The British Psychological Society Steering Committee on Test Standards says that reliability is a reflection of ‘how accurate or precise a test score is’ (1999: 4).

Measures of reliability are usually based on correlation coefficients. A correlation coefficient ranges from +1.0 to -1.0. It is the measure of the strength of association or similarity between two sets of scores obtained by the same person or group. In psychological tests, perfect reliability does not exist usually.

There are several different ways of assessing reliability: item-total correlations, test-retest reliability, split half reliability, factor and principal component analysis and inter-rater reliability. The choice of method depends on the needs of the investigator. In test-retest reliability method, the same test is administered twice to the same group and coefficient correlation is calculated for the scores on both the test. Alternate forms reliability is estimated with the help of alternate form of the

same test. The investigators sometimes develop alternate form of the test which has same content and covers the same range and level of difficulty. Both forms of the test are administered on the same group and the test scores are correlated to find out the reliability of the test. It is also called equivalent or parallel forms reliability. Split half reliability is estimated by correlating the scores obtained from equivalent halves of a test administered once to a representative group. In the item total correlations the investigator calculates the correlation between scores on each item of the test and the total score on the test. Inter-rater reliability is calculated when the measured behaviour is rated by observers. Ratings of different observers are correlated to measure the correlation coefficient. The Table 1.2 gives a brief overview of the methods of reliability.

| Method | No. of Forms | No. of Sessions | Sources of error variance |
|-----------------------------|--------------|-----------------|---------------------------|
| Test-Retest | 1 | 2 | Changes over time |
| Alternate forms (immediate) | 2 | 1 | Item sampling |
| Alternate Forms (delayed) | 2 | 2 | Item sampling |
| Changes over time | | | |
| Split Half | 1 | 1 | Item sampling |
| Nature of split | | | |
| Item total | 1 | 1 | Item sampling |
| Test heterogeneity | | | |
| Interscorer | 1 | 1 | Scorer differences |

Source: Robert J Gregory (2004: 111)

There are different statistical methods used to assess reliability: Cronbach's alpha, Kuder- Richardson (KR-20), Pearson correlation and Guttman's coefficient and factor analysis. Readers can read more about reliability and validity on <http://psychology.wadsworth.com/book/gravetterwallnau5e/index.html>

What should be the accepted level of test reliability or when do we say that the particular test should be used as it has good reliability index? There is no such fixed criterion for a good psychological test. Some authors suggest that reliability should be at least .95. But in the words of Guilford and Fruchter (1978), 'There has been some consensus that to be a very accurate measure of individual differences in some characteristics, the reliability should be above .90. The truth is, however, that many standard tests with reliabilities as low as .70 prove to be very useful. And tests with reliabilities lower than that can be useful in research.

b) **Validity**

A valid test is one that measures what it is supposed to measure. 'A test is valid to the extent that inferences made from it are appropriate, meaningful and useful.' (Standards for Educational and Psychological Testing, 1999). The first essential quality of a valid test is that it should be highly reliable. If a test yields inconsistent results, (i.e. it is not reliable) it can not be correlated with any criterion (some behaviour or personal accomplishment etc.). But high reliability does not guarantee high validity of the test. The relation between reliability and validity can be discussed with the following example: 'Sir Francis Galton's sensory and motor measures could never have been valid if they had not been reliable..... Yet even though some of Galton's measures turned out to be very reliable, later evidence showed that they were not valid measures of intelligence. The measures yielded similar scores time after time, but those scores were poorly correlated

with validity criteria such as school grades and teacher ratings of intelligence.’ (Morgan, King, Weisz and Schoplar, 1997: 520).

There are several different types of validity. One or more methods can be selected depending on the needs of the measure. Different ways of measuring validity have been grouped into three categories: Content validity, Criterion-related validity, Construct validity. Content validity is ‘an estimate of validity of a testing instrument based on a detailed examination of the contents of the test items; contents here means the actual constituent material of the test item’ (Reber and Reber 2001: 781). Content validity depends on the judgment of experts on the relevance of the items used in the instrument. Criterion related validity is assessed by determining the relationship between test scores and some independent criterion. Gregory has included two different approaches under criterion related validity- concurrent validity and predictive validity (2004: 124):

- In concurrent validity, the criterion measures are obtained at approximately the same time as the test scores. For example, the current psychiatric diagnosis of a patient would be an appropriate measure to provide validation evidence for a paper-and-pencil psychodiagnostic test.
- In predictive validity, the criterion measures are obtained in future, usually months or years after the test scores are obtained. For example, a college entrance exam that is accurate in predicting the subsequent grade point average of examinees would possess criterion related validity.

