1

PHILOSOPHY AND ETHICS OF PSYCHOLOGICAL RESEARCH

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1.1 INTRODUCTION

The main objective of research in psychology is to find scientific answers to questions related to individual's behavior and thought process. As research in psychology can greatly influence not only the individuals but also entire society, it is imperative for psychologists to have a skeptical attitude while planning the research and using empirical methods to do research in scientific way.

1.2 EPISTEMOLOGICAL POSITIONS IN PSYCHOLOGICAL RESEARCH: SCIENTIFIC REALISM, LOGICAL POSITIVISM; OCKHAM'S RAZOR

There is a close connection between philosophy and science. Science gives scientific answers with evidence, to questions raised by philosophy and helps to differentiate between knowledge and beliefs. For instance, one may have a strong belief that air pollution is responsible for lung

diseases, but to accept it as a fact, one needs to follow scientific processes and give strong evidences for that, then only it will gain respectability and become a scientific fact instead of just a philosophical explanation.

1.2.1 Epistemology:

Epistemology is a branch of philosophy that looks into knowledge and justification. It deals with questions such as how do we define knowledge, what is the difference between knowledge and mere beliefs? How do we know that what we have got is actually knowledge? One can say, knowing about knowledge is of paramount importance in epistemology. All of us have lots of beliefs that we might consider either as true or false. If we believe any particular piece of information to be false, then it will not be part of our knowledge. Logically, what it means is that if we say that we know a particular thing, it means that we believe it to be true. For instance, if I say Delhi is the capital of India, it means I believe this information to be true, I cannot believe it to be false and then stating it as fact too. Suppose a person believes and states that height of Himalaya mountain is 12000 ft. but on checking, we find this information to be incorrect/ false, then we can say that this person believed that he knew the height of Himalaya but in reality, he did not know it. So, knowledge can be equated with true beliefs.

However, in epistemology, true beliefs need to be justified too before they become part of knowledge. Knowledge can be defined as justified true beliefs. For instance, suppose, while playing the 'Tambola Housie' game, I believe that next number that will be announced will help me to win the number round. After several rounds, finally a number is announced that helps me to win the game. In such a situation, I had a true belief that a number will be announced that I need to win 'full house', but this true belief cannot be called knowledge, because there was no basis or reason or justification for my true belief. Many rounds passed when my required number was not announced. If my true belief was based on any particular justification, then I would have been able to predict that in which round my number will be announced. The epistemology believes that for a belief to be labelled as knowledge, it must fulfill both the conditions – it must be true as well as there must be sufficient reason or justification for the belief. If scientific methods are followed to test or to generate the beliefs, then these scientific methods can become the base for justification of the beliefs. After all the word science comes from the Latin word scientia, which means knowledge.

1.2.2 Scientific realism:

There are many things in this world that modern scientists assume to exist but we cannot see them or sense them without the help of some other aids, or instance, we cannot see atoms, electromagnetic radiation, etc. With the help of scientific methods, scientists explain that there is reality behind the way things appear. Scientific realism propagates that people should believe in things that are not visible but have been assumed by the scientific theories. Though, the critics ofscientific knowledge agree with

realists that science is based on paradigm of rational inquiry and it has progressively contributed to the growth of empirical knowledge, but at the same time they also believe that scientific knowledge cannot be applied to each and every reality and it can be applied only in a limited degree to certain areas. The critics of scientific realism also argue that whatever is not visible becomes visible with advanced technology, and many of the theoretical concepts that were part of past best scientific theories do not exist anymore, then why there should be a distinction between appearance and reality.

1.2.3 Logical positivism:

August Comte (1798-1857) was a French philosopher , he invented the term 'positivism' and propagated the idea that all societies go through three stages – the theological, the metaphysical and the scientific stage. In theological stage, people believe that adverse natural events such as thunder, rain, drought, disease, etc. are caused due to wrath of the God or spirits or due to magic. In metaphysical stage too, people believe that adverse events are caused by unobservable elements but in the scientific stage, people do not try to explain these phenomena, they do not assume that they know what causes these events, instead, they adopt an inquisitive attitude and try to understand the scientific causes behind these events, so thatthey can predict them accurately. Comte propagated that European society and social relations within it should be scientific studied. He asked people to discard traditional calendar of Saint's Day as well as the festivals based on religion. Instead he encouraged people to celebrate the science and the scientists. Hume, another philosopher of that time, separated the meaningful from meaningless and thus positivism originated from empiricism.

Positivists in general lay great emphasis on:

(a) verification/falsification;

(b) observation/experience as the only source of knowledge (empiricism);

(c) not looking at the causation;

(d) not looking at theoretical entities;

(e) not looking at the explanation;

(f) being anti-metaphysics.

Originally, in 1920s, logical positivism revolved around a group, called Vienna Circle, of Jewish scientists, mathematicians and philosophers, some of whom were also socialists. Later on, this group disbanded and members migrated to either America or other places as the fascism became stronger in Nazi Germany. At the same time, their ideas of logical positivism had a great impact on the development of science as well as philosophy.

Academicians and scientists have been pondering and arguing, for a long time, to determine the difference between logical positivism and logical empiricism. There are many famous positivists such as Moritz Schlick (1882–1936), Carl Hempel (1905–1997), Carnap, Reichenbach and Ayer, who adopted Hume's empiricism and Comte's dream of having fully scientific intellectual culture. They also adopted mathematical logic, developed by GottlobFrege (1848–1925) and Russell. They wanted to establish a simple connection between ideas and relevant experiences, so that confusing metaphysical explanations could be avoided.

A fundamental principle of simplicity is Ockham's razor. The principle of Ockam's razor states that generate only those assumptions of the facts or entities that are extremely necessary to carry forward the reasoning or discussion. This type of argument about simplicity is called ontological parsimony. According to Ockham's razor, while comparing two hypotheses, if everything else is equal, then we should prefer the simple hypotheses out of the two hypotheses. This is in sync with Hume's empiricism. He also argued that if two hypotheses are related to things that we can observe then it can be safely assumed that both of these two hypotheses are equal.

1.2.4 Ockham's razor

Ockham was not actually the originator of the principle of simplicity. It was used much before Ockham actually used it. For instance, Durandus of Saint-Pourçain, a French Dominican theologian and philosopher used it to discard abstraction as active intellect and considered it to be absolutely not necessary. Later on, Galileo and other scientists also used the principle of simplicity in their work.

Ockham was the first one to use the principle of simplicity constantly and with such precision and intensity that it came to be known Ockham's razor. He used the principle of simplicity to refute relations between things as he thought that relations are part of foundation of things. He also discarded the concept of causality as he considered it to be merely a succession of things or events. He believed that motion is nothing but things appearing again at different places at different times. Similarly, he believed that each sense organ has different psychological power and when we speak about ideas in the mind of the person who has created those ideas, we are talking about the person himself which is not distinct from his ideas.

Scientists use Ockham's razor as a rule of a thumb to develop theoretical model instead of using it to evaluate already published models. For instance, Albert Einstein used the principle of simplicity as a guiding light or heuristic, to explain his theory of special relativity. Similarly, Pierre Louis Maupertuis and Leonhard Euler also developed and applied the principle of least action based on the simplicity principle, and Max Planck, Werner Heisenberg and Louis de Broglie used parsimony as a guiding principle to develop quantum mechanics.

The concept of parsimony in scientific research is adopted to indicate that there can be only one interpretation of the results and that too in a under specific conditions. While using parsimony, lot of presumptions are made while planning the study so that no extraneous variable can give any other alternative explanation for the findings. No two research studies will share the same tenability of parsimony, as there is no single universal principle that will cover variety of subject matters.

1.3 POPPER AND KUHN'S CONTRIBUTION: THEORY DEPENDENCE OF OBSERVATION; UNDERSTANDING THEORY: COMPONENTS AND CONNECTIONS – CONCEPTS, CONSTRUCTS, VARIABLES AND HYPOTHESIS; DUHEM–QUINE THESIS; QUINE'S CRITIQUE OF EMPIRICISM

In twentieth century, Karl Popper was an extremely popular influencer, having many followers, in the field of philosophy of science. He was offered and he accepted to be a member of a prestigious scientific association such as Royal Society of London. To begin with, he became interested in the philosophy of science as he was trying to find the difference between science and pseudo-science. He appreciated the theories of physics but felt that theories used in fields such as psychology and sociology were not scientific. He believed that people who mistook the pseudo-scientific fields such as psychology and sociology as scientific did not know what exactly made physics as scientific field. He propagated the concept of falsification and it was whole hearted accepted by scientists rather than by philosophers. He was instrumental in providing intellectual criticism of Marxism. Two books authored by him ThePoverty of Historicism and The Open Society and Its Enemies are popular among political theorists even in present times.

Popper was very much against induction method and rejected all forms of induction as a proper method to verify science. Induction method is used to make generalizations from specific incidents. Popper argued that science does not need induction. There is a logical contradiction between confirmation of universal generalization and falsification.When a researcher gives many examples that favor generalization from a specific event, one cannot deny that there is always a possibility of an event coming up that refutes or falsifies that generalization. For example, if a researcher makes a statement that all birds fly, then just one instance of a creature that comes under bird category but does not fly is enough to falsify his hypothesis.

Thus, Popper firmly believed that basically the job of science is to falsify the theories and not to merely confirm them. He believed that theories can be falsified by using deductive logic and not inductive logic. Therefore, his theory of scientific method is known as falsificationism.

Another contemporary of Popper, Kuhn was a physicist and was interested in the Copernican revolution and the history of science. Kuhn noticed that

most of the books on philosophical and historical work covered Copernican revolution as a norm. These books were strewn with the difference of opinion between Galileo's reason and experiment on one hand and Catholic Church's superstitions and religious orthodoxy. There was a strong argument in those books that the experimental data that Galileo and his followers have found is totally against the Aristotelian view of Cosmos.

Kuhn was of the opinion that these arguments in the text book were too simplistic and Copernican revolution as well as other revolutions in science were not in sync with either the induction principle nor with falsification view of scientific method. In his book The Structure of Scientific Revolutions (1962), he presented a totally different thought about what is meant by knowledge and what should be considered as scientific methodology. This brought a paradigm shift in the history of science.

His brand of philosophy of science became very popular among academicians belonging to different streams such as literature and management science. He was also instrumental in popularizing the word 'paradigm'. He believed that theories can not be evaluated on the basis of just induction or deductive principle, they should be judged keeping in mind the local historical occurrences that might have influenced the development of the theories. Similarly, he argued that no data that is collected through observation is totally objective data. A researcher's observations and consequently the data is always influenced by theories. Consequently, the extent to which an experiment confirms the hypothesis is also not totally objective. There cannot be any one logical way of deciding which evidence-based theory should be judged as true. He explained that all research scientists develop new theories based on their personal values and the entire scientific community also judges those theories on the basis of prevalent values of the society at that time. So, it is not possible to judge theories objectively.

1.3.1 Theory dependence of observation:

As mentioned above, there are some scientists who believe that to determine how the real world is, one needs to just look at the facts, i.e., observe or perform experiments. This is known as theory-based observation. However, the critics of this idea point out that there is no such neutral point from where a researcher can make observations about the real world. Whatever observations are made or conclusions are drawn from the data, they all are explained in the light of researcher's background such as his prejudices, expectations, beliefs and the same facts can be observed and interpreted in a substantially different way by different researchers.

Historians of science have given many examples of instances where promoters of antagonist theories have given very different interpretations of the same empirical evidences, in accordance with their theoretical commitments. An interesting illustrative case can be found in a popular

drawing called the 'duck-rabbit', a sketch which can be interpreted as either a drawing of a duck or of a rabbit, depending on the 'theory' one applies in interpreting the pattern of lines. While in this particular case both interpretations are equally 'correct', in many cases scientific and philosophical disputes, however, many times it is not clear whether one, both, or none of these different interpretations of the relevant facts are right or no.

One more problem with observation method is that there is lot of observed factual data and a researcher does not know how to choose and take into consideration only relevant data. To choose only relevant facts, he will have to depend on some theory and there are possibilities that the chosen theory may be under criticism. For example, a researcher may think that it is not necessary for him to count every drop of rain water in different geographical areas. But, if another researcher believes that every drop of rain water is a blessing from God and mother nature is communicating a message through these rain drops, then the significance and whole meaning of these rain water changes. Both researchers would look at the facts in a different way depending upon which theory they believe in.

How to resolve such problems has been the subject of considerable philosophical attention, and remains an ongoing problem for any attempt to provide a comprehensive philosophical underpinning for scientific inquiry.

1.3.2 Understanding theory: components and connections – concepts, constructs, variables and hypothesis:

A theory can be defined as a method that helps a researcher and others to understand given phenomenon. The basic goal of any theory is to give an answer to the question 'why?'. For any researcher to learn and develop, it is essential for him to ask the question 'why?'. This helps him to not only increase his knowledge of a given subject area, but also helps him to reorganize his thoughts and opinions.

You must have observed that children are constantly asking the question 'Why'. For example, children are often asking questions such as

- "Why I can't eat full box of cookies?"
- "Why is cow ruminating?"
- "Why lemons are sour?"
- "Why does it rain ?"

It can be very tiring for an adult to keep answering such questions and some times the adult person may not have plausible answer to children's question and may get irritated and ask the child to stop asking such questions. But one must realize that asking the question 'why' helps children to learn, to understand the world and develops their own theories about why things are the way they are.

However, the definition of theory will not be complete by saying that it answers the question 'why'. Theory includes much more than that, for instance, it performs following functions too:

- It does not merely provide answer to the question 'why' but gives explanation to enhance the understanding.
- A theory is not a general explanation – it is formulated on the basis of consensus among large number of people about certain ideas and their relationships.
- A theory may not be based on facts – how a researcher understands and explains the given facts depends on his cultural background and the way he sees the world.

Components:

In order to generate new ideas and new discoveries, a theory must be testable, coherent, economical, generalizable, and must explain the known findings. If a theory has all these characteristics, then it will be considered a 'good' theory.

A theory has two components – The well-defined concepts and principles.

A concept can be defined as a symbolic representation of an actual thing, for example, train, mountains, rivers, distance, etc. It expresses or verbalizes an abstraction that is formed through generalizations from specifics, for example, weight, achievement.

When a concept expresses an abstraction that has no physical referent such as democracy, learning, happiness, etc. it is called Construct. Since concept is an expression of an abstraction, it is always in the form of words, so we can say that language helps in forming the concepts. However, a construct is expressed in the form of a word that has been it has an additional Construct has the added meaning of having been purposely created or adopted for a special scientific purpose

On the other hand, a principle can be defined as an expression of the relationship between two or more concepts or constructs.

While developing a theory, a researcher extracts principles on the basis of his research about how things or concepts are related.

There are two important functions of Concepts and principles:

1) It is through concepts and principles that we understand what is going on around us.
2) It is through concepts and principles that we can predict future events (These predictions can be causal or correlational)

A Problem can be defined as a probing or inquisitive statement about the relationship between two or more variables.Do teachers' comments cause improvement in student performance?

Now let us look at what is a research problem? Research problem can be defined as any specific issue, difficulty, contradiction, or gap in knowledge that a researcher wants to investigate in his research. The research problem can be either practical problems or a theoretical problem. The goal of a practical research problem is to help in ushering in the change, and a theoretical problem helps in expanding the knowledge.

Though, generally a research study has either a practical or theoretical research problem but there is no strict compartmentalization. It can have both practical and theoretical research problem also. What kind of research problem a researcher will chose depends on the broad topic of his interest and the type of research he wants to do.