Construct validity is ‘a set of procedures for evaluating the validity of a testing instrument based on the determination of the degree to which the test items capture the hypothetical quality or trait (i.e. the construct) it was designed to measure. For example, if a test is supposed to provide a measure of intelligence one should ask: what traits or qualities (or constructs) actually characterize intelligence? Do the test items actually tap such constructs?’ (Reber and Reber 2001: 781). Face validity is dependent on whether the test looks valid to test users, examiners and examinees. Gregory comments that face validity is important for social acceptability of the test but is irrelevant for psychometric purposes.

c) Norms

Suppose someone gets 50 marks on an intelligence test. This score has no meaning in itself. In psychological testing the scores obtained first from a test are called raw scores. These scores are simply overall score of the performance on the test, like the number of problems solved in an intelligence test. These initial scores are converted to some form of standard scores based on a norm group. ‘A norm group consists of a sample of examinees who are representatives of the population for whom the test is intended’ (Gregory 2004: 81). For example, if a test is designed to study the value system of twelfth graders, the test will be given to large number of such age group (rural- urban, rich – middle class – poor etc.) to determine the distribution of raw scores. On the basis of collection of scores, the test developer will provide derived scores. These scores are known as norms. Norms can be in the form of percentiles ranks, stanines, stens, age norm, grade norms or standard scores.

A percentile expresses the percentage of scores in a sample that fall below it. A score at 50th percentile indicates that 50% of the scores fall below it. Percentile should not be confused with percent correct. Percentile is a comparative score. It tells where your scores places you in particular sample (norm group) whereas

percent tells the number of questions answered correctly. 50% expresses how much was attempted correctly on an intelligence test and this 50 percent can be placed at the percentile of 50, 90, or 80 depending on the performance of the sample. Percentile 1 is the lowest rank and 100 percentile is the highest rank.

Standard score is any derived score based on standard deviation. It is more commonly known as z-score. It expresses the distance from mean in standard deviation units. T-score is a variant of standard score. It was suggested by McCall (1922). In case of standard score, the value of mean is taken zero whereas in a T-score the value of mean is 50 and standard deviation of 10.

Stanine (or standard nine) scale was developed by the United States Air Force during World War II. In stanine scale all raw scores are converted to single digit system ranging from 1 to 9. Sten scale (standard ten) was proposed by Canfield (1951). It is a ten unit scale with 5 units above and 5 units below the mean. Age norms express the level of performance with reference to age. Grade norms express the level of performance with reference to grade level.

There are many such norms developed for different tests, as mental age and I.Q. Learners will know more about them while using various tests with different norms.

Test Administration and Scoring

Test administration can be either individual or group. The administration of a test should be according to a uniform and specified set of instructions. This is the first principle of test administration. 'A test is considered standardized if the procedures for administering it are uniform from one examiner and setting to another' (Gregory 2004: 54). If a test is not administered according to the specified set of instructions, there will be no uniformity in the administration of the test. The result of such a test will not be reliable. Test administration should follow the guidelines given in the manual. Some important points that the investigator should know before administering a test are given below:

- Every psychological testing procedure, as we already said, has a purpose and rationale.

Before using a test, tester should see whether the test fulfills the purpose at hand. The question that one needs to ask is, why do I use this test, what is the purpose of using this test? If all the questions are satisfactorily answered, then one should proceed and use the particular test. But if the use of the test is not rationalized on any ground - purpose, population, or context of using the test - the test should not be used.

- Before using a test, examiner must be familiar with the materials, instructions and the procedure to be followed in the test.
- An examiner should be sensitive to disabilities in the examinees. Disabilities related to hearing, vision, speech or motor control may affect test performance. In case of unrecognized disabilities, serious errors of interpretation may occur.
- Examiners should allot proper time for the entire testing process: setup, reading instructions and actual test taking by the examinees. Allowing too much time for a test is equally erroneous as allowing less time.
- Instructions should be read out in a clear and loud voice. Examiners must stop to answer the questions if the instructions are not clear to examinees.

- The physical conditions (testing room) should be suitable for the test. The conditions such as illumination, temperature and humidity should be taken into consideration before the test. The testing environment should be pleasant, quiet and well illuminated with proper writing desk (in case of a test where answer sheet is required to be filled up).
- Establishing rapport is the first thing that examiners are advised to do when giving a test to an individual or a group. ‘Rapport is a comfortable, relaxed, unconstrained, mutually accepting interaction between persons’ (Reber and Reber 2001: 597), especially between an examinee and an examiner. It is essential requirement to motivate examinees to cooperate during testing. It is more important in individual testing and particularly when examinees are children. Failure in establishing rapport may cause anxiety, hostility, and uncooperative behaviour in examinees.
- The scoring of the test should follow the pattern as specified in the test manual. If scoring is not numerical, the method of interpretation should also follow the guidelines as given in the test manual.

Thus, a psychological test is a standardized instrument in the sense that it provides well defined procedure and instructions, the items used in the test are reliable and valid and the test depicts scores in terms of standardized scores. At present, when we have access to computer assisted test administration and scoring, the accuracy and precision in administration will require proper training and practice of the examiner both on technical and human grounds.

Report Writing

After administration of a psychological test, the findings are to be presented in the form of a report. Report should be written clearly. The report should be properly divided into sections and subsections and the findings should be tabulated wherever required.

The report should be written in passive voice. For example, instead of writing ‘I gave the test booklet to the examinee’, one should write, ‘the test booklet was given to the examinee’. The report should be written in a standard format.

Being Qualified and Trained in Psychological Testing

There are two aspects of being trained in psychological testing:

- Having technical and theoretical knowledge of psychological testing and its applications
- Having skills necessary for the application of psychological testing, for example communication skills, being a good observer and empathetic listener, etc.

The above aspects are briefly discussed as follows:

a) Technical and Theoretical Knowledge

Some basic components of this knowledge are:

- i) Knowledge of test construction
- ii) Efficiency in application
- iii) Knowledge and efficiency in scoring and interpretation

i) Knowledge of test construction

Today testing is required in every field: schools, industries, selection agencies, hospitals, special education centers, rehabilitation centers and various other organisations. A psychologist may face the task of choosing a test from the available tests or developing a test as the situation demands. In both the situations knowledge of test construction is mandatory. If one needs to select a test, one should have the knowledge of basics of test construction. How the test is developed? Whether it has proper norms or it is standardized, what is the method of scoring, etc. All this information requires technical knowledge about the test construction process. Otherwise, decision of choosing will be fraught with biased assumptions. The theoretical knowledge pertains not only to the selection of test, but also to the construction of tests. One might face such a situation when no test is available, or the available test is outdated, or not suitable culturally. Suppose you are required to make an index of happiness of people in your country or your state or city. How to prepare such an index? You come to know that one such procedure is available in some other country. But the definition of happiness may differ from one country to the other. At one place, it may be family which is primary source of happiness to persons, but at the other, it may be secure future and material prosperity. Thus, one might decide to prepare a questionnaire to study the level of happiness.

ii) Efficiency in application

Which measure one should choose if one is find out whether a child has learning disability or not. One might need a range of procedures – paper pencil test (test of learning and intelligence), observations, interviews with the child, parents and teachers. Which test one should choose - verbal or non-verbal, some qualitative approach or quantitative or both, whether the test is fit for the cultural background. These decisions need not only theoretical knowledge but insight on the part of the investigator which comes with knowledge, practice and experience.

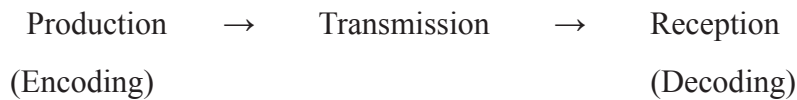
iii) Efficiency in Scoring and Interpretation

Scoring procedures in testing are developed through rigorous statistical procedures. While using psychological tests, one is required to have sound knowledge of statistical principles applied in psychological testing. How the reliability and the validity of the test has been calculated? How the norms of the test have been developed? Knowledge of these technical aspects helps both in construction, selection, revision and adaptation of a test. Interpretation is an essential aspect after scoring which also involves explaining the significance of the scores. What does it mean for a person who gets IQ score of 94? To fulfill all these purposes, an appropriate explanation is an essential requirement from the part of the investigator.

b) Developing Skills

The work of a psychologist is more like an artist. S/he needs to observe, listen, feel and then say something as less as possible. Observation here is not only a method used to study a specific problem. It should be developed as a habit. How to see things: people talking to each other in buses, trains, or offices; youngsters chatting outside a mall, people writing their views in newspapers and magazines, people behaving with each other- in families, in offices, in traffic, nothing should go unnoticed. It need not be a deliberate exercise once it is developed as a habit.