Now let us look at the importance of a research problem. A researcher will not be able remain focused if his research problem is not well defined and he will find his research becoming difficult to complete. He may waste time and effort in repeating what has been already said by other or he may be doing research without any goal and justification. A well-defined research problem, on the other hand, will guide him about what to pay attention to and what to ignore related with his broad area of interest. This sharp focus will help him to complete his research work more efficiently, adequately and in given time frame. Furthermore, a well-defined research problem will help a researcher to get new and appropriate insights about the topic that he wanted to investigate.

So, we can say that having a well-defined research problem is the first step in preparing a research proposal or a research paper or even a thesis. A well-planned research problem will help a researcher in being very clear about what he exactly he wants to do and why.

In research, a variable is any characteristics or thing that varies, i.e., it can have more than one value. For instance, gender can have two values - male and female. Some of other examples of variables can be height, age, temperature, or test scores on a psychological test.

In a research where the researcher is trying to find cause-and-effect relationship, there are two types of variables, independent variable and dependent variable. An independent variable is the one that is controlled and manipulated by the researcher. A dependent variable is the one that varies due to the changes taking place in independent variable. We can say, an independent variable is the cause and the dependent variable is the effect.

For Example:

Suppose a researcher wants to test whether background music in a room will have an effect on the math test scores.

His independent variable will be the background music in the room. He can choose to have two groups of subjects and vary the loudness and the type of music that he wants to introduce in the room in each trial.

Your dependent variable is math test scores. You measure the math skills of all participants using a standardized test and check whether they differ based on back ground music in the room.

A Hypothesis is a speculative or theoretical declarative sentence that states the relationship between two or more variables. Teachers' reinforcement would have significant impact on students performance.

It is speculative because a researcher will not know what will be the result, before he/she conducts the study. He will be making a speculative statement on the basis of curiosity or certain premonitions about the outcomes of the study. To test out whether his assumptions are true or no, he will conduct study to gather data and analyze it. Apart from this general function, there are many other functions performed by hypothesis, such as-

(a) It increases the objectivity and clarifies the purpose of a research work;

(b) It keeps the researcher focused by highlighting what is the specific scope of his research, i.e., what is to be included and not included in his research.

(c) It is through hypothesis that a researcher will know from whom what data to collect depending upon the scope and focus of the study

(d) Finally, it helps a researcher to develop a theory so that he can determine what is what is true and what is not.

Initially, researchers used to use only research hypothesis to carry out their research but now researcher scientists use two types of hypothesis – research or null hypothesis and alternate hypothesis. While research or null hypothesis assumes that there is no relationship or difference between two variables or constructs, alternate hypothesis clearly particularizes the relationship between two variables or constructs. If the analysis of gathered data indicates that research or null hypothesis cannot be accepted as true, then alternate hypothesis is considered to be true. One can say that alternate hypothesis and null hypothesis are opposite of each other.

1.3.3 Duhem–Quine thesis:

Duhem:

Quine thesis is also known as Duhem-Quine problem. This thesis has a significant place in philosophy of science as it contradicts the most prevalent views of positivists. While positivists propagate the idea of falsification to confirm or reject the hypotheses, Duhem-Quine thesis propagates the idea of undetermination of theory by evidence. The thesis theorized that researchers do not experimentally test any single hypothesis alone, they always test a bunch of hypotheses. In other words, when a researcher makes any hypothesis, he has certain beliefs or presumptions and hypothesis which is also an assumption is based on those presumptions. For example, if a researcher comes up with the hypothesis that dark clouds lead to rain, this assumption has a background

presumption that clouds become dark in color when they are full of water. So while empirical test is testing the hypothesis, it is also testing the presumptions or supplementary hypothesis behind that main hypothesis.

If the observed data does not support any of these hypotheses, the only thing that they can conclude is that one of these hypotheses is not supported by the data, they cannot pin point which hypothesis needs to be changed. In other words, he believed that a single hypothesis cannot be decisively falsified or confirmed or dropped completely on the basis of observed data. In other words, the cluster of hypotheses stand or fall together and cannot be tested individually.

This highlighted two things:

a) He shifted the emphasis from testing hypotheses to testing theories.

b) He also emphasized that observed or experimental evidence do not always lead to generation of unique novel theories.

Duhem held that many different theories can be generated about the world and its ways from the same observed data. This is especially true for abstract concepts about the world. In other words, Duhem argued that a hypothesis cannot be accepted or rejected just on the basis of some given experiment or observed data as it may be very restrictive. However, Duhem was applying his concept of holism predominantly to the field of physics, and to some of the similar fields such as chemistry, as they have similar logical structure, but he did not include a priori disciplines such as logic and mathematics, as he believed that they cannot be tested. His idea of holism and analytic-synthetic distinction makes it very difficult to assess the match between theory and the real world.

In 1950, W.V.O. Quine presented a paper titled, "Two Dogmas of Empiricism" in which he openly questioned the idea of analytic-synthetic distinction. He argued that the thesis can be interpreted in a more progressive epistemic holism manner.

Quine believed that the entire body of human knowledge (he called it 'web of beliefs') is one field that is bound by human experiences. He included a priori disciplines like logic and mathematics too under empirical investigation. For Quine, holism was a general theory of meanings. He looked at the relation between evidence and theory through semantic prism.

He argued that if empirical evidence are there then even fields like logic and mathematics can also be revised. He took support of quantum logic to substantiate this logic. However, later on he disowned this idea as later on he believed that quantum logic is not based on true values. He further argued that if evidence do not confirm the given bunch of hypotheses, then either core beliefs or supplementary beliefs or both can change. He also pointed out that an empirical evidence can merely confirm or support a theory, but it cannot say whether the theory is correct or no.

1.3.4 Quine's critique of empiricism:

While presenting his ground-breaking paper "Two Dogmas of Empiricism" (1951), Quine, first of all, dismissed the idea that logic and empirical science differ significantly. This was similar to Wittgenstein's idea that logical structure of a language can changes if appropriate empirical evidences are presented. Any change in human knowledge has the potential to change human being's most basic and deep-rooted inferential habits.

The second principle of empiricism, according to Quine, is that science is nothing but a web of interconnected scientific or empirical statements about given situations and their veracity is tested by the observer's experiences or observations. However, critics pointed out that science being nothing but a web of scientific sentences is not correct. The observation often depends upon instruments and we cannot say that there is relationship between the instrument and the phenomenon being measured. For example, suppose we want to know the weight of a piece of gold and for that we use an instrument. The instrument may be faulty and give different readings but we cannot say there is any relationship between the instrument and the actual status of the piece of gold. The actual weight of the gold does not change when it is placed on the weighing scale.

Similarly, Wilfrid Sellars (1912–89), an American philosopher, also refuted the "myth of the given". He argued that there is no inbuilt obvious facts in our observation of either the world or the mind. The same idea was propagated by the French philosopher and literary theorist Jacques Derrida (1930–2004) when he analysed the "metaphysics of presence". They believed that all human knowledge is nothing but the impressions that we form on the basis of information received through our sense organs.

Quine was of the opinion that language has no distinct meaning as it has no clearly established logical attributes and no direct relationship to experience.

He went on to argue that He argued that, since there are no a priori standards to find out whether two words have same meaning or no. In fact, in philosophy, the very idea of meaning is doubted.

To prove his point, he described a thought experiment related with "radical translation". He said suppose a linguist has to translate a completely unknown language without taking any help from bilinguals or other informants. Then to understand the vocabulary, structure, grammar of an alien language, the only method that a translator can use is to constantly look out for links between the events that are taking place in an unknown environment and what the people in that environment are saying, till he finds the pattern and can decipher the vocabulary and grammar of that language. If this method is used by two translators, there is a possibility of them developing two altogether different translation manuals for that language, based on equally strong but different evidences.

This will happen due to the fact that words do not have well defined meanings, that is a unique or specific content belonging to each word. Quine said that in language, there are no well-defined "fact of the matter" words.

1.4 ETHICAL STANDARDS OF PSYCHOLOGICAL RESEARCH: PLANNING, CONDUCTION AND REPORTING RESEARCH

Research in any stream of knowledge is not free from its answerability. While on one hand, the credibility of research in psychology depends on the scientific methods used, it is equally important for a researcher to follow ethical guidelines established by the world recognized bodies in their field. For instance, Institutional Review Board (IRB) has laid down ethical guidelines to be followed for psychological research about the rights and welfare of human participants, Institutional Animal Care and Use Committees (IACUCs) checks the research conducted with animals to ensure that animals are treated humanely during the research.

The researcher must keep these ethical guidelines in mind even at the planning stage of the research. There can be serious repercussions for not following the ethical guidelines, e.g., it may hinder the advancement of knowledge, gradually destroy the credibility and respect for scientists and academicians, there can be legal and financial repercussions too.

Risk/benefit ratio:

- A researcher needs to make a judgment about the possible risks and benefits of a research project. If potential benefits of contributing to scientific knowledge are more than the risk, then the research can be conducted with appropriate constraints.
- Some of the examples of potential risks in psychological research are risk of physical harm, social harm, and mental or emotional stress.
- To avoid or minimize social harm to the participants, participants can be asked to give information anonymously, or if it is impossible to have it anonymously, then the confidentiality of their information should be maintained.

Informed Consent:

- Informed consent procedure is a social contract between researchers and participants that takes place before the actual study begins.
- One of the ethical obligations of researchers is that they must clearly describe the research procedures, and answer any queries or doubts that potential participants may have about the research.
- The potential research participants must be informed beforehand that they can withdraw their consent at any time without any repercussions.

- There should be no direct or indirect compulsion on the potential participants to participate in research.

Deception in psychological research:

- In psychological research, deception takes place when researchers intentionally do not give full information or misinform participants about the research. Naturally, such an act of a researcher is against the ethical principle of informed consent.

- Generally, deception is undesirable but in some of the research studies in psychology, it becomes an imperative research strategy.

Debriefing:

- Immediately after the research study, it is imperative for the researcher to give detailed information to the participants about what was the research about and what was their role in the study and also to tell them about the research process. The main objective of debriefing is to make sure that individuals feel good about their participation in the research.

- In case researchers have used deception, they are ethically bound to inform the participants, that the deception was used and why it was used, immediately after the research study is over or as soon as possible.

- Debriefing not only informs the participants about the real nature of the research study, but also gives a chance to researchers to learn about participants' views about the research procedures, and gives them potential insights into the nature of the research findings and gives them ideas for future research.

Research with animal:

- In some of the psychological research studies, animals are used to gain knowledge that will benefit humans, for instance, a research procedure may involve giving shock or investigating the effect of a new drug.

- In such studies, researchers are ethically bound to get animals legally, to care for them and use them humanely, and later on dispose them according to the local laws and regulations of the land as well as according to the professional standards.

- Whether it is ethical to use animals for gaining knowledge that will benefit humans but causes lot of agony and even death to animals is matter of heated debate and there is no straightforward answer to that. It is a complex issue, having both pros and cons.

Reporting of psychological research:

- The APA Code of Ethics gives guidelines for researchers to communicate their research findings in peer reviewed scientific journals.
- Based on the scholarly importance of the contribution, there are clear guidelines about who should get the credit for publication.
- If researchers are using others' research, it is necessary for them to acknowledge it in their research by using proper citations and references, otherwise it will be considered a case of plagiarism, and that will be violation of ethical codes. Plagiarism will involve legal difficulties too apart from losing the credibility of the research.

1.5 PROPOSING AND REPORTING QUANTITATIVE RESEARCH

Before starting a research study, the researcher has to present a research proposal to the research guide or supervisor, and to the research committee at the university for their scrutiny anddecide whether that proposed research is good enough to allot the degree, whether that proposed research can be done with the given time and resources, as well as whether it will meet scientific guidelines.

In a way, the researcher has to sell his research idea to the concerned authorities of the university. In case, he is also seeking funds for his research, then he needs to convince the funding agency too. If the research committee does not approve the research proposal, then either the researcher will have to submit a fresh proposal or rework and again submit the rejected proposal on the basis of comments given by the committee.

This of course will be time consuming and costly and may even dampen the spirits of the researcher. Therefore, it is necessary to know what are the salient features of the research proposal. A good research proposal should include the proposed answer to the following questions :

WHAT – Your research topic:

The first thing that you need to clearly and specifically mention in your research proposal is what is the research topic. In other words, it should clearly state what exactly you plan to do in your research and what is its context.

For instance, suppose the research topic is the factors that may lead to suicidal ideation in adolescents in India. Here the context is India

What's being investigated – factors that may lead to suicidal ideation

Who it involves – adolescents

In what context – Indian

The research proposal should give an exhaustive detail of the research topic.

WHY – Your justification:

Research proposal should not only have a clear research topic but should also include the rationale for doing that research or significance of that topic. The researcher must give justification for choosing that particular topic. He must be able to convince that this topic is not researched before, that it is original. On the basis of review of literature, he should be able to identify the gaps in the existing literature about that topic and explain how his research is going to fill that gap. In other words, he should be able to explain how his research will provide significant inputs to the existing knowledge or solve some unsolved problem and therefore will be value creating.

For example, if a researcher is looking the possible factors contributing to suicidal ideation in adolescent population and he can identify some of the factors that were previously unknown or not related with suicidal ideation, then his research will be making a significant contribution to the existing body of knowledge related to suicidal ideation. This research may help in framing government policies too. This theoretical and practical contribution of the study becomes the justification for the research.

HOW – Your methodology:

Apart from convincing the research authorities about the originality and importance of your topic you also need to briefly explain the tentative methodology that you will use to do that research. In other words, you need to answer the questions such as –

What will be your research design to investigate your topic? Will you be doing quantitative or qualitative research, longitudinal or cross-sectional research?

Which sampling technique you will use and why? What will be the sample size?

What will be the scope of your research study?

What will be method of collecting the data – survey method, interview method, observation or any other?

You will also need to specify, how will analyse the data after it is collected? Which statistical analysis you propose to use to test your hypotheses?

Will you be adhering to all scientific and ethical guidelines?

Do you have the expertise and other resources to do that research and how will you complete it in given time frame?

It is obvious that to answer such questions, the researcher needs to be aware of different types of research methodologies that are available. He must also have a good knowledge of statistical tools, if he is planning to do quantitative research.

Reporting quantitative research:

A quantitative analysis of the gathered data provides the information not only about whether the researcher's assumptions were statistically significant or no but it also provides enough information that helps in making decisions about policy and planning for a program or organization. It is very important for a researcher to know how to write a good quantitative analysis,irrespective of whether he is doing research for publishing a research paper or for research thesis. A good qualitative analysis ensures that data gathered is of good quality and the conclusions drawn are based on scientific principles. To ensure the quality of the data, it is important that it is collected by using one of the well-established methods, such as survey method, and to draw authoritative conclusions from the data, the researcher must have good knowledge of statistics.

Step 1:

In the beginning of the report, first of all the researcher needs to highlight why the report is being written. He must indicate what was the lacuna or gap in the previous studies, that his study is filling up and what more can be done in future beyond his study. He must clearly mention who are the targeted readers of his report,that is, for whom it is prepared.

Step 2:

Secondly, he needs to describe how the data was collected, that is, which method was used and how that method was designed. Describe in detail all the steps taken for data collection. For example, did he use survey method or observation or interview method or anything else. If he has used survey method, then whether he used a standardized questionnaire or made one himself. If he has made it, what was the procedure adopted for determining the reliability and validity. Had he conducted any pilot study before collecting the actual data? What was the population from which sample was taken? Which sampling technique was used and what was the sample size? Depending upon the hypotheses, data should be subdivided into relevant categories such as age, gender, socioeconomic status, etc. to test the hypotheses. If there are any biases in gathering the data, or if there have been some extreme responses, or certain data is missing, it should be reported in this section.

Step 3:

The next step is to report results by means of visual representation. It can be in the form of tables and graphs. One can use histogram, pie charts, etc. for describing the data as well as for reporting the conclusions from the data. In result section, it is advisable to report only the most important table and graphs that the researcher wants to high light. Rest of the results

can be put in appendices. For the sake of convenience of the reader, the appendices should also include a blank form of the questionnaire used to collect the data as well as the raw data.