‘A psychologist should be a good writer’, said a wise man. Yes, whatever you observe pen it down. Psychology is a science in the methods it uses, but it is essentially an art in its application. This art will develop gradually when you observe and contemplate and develop the habit of writing things systematically. After observation, another important skill is communication skills. Psychologists working as therapists, counsellors, trainers or psychometricians require communication with others. Communication is a chain of events from the speaker to the Listener. The chain of events involves



Thus, communication involves other mind, a message (information) a code (language) and a channel (written-visual, spoken-auditory) through which information is transmitted. A psychologist should learn to be a good listener before learning to be a good speaker. S/he should learn where and when to speak and where not to. Being just a listener is not sufficient; a psychologist should be an empathetic listener. S/he should feel what others are feeling.

Psychologists should be sensitive to the cultural differences. Various behaviours have their roots in the cultural milieu of a person. The way people talk, greet, their eating habits and sometimes their sensitivity to their surroundings is affected by the environment they live in. If a psychologist is not sensitive to the cultural and environmental factors, there will be no meaning of the inferences drawn from observations and testing, and ultimately will be harmful for the individuals and society at large.

Knowledge of ethical principles during testing is also expected from a trained psychologist. Ethical guidelines for testing issued from time to time are called ethical principles and code of conduct. Psychologist should comply with these principles to avoid any mistake in research and testing. In general, we can phrase principles of ethical treatment as,

- 1) Right to safety
- 2) Right to respectful treatment
- 3) Right to confidentiality
- 4) Right to be informed – technically called informed consent – an examinee should be informed about the nature of the test, risk involved, purpose, and use of information of the test beforehand and only if s/he agrees the examiner should proceed with testing. Examinee should also get informed about the results of the study and use of the test findings.

All the above rights of examinees should be respected during testing and research. In a nutshell, a psychologist should take responsibility of working with humans or animals very honestly that will serve the purpose well for both the examiner and the examinee.

Experiments in Psychology

The first psychology laboratory was established in 1879 by Wilhelm Wundt at Leipzig. In a way, experimental psychology as a formal discipline may be said to be more than hundred and thirty years old. Over the years, experimental psychology has expanded to a large extent. Psychologists have been able to develop precise methods, techniques and procedures of observation and analysis.

With the help of experiments, psychologists have also successfully investigated complex behaviour of both human and animals, predict behaviour with a good deal of accuracy, and have been able to improve behaviour in real life situations.

Experimental psychology had its roots in philosophy and subsequently emerged as an independent discipline. Growth of Experimental Psychology has been possible not because psychologists themselves made all the contributions but also because of their ability to assimilate and adapt the findings of other sciences like physiology, chemistry, astronomy, sociology, etc.

Among the philosophical writings which gave a prominent place for matters of psychological interest were those of Descartes, Leibnitz, and the British Associationists. These writers gave importance to issues like acquisition and growth of knowledge, memory, etc. which were directly related to an understanding of human behaviour. Locke, Berkeley, Hume, Brown, gave the earliest scientific principles of psychology, known as the Laws of Association, which were derived through intellectual analysis and not experimentation.

The mid 19th century witnessed significant developments in the field of biology and physics. The most important was the theory of organic evolution, propounded by Charles Darwin. Since, early psychologists had a close association with religion, theology, and philosophy, Darwin's theory gave a new outlook of establishing psychology as an independent experimental science. This paved the way to take help from developments in other areas like physiology, neurology, medicine, etc. in explaining behaviour. Attempts were made to design and carry out experiments on human behaviour.

In the meantime, the physicist-physiologist Helmholtz made an attempt to study the speed of reaction in frogs. Helmholtz demonstrated that the speed of nerve conduction in a frog could be measured. This gave way to study the speed of reactions in human beings. Significant contributions was made by Donders, a Dutch physiologist. This was the starting point of now famous 'reaction- time' experiments.

The next important development came from the work of E.H. Weber, a German physiologist, who experimented on sensation. Weber attempted to study the quantitative relationship between changes in physical conditions and accompanying psychological changes. Weber, called this area of experimentation as psychophysics. Weber's work was further developed by G.T. Fechner, a German physicist. The work of Weber and Fechner resulted in the formulation of Weber-Fechner law, the first quantitative law in psychology.

The problem of individual differences was addressed by Galton, who was mainly interested in studying and analyzing differences in human behaviour. The most important aspect studied was imagery. Galton devised a test to study the differences among people in imagery.

All these developments were taking place in Europe and this further helped in the establishment of the first psychology laboratory in Leipzig (by Wilhelm Wundt in 1879). After this, various other laboratories were established in places like Vienna, Berlin, Wurzburg, etc. These laboratories were carried out experiments on laws of association, reaction-time, imagery, and sensation.

Another important development in experimentation was by Herman Ebbinghaus, regarding the processes of memory (retention of knowledge) and forgetting

(loss in knowledge). This brought 'higher mental processes' into the domain of experimental psychology.

In United States, attempt to develop experimental psychology was made by E.L. Thorndike. Thorndike had come out with his experiments on learning process and the unique feature in his experiments was the use of animal subjects. He was of the view that animal behaviour would provide very useful clues to study human behaviour. Thorndike's experiments on trial and error learning with cats as subjects and the 'puzzle box' as the apparatus were significant and provided the foundation for modern experimental psychology. Thorndike's work resulted in the first set of empirically derived quantitative laws in the area of learning. The introduction of animals in the laboratory helped in the development of experimental psychology, since, animal experiments provided more accurate observation, as well as, greater manipulation of experimental conditions to ensure better control.

Yet another major development was by Russian physiologists, Bechterev and Pavlov. Bechterev's 'objective reflex' and Pavlov's 'conditioned reflex' threw significant light on the origin of behaviour.

Experimental psychologists soon realised the significance of social factors, and the result was the development of experimental social psychology. Early contributions were made by Allport, Newcomb, Lippitt, Asch, Sherrif, Murphy, Lewin, and others. Today, experimental social psychology has become an independent branch of study all together. Social psychologists have planned and carried out experiments that have helped us to understand the behaviour of human beings in different kinds of social situations. Such understanding has found application in industry, hospitals, schools and other situations where people are found to interact.

Thus, it may be concluded that experimental psychology gradually expanded to areas of learning and social behaviour. Over the years, experimental psychology also included the study of abnormal behaviour, and this resulted in the emergence of experimental clinical psychology to be an important field of application and inquiry. Experimental psychology has developed techniques of behaviour therapy and behaviour modification which may be applied in hospitals, clinics, correctional homes, prisons, etc.

The findings of experimental psychologists are applied in factories, offices, hospitals, schools, etc. There is probably no area where experimental psychology cannot make its contributions. Its area of scope and application is much wider than those of most other sciences.

Psychophysics Experiments

Psychophysics means the relationship of the sensation (psychological effect) to the physical stimulus. The field of psychophysics was founded by Gustav Theodore Fechner in 1860, with the publication of his book *Elemente der Psychophysik*. The important problem of psychophysics, as seen by Fechner, was to discover the psychophysical function- the relationship between the physical intensity of a stimulus and its perceived intensity. Though, Fechner did not measure sensation(perceived intensity) directly. Instead, he used an indirect method of measuring the ability of the subject/participant to discriminate between two physical intensities a way of constructing such function. The psychophysical function was discovered by indirect scaling to be the logarithmic function, and this function, called Fechner's Law, has been the subject of intense debate among psychophysicists ever since. Psychophysical methods developed as ways of

understanding sensory experience. Whatever we know about the world comes to us through our senses. The limitations of our sense organs limit what we can know of the world directly, and bias our view of the world. Accordingly, the study of sensory limits is extremely important. Although we are limited to sensing only certain ranges of physical energies, the variety and form of sensory experience is significant. The psychophysical methods were developed for the general purpose of investigating the laws relating to sensory experience to properties of the initiating stimulus. Although a number of different psychophysical methods were developed, three methods, explored in detail by Fechner, gained particular prominence. These three classical methods are – the method of limits, the method of constant stimuli, and the method of average error- exist in one form or other to this day. One important feature of these classical methods is that they call upon the subject to make the simplest possible

judgement: to detect the presence or absence of a sensation or to decide whether two equal sensations are equal in magnitude or different. These discriminations are among the most reliable judgement of which organisms are capable. Experiments in discrimination study the question what is the minimal difference in physical energies required to discriminate between two stimuli?

Sensitivity is measured by threshold (latin form-LIMEN) – the absolute threshold for detection, and the difference threshold or just-noticeable-difference. Threshold experiments in psychophysics are primarily concerned with detection and discrimination. Experiments in detection study the question – what is the minimal amount of physical energy required to detect a stimulus?

Experiments in discrimination study the question – what is the minimal difference in physical energies required to discriminate between two stimuli?