Step 4:

In the next section of the report, the researcher needs to write what conclusions have been drawn from the results reported in previous section. On the basis of results, the researcher may even suggest if further research should be done to have more authoritative conclusions. While writing conclusions, the researcher should restrict himself to only those conclusions that can be made on the basis of the findings.

Step 5:

Lastly, make an executive summary of two pages. In this executive summary very briefly repeat what the report contains, for example, write concisely what was there in introduction, research design, sample, data collection and analyzing methods, findings and their interpretations. Executive summaries give a glimpse of what is there in the research report.

1.6 REFERENCES

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2

RESEARCH SETTINGS AND METHODS OF DATA COLLECTION

Unit Structure

2.1 Introduction
2. 2 Observation and Interview method
    2.2.1 Observation
    2.2.2 Interviews
2.3 Questionnaire
2.4 Survey research
2.5 Other non-experimental methods
2.6 References

2.1 INTRODUCTION

To test his research hypotheses or questions, a researcher needs to collect data with the help of an instrument. We can define data collection as a method of collecting, measuring and analysing information by using standardized validated techniques to get precise sagacity for research. The main goal of data collection is to secure reliable data that can undergo statistical analysis and yet is rich in information.

There are various different methods of collecting data and different researchers use different methods to collect data on the basis of their research topics, the kind of information needed forhis work, sample (children, adults or old people, patients or healthy people, etc.) the instrument or measurement to be used (e.g., questionnaire, test, observation, interview, case study, etc.), for data collection. It will also depend upon the time line, resources available, the expertise or skill of the researcher and the ethical requirements of the study. A researcher may decide to collect data through online means such as an online survey via Qualtrics or survey monkey, or he may decide to conduct experiments online using Inquisit or Open Sesame. No matter which method is used to collect data, one cannot deny that data collection is an important part of any kind of research, quantitative or qualitative.

The researcher needs to pay attention to not only the method of data collection but also to the research setting or environment in which the study is carried out. This research environment includes physical, social, and cultural aspects and can significantly impact the data collection and the interpretation of the data. For instance, a qualitative research will be carried out in the natural environment of the participant as the researcher is more interested in finding out the environmental factors that make meaning for the participant, while quantitative study can be carried out in either natural or artificial environment, e.g., field work or experimental

laboratory. The validity and the generalizability of the study gets impacted by where the research study was conducted.

Some of the common data collection methods are observation (direct and participant), interviews, surveys, archival data, and tests. Each of these methods have both advantages and disadvantages. To improve the accuracy and veracity of theresults and their interpretations, it is advisable to use a combination of many different methods of data collection. This combination of different data collection methods is called triangulation.

The next question that is often asked is how many times the data should be collected.

How often the data should be collected:

How often to collect the data will depend upon the research topic and the frequency of its occurrence in the participants' lives. For instance, if a researcher is interested to know the work profile of a teacher and if is using observation method, then he needs to observe different teachers throughout the year and still may miss on some of the details. For a topic like this, it is better for a researcher to use survey method instead of an observation method. To use survey method, he will need to have an accurate relevant standardized instrument and he will need to ensure that he administers this instrument to a representative sample of that population.

One can get a representative sample through:

Time Sampling: It is an observational technique. It is used to evaluate how many times and for how much time a particular behavior occurs in different groups or individuals, in a specified time period. For instance, how many times and for how long the violent behavior occurs in 5th standard students in a single day and are there any gender differences in their violent behavior.

Situation Sampling:

Situation sampling is used to enhance the external validity or generalizability of a study. The researcher observes people under different situations and under different geographical locations. This type of sampling is not concerned about the fixed or predetermined time interval. In fact, the particular behavior under study may be occurring infrequently and randomly.

2.2 OBSERVATION AND INTERVIEW METHOD

2.2.1 Observation:

The observational method comes under the umbrella of descriptive research and it allows a researcher to watch and record the specific targeted behavior of participants. It is different from survey method as experimenter does not administer any questionnaire, and it is different from experimental method, as the researcher cannot control any of the

variables. Usually, observation method comes under the preview of qualitative research.

Observation method can be used in various ways:

Naturalistic observation and structured observation, covert or disguised and undisguised or open observation.

Naturalistic Observation:

Naturalistic observation can be of two types- observation without intervention and observation with intervention.

Observation without Intervention:

- The naturalistic observation is used with the aim of just describing the natural behavior as it normally occurs.
- The external validity of the research studies using naturalistic observation is higher compare to those studies that are conducted in laboratory settings.
- In some of the research areas, it is ethically not possible to control or manipulate certain variables. In such cases, using observation to study naturally occurring behavior is the best way to do the research. For example, areas like juvenile delinquency, child abuse, etc. Another example can be the work of Jane Goodall, a primatologist, who observed and recorded the behavior of Chimpanzees in a national park in Tanzania. She observed their social behavior, family relationships, tool making skills, etc. This study became a milestone in the field of anthropology.

Observation with Intervention:

However, there are many areas of research where researchers can use observation with intervention.

The observation with intervention can be done in three different ways:

a) participant observation,

b) structured observation,

c) the field experiments.

Participative observation:

A researcher using participative observation method will completely merge himself with the members of the targeted sample. He will adopt the life style, culture and may be profession too. This type of observation takes place in natural setting and the researcher has no control and cannot manipulate any variable. The behavior of the participants will be their natural behavior, taking place in natural context, and they may or may not

be aware of being observed. This research method is also known as covert or disguised observation method. The researcher observes and records their behavior in a nonobtrusive way. The recording of the behavior takes place after the behavior has already occurred or whenever the researcher gets a chance to record it. In such cases, the threat of personal bias or forgetting some of the details, is very high but the threat of reactivity in participants' behavior (i.e., participants' natural behavior changing as they become aware of being under observation and have desire to present themselves in socially desirable manner) is very low.

Structured Observation:

The structured observation method is generally used by clinical and developmental psychologists. It is also known as systematic observation method.

It is a non-participative method:

The researcher does not join the sample group as a participant. The participants are aware that they are being observed and yet there is no fear of reactivity, that is, their natural behavior does not change. The researcher identifies the specific behavior(s) that he is going to observe and the behavior can be recorded while it is naturally occurring. This also cuts down, to some extent, the problem of researcher's own biases or memory interfering with the recording of the behavior. This method is especially useful with sample who cannot articulate their thoughts or emotions. He has some control over the setting and the event that he is observing, though the degree of control is not as much as in case of field experiments. He records the occurrence of the behavior in terms of either the frequency of the occurrence of that behavior or when that behavior occurs.

For example, the researcher is a doctor who is studying the influence of different dosages of a particular drug. The person on whom the drug is administered is the subject of the experiment and is aware that his behavior is under observation. Since the researcher is actively controlling and manipulating the dosage of the drug and observing the changes taking place due to this intervention, we can say that researcher structures the situation to observe and record behavior more effectively.

However, structured interview can also take place without the knowledge of the subject. For example, Asch studied the impact of group pressure on conformity behavior. He used confederates to build the unspoken group pressure on the actual research subject and observed his conformity behavior. This experiment was not conducted in natural setting. It was in a laboratory setting.

The Field Experiment:

In a field experiment, researchers can manoeuvre independent variables in a natural setting and observe its' effect on behavior. The experiment takes place in natural setting and the participants are not aware of being part of research study and under observation. As there is no fear of reactivity,

such experiments have higher external validity. The Stanford Prison experiment in 1971 is a classic example of the field experiment.

Observation method has many advantages and disadvantages both. Let us see them in detail:

Advantages of Observational Studies:

1. The researcher gets the first-hand information about people's specific, naturally occurring behavior. He can see if any patterns are emerging in their natural behavior, that will help him to make his research questions or hypotheses more specific. As we have already discussed before, the clearer the hypotheses are, more they will help in deciding what data to collect and how to interpret. So, observation method can be used as a part of exploratory study.

2. Since this method can be used at initial stage of the research study, it also allows a researcher to make on the spot changes in the objectives of the study, if needs.

3. Unlike in other research methods, it is possible to study the natural behavior of the subjects without plagued with any biases or reactivity of the subjects. The researcher has to be merely conscious of his own biases and ensure that they don't contaminate his observations and interpretations.

4. Since data is collected from natural settings, the external validity or generalizability of the research study will be robust.

5. There are certain areas of interest to psychologists that they can study ethically only by using observation method in natural settings and not in lab settings. If they use any other method, they will be violating the ethical guidelines of doing research and their study will be considered invalid. For example, one cannot study domestic violence in lab settings.

6. Observation method is very useful to study cross-cultural differences.

Disadvantages of Observational Studies:

1. Compare to other methods, observation method is very time consuming and costly and it requires more man power. If there searcher decides to observe during a specific time period, there is no guarantee that targeted behavior will occur during that time period. If the researcher does not predetermine the time period of observation and observe the behavior as and when it occurs, it may take place after a long gap.

2. Generally, large sample size cannot be taken while using observation method. As large quantitative data cannot be generated by using this method, it is more suitable for qualitative or exploratory study only.

3. Since, experimenter is not controlling any variable, one cannot establish cause and effect relationship by using observation method.

4. If the participants are aware that they are being observed, they may not behave in their natural manner and reactivity or Hawthorne effect may take place. To avoid the chances of Hawthorne effect occurring, the researcher should use observation method to collect the data in natural setting, in an unobtrusive manner, where participants are not aware that they are being observed. For example, observing children while playing in a garden.

However, the disadvantage of observing in natural setting is that the researcher has no control over the environment or any of the variables. For example, suppose a researcher goes to a garden in the evening to watch children's prosocial behavior, but he finds that most of the children have already left the garden for their homes as they all have to appear for class tests the very next day. This extraneous variable (class test on the very next day)will affect his data as he will be able to observe only those children who do not have class test next day. These children may be from younger age group compare to those whom he wanted to observe.

5. Another major problem can be of observer's personal biases. The chances of observer's bias influencing what will be observed and recorded and how it will be interpreted are very high. Some people suggest the use of multiple observers to overcome this problem. But in such cases too, subjectivity cannot be eliminated. In fact, different observers may give different interpretation for the same piece of behavior of a person.

6. In case of disguised participative observation in natural setting raises the concern about the ethics of the research. It is not ethical to record anyone's behavior without taking his/her consent.

To overcome this problem, if one decides to do overt observation where the participants are aware of being observed, the possibility of reactivity cannot be dismissed.

2.2.2 Interviews:

Interview is a type of qualitative data collection method in which the researcher asks questions to find out either the factual information or the thoughts, feelings, values, experiences, meanings, etc. from the interviewee. This method can be used either as a substitute or as a supplementary to other data collection methods. Though, usually, interview is done face to face, now technology facilitates it over phone or through video conferencing too. There are various types of interviews. Some of them are discussed here-

Structured Interview:

It is more like an oral questionnaire, where same questions, in same sequence, with same multiple-choice answers to choose from, are asked to

all respondents. The interviewer cannot change the sequence of the questions asked, omit or change the wordings of any question, if he finds that the interviewee is not comfortable with any question. It is possible for an untrained person also to conduct this type of interview.

Semi-structured Interview:

The interviewer has a list of predetermined areas and few related questions, to be covered during the interview but he can add or delete any question depending upon the answers given to previous questions. The respondent is not given any multiple-choice answers to choose from. The interviewer does not ask questions in any predetermined sequence. In fact, depending upon the comfort level of the respondent, the interviewer decides impromptu what question should be asked and which area of interest should be covered first. He has to only ensure that no area of interest is left out for any of the respondents, but the sequence of areas to be covered can vary depending upon the respondent's comfort. This adaptability of the interviewer ensures that he gets in depth and complete information from the respondent.

Unstructured Interview:

The interviewer does not have any list of predetermined questions to be asked. He has only a general idea of the areas to be covered and not the specific detailed areas to be covered. The interviewer goes with the flow and allows the interviewee to talk about whatever he wants to talk. The interview is in the form of a conversation, where both the interviewee and the interviewer are free to ask as many questions to each other as they want.

Technology Assisted Interviews:

Now days due to advanced communication technology and internet it is possible to conduct interviews either on phone or through video conferencing sites such as zoom, google meet, skype, etc. While interview through landline phone is not so satisfying and has its limitations, interview through video conferencing has become very popular in last one decade or so. It has the advantage that both interviewer and interviewee need not spend time and money in travelling to meet each other face to face. The interviewer need not incur the cost of finding a quiet place to conduct the interview. Such type of interviews can be recorded so that supervision of such interviews as well as data analysis becomes easier. It is also possible to access respondents from remote areas or places which are not easily reachable, e.g., remand homes, jails, brothels, etc.

However, this advantage also becomes the disadvantage in the form of serious sampling error. One cannot use random sampling method to conduct this type of interviews. One can conduct such interviews only with those who have access to internet. Especially in poor and developing countries, internet penetration is very poor and availability of electricity at all times is also not guaranteed. So, a large population can not be accessed for this type of interviews.

In this type of interview, establishing rapport with introvert respondents is also a challenge and one cannot observe the entire body language. There is also the time pressure and such interviews cannot be as relaxed as face to face interviews.

Advantages of Interview Method:

1. Compared to other methods of survey, this method is more flexible.
2. It is ideal to get much more information than what the researcher had originally planned for and it can give lot of insights and context into the problems, attitudes, values and lives in general of the respondents.
3. Interview method provides the opportunity to clarify, during the interview session itself, any doubts, misunderstandings, queries, etc. that either the interviewer or interviewee may have.
4. It is possible for a skilled interviewer to establish rapport and put the interviewee at ease, and talk about themselves. At the same time, the interviewer can ensure that focus of the interview session remains on the main objectives with which the interview session was initiated.
5. In other survey methods, the chances of respondents not responding at all or returning half-filled questionnaires, etc. is very high. In interview method, the response rate is very high. So, if the researcher needs to collect vast in-depth data from a small group of people, interview method is the best.
6. It is also useful when the respondents have language barrier, have limited reading writing ability or have limited capacity to articulate written answers to open ended questions.
7. The interviewer can collect both verbal as well as nonverbal data in interview, which is not possible in other methods. Through non-verbal language, the researcher can also gauge whether the interviewee is giving accurate information or falsifying. If the interviewer feels that the respondent is trying to avoid the question or giving false or contradictory information, then he can probe further in that area and get to know the real issues of the problem. This will also ensure the accuracy of the data.

Disadvantages of Interview Method:

1. Compare to other methods of conducting survey, interview method is more time consuming and costly. It requires a lot more time in preparing for the interview as it requires in conducting the interview.
2. This method cannot be used if the sample size required is very large.
3. The effectiveness of interview method depends upon the skills of the interviewer. Personal biases of an interviewer can influence what information will be sought and how it will be sought from the respondents. In case of panel interview, where there is more than one

interviewer, the problem gets further aggravated as each interviewer will ask questions and interpret the answers in light of his own personal biases. One can circumvent this problem by using inter-interviewer reliability, but it reduces the flexibility of the interview.

4. If an interviewer is not trained and is using unstructured form of interview, then inadvertently, he may not cover all requisite areas of interest that he was supposed to cover, with all the respondents. Another problem that an untrained interviewer may face is that he may develop an empathy for the interviewee during the interview and will not be able to do objective analysis of the data. Moreover, interviewer must have good communication skills.