The guidelines for the experiments of BPCC-105 is given as below

1) DIFFERENTIAL APTITUDE TEST

Aptitudes of individuals are assessed by administering the Aptitude Tests. These tests usually consist of a number of subtests. The most commonly used Aptitude tests are Differential Aptitude Test (DAT), David's Battery of Differential Aptitude (DBDA), General Aptitude Test Battery (GATB) etc. Differential Aptitude Test (DAT), was developed by Bennett, Seashore and Wesman (1984), and it consists of eight subtests. These are Verbal Reasoning, Numerical Reasoning, Abstract Reasoning, Spatial Reasoning, Clerical Speed & Accuracy, Mechanical Reasoning, Language Usage, and Spelling and Grammar. Combination of these abilities is required for success in different occupations. Administration of the whole battery may be time consuming; so combination of subtests are used as per requirement. Aptitude test scores must be used along with previous achievement data, present interests, work preferences, general mental ability etc. in order to effectively guide the person. It may be noted that aptitude data provide only clues/suggestions to help in educational and career planning. It does not explicitly establish a fit between the individual and the job. Other factors such as interest, motivation, hard work, etc. also contribute a lot. These must be taken into account before reaching to a conclusion.

Name of the Test/Experiment: Differential Aptitude Test

Problem: To determine the aptitude/ability of students to learn or succeed in selected areas.

Materials Required: Differential Aptitude Test questionnaire, paper and pencil.

Procedure: After the process of rapport building, the investigator has to provide the questionnaire to the learner. The fifth edition of the battery has been designed for use in educational and career counseling of students in grades seven to twelve; organized into two levels; one for students in grades seven to nine and the other for students in grades ten to twelve. The DAT consists of eight independent scales:

i) Verbal Reasoning (VR), ii) Numerical Reasoning (NR), iii) Abstract Reasoning (AR), iv) Perceptual (Clerical) Speed and Accuracy (PSA), v) Mechanical Reasoning (MR), vi) Space Relations (SR), vii) Spelling (S), viii) Language Usage (LU).

All the above subtests except the Perceptual (Clerical) Speed and Accuracy are multiple-choice power tests. A power test is one which allows enough time to complete the test, but some of the items are so difficult that no one can get a perfect score. On the contrary, the Clerical Speed and Accuracy is a speed test in which the items are of low difficulty level, but the time limit is too short to finish all the items. Alternate forms of the DAT are available.

Result: Nine scores are provided (one for each scale). Scholastic Aptitude score consists of a composite score of verbal reasoning and numerical reasoning. Manual of the test may be referred to for further scoring and interpreting of the result.

Discussion: Discuss the results obtained in Differential Aptitude Test. Follow the manual to analyze, interpret and discuss your score in this section.

2) INTEREST INVENTORY

Interest refers to one's likings and preferences. You may like to play football more than reading a story. This reflects your interests. This means you have more liking for playing football compared to reading. It does not mean that you will not be able to do well in reading. However, it indicates your natural inclination or natural desire to undertake one activity in place of another. Thus, an interest is a tendency to become absorbed in an experience and to continue it and to enjoy it. Interest is an integral part of our personality. The development of interests depends on our environment. If a child is exposed to a family environment where everybody talks about music then there is more likelihood that the child will develop interest in music. Once an interest is developed, it may continue long term or it may even change also. Interests change depending on one's motives, experiences, exposures and emotional responses. However, many of our interests get stabilized by the age of adolescence and young adulthood. Interest may be intrinsic or extrinsic. e.g., playing hockey or tennis for the sake of pleasure or enjoyment is intrinsic, whereas playing it for earning money is extrinsic interest. Super (1990) has classified interests into three groups:

- 1) **Expressed Interests:** These are the interest expressed or told by the individual. These reflect the subjective opinion of the individual.
- 2) **Manifest or Observed Interests:** These are the interests which we observe in a person by seeing that person involved in some or the other activity. However, the observation has to be on a long term basis and across different occasions to arrive to an accurate data
- 3) **Measured or Tested Interests:** These refer to the interests found by assessing/ testing the individual by using different types of interest inventories.

One of the example of interest inventory has been mentioned below:

Name of the Test/Experiment: Kuder Preference Record

Problem: To measure the preferences of the individual for specific activities.

Materials Required: Kuder Preference Record Inventory, paper and pencil.

Procedure: Each item in the questionnaire contains three choices. After building the rapport with the participant, the participant is instructed to select one of the three choices as his/her first choice, and another as his/her third choice. An example is given below:

- Build bird houses
- Write articles about birds
- Draw sketches of birds

This particular item aims to assess three types of interests such as mechanical, literary and artistic interest. The tool uses a forced choice pattern type of assessment where the individual is forced to say which one of the three activities he/she likes best and which one he/she likes least, even though he/ she may not like any of these.

Result

The test has about 168 items having three choices each which provides a score on total 10 dimensions (called occupational areas) - which are- artistic, clerical, mechanical, musical, computational, literary, social service, persuasive, outdoor and scientific interests. The results of the test are scored in form of percentile scores, separately for men and women. It then compares the person's scores on these scales to the manual scores. It also provides comparison between the participant's interests and the interests reported by representative sample.

Discussion: Use the manual score to interpret the scores of the participant. Discuss your results, findings and about the scores achieved in this section.

3) ATTITUDE (e.g. Social Distance)

Any test to measure attitude like social distance scale, semantic differential scale and so on can be used for this subsection of practicum. An example to assess the distance in social relationships using sociometry, has been given below:

Name of the Test/ Experiment: Sociometry

Problem: To measure the degree of relatedness or affiliation amongst the members of the group, work teams, class or organisations.

Material: Paper, pencil, list of names of the members of the group of participants.

Procedure: Sociometry can be used as a scale, which helps in forming choices among interpersonal relationships of people. It is a technique of measurement in which at least (minimum) a group consisting of 5-6 members are asked to select or choose members of the same group based on a specific criteria, as for example everyone in the group can make choices and describe why the choices were made. From these choices a description emerges of the networks inside the group. With the help of these choices or preferences, a drawing, like a map, of those networks called a sociogram is developed. The data for the sociogram

may also be displayed as a table or matrix of each person's choices. Such a table is called a sociometric matrix. It is also important to understand the concepts of sociometric star, mutuals, cliques/chains, isolates, sociometric matrix, and sociogram, they are explained as follows:

1) Sociometric star: Regardless of the criterion, the person whose name is selected by maximum members of the group is known as the sociometric star for that specific criterion. 2) Mutuals: where two people choose each other 3) Chains or cliques: where person A chooses person B who chooses person C who chooses person D and so on 4) Isolates: the person who has not been chosen by any one within the group 5) Sociogram: With the help of the choices or preferences, a drawing, like a map, of those networks called a sociogram is developed. 6) Sociometric matrix: The data for the sociogram may also be displayed as a table or matrix of each person's choices. Such a table is called a sociomatrix. The above concepts can be clearly understood with the help of an example. Let us assume that there is group of six members, namely, 'A', 'B', 'C', 'D', 'E' & 'F'. Each member will be asked to give their choices for a set of questions. The questions asked may be as follows:

- 1) Whom do you trust amongst the members of your group?
- 2) Whose advice would you like to take regarding serious matters of your life?
- 3) Who do you think can transmit messages accurately within your group?
- 4) Who would like to work with?
- 5) Who would you like to spend your leisure time with?
- 6) Who would you like to seek help from to generate creative ideas for your task?

The only requirement is that, the members are required to choose only one person for each question. The sociometric matrix chart, sociogram, star, mutuals, isolates and cliques will be different for each question. Suppose the members have given their responses for the first (question no.-1) question. Let us say, the members have marked a '+' to indicate "High Trust", "M" to indicate "Moderate Trust", and "-" to indicate "Distrust/Conflict". Say for example, the member 'A' has been asked the question first and the following is his/her rating:

B +

C -

D M

E M

F +

This means that for the above question, 'A' highly trusts 'B', distrusts or is in conflict with 'C', has moderate trust on 'D', has moderate trust on 'E' and has high level of trust for 'F'. After obtaining the responses from everyone for the first question (Question No.-1), the next step is to prepare a sociomatrix from all the received responses which may be as following for the above example:

Table: Sociometric Chart for the Question 1

| | A | B | C | D | E | F |
|---|-------|-------|-------|-------|-------|-------|
| A | ----- | M | + | M | + | M |
| B | + | ----- | + | + | + | + |
| C | - | M | ----- | - | - | - |
| D | M | M | + | ----- | M | + |
| E | M | M | + | + | ----- | + |
| F | + | + | M | + | M | ----- |

In the above, the first column shows the choice based ratings of 'A' for the other group members, the second row shows the ratings of 'B', third row is of 'C' and so on. The matrix clearly represents the extent to which the interpersonal relationships exist amongst the members of the group. The row which has a large number of '+' can be identified as the informal leader(s) of the group (member 'B' can be said to be an informal leader in the above example). Rows showing '-'s can identify those people the group may be close to rejecting (member 'C' can be said to be as rejected or least trusted member in the above example). Columns showing all M's or all +'s may highlight those members who have a fear that their responses may be disclosed to others and therefore give moderate responses.