2.3 QUESTIONNAIRE

The questionnaire is a scientific tool to get data from a large sample, and not merely a list of questions. A researcher needs to do lot of planning and pretesting to make an effective questionnaire, as faulty instrument will lead to faulty data and that will compromise the validity of the study. A questionnaire can be in verbal or pictorial form and it can contain both open ended or close ended questions. The respondent can answer in short paragraph answer to open ended questions and close ended questions can be answered by selecting an option from either binary form (e.g. yes/No) or from multiple choices (e.g. Likert type Scale) or fill in the blanks. This list is not exhaustive, there can be many more options that a researcher can offer to the respondent. The questionnaire can have both open ended and close ended type of questions. It can be univariate, bivariate or multivariate type of questionnaire. A questionnaire collects various types of data, e.g.:

Factual data, that is mostly demographic data that can be verified by other means too.

Data related to cognitive factors, i.e., what people think and how they make decisions, their attitudes and opinions, etc.

Data related to affective factors, i.e., the feelings and preferences of the people

Data related to behavior, i.e., what people do or intend to do in a given situation.

It can be administered either individually or in a group, either face to face or electronically or by post. If it is a self-administered questionnaire, which generally the questionnaires are, then it can be administered by either the researcher himself or by his assistants or by data collection agency. A well planned questionnaire should ensure that the questions that are easy to answer and do not tax memory too much, are interesting, are crucial for the study should be asked first. The questions that require lot of thinking and taxes the memory, are embarrassing or difficult to answer, are boring should be asked at the end. The questionnaire and the length of the questions should not be too long. The questions should be prepared

keeping in mind the age, literacy rate and culture of the respondents in mind.

Advantages of Questionnaire:

1. It can be used to collect data from a large sample at the same time, so it is less time consuming and less expensive.

2. Since it is not necessary to administer it face to face and it can be sent by post or can be uploaded on social media sites or sent by email, data can be collected even from those who are geographically at far off places. In fact, cross national studies also can be done by using the questionnaire as a tool for data collection.

3. It is possible to maintain anonymity of the participants, if they so desire.

4. A respond can take his own time to understand the question and think about the answer before answering it, which is not possible in interview method.

5. A well planned and constructed questionnaire helps us to code and statistically analyze the data easily and scientifically.

Disadvantages of Questionnaire:

1. If the questionnaire is not well planned, it may contain personal biases of the researcher. A faulty questionnaire may contain:

a) Leading questions, where he inadvertently gives a cue to the respondent about the answer that the researcher wants him to give.

b) Ambiguous questions that can be interpreted in more than one way, leading to either confusion in the mind of the respondent or respondent may interpret it differently then what the researcher intended.

c) Loaded questions where a respondent finds choosing any option as an answer is embarrassing. For example, have you stopped stealing? Choosing either yes or no both can be embarrassing for a person.

d) Hypothetical questions, ego boosting questions, double barrel questions can all put a question mark on the useful ness of the data.

e) There is no guarantee that respondents will give honest answers and their answers will not be contaminated by social desirability factor or demand characteristic. Social desirability takes place when the respondent wants to present himself in socially acceptable way to the researcher. He wants researcher to consider him to be good. The problem of 'demand characteristic' takes place when the respondent gives the answer that he thinks the researcher wants to hear, instead of expressing his true opinions, attitudes, or feelings, etc.

f) When questionnaires are administered in group or by post or electronically, the chances of either low response rate or getting half-filled forms become very high. The researcher has to discard these half-filled forms and then using questionnaire method can become costly and time consuming. He will have to either get new respondents or contact the same respondents and request them to complete the forms. Very low response rate creates another question in mind. The researcher has to think, do people who filled up the form and sent back are different from those who did not bother to fill up or filled it half and sent. In other words, there can be sampling error and may reduce the generalizability of the results.

Guidelines for writing good Questions:

By now you must have realized that lot of care needs to be taken to write effective questions for a questionnaire. Let us see some of the guidelines for making good questionnaire.

1. Pay attention to the language:

You need to pay attention to the vocabulary, grammar and connotation of the words.

One should use simple words that are understood by majority of the people and avoid using any technical jargons, acronyms or culturally alien words for the respondents. Avoid using ambiguous words that can be interpreted in multiple ways. connotation of the words can also change the meaning of the question and influence the way people respond to them.

Words having similar meaning but different connotations in questions can change the flavor of the question and impact the choice that a respondent makes for answering it.

For instance, “Do you think Ravimust give test?”, “Do you think Ravicangive test?” or “Do you think Ravimay givetest?”.

As you can see here, the word must indicates a compulsion, can indicates the capacity of the management but not the possibility and may indicates the possibility. This slight change can lead to different responses. Similar result differences were observed when strong words such as prohibit was used in the questions. Such strong words give the impression of control.

Avoid Ambiguous questions?

Suppose a researcher wants to study the popularity of certain types of food. In the questionnaire, a question is asked “Do you like South Indian food?” This is an ambiguous or vague question. The respondent will be confused and wondering on what parameter I should be judging and replying to this question. The questions do not specify South Indian food from which South Indian state he should consider and whether he should

respond keeping in mind dishes served at meal time or he should consider the snacks. He should indicate his liking on the basis of taste, smell, texture or monetary value.

Avoid leading questions:

Avoid framing a question that puts mental pressure on the respondent or gives him a cue about what the researcher wants the answer to be. For example, "All students like mathematics, do you ?"

Provide Context to the questions:

Wherever necessary, the context or reference should be provided to the questions. One can use the technique of filtering and branching to give context to the questions.

Multiple choice questions:

If you are asking multiple choice questions make sure that answers are in mutually exclusive categories.

Avoid asking loaded questions:

Don't ask questions that can encroach upon the privacy of the person (e.g. questions related to their salary, religion, caste, etc.) or can be embarrassing and emotionally inconvenient for them to answer (e.g., have you stopped stealing?)

Unbalanced answer options in scales:

Depending upon the topic to be covered in the question, one should decide whether to use Gutman Scale, Likert Scaleor Semantic Scale or any other type of scale. If the scale type is not chosen properly it may force a respondent to choose an option that does not reflect his true answer. For example, suppose a researcher wants to study the eating habits of obese vs. non-obese people on a Likert type of scale. He provides a five point scale where one extreme option indicates that people starve themselves and the other extreme option shows that people consume abnormal amount of food, with a neutral middle indicating that they neither starve nor consume abnormal amount of food. It has been found that people generally choose the neutral option since they can't find the right response option that truly represents them. Unbalancing in the scale takes place when there are two negative and one positive and one neutral option is given to choose from.

Avoid Double Barrel Questions:

Avoid asking about two variables in one question. For example, a manager of a restaurant asking a customer, "did you like the food and the service of the restaurant?" It becomes difficult for a customer to answer that questions as he may have liked the food but not the service.

Avoid the use of long questions:

Long questions require more effort to understand and answer the question. That demotivates the respondents. They may leave such questions or pick up an option from response category without comprehending the question.

2.4 SURVEY RESEARCH

One of the methods used for data collection in descriptive research is the survey method. It is a very popular research method among social scientists. In most cases, to conduct a survey, the researcher uses a self-administered questionnaire to collect the data. As explained above, the questionnaire can have both open ended and close ended questions with various types of options to respond to those questions. Survey method can be structured or non-structured. The structured survey method uses questionnaire having predominantly close ended questions where the answers are to be given on a forced choice type of scale. On the other hand, unstructured or non-structured survey can be the one that uses questionnaire with lots of open ended questions. It is better to use structured survey rather than the non-structured survey. In a structured survey, it is easier to code every answer and statistically analyze the data. In case of open-ended survey, though, it is possible to get lots of rich data that gives insight into respondent's way of thinking, behavior etc. , but this data is not easy to code and statistically analyze. Open ended type of questions are more suitable for qualitative research rather than quantitative research.

Survey method can be used in experimental research also. For example, suppose a researcher wants to study the impact of mood on prosocial behavior. He conducts the experiment in laboratory by taking a random sample of college students. He divides them into two groups. One group is experimental group and the other is control group. Students in the experimental group are asked to recall all the negative things that have happened to them during the past one week while the control group is just asked to read a book.

After one hour, both the groups are asked to take a questionnaire and indicate how likely they are to help another person who needs help. In this experiment, the mood of the experimental group is manipulated by asking them to think of negative things and thus creating a negative mood in them. While no such manipulations are done in control group. And yet their prosocial behavior which is a dependent variable is measured through survey method.

There are various other types of survey method. Some of them are discussed here.

Cross-Sectional Surveys:

In the cross-sectional survey, the questionnaire is administered only once across various types of the sample from a given population. For example, suppose I want to find out the mathematical ability of class fifth students. I

will administer themathematical ability test to the entire fifth class students, having both boys and girls. After wards I can compare boys' proficiency in mathematical ability with girl's mathematical ability. Thus, a cross sectional study can find the difference between two segments of the same population or it can be correlational study, that tries to find the relationship between two variables. However, it is important to underline once again that it collects the data only once. So, the biggest disadvantage of this method is that by the time the results are published, the targeted population's attitudes, values, preferences might have changed due to some sudden changes in the society.

Longitudinal Survey:

- Longitudinal survey overcomes the problem of collecting data only once. In longitudinal study, same set of respondents are studied over a long period of time, sometimes lasting over years, and the changes in their behavior are noted down.

- There are various types of longitudinal studies, e.g., trend survey, panel survey and cohort survey. In trend survey, the researcher tries to find out whether there are any changes in the values or preferences of the people. However, in trend survey, some of the original respondents may drop out and same people may not be aware year after year. Contrary to that, in panel survey, same people participate in the survey year after year till the survey lasts. So, panel survey is costlier and more difficult to carry out than trend survey, as the researcher has to keep track of his sample over the years. In cohort study, the criteria for taking sample is that people born in same year or same generation people are taken as sample. For example, people born immediately after world war II. It is not necessary that researcher has to take same people year after year, he has to merely ensure that they should be born in the same year.

Mail Surveys:

In mail survey, the questionnaire is sent by post with a self-addressed envelope, so that the respondent can send back the filled up questionnaire.

Advantage of mail survey is that one can reach out to people even in remote areas.

Disadvantage: The disadvantage is that it is very costly and time consuming method and the response rate is also very low. The potential respondents either do not reply at all or they may send half-filled forms.

Phone Surveys:

Advantages: Compare to mail survey, this method is quicker and less costly. It also generates higher response rate. The problem of half filled forms is also avoided as the researcher is asking questions on phone.

Disadvantages: Though it is better than mail survey method, but certain problems still remain with this method too. First of all this method can be

used only if a respondent has a phone. Even if he has a phone, fixing up an appointment when he will be willing to answer the questions becomes a problem. The respondent may have difficulty in understanding the questions spoken on phone and the researcher may have to repeat it many times. The researcher's voice or tone may reveal his personal biases. So this method becomes costly and time consuming. The researcher can't take a large sample and will have to limit the number of questions that can be asked. The respondent may refuse to answer embarrassing questions.

Web/Online Surveys:

Web or online survey can be done either by sending questionnaire in email or through video conferencing devices such as zoom or google meet.

Advantages:

This method is still better than phone survey. Sending questionnaire through email is faster and less costly than sending through mail.

There is no need for the researcher and the respondent to coordinate their timings to talk to each other unless they are using video conferencing.

The respondent can read the questions in email and take his own time to understand the question and decide on his answer. It is less troublesome for him also to send the filled questionnaire back to the researcher.

If the researcher is using google forms, then the added advantage is that he can download it in excel sheet and analysing the data becomes easier.

In case of video conferencing, the respondent can understand the questions much easily as he can see the researcher and his facial expressions. The researcher can clarify any doubts or confusions that a respondent might have while answering the questions.

Disadvantages:

Similar to phone survey difficulty, in case of web or online survey too, the first condition is that the respondents must have either a laptop, desktop or internet enabled mobile phone. Moreover, they must have good internet connectivity. In some of the geographical areas, having electricity, good internet connectivity might be a challenge. People belonging to poor class may not have laptop or even internet enabled mobiles. In such cases, the possibility of sampling error cannot be ruled out.

The questionnaire sent on email may go in spam and the respondent may not be aware of it. The researcher needs to do the follow up and that may become time consuming and push up the cost of doing research.

Multi-Mode Surveys:

When different modes of Survey method are used to collect the data and the respondents' responses are combined together to analyse the data, it is called multi-mode or mixed mode survey method. This method helps in reducing the sampling error as those who do not have access to internet or

do not respond can be contacted by using a different mode of survey method. However, the impact of using different mode of collecting data cannot be ignored.

Advantages of Survey Method:

Since survey is mostly conducted by using the self-reported questionnaires, it is possible to collect the data quickly from a large sample. So it is less time consuming and less costly than experimental method. Compared to experimental method, use of survey method is much easier.

Surveys method can be used to study variety of topics, evens those topics that cannot be studied through experimental method either due to ethical constraints or due to lack of resources.

It is easy to analyze the data collected through survey method than many other methods.

Surveys method is reliable as it follows the principles of scientific research. The tool to be sued, the sample, the objectives and hypotheses are well thought of.

Disadvantages of Survey Method:

Since surveys are conducted through self-reported questionnaires, we do not know whether the respondents have answered the questions accurately or no. Some people may not give honest answers or may not answer all the questions, because of their social desirability factor or due to demand characteristic. They may want to project themselves in good light in front of the researcher, or they find certain questions very embarrassing to answer, or due to lack of knowledge or capacity to answer those questions or they may be unable to recall the information at that moment when they are filling up the form. Their responses can also get affected by their level of motivation.

The data collected through survey method may be faulty if the tool used to collect the data is faulty. For instance, if the researcher has constructed a questionnaire and if that questionnaire has faulty format, wordings of the questions, wrong scaling, wrong placement of the questions in the questionnaire, not conducted the pilot study, reliability and validity has not been established, then obviously the data collected through the use of this instrument will be faulty. "Reliability" of an instrument indicates how much there will be consistency in the answers given by the respondents, if the same questionnaire is administered again and again.

Validity of an instrument indicates whether it is measuring what it intended to measure. Both reliability and validity are in the form of degrees and not in absolute terms.

It is observed that questionnaires having more of close ended questions have lower reliability than those which have balanced mixture of open ended and close ended questions. Especially if the questionnaire is used to

measure emotions or feelings. It has also been observed that survey method proves to be inadequate for studying complex social issues.

One cannot establish cause and effect relationship through survey method as the researcher is not controlling any variable.

Other non-experimental methods:

Sometimes in social sciences it is not possible, either due to ethical considerations or due to lack of resources, to use the principles of randomization and control of variables. In such cases researchers use non-experimental methods. Some of the non-experimental methods are survey method, and observation method, case study method, etc. Data collected through these non-experimental methods or quasi experimental methods are more difficult to analyze and interpret than the data from experimental method.

Case study Method:

Case study method is a systematic and scientific procedure for observing or examining a phenomenon related to any specific event or person or organization within its real-life context. Case study method can be used for a single person as a subject (e.g. in clinical settings) or it can study a group of people or events or organization (e.g. success story of Maruti car). Case study method can rely upon administration of standardized scales, observation, interviews, etc. In other words, it combines multiple methods to collect the data. The data can be numerical as well as qualitative.

A researcher can gain lot of insights and understand in a better way why certain event took place or why a person behaves in a specific manner. On the basis of this enhanced understanding, he can judge what should be the future course of action to do research in that particular field.

Case studies can be instrumental in both generating and testing of hypotheses. As mentioned before, initially case study method was predominantly used by clinical psychology but now it is used by other branches of psychology too. Clinical psychologists firmly believe that to understand a person's physical and mental health, it is very important to know his past and present history of health as well as about his past and present social, physical and economic environment.

Apart from primary data, secondary data can also be a rich source of information and insight for a researcher. One can collect secondary data from books, personal sources, journals, newspapers, websites, government records etc. There are many fields of social sciences that depend either entirely on secondary data or secondary data plays a major part in research in those fields, e.g., research in history, politics, economics, etc. It is easier, less expensive and quicker to collect secondary data than primary data. The researcher either does not need or requires minimal help from others to collect such data. One of the sources of secondary data are archival records. Let us see it in some detail.

Archival Records:

Archival records are generally the running records of the specific events that have taken place or are taking place in public domain and these records have some permanent value. For example, they may be documents having information about historical events, information about introduction of some new laws or change of laws of the land. It may be record of criminals and their past history of conviction, academic records of students, etc. These records can be in the form of newspaper articles, government files, on official websites, in micro films, etc.

Archival records can be used to test hypotheses about human behavior in natural setting. Though observation method also aims to study human behavior in its natural setting, but archival records have an advantage that it can give us information about natural human behavior that may have taken place long back and in any part of the world. The researcher need not be present in that era and at that place to study that specific human behavior. Since behavior is studied in natural settings and unobtrusively, it has high ecological validity. Apart from testing the hypotheses, it can also help in generating the new hypotheses.

The advantage of this method is that it is quicker and cost effective. The researcher can access the data of many people at the click of his mouse.

The disadvantage is that the data recorded was according to the hypotheses of the researcher. It was collected by someone else for different purposes. The researcher will have to see which data has maximum relevance to his hypotheses.

Secondly, if there is already some inherent fault in the archival records, then the researcher has no way of correcting it or even knowing it and will have to use those faulty archival records only. That may reduce the reliability of his study. For example, suppose a researcher aims to use archival records to find out the relationship between age of the participants and their preferences for various political parties. The researcher decides to use data available on Facebook. There is no guarantee that people have put their real age or political leanings on the social media site. Similarly, if a person wants to know the financial health of an organization and looks at the records available on that organization's website, there is no guarantee that figures put there are the true ones. In such cases, the researcher will have to seek same information from many different sources to see whether there are any contradictions in the information given in different records. If the contradictions are glaring, he cannot use that information.

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3

EXPERIMENTAL AND QUASI-EXPERIMENTAL METHODS

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3.1 INTRODUCTION

we have seen that survey method can be used to describe people's attitudes and behavior. However, it does not establish cause and effect relationship. It does not tell us why people have specific attitudes that they have. Getting an answer to the 'why' of behavior is essential to make predictions about the future behavior. Both description and prediction are two of the goals of psychology. To determine causal relationship, psychologists need to use experimental designs. In this unit, we will study how do psychologists use experimental method. How groups are formed in independent group design research. We will also discuss how to establish external validity of the experiment.

We will discuss the experiments that involve more than one independent variable in one experiment only. Such designs are called complex designs or factorial designs. This design allows us to find out the main effect, that is effect of each independent variable as well as the interaction or combined effect of the independent variables. In last unit we touched upon the difficulties in establishing cause and effect relationships through experimental method. In this unit we will elaborate further on those difficulties, especially when experiments are conducted in natural settings. We will also discuss how to overcome these difficulties by using quasi experiments. Researchers also try to determine the effectiveness of changes made by government agencies and other organizations. This is called program evaluation. We will briefly discuss the procedure and limitations of program evaluation.

3.1.1 Why Psychologists Conduct Experiments:

One of the main reasons for conducting experiments is to establish the cause and effect relationship between two or more variables. Researchers first of all make hypotheses from existing psychological theories and then empirically test those hypotheses to validate the assumed cause and effect relationships between variables under study. For example, Pennebaker et.al. (1989) developed a hypothesis that suppressed feelings about a painful experience can lead to physical toll. They derived this hypothesis from 'inhibition theory'. To empirically test this hypothesis, they used experimental method, in which all participants were divided into two groups. One group was asked to write down about personal emotional events while the other group was asked to write down about superficial topics. The results showed that the group who wrote about personal emotional events had better health later on than the other group that had written about superficial events. However, in another version of the same

experiment, researchers divided the group into two groups – one group was asked to dance expressively about an emotional experience while another group was asked to write as well as dance about their personal emotional experiences. It was found that the group that wrote and danced both, had better health results then the first group that had only danced. These two versions of the experiment led them to believe that there is a cause and effect relationship between expressing one's emotions and the health outcomes of a person. If the results validate the hypotheses, the theory is accepted, otherwise new hypothesis needs to be formed and again tested through another experiment.

Apart from validation of the psychological theories, experimental method is used to find out the effectiveness of treatments in various areas of medicine and psychology.

3.1.2 Logic of experimental research:

As mentioned above, experimental method allows a researcher to firmly infer causal relationship between independent variable and dependent variable. This is made possible due to the use of experimental control. An experimenter exerts experimental control through either manipulation or holding conditions constant, or through balancing. Three conditions are required to make a causal inference. These are – covariation, time-order relationship, and elimination of plausible alternative causes.

Covariation:

As the name suggests, covariation means there is relationship between independent and dependent variables. They change or vary simultaneously.

Time order relationship:

A time order relationship takes place when independent variable is manipulated first and then the subsequent changes in behavior are observed. In other words, we can say that the change in behavior is contingent on the manipulation of independent variable.

Elimination of plausible alternative causes:

Means applying the control procedures to ensure that no other factor than independent variable is the cause of change in dependent variable. This control can be achieved through holding conditions constant and balancing.

If these three conditions are met, experiment will have high internal validity and we will be able to say firmly that independent variable caused the changes in dependent variable.

3.2 INDEPENDENT GROUPS DESIGNS

In experimental method, to determine the cause and effect relationship, two groups of participants are taken. In one group independent variable is

introduced or manipulated while in another group, independent variable is not introduced. Then the impact of this manipulation is measured or observed on behavior. The measure used to record the change in behavior is called dependent variable. An independent variable must have at least two levels or conditions, e.g., exists/ does not exist, etc. One level will be considered 'treatment' condition while the other level will be considered as 'control condition'. An independent variable can have more than two levels too for additional comparisons between groups. This is known as independent group design

3.2.1 Random Group Design:

Random group design is part of independent group design. In independent group design, each group of participants is exposed to only one condition or level of independent variable. If there are two groups of participants, it is necessary to ensure that they are comparable. This can be done by balancing or averaging the characteristics of participants across the groups. This averaging can be done by randomly assigning participants to any of the groups. This will make all groups comparable or similar on all important characteristics before the experiment begins. This is known as random group design. Once the comparable groups are formed, then independent variable is introduced in one of the groups and it is assumed that any difference between the groups on the dependent variable must be due to the introduction of independent variable.

Between Subject Design is another name for independent group design. In either case, the basic principle remains same. Either two or more groups of participants are compared. Groups are similar or comparable but none of the participant will be in more than one group.

Manipulation of an independent variable satisfies three conditions that are necessary to firmly establish cause and effect relationships. These are:

1. Difference in measures of dependent variable covaries with the changes or manipulation of independent variable.

2. The change in dependent variable takes place after the change in independent variable condition (time order relationship)

3. By holding conditions constant and balancing, alternative explanations for changes in dependent variables are eliminated. Holding conditions constant ensures that the only factor that changes systematically is the independent variable and nothing else. If independent variable under study and a potential independent variable are allowed to covary, confounding condition takes place and that threatens the internal validity of the experiment.

However, it is important to keep in mind that researcher cannot hold constant all possible covariants of independent variables. He will keep constant only those factors that he thinks can be the plausible alternative causes. But an experimenter should constantly keep looking for such

alternative possible factors that he had not considered or anticipated and that may influence the outcome of his experiment.

Balancing:

The experimenter needs to use balancing as a control technique before introducing the independent variable. Very often if the groups formed are not equivalent groups, individual differences can become the confounding variable that undermines the internal validity of the experiment. The groups can be balanced by using random group design.

3.2.2 Block Randomization:

Block randomization is also known as randomized block design. It helps the experimenter to balance the participants' characteristics and other confounding factors that may occur during experimentation. It also helps to ensure a balance in sample size across groups over time. Block randomization is better than simple randomization because simple randomization cannot rule out the possibility of known or unknown confounders bringing severe imbalances in sample allocation. This method is especially useful when sample size is small. Now let us see how block randomization is done.

In block randomization we form groups where participants are similar, so that they can be compared with each other. Suppose we want to study the difference in the effectiveness of online teaching and traditional method of teaching on class fifth students. We first create two homogeneous blocks of students. In both the blocks we have students from fifth standard, both male and female students and having same level of intelligence. Let us say that our sample size is 60. So there are 30 students in each block. Now in each block we randomly expose 15 students to online teaching and 15 students to traditional method of teaching. Let us take another example, suppose there are five levels of independent variable, viz., A, B, C, D, E. If the researcher wants to have 10 participants for each condition. Totally, there will be 50 participants. There will be 10 blocks and each block will consist of a random assignment of the five conditions.

Advantages of block randomization:

1. It produces groups of equal sizes. Having groups of equal size is very important because the number of observations in each group affects the reliability of the descriptive statistics for each group

2. It controls for time related variables. If an experiment takes a long time to complete, the chances are very high that subjects may get influenced by events that may take place while the experiment is still going on. In block randomization, since every level or condition of independent variable is tested in each block, these time related variables are balanced across the conditions of the experiment. Time related factors can be a traumatic event, change in the experimenter or even change in the population from which the sample was taken.

Block randomization will average out any characteristics of participants.

3. It increases internal validity by balancing extraneous variables across conditions of the independent variable.

3.2.3 Threats to Internal Validity:

By definition, internal validity refers to the degree to which difference in performance on a dependent variable can be clearly attributed to the effects of independent variable and not to the uncontrolled variables.

Uncontrolled variables are the alternative explanations for the results obtained for a study. The uncontrolled variables are the threats to internal validity of an experiment. Let us see what are these uncontrolled factors and how to control them.

a) Testing Intact Groups:

Sometimes, in spite of using random assignment, comparable groups are not formed. This problem comes when intact groups are formed at the start of an experiment and randomly assigned to various conditions of an experiment. In noncomparable groups, the confounding takes place when individuals differ systematically across the intact groups. For example, in third year BA, while choosing courses, sometimes students choose subjects on the basis of who will be the teacher, subjects taken by friends, how easy it appears, how scoring it is, etc. Consequently, they will be put in different divisions of the same class. For example, Div. A will have all psychology students, Div. B will have all economics students, and so on. If an experimenter randomly assigns different divisions to different levels of independent variable, a confounding due to testing intact groups may take place. Students may systematically differ across the divisions or intact groups.

b) Balancing Extraneous Variables:

Potential variables that experimenter has not planned to study but these variables can still influence the outcome of the experiment are called extraneous or confounding variables. For example, if all the participants in the experimental group are tested by one experimenter and by another experimenter in the control group, the levels of the intended independent variable would become confounded with the two experimenters. Let us take another example, Evans and Donnerstein (1974) found that students who are willing to participate in the experiment at the beginning of the academic term are the ones who are more academically oriented and have internal locus of control, while those students who volunteered to participate in the experiment in the later part of the academic term, were those who were not academically oriented and had external locus of control. The difference in participants' characteristics would be a confounding variable.

Psychologists suggested that block randomization method can be used to balance extraneous variables across groups.

c) Subject Loss:

Internal validity of an experiment gets compromised when participants in an experiment take part in the beginning of the experiment but do not remain in the experiment till the end of the experiment. The subject loss can be of two types – mechanical subject loss and selective subject loss.

d) Mechanical subject loss:

When a subject fails to complete an experiment due to an equipment failure (and here we consider experimenter too as part of the instrument) it is called mechanical subject loss. For example, malfunctioning of an instrument, computer crash, experimenter giving wrong instructions or someone inadvertently disrupting an experimental session, etc. Mechanical loss is not as grave as selective subject loss, as it does not lead to systematic differences between the characteristics of the subjects who successfully complete the experiment. However, whenever mechanical subject loss takes place, it should be documented along with the reason for the loss. Then the lost subjects should be replaced with other tested subjects.

e) Subjective loss takes place when:

(1) subjects are lost differentially across the conditions of the experiment;

(2) any particular characteristics of the subject is responsible for the loss;

(3) this specific characteristic of the subject is related to the dependent variable of the study.

If the subject loss is selective, the groups can't be compared. But the basic reason for using random group design in experiments is to have comparable groups. In such a situation it is not possible to have any reliable results from the experiment. Let us take an example to understand selective subject loss. Suppose a gym instructor wants to test the effectiveness of a one-month fitness training program. He gets total 80 volunteers for this experiment. He randomly divides them into two groups of 40 each. He made sure that characteristics of the participants like weight, fitness level, age, gender, motivation are same in both the groups. Thus, both the groups are comparable at the initial stage of the experiment. Participants in the experimental group start with the one-month fitness training program, while the participants in control group continue with their normal fitness routine work. At the end of the month, suppose only 38 participants in control group and 25 participants in experimental group remain in the experiment. On comparison, the experimenter finds that average fitness score of 25 participants in experimental group is much higher than the average fitness score of 38 participants in control group. It will be wrong on the part of gym instructor to claim that his one-month fitness training program has been effective. The selective subject loss has

occurred, especially in experimental group. Out of 40 participants in experimental group, only 25 continued till the end of the month. The remaining 15 participants may have dropped out because they were less fit, compared to the other 25 in that group, even before the program began. Another potential possibility of difference in the fitness scores of experimental and control group can be that 25 experimental participants might have been more fit than control group and may have scored more than them without training program too. Thus, the selective loss of participants in the experimental group has most likely destroyed the comparable groups that were formed by random assignment at the beginning of the experiment. In other words, the characteristic of the participants, i.e., their original fitness, became a confounding variable. To prevent the possibility of subjective loss, the experimenter should have screened the participants through pretest, kept only those who were similar in fitness and then randomly assigned them to either experimental group or control group.

f) Placebo Control and Double-Blind Experiments:

Both experimenter and participants come to the experiment with certain expectations and these expectations can lead to certain biases that can be a threat to internal validity of the experiment.

Demand characteristic is one such bias that originates from participants' expectations. Participants look out for cues or any other information to get an idea about what kind of behavior is expected from them during the experiment. For example, if a participant is given chocolate and he thinks that experimenter expects him to feel happy about it, then he will behave consistent with those expectations, irrespective of his real feelings.

g) Experimenter effect is another such bias that may compromise the internal validity of the experiment. An experimenter may unknowingly treat subjects differently in different groups. He may treat subjects in experimental group in a biased manner to get response that validates his hypotheses. For example, in an experimenter wanted to test the effect of alcohol on cognitive and motor functions of the subject. He divided subjects in two comparable groups. One group (experimental group) was given alcohol and the other group (control group) was given plain water. The experimenter read the instructions to the experimental group more slowly than to the other group, thus creating an experimenter bias. Furthermore, experimenter effect took place again when the experimenter keenly observed the subjects in experimental group for any unusual motor movement or slurred speech as he was expecting that kind of behavior from them,

Though it is not possible to completely eliminate demand characteristics and experimenter bias but they can be controlled by using certain techniques. The demand characteristic can be eliminated by using placebo control group. The subjects can be divided into experimental and control group. An independent variable such as alcohol or some drug can be given

to them while the control group can be given something which looks like drug or alcohol but is actually inactive or plain substance. Subjects in both groups have same awareness of taking alcohol or drug and similar expectations or demand characteristics. Any difference in the behavior of these groups can be attributed to independent variable. However, there can be an ethical issue while using placebo control group, especially if the experiment is about testing the effect of any drug to treat an illness. If patients benefit from the new drug that was introduced as independent variable than those in placebo control group also would be expecting similar benefit. To overcome this problem, experimenters take written informed consent from the subjects that they might get either new drug or placebo. If the new drug proves to be effective, then those who got placebo also will be given that new drug.

To overcome experimenter bias, double blind procedure can be used. In this technique, both experimenter and the participants are unaware about which group has been exposed to independent variable. In double blind procedure, there will be two experimenters conducting the experiment. One experimenter will code the independent variable and control variable separately and administer it to the groups. The other experimenter will be the observer of the behavior and will not know in which group independent variable has been introduced, Therefore, the observer experimenter will treat both the groups in the same manner and there will be no experimenter effect.