Another important pattern to look for is what is called mutuals. A mutual occurs when I rate you at the same level as you rate me. A positive mutual is when we both rate each other +; a negative mutual is when we both rate each other -. Positive mutuals show bonding in a group. Negative mutuals show areas of conflict. The identification of negative mutuals gives the consultant or therapist insight as to where to start to repair a dysfunctional group. Here are the column totals, and mutuals for our sample group:

Table: Mutuals for the Question 1

| | A | B | C | D | E | F |
|------------------------|---|---|---|---|---|---|
| TOTAL + | 2 | 1 | 4 | 3 | 2 | 3 |
| TOTAL M | 2 | 4 | 1 | 1 | 2 | 1 |
| TOTAL - | 1 | 0 | 0 | 1 | 1 | 1 |
| TOTAL CHOICES RECEIVED | 5 | 5 | 5 | 5 | 5 | 5 |
| NO CHOICES RECEIVED | 0 | 0 | 0 | 0 | 0 | 0 |
| MUTUALS: | | | | | | |
| MUTUAL + | 0 | 1 | 0 | 1 | 0 | 2 |
| MUTUAL M | 1 | 0 | 0 | 1 | 0 | 0 |
| MUTUAL - | 0 | 0 | 0 | 0 | 0 | 0 |

The sociometric thus, highlights that, the member 'C' requires to work more upon its interpersonal relationship with the other members (as it does not reflect mutual relationship with others) in order to bring a better team effort. Similarly, the data of a sociomatrix can also be represented in a graphical form (called "sociogram"). The persons are represented in the form of small circles or bubbles. Say, if you are to prepare a sociogram for the above example, where the arrow → indicates "high trust", the arrow --> indicates "moderate level of trust" and the arrow> indicates distrust or "conflict". Since, all the members have high trust for the person 'B', he is at the center as a sociometric star and the relationship of each

member with each other has been indicated simultaneously. If there would have been an isolate in the above example, then no arrow would have been drawn for the concerned person.

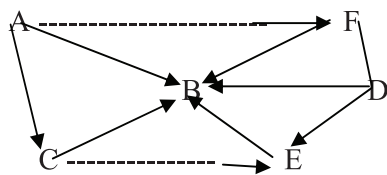


Fig: Sociogram

The learners are required to prepare and work out the sociometric, sociogram, sociometric star, mutuals, cliques and isolates for all the rest of criterion based responses in a similar pattern.

The following instructions should be given, “The following are some of the questions, on the basis of which you have to prepare a sociometric chart, sociogram and then you are required to find out the sociometric star, isolates, mutuals, and cliques for each of the following criteria You have to select only one person for each mentioned question”.

Some of the questions are given below: Whom in this room would you choose...

- 1) for advice on the best suited mobile phone for you?
- 2) to generate creative ideas for your tasks?
- 3) for support in taking risks?
- 4) to transmit messages accurately?
- 5) for help in dealing with a difficult situations?
- 6) to work with you?
- 7) to get reliable information on top management decisions?
- 8) to keep a confidence?
- 9) who would recognize your effort and your job?
- 10) who has shown the most growth in the past year?

Discussion: In this section you are supposed to discuss about the star, isolates, mutuals and cliques, on the basis of the responses of the participants. He/ she has to then prepare a sociometric chart and sociogram and discuss accordingly.

TITLE PAGE FOR PRACTICUM NOTEBOOK

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BA PSYCHOLOGY

Programme Code: BAPCH

Course Code: BPCC-105

Title of the Course: Psychological Research

Name & Enrolment of the Learner:

Address:

Phone No.:

Email:

Study Centre Name/Code/Address:

Regional Centre:

Date:

Signature of the Learner

CERTIFICATE

This is to certify that Ms/ Mr
of BA Psychology Ist Semester has conducted and successfully completed the
practical work in BPC-105 Practicum: Psychological Research

Signature of the Learner

Name:

Enrolment No.:

Name of the Study Centre:

Regional Centre:

Place:

Date:

Signature of Academic Counsellor

Name:

Designation:

Place:

Date:

ACKNOWLEDGEMENT

This is to acknowledge that Ms./Mr.

Enrollment No. of BA has submitted the

Practicum Notebook at the study centre, Regional

Centre.....

Date:

Signature (with stamp)

(Coordinator, Study Centre)

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