3.2.4 The Role of Data Analysis in Experiments:

Data analysis is a very crucial part of any experiment. Without proper data analysis, an experimenter cannot establish cause and effect relationship between independent and dependent variable with surety. Robert Abelson (1995) said that the basic purpose of data analysis is to determine whether obtained data supports the assumptions made in the hypotheses. One of the best ways to find out the reliability of our results is to replicate the experiment. Replication means repeating the experiment with same variables, similar sample, using the same procedures and under similar conditions. If we get the same results in replicated study too, that indicates that our previous results are reliable. However, it is nearly impossible to have exact replication of the original experiment as the subjects and external conditions of the experiment will be different. Another problem with replication is that it will be very cumbersome, costly and time consuming to establish the reliability of each and every experiment through replication method. As an alternative to replication, researchers can use data analysis and statistics for determining whether the results of a single experiment are reliable and can be used to state that independent variable does have an impact on behavior.

Describing the Results:

Data analysis is done in three stages:

(1) getting to know the data: this involves scoring, coding, inspecting the data, removing errors and cleaning the data

(2) **summarizing the data:** this includes using descriptive statistics such as mean and standard deviation, percentages

(3) **confirming what the data reveal:** this includes testing the hypotheses through inferential statistics.

One of the major concerns the researcher has is how much or significant the effect of independent variable is on dependent variable. This question can be answered by measures of effect size. Measure of effect size is not influenced by the sample size and indicates the strength of relationship between the independent and dependent variables. One of the common measures of effect size is Cohen's d. He suggested that d values of .20, .50, and .80 to indicate small, medium, and large effects of the independent variable, respectively. Measure of effect size is also used in another statistical technique called meta-analysis.

Meta-analysis is a statistical technique that helps to summate the effect sizes from various independent experiments studying the same independent or dependent variable. Meta-analysis is used to get answers to questions like: Are there gender differences in ….? What is the effects of class size on XYZ…...?Is solution-based therapy effective in the treatment of …...? Meta analyses gives an efficient and effective way to summarize the results of large numbers of experiments using effect-size measures.

Confirming What the Results Reveal:

As mentioned above, inferential statistics is used to confirm whether independent variable has significant effect on dependent variable. There are two methods of making these inferences – null hypothesis testing and confidence interval.

A statistically significant difference between the two groups indicates that null hypothesis is not true and independent variable does have an impact on dependent variable. In other words, it indicates that the difference between the two groups is more than the difference expected due to error variation. Error variation refers to non-systematic or random variation or chance factor variation due to differences among subjects within each group. The objective is to have as less error variation as possible. Though it can't be completely eliminated. When we do null hypothesis testing through inferential statistics, we are indirectly trying to determine what is the likelihood or probability of our results occurring if null hypothesis was true. It is well accepted in research that results with probabilities (p) of less than 5 times out of 100 are judged to be statistically significant. The probability value chosen by the researcher to determine that an outcome is statistically significant is called the level of significance and is denoted by Greek letter alpha (α). The obtained value at alpha level or higher than that is considered significant.

What Data Analysis Can't Tell Us:

As already mentioned above, our data analysis cannot tell for sure whether our independent variable has an effect on dependent variable. when an

outcome is not statistically significant, we cannot conclude with certainty that the independent variable did not have an effect. We can only conclude is there is not sufficient evidence in the experiment to claim that the independent variable produces an effect. Secondly, data analysis cannot tell us whether our experiment was meaningful or had any practical value. There are two types of errors that a researcher can commit while using inferential statistics. Type I error takes place when null hypothesis is wrongly rejected while it is true, and type II error takes place when null hypothesis is accepted as true even when it is false

3.2.5 Establishing the external validity of experimental findings:

External validity refers to the extent to which findings from a research study can be generalized to individuals, settings, and conditions beyond the scope of the specific study. Compared to experiments conducted in laboratory, field experiments will have higher external validity as they will be closer to real world setting. The researchers want to and should strive for higher external validity of their studies as higher external validity means higher generalizability. However, whether the researcher will emphasize on internal validity or external validity depends on the topic of research. If the researcher is testing any existing theory, he may emphasize on internal validity and if he is conducting a research in real world setting to find solutions to a problem. Though, to increase external validity, psychologists try to mimic real life situations while designing an experiment in laboratory conditions, it is not always possible or ethically permissible to mimic the real-life situation. For example, Ceci (1993) conducted an experiment to test the factors that may affect the reliability of eyewitness testimony in an assault case, but he cannot create actual assault in laboratory as it is ethically not correct. Another factor that may raise doubts about the external validity is the sample. Most of the experiments in laboratory conditions are conducted with college students as subjects. The question arises, do students represent the general population, and if yes, then how much is this representation a true representation.

One of the ways, psychologists can determine external validity is through partial replication of the experiment. Partial replication establishes external validity by showing that a similar experimental result occurs when slightly different experimental procedures are used. Another method of establishing external validity can be to use conceptual replication. For example, Anderson and Bushman (1997) suggested that suppose we wish to establish the external validity of the idea that insults lead to aggressive behavior. In that case, we need to use different words that may appear to be insulting to different population. The words that children may find insulting may be different from the words that adults find insulting.

Matched Group Design:

Matched group design is another design involving independent groups. Random group design can be used when the sample size is large, especially if the researcher is working with heterogeneous population.

Random group design functions on the assumption that individual differences get averaged out across groups. When there are very few people available that can be divided into two random groups or when it is not possible to use repeated measure design, then matched group design is used. By matching the subjects on dependent variable task and then dividing them into two groups, matched groups become as good as random groups. However, the matched group design will be effective only if the two groups are pre tested on a good matchable dependent variable. For example, if the researcher wants to study the impact of a training program on mathematical ability of the class 5th students. Then it is important to match the students based on their mathematical ability and then dividing them into two groups and introducing special training program. Both the groups should have on average equivalent mathematical ability. In such cases, pre test-post test can be used.

Ideally, the groups should be matched by pre testing them on dependent variable. But some times the dependent variable may be such that it gets affected by previous exposure. For example, suppose we want to study the amount of time taken by 5th classstudents to learn spellings of certain English words. If we use the same list of English words for pre test and post test to measure their spelling ability, we may not be sure that less time taken in post test is due to the independent variable or due to the familiarity or practice effect with the words. In such situations, it is advice able to use dependent variable task which is similar to the dependent variable that you are going to use in experiment but not exactly the same one. This similar dependent variable task which is similar but not the same as dependent variable task in experiment is called matching task. There should be high correlation between the matching task and actual dependent variable task.

Even after the subjects are matched on a particular task, one should ensure that they should be assigned to the two or more groups in random manner. This will help in averaging out any other factor, that is beyond the matching factor. That may influence their performance.

Natural Group Design:

Natural group design is usually used in correlational studies. Researcher tries to find correlation between the subject variables and dependent variables. As you already know, in correlational studies, we cannot establish cause and effect relationship. But psychologists are interested to see the influence of individual differences or subject variables on specified dependent variables. They cannot experimentally manipulate these subject variables to see their impact on dependent variable, they can manipulate these variables by selection method only. For example, experimenter cannot increase or decrease variables like gender, age, height, race, etc., to see its impact on dependent variable (e.g., performance in sports), He will have to manipulate it by selecting participants naturally belonging to different height, weight and form different natural groups and then compare their performance on the dependent variable. Natural groups are those groups where independent variable's levels are selected instead of

being manipulated to form different groups. Natural group design is used to describe and predict the behavior and not to establish the cause and effect relationship.

3.3 REPEATED MEASURES DESIGNS

Why researchers use repeated measures designs:

Sometimes researchers use repeated measure design even when sufficient number of subjects are available, because they find it convenient and efficient in answering their questions. For example, Ludwig et.al. (1993) were interested to find out how both hemispheres of the brain communicate with each other. They briefly presented two letters having either similar or different name to the participants. Either one or both letters were presented to each participant in either unilateral condition (one hemisphere) or bilateral condition (both hemisphere). Since each participant was tested in both unilateral and bilateral conditions, it is called repeated measure design. This design was far better than if they had to use two separate groups to test unilateral and bilateral condition separately.

Repeated measure design is more sensitive than an independent groups design. It means that repeated measure design can detect even the smallest of the effect of independent variable and thus have lower error variance. There is less error variance in repeated measure design because there is usually more variation between people than there is within people.

Psychologists find repeated measure design more suitable for longitudinal studies, where they would like to record the changes taking place in dependent variable over time, for example in learning experiments. This design is very useful in psychophysics studies, where psychologists want participants to compare two or more stimuli relative to one another, for example, in Hawthorne experiment, researchers wanted to know how much light will lead to optimum productivity, so they had to keep measuring the subjects' performance in different intensity of light.

Another advantage of this method is that individual differences cannot confound the findings as same individuals are used in different conditions.

3.3.1 The role of practice effects in repeated measures designs:

In spite of repeated measure design having many advantages, it is not free from shortcomings. These shortcomings can threaten the internal validity of the experiment.

One of the factors that can threaten the internal validity of the repeated measure design experiment is that due to repeated testing the participants' performance may change due to practice effect rather than due to independent variable manipulations. The changes that participants undergo with repeated testing in the repeated measures designs are called practice effects. The participants may perform better and better at the task as they learn more about the task, or they may get worse at the task due to factors like fatigue and boredom.

Another threat to internal validity can come from participants' natural maturation process. Their performance may improve with age as they become more mature.

3.3.2 Balancing Practice Effects in the Complete Design:

There are two types of repeated measure design – the complete and incomplete design. The main goal of repeated measure design is to control practice effect.

Practice effect can be balanced by using a technique called counterbalancing technique. But counterbalancing technique is used differently in complete and incomplete repeated measure design.

In the complete design, practice effect is balanced by using block randomization or ABBA counterbalancing.

Each participant is administered each condition many times to control the practice effects using different sequence each time. These conditions are administered in different order on each trial. Each participant can thus be considered a "complete" experiment.

When all the conditions of an experiment or block are presented in a random order in each trial, it is called block randomization.

When a random sequence of all conditions is presented, followed by the opposite of the sequence, it is called ABBA counterbalancing. It is better to use block randomization rather than ABBA counterbalancing if:

a) practice effect is non-linear

b) when the performance of the subject can get affected by anticipation effect

c) It is possible to have large number of trials and number of conditions are also sufficiently large.

Anticipation effect takes place if the participants develop an expectation about which condition will take place next in the sequence, and this expectation influences their responses to the task.

Generally, the number of blocks in an experiment are equal to the number of times each condition is administered and the size of each block is same as the number of conditions in an experiment. To balance out practice effect in block randomization, it is necessary to repeat each condition many times.

It is better to use ABBA counterbalancing technique if:

a) the number of conditions is less,

b) it is not possible to repeat each condition many times

c) practice effect is linear.

d) Anticipation effect will not take place

In ABBA counterbalancing, as the name suggests, the condition is presented in one sequence (A then B) and then represented in opposite of the first sequence (B then A). However, in ABBA counterbalancing, there must be an even number of repetitions of each condition.

3.3.3 Balancing Practice Effects in the Incomplete Design:

In the incomplete design, a researcher will administer each condition to each participant only once. The order of administering the conditions differs across participants rather than for each participant. The general rule for incomplete design is that each condition of the experiment must appear in each ordinal position (1st, 2nd, 3rd, etc.) equally often.

Practice effects in the incomplete design are balanced out across subjects rather than across each participant. There are two techniques, in incomplete design, to choose the order:

a) All Possible Orders

b) Selected Orders

All Possible Orders of the Conditions:

When there are four or less than four conditions in an experiment, it is better to use all possible orders of the conditions. Each participant is randomly assigned to one of the orders. It is advisable to use it for not more than 4 conditions because the number of orders increase dramatically as the number of conditions increase. For example, if there are 3 conditions then number of possible orders will be 6, for 4 conditions, there will be 24 possible orders. The number of possible orders will go up to 120 if there are 5 conditions and there will be 720 possible orders if there are 6 conditions.

This technique will be effective if at least one participant is tested with each of the possible orders of the conditions. So, if there are 4 conditions, at least 24 or multiples of 24 participants will be needed. Consequently, this technique can be used only if large number of participants are available according to the number of conditions in the experiment.

Selected Orders:

When large number of participants are not available and the number of levels of independent variables is more, it is better to use selected order method. It is possible to balance practice effect with some of the selected orders out of all possible orders. There are two techniques that can be used to do balancing with selected orders. These are -

a) Latin square

b) Random starting order with rotation.

a) Latin square:

In Latin square each and every condition appears at each ordinal position at least once, and each condition precedes and follows each other condition exactly once.

b) Random starting order with rotation:

This technique begins with a random order of the conditions and rotates their sequence systematically with each condition moving one position to the left each time. This ensures that each condition always follows and always precedes the same other conditions. The advantage of this technique is that it is very simple to apply and it can be used with more than 4 conditions.

3.3.4 Data analysis of repeated measures designs:

Describing the results:

The first step in analyzing the data is to check for any errors and outliers. The second step will be to use descriptive statistics (e.g., mean, standard deviation) to summarize the data for each condition of the independent variable. It is easy to summarize data in random group design. In incomplete repeated measure design, while summarizing, the researcher needs to make sure that participants' scores are listed with the correct condition. In complete repeated measure design, the researcher needs to first compute a score for each participant in each condition before he begin to summarize and describe the results, because each and every participant is tested in each condition more than once.

Confirming what the results reveal:

Similar to random group design, in repeated measure design too, researchers test whether independent variable produces an effect on dependent variable by testing null hypotheses against set confidence limits. However, repeated measure differs from random group design in estimating the error variance. In random group design, error variance is estimated by finding the individual differences among participants within the groups, while in repeated measure design, differences among participants are eliminated from the analysis. Repeated measure design is considered more sensitive than the other design due to its ability to eliminate systematic variation. Error variance occurs in repeated measures due to the differences in the ways the conditions affect different participants.

3.3.5 The Problem of Differential Transfer:

When performance in one condition differs depending on the condition that precedes it, it is called differential transfer. Differential transfer is a threat to internal validity of repeated measures designs. It also undermines the external validity of the results by underestimating the differences in the conditions. So, if there is differential transfer, the researcher should use independent groups design.

3.4 COMPLEX DESIGNS

3.4.1 Complex Designs with Three Independent Variables:

The simplest complex design is 2X2 design. But we can have more than two independent variables having more than two levels. As the number of independent variables increase the power, the complexity and the efficiency of the complex design also increases. A two-factor design can compute only one interaction effect while a three factor design can compute three main effects and four interaction effects. For example, if we take three independent variables – A, B and C. Then apart from the main effect of each of these variables, we will get 4 different interaction effects such as AXB, AXC, BXC, AXBXC.

In a three-factor complex design, a three-way interaction effect occurs when the interaction of two of the independent variables differs depending on the level of the third independent variable. Therefore, while describing the results, all three independent variables must be considered.

Just as in case of 2X2 design, in complex design experiment too, the data is first checked for any errors or outliers and then data is analyzed to check for three potential sources of variations such as the main effects of each independent variable and the interaction effect between independent variables.

Descriptive statistics such as mean, standard deviation, and measures of effect size is used to describe the results.

Inferential statistics such as null hypothesis testing and confidence intervals are then used to determine whether any of the effects are statistically reliable.

Both descriptive and inferential statistics are used to interpret main effect and interaction effect of an experiment. An effect is considered to be statistically significant if the probability of observed effect of an independent variable is less likely to occur by chance factor or it is the probability under the null hypothesis that is less than significance level of .05.

3.4.2 Describing effects in a complex design:

When researchers study the effects of two or more independent variables in one experiment, it is called complex design. These are also known as factorial designs. There are many types of complex designs. The simplest complex design has two independent variables with each independent variable having two levels. It is denoted as 2X2 design. In other words, complex designs are denoted by the number of levels of each of the independent variables in the experiment. As the number of independent variables increase or the number of levels of each independent variable increase, the design also becomes more complex and more powerful too, e.g., we can have 2X2X3 design, 3 X4 design, 3X3X4X2 design, etc. Though theoretically, there can be unlimited number of complex designs

but generally, experiments do not involve more than five independent variables having two or three levels. Moreover, these complex designs can have either independent groups variables or repeated measures variables. If a complex design has both an independent groups variable and a repeated measures variable, it is called a mixed design

No matter how many independent variables and how many levels of independent variables are there in a complex design, the nature of main effect and interaction effect remains the same.

A simple main effect is defined as the effect of one independent variable at one level of a second independent variable. In complex design, one can test the overall effect of each independent variable while ignoring the effect of the other independent variables.

Interaction Effects:

An interaction effect refers to the effect of one independent variable depending upon the level of second independent variable. In other words, the effect of one independent variable differs depending on the levels of a second independent variable. The order of the independent variables is immaterial.

Main Effects and Interaction Effects:

The gross general effect of each independent variable in a complex design is called a main effect. It shows the differences in the average performances for each level of an independent variable colligated across the levels of the other independent variable.

An interaction effect between independent variables takes place when the effect of one independent variable differs according to the levels of the second independent variable

A researcher can easily identify interaction effect by merely seeing the graphical representation (descriptive study) of the means or averages of conditions under study. He can confirm the presence of interaction effect by using statistical analysis. He can also choose the results of which interaction effect to emphasize. Compared to experiments with only one independent variable, the study of interaction effect in complex experiment allows researchers to have better understanding.

As mentioned before, results of complex experiments can be summarized in descriptive statistics and findings can be explained scientifically through inferential statistics. Three main ways to summarize results are tables, bar graphs, and line graphs. Tables are used to show the exact values for each condition in the experiment. Bar graphs and line graphs are used to show the patterns of the results without emphasizing the exact values. Especially, interaction effect can be clearly seen in line graph. Nonparallel lines in the graph indicate an interaction effect, while parallel lines indicate no interaction effect.

Another way of finding interaction effect is the use of 'subtraction method especially in 2X2 design. In subtraction method, the differences between the means in each row (or column) of the table is compared. If these differences are different, an interaction effect is likely. While using this method, it is important to calculate the differences in the same direction. This method can be used only when one of the independent variables has two levels. If both independent variables have three or more levels, then it is better to use graph to see the interaction effect.

3.4.3 Analysis of Complex Designs:

Just as in case of 2X2 design, in complex design experiment too, the data is first checked for any errors or outliers and then data is analyzed to check for three potential sources of variations such as the main effects of each independent variable and the interaction effect between independent variables.

Descriptive statistics such as mean, standard deviation, and measures of effect size is used to describe the results.

Inferential statistics such as null hypothesis testing and confidence intervals are then used to determine whether any of the effects are statistically reliable.

Both descriptive and inferential statistics are used to interpret main effect and interaction effect of an experiment. An effect is considered to be statistically significant if the probability of observed effect of an independent variable is less likely to occur by chance factor or it is the probability under the null hypothesis that is less than significance level of .05.

Analysis Plan with an Interaction Effect:

Inferential statistics tests are used in conjunction with descriptive statistics to determine whether an interaction effect has, in fact, occurred. If significant interaction effect is present, then the source of the interaction effect is identified using simple main effects analyses and comparisons of two means. When three or more means are tested in a simple main effect, comparisons of means testing two at a time can be done to identify the source of the simple main effect. Generally, researchers do not pay much attention to main effects of each independent variable if interaction effect is present.

Analysis Plan with No Interaction Effect:

If no statistically significant interaction effect is present, then the next step is to see whether the main effects of the variables are statistically significant. Once again for finding the statistical significance of main effects, comparisons of two means or using confidence intervals to compare means two at a time are used.

Studies have shown that complex design can provide lot of information even when there is no statistically significant interaction effect

3.5 INTERPRETING INTERACTION EFFECTS

3.5.1 Interaction Effects and Theory Testing:

Very often, theories predict that interaction of two or more independent variables influences the given behavior. These theoretical assumptions can be tested through complex designs. Most of theories in psychology are of complex nature. On being tested, they may produce contradictory findings. In such cases, finding out the interaction effect helps in resolving the conflicting findings. The complex designs are laborious but, very useful in finding out the reasons for seemingly contradictory findings when theories are tested. Complex designs enhance the researchers' ability to test theories because they can test for both main effects and interaction effects

3.5.2 Interaction Effects and External Validity:

If no interaction effect shows up in a complex design, the main effect of each independent variable can be generalized across the levels of the other independent variable. This increases the external validity of the independent variable. When interaction effect is present, it specifies the conditions in which an effect of an independent variable will occur. These conditions indicate the boundaries for the external validity of a finding. The interaction effect also identifies what those boundaries are. When a question is asked whether a particular independent variable has an overall effect across other independent variables, the typical answer will be "it depends". Independent variables that influence behavior directly or produce an interaction effect are called relevant independent variables. Identifying relevant independent variables is important for designing effective interventions. The opposite of relevant independent variables is irrelevant independent variable. There are many reasons that make it crucial to identify irrelevant independent variables too, such as:

1. If an independent variable has no effect in an experiment, it can't be assumed that this variable wouldn't have an effect if different levels of the independent variable had been tested.

2. If an independent variable has no effect in a single-factor experiment, this doesn't mean that it won't interact with another independent variable when used in a complex design.

3. If an independent variable does not have an effect in an experiment, there is a possibility that an effect could have been seen with different dependent variables.

4. The absence of a statistically significant effect may or may not mean that the effect is not present.

Thus, presence or absence of interaction effect is important to determine the external validity of the findings in a complex design. However, if there is no statistically significant interaction effect, it does not mean that there was no interaction between the independent variables. On of the reasons for not finding statistically significant interaction can be that the

researcher may not have performed the experiment with sufficient sensitivity.

3.5.3 Interaction Effects and Ceiling and Floor Effects:

When participants' performance reaches a maximum in any condition of an experiment, it is called ceiling effect. On the other hand, if the performance reaches the minimum in one or more conditions of an experiment, it is called floor effect and results for an interaction effect become uninterpretable.

Researchers can avoid ceiling and floor effects by selecting dependent variables that allow sufficient chance for performance differences to be measured across conditions

3.5.4 Interaction Effects and the Natural Groups Design:

When groups of people are formed by selecting individuals who differ on some characteristic such as gender, age, introversion– extraversion, or aggressiveness, etc. they are called natural groups. The natural groups design is efficacious for showing correlations between individuals' characteristics and their performance. However, it is difficult to establish cause and effect relationship through natural group design, as there can be many other possible causes for difference in performance other than individual differences. The problem of drawing causal inferences based on the natural groups design can be dealt with by developing a theory about the critical individual difference variable.

Three steps for making a causal inference involving a natural groups variable are to state a theory for why group differences exist, manipulate an independent variable that should show how the theory was processed, and test whether an interaction effect takes place between the manipulated independent variable and natural groups variable.

Step 1: Develop a Theory

First of all, the researcher mustdevelop a theory explaining why a difference should occur in the performance of groups that have been differentiated on the basis of an individual differences variable.

Step 2: Identify a Relevant Variable to Manipulate

Next the researcher needs to select an independent variable that can be manipulated and that is presumed to influence the likelihood that this theoretical process will occur.

Step 3: Test for an Interaction

Lastly, the researcher should try to produce an interaction effect between the manipulated variable and the individual differences variable. This way, the relevant manipulated independent variable will be applied to both natural groups.

If the analysis of a complex design shows that there is no statistically significant interaction effect between independent variables, then we need to determine whether the main effects of the variables are statistically significant.

3.6 TRUE EXPERIMENT

A true experiment can be defined as an experiment that leads to an unambiguous result and clearly established cause and effect relationship.

3.6.1 Characteristics of True Experiments:

There are three important characteristics of true experiments:

1. True experiment will have some type of treatment in it.
2. In true experiments, the experimenter has high degree of control over the assignment of the participants, experimental conditions, systematic manipulation of independent variables and determining the dependent variable. Random assignment of the subjects to different groups is the hallmark of true experiments. However, experimenter of true experiment in natural setting may not have same level of control over either the assignment of the participants to different conditions or even on the conditions of the experiment as he would have in laboratory setting. But the experiment conducted in laboratory setting may not have same external validity as the one conducted in natural setting.
3. True experiments always involve comparison, that is, finding out the difference in the dependent variable due to different levels of independent variable.

3.6.2 Obstacles to Conducting True Experiments in Natural Settings:

Some of the difficulties that an experimenter face while conducting experiment in natural settings are:

Difficulty in getting permission from the authorities (such as school principals), to reach out to the potential participants and to conduct the experiment in natural setting. Government officials may not financially support a research if they think it is not useful. So financial crunch is another obstacle to conduct research.

Having access to potential participants becomes more crucial if the research design requires randomly assigning the participants to more than one group and compare them on a dependent variable.

If participants are divided into two groups on the basis of random assignment, those in control group may feel discriminated as they are denied to experience the independent variable. For example, if the experimenter is testing the effectiveness of new teaching method compared to the old teaching method, those who are randomly assigned to control group will feel deprived of new method, especially if the new

method has proved to be better than the old method. On the other hand, if the new method proves to be ineffective, then random assignment will prove to be a boon for them as it would have protected them. To make sure that researcher has potentially comparable group by using random assignment and yet no participant is left out of either of the independent variable conditions, researchers can use alternate treatments. That is both the groups alternatively go through old and new method of teaching. Each group will serve as control group for the other group.

However, there may be some experiments where random assignment cannot be used. For example, if a researcher wants to test the effectiveness of a new drug, patients may not agree to get assigned to experimental group where new medicine will be tested. In such cases, quasi-experimental design can be used.

3.6.3 Threats to Internal Validity Controlled by True Experiments:

Internal validity of an experiment gets threatened when the results of an experiment can be explained by alternative factors other than the independent factors only.

Some of these confounding factors are history, maturation, testing, instrumentation, regression, subject attrition, selection, and additive effects with selection. Let us see how these factors can contaminate the results.

History:

In true experiment participants in the experimental group and in the control, group must have same history of experiences during the experiment, except for the treatment. In natural settings, it may not be possible for the researcher to have high degree of control, so internal validity may be threatened due to confounding variable - history. For example, a teacher wants to test the effectiveness of an interactive teaching program for fifth class students. She conducts a pretest, introduces the interactive program and then conducts the posttest. She finds the difference in the pretest and posttest scores. However, without a comparison group, it is difficult to say whether the difference is only due to the independent variable or some other factors also might have played the part. For example, many students might be attending coaching class also.

Maturation:

Change associated with the passage of time per se is called maturation. Participants in an experiment grow older and become more experienced as the experiment progresses. This confounding factor influences especially the longitudinal studies.

Testing:

Very often, it is observed that scores on the post test improve without any intervention too. The reason is that exposure to pretest has an impact on

post test that is similar to pre test. Participants become familiar with the type of questions, instructions and experimenter's expectation and this has an impact on their subsequent performance. In pretest -posttest design, it is difficult to separate the effect of independent variable and testing effect.

Instrumentation:

Apart from the participants, even instruments can change over time. For example, if human observers are used to assess the change in behavior, their judgment may suffer from observer bias such as fatigue, expectations, and other characteristics of observers. It may be argued that one can use mechanical observation instead of human observation to avoid the problem of instrumentation. However, even mechanical instruments may change with repeated use. For example, a machine used in pre-test may become faulty by the time post-test is conducted. In that case, change in scores from pre-test to post-test may be due to faulty measurement rather than the effect of independent variable.

Regression:

The error of statistical regression takes place when participants are selected on the basis of their extreme scores on a specific test. There is no guarantee that extremely poor or good scores on a particular test will lead to similar scores on another test too. For example, if a student has faired badly in one of the subjects in 12th standard exam, it does not mean that he perform poorly in college exam too or vice versa . There can be various reasons for his poor performance in 12th standard exam. If a student who has scored very poorly in 12th standard exam gives the same exam again, the chances are very high that his performance will be close to the average of his overall scores. This is called regression to the mean. The chances of statistical regression occurring are much more when a test or measure is unreliable. An unreliable test will produce inconsistent results over time. Sometimes, researchers commit the error of assuming regression effect as treatment effect.

Subject Attrition:

The internal validity of an experiment gets compromised if participants drop out in the middle of the experiment. The nature of the group that was established before treatment changes if there is loss of participants. The groups that were formed on the basis of random assignment may not remain equivalent.

Selection:

If the groups are made on the basis of selection instead of randomization, there might be inherent difference between the groups. This inherent difference can threaten the internal validity of the experiment. The chances of selection threat are more in natural setting experiments than lab experiments.

Additive Effects with Selection:

History and maturation combined with selection can be another cause for threat to internal validity. These additive threats can be of three types –

a) Additive effects of selection and maturation:

As explained above maturation refers to natural increase in cognitive, physical and emotional maturity as well as familiarity with the environment. If a researcher compares fresh recruits in a company with those who were recruited a year back, it will result in additive effect of selection and maturation effect. Those who were recruited a year back must be already familiar with the work culture and work routines while new recruits will be still struggling to get adjusted. In such a scenario, any difference in the behavior of two groups cannot be attributed solely to variations in independent variable.

b) Additive effect of selection and history:

Additive effect of selection and history is more prominent when researcher compares two intact groups. Both of these intact groups may not be equivalent as they may have different experiences, or they may experience the same event differently depending on their specific characteristics. For example, if a researcher wants to study the effectiveness of corona prevention program among college students. Students who have either suffered an attack of corona or their near dear ones have suffered from corona will pay more attention to this program rather than those who were least affected.

c) Additive effect of selection and instrumentation:

An additive effect of selection and instrumentation will take place if the instrument can detect or measure changes in one group but not in another group. This becomes more prominent when there is floor or ceiling effect is present in the groups. when a group scores so low on an instrument (floor effect) in the beginning that any further drop in scores cannot be reliably measured, or so high (ceiling effect) that any more gain cannot be measured. The floor or ceiling effect will endanger the internal validity, if an experimental group shows relatively no change (due to floor or ceiling effects) and a control group changes reliably because its average performance was near the middle of the measurement scale right from the beginning.

All these threats to internal validity can be controlled through true experiments. But some of the threats may not be controlled through true experiments too. Let us see some of such threats.

Problems That Even True Experiments May Not Control:

Although major threats to internal validity are removed by the true experiment, there are some other threats that the researcher must guard against, while working in natural settings. Some of these threats are:

Contamination:

The term contamination refers to a general class of threats to internal validity. Contamination takes place when information about the experiment is communicated between groups of participants, which may lead to resentment, rivalry, or diffusion of treatment. when an experimenter unintentionally influences the results, true experiments gets affected by threats such as experimenter expectancy effects.

Observer bias takes place when researchers' biases and expectancies lead to systematic errors in observing, identifying, recording, and interpreting behavior

i. Resentment:

Resentment takes place when participants, randomly assigned to a control group, come to know that they are receiving less desirable treatments or that the other group is getting better treatment. It may dishearten the control group participants or make them angry, and they may give lower performance due to resentment.But the experimenter may interpret this lower performance compared to experimental group due to intervention and not as a deliberate attempt by the control group due to resentment.

ii. Rivalry:

Another possible reaction of the control group, on knowing that experimental group is receiving better treatment than them, is the spirit of competition and rivalry. A control group might become motivated to reduce the expected difference between itself and the treatment group and not look inferior to experimental group.

Diffusion of treatments:

Diffusion of treatments occurs when participants in a control group use information given to participants in the treatment group to help them change their own behavior. They may copy the behavior of participants in experimental group. This will also reduce the differences between the treated and untreated groups and affects the internal validity of the experiment.

a) Novelty Effect:

Novelty effects occur when people's behavior changes simply because new element is introduced in their environment (e.g., an experimental treatment). It produces excitement, energy, and enthusiasm. This enthusiasm, rather than the intervention itself, may account for the "success" of the intervention. The opposite of a novelty effect is known as a disruption effect. Disruption effect takes place when due to novelty in work procedures, the routine work of employees gets disrupted to such an extent that they cannot maintain their typical effectiveness.

b) Hawthorne Effect:

Hawthorne Effect refers to changes in people's behavior brought about by the interest that "significant others" show in them. The behavior changes because participants are aware that someone is interested in them. It is a kind of reactivity (i.e., an awareness that one is being observed). The effect was named after such an effect showed in the experiment conducted in the Hawthorne plant of the Western Electric Company. In Hawthorne plant, the experiment was conducted to find out the whether variations in amount of lighting in the plant will affect workers performance. Results showed that experimental and control groups, both increased their productivity during the study.

Cook and Campbell (1979) emphasized that judging the internal validity of a relationship is a deductive process. The researcher has to be his own best critic, minutely examining all of the threats he can imagine. He must systematically look at each of the internal validity threats and determine how it may have influenced the data. Then, he must examine the data to find out which relevant threats can be ruled out. He can make conclusions about the causal relationship between two variables with confidence only when all of the possible threats can be eliminated.

Apart from threats to internal validity, the researcher must ensure to eliminate the threats to external validity too.

External validity can get threatened if the sample is not representative of the persons, settings, and times to which the researcher wants to generalize. Theoretically, representativeness can be achieved through randomization, but in real life random sampling is not used often. If complete randomization is not possible, then the next best alternative to ensure external validity is repeating the experiment with different types of participants, in different settings, with different treatments, and at different times. The experimenter can built partial replication into the experiment itself such as selecting more than one group of participants and comparing them.

3.7 QUASI-EXPERIMENTS

The word quasi is a prefix and it means 'resembling'. Quasi- experiment means a procedure that resembles true experiment but is not true experiment. Just like true experiments, quasi experiments too include comparison and some type of intervention, but they lack the randomization and the control that is an essential part of true experiments. So quasi experiments are used when it is not possible to have the rigour of true experiments. Quasi experiments may be incapable of controlling all confounding factors that may threaten internal validity of the experiment. Shaughnessy and Zechmeister believe that first of all experimenters should try to make quasi experiment as close to true experiment as possible and they must identify the specific shortcomings of the procedure and give all possible evidence to overcome those shortcomings.

One of the serious issues faced by quasi experiment is lack of opportunity for randomization. Due to either practical considerations or administrative decisions, the researcher may have to work with intact group, for example, children in a particular class or employees of a particular organization. In such situations, the researcher has to use one-group pretest-posttest design that is also known as pre-experimental design. Though it is assumed that any difference between pre-test and post test scores is due to independent variable, but it is possible that the difference in scores is due to confounding factors (such as history, maturation, testing, and instrumentation threats, etc.) that threaten the internal validity. That is why it is also known as bad experiment. The results of a bad experiment are inconclusive about the effectiveness of a treatment. There are some quasi experimental designs that can improve upon this pre-experimental design. We will discuss here some of these designs.

3.7.1 The Nonequivalent Control Group Design:

There are two requirements of this design – there should be two comparable groups and there should be a possibility of using pretest and posttest on them.

As the researcher is forming comparison groups on the basis of non-randomization, we cannot assume that participants in both the groups have equivalent characteristics. The experiment suffers from selection threat. So, it is necessary to equalize them on the basis of pretest scores.

For example, we have two groups – a treatment group and a control group and they are compared through pretest and post test measures. If the pretest scores of both the groups were similar, then we can say that both groups are comparable, If post test scores of both the groups differ, it is assumed that it is due to the effect of the treatment.

With this design, it is possible to control confounding factors such as history, maturation, testing, instrumentation, and statistical regression. The reason being that it is assumed that both the groups have similar experiences (of confounding factors), except the treatment. Then confounding factors cannot account for differences in post test score, and the researcher can safely claim the cause and effect relationship between independent and dependent variable.

This experiment can be symbolized as follows:

O1XO2

O1 O2

O1 refers to pre-test or first observation and O2 indicates the post test score or second observation. The dash line indicates that experimental and control group were not formed on the basis of random assignment.

Nonequivalent Control Group Design: The Langer and Rodin Study:

Quasi-experiments usually assess the overall effectiveness of a treatment that has many components. A follow-up research may be required to determine which components are crucial for achieving the treatment effect. For example, Langer and Rodin (1976) conducted a study to test the assumption that the lack of opportunity to make personal decisions contributes to the psychological and even the physical debilitation. Their argument was that environmental changes associated with old age partly contribute to the feelings of loss, inadequacy, and low self-esteem among the elderly, especially those living in a nursing home. They believed that nursing homes provide a "virtually decision-free" environment. The elderly are no longer allowed to make even the simplest decisions, such as what time to get up, whom to visit, what movie to watch, etc. They carried out a quasi-experiment in a nursing home. The independent variable was the type of responsibility given to two groups of elderly residents staying in that nursing home. It was not possible and administratively undesirable to randomly assign them to two different groups. So, researchers chose to take residents of two floors. These floors were chosen on the basis of similarity in the residents' physical and psychological health and prior socioeconomic status. It was decided to randomly assign any of the floors to one of the two treatments. Residents of one floor were informed of the many decisions they needed to make regarding how their rooms were arranged, visiting, care of plants, movie selection, and so forth. Moreover, these residents were given a small plant as a gift (if they decided to accept it) and told to take care of it as they wished. This was the responsibility-induced condition. The second group of residents, the comparison group, was told that it is staff's responsibility to look after their needs. They were also given a plant as a gift (irrespective of whether they chose to have one or not) and were told the nurses would water and care for the plants for them. Questionnaires having items related to "how much control they felt over general events in their lives and how happy and active they felt" were given to residents 1 week before and 3 weeks after the responsibility instructions. Staff members on each floor were asked to rate the residents, before and after the experimental manipulation, on traits such as alertness, sociability, and activity. Differences between pretest and posttest measures showed that the residents in the responsibility induced group were generally happier, more active, and more alert following the treatment than were residents in the comparison group. However, it is important to know that the effectiveness of the overall treatment, not individual components of the treatment, was assessed. So, we don't necessarily know whether the treatment would work with a smaller number of components or whether one component is more crucial than the others. Generally, research in natural settings is characterized by treatments with many components and aims to assess the overall effect of the treatments. Theoretically, however, it is important to determine whether components of the treatment specified by a theory, as being critical, are really the critical components.

3.7.2 Sources of Invalidity in the Nonequivalent Control Group Design:

Though non-equivalent control group design generally controls for all major classes of potential threats to internal validity yet for proper interpretation of quasi experiments, the researchers check out the presence of any threats to internal validity, such as additive effects with - selection and maturation, selection and history, selection and instrumentation, and differential regression, observer bias, contamination, and novelty effects. Let us look at each one of these threats.

Selection-Maturation Effect:

An additive effect of selection and maturation takes place when participants in one group grow more experienced, more tired, or more bored at a faster rate than participants in another group. This threat to internal validity becomes more prominent when the treatment group is self-selected (the members deliberately sought out exposure to the treatment) and when the comparison group comes from a different population than the treatment group. We cannot say that both control and experimental groups are equivalent, for various reasons, even if their pretest scores are same on an average.

The first reason is that the natural growth rate of two groups from different populations might be different, but the pretest may have been taken at a time when both groups happened to be about the same. Both such groups may show a difference at the posttest due to differential growth rate but it could be mistaken for a treatment effect.

The second reason is that pretest is conducted to measure respondents on only one measure or only few measures. The mere fact that individuals do not differ on one measure does not mean they don't differ on other measures that are relevant to their behavior in this situation.

Selection-History Effect:

Additive effect of selection and history arises when an event other than the treatment affects one group and not the other. This is also known as the problem of local history of effects. The more the settings of the individuals in the treatment and comparison groups differ, more the problems of local history becomes acute. For example, in above mentioned Langer and Rodin study, suppose the results had to show that the happiness and alertness of residents increased on one floor but not on the other floor. Then these results could have been due to many possible reasons such as change in nursing staff on one floor may have increased or a decreased the morale of the residents', depending on the nature of the change and any differences between the behavior of a new nurse and that of the previous one.

Selection-Instrumentation Effect:

A threat of selection - instrumentation is more likely to take place when changes in a measuring instrument are more likely to be detected in one group than they are in another. Floor or ceiling effects may make it difficult to detect changes in behavior from pretest to posttest. The threat of selection -instrumentation effect is more likely to be prominent in groups that are more non-equivalent and closer the group scores are to the end of the scale.

Differential Statistical Regression:

Regression toward the mean is likely to occur when individuals are selected on the basis of extreme scores (e.g., the poorest readers, the workers with the lowest productivity, the patients with the most severe problems). Differential regression can takes place when regression is more likely to be there in one group than in another. The changes from pretest to posttest may be mistakenly interpreted as a treatment effect if regression is more likely in the treatment group than in the control group.

Expectancy Effects, Contamination, and Novelty Effects:

This observer bias, or expectancy effect takes place if the observers are aware of the objective of the study. They inadvertently try to prove the hypothesis.

Possible contamination effect, that is participants getting demoralized after knowing that other group is getting better treatment, can be controlled by making sure that both the groups are geographically far apart or have almost nil communication with each other. For example, in Langer and Rodin's study, the residents of one floor had very little communication with residents of the other floor.

3.7.3 The Issue of External Validityand Interrupted Time-Series Designs:

As mentioned before that the best evidence for the external validity of research findings is replication with different populations, settings, and times. Same deductive process that was explained to determine internal validity must also be used to examine external validity of the study. For example, let us look at Langer and Rodin (1976) study once again. They conducted the study in a nursing home that was rated one of the best caring unit, having the best of the staff and facilities. Will the result be different if the study was conducted in another care unit which was not so highly rated? Another factor that can threaten the external validity is whether the residents staying in this facility are comparable to elderly inmates staying in other facilities. If inmates of different care units differ in their background, then their reactions to staying in the care unit also might be different. Similarly, one needs to determine whether the staff of this unit is comparable to the staff of other care units before any generalizations can be made.

Interrupted Time-Series Designs:

Generally, in simple time series experiments, observations are made before the treatment and after the treatment. If abrupt changes (discontinuities) in the time-series data occur when treatment is introduced, it is safely concluded that the change is due to treatment.

However, the internal validity of time series experiments can be seriously threatened from history effects and changes in measurement (instrumentation) that occur at the same time as the treatment. To overcome these threats, researchers can make many observations from time to time to check the changes taking place in a dependent variable before and after a treatment is introduced. This is called a simple interrupted time-series design. This design can be outlines as

O1 O2 O3 O4 O5 T O6 O7 O8 O9 O10

O refers to the observations and T refers to the treatment introduced. This design can be effectively used when a new product has been launched, a new social reform has been implemented etc.

One specific feature of time series experiments is that only abrupt changes can be observed and not the gradual changes taking place. History, instrumentation and seasonal variations are the major threats to internal validity of time series design. Threats such as maturation, testing, and regression can be controlled in the simple interrupted time-series design. However, simple interrupted time series design has serious problem with external validity as it generally involves testing only a single group that has not been randomly selected.

Time Series with Nonequivalent Control Group:

In a time series with Nonequivalent control group design, researchers make a series of observations before and after treatment for a treatment group and a comparable comparison group, both. This significantly improves the internal validity of the experiment. To implement time series with Nonequivalent control group design, the researcher must have two comparable groups that can be observed multiple times. He can make multiple observations of dependent variable in both the groups and then introduce treatment in experimental group, and again make multiple observations of both the groups over a period of time.

This design is outlined as follows:

O1 O2 O3 O4 O5 T O6 O7 O8 O9 O10 - Experimental group

O1 O2 O3 O4 O5 O6 O7 O8 O9 O10 - Control group

A dashed line indicates that the control group and the experimental group were not randomly assigned. This design can eliminate the effect of history.

3.7.4 Program Evaluation:

Posavac (2011) differentiated between organizations in manufacturing sector and in service sector. Program evaluation is more applicable to service organizations such as hospitals, schools, government agencies, etc. The efficiency of manufacturing organizations can be easily assessed by the profitability of the organization but that is not the case in service organizations. Service organizations' effectiveness is assessed through program evaluation.

Posavac (2011) said that program evaluation is a methodology to find out the depth and extent of need for a human service and also to find out whether the service is likely to be used, whether the service is sufficiently intensive to meet the unmet needs identified, and the degree to which the service is offered as planned and actually does help people in need at a reasonable cost without unacceptable side effects. (p. 1)

This definition of program evaluation highlights questions about four areas – needs, process, outcome and efficiency. The process of answering these four questions includes the entire process of conducting an experiment. Let us see how it works. So for designing any program for the people, the service organization has to first of all assess what are the needs of the target population. For example, suppose the state government decides to built and maintain certain parks only for senior citizens and names the scheme as 'nana-nani park'. This scheme will be successful only if senior citizens have the need or want to have parks exclusively for themselves. The government agencies can use survey method to assess the recreational needs of the senior citizen. This survey will help them to decide whether exclusive parks are needed or some other form of recreation is needed. On the basis of this survey, if exclusive parks are provided for senior citizens, the next step will be to appoint program evaluators to assess whether program or scheme is effectively implemented or no and whether it is meeting its goals. If in spite of providing exclusive parks, very few senior citizens are using them, it will indicate that either the program was not designed properly or not implemented properly. Thus, program evaluator looks at how actually the program or scheme is being carried out and what adjustments are needed to make it more effective. Program evaluators can be used to assess the either existing schemes or new schemes to find the gap between needs and what is provided for need satisfaction. Evaluation of outcome of the schemes can involve either or both experimental and quasi-experimental method, that is experiment in natural setting.

Efficiency of the program is also determined by the cost of the program. The evaluator has to determine whether continuing the program is economically viable or not. On the basis of evaluator's reports, the agencies can make a informed decision about whether to continue the program, does it need improvement and how to improve it, or whether to try an alternative program. If very few people are using the existing facility, it may not be economically viable or it may require changes to be made to make it more useful for the targeted population. Programmed

evaluation is an example of applied research. Its goal is not to test or formulate any theory, but practical goal. However, there is a reciprocal or circular relationship between basic and applied research. Basic research gives us certain scientific principles. When these principles are applied in real world, new complexities are notices and new hypotheses are formed. These new hypotheses are tested in controlled lab environment. That gives rise to new theories or modifies existing theories and then these theories are again tried in the real world. The cycle goes on.

Campbell (1969) emphasized that government agencies introduce and implement many social reforms that ultimately fail because most of these programs are not based on hard scientific data, instead they are based on certain assumptions and for political gains. Such ill-informed programs lead to waste of public money. Public officials should not try to apply one solution for all problems, instead they should use experimental method to find out different solutions for different problems. Only then the solutions will be effective.

3.8 SUMMARY

The experimental method is used to establish cause and effect relationship. One way to determine the cause -effect relationship, it is important to control as many confounding variables as possible. One of the confounding variables can be sample itself in different groups. To avoid this contamination, researchers use random group design, matched group design, etc. In random group design, comparable groups are formed by randomly assigning the subjects to different groups. This can be done through block randomization. There are various factors that can undermine the internal validity of an experiment. For example, it may be extraneous variables like different physical settings, different experimenters, selective subject loss across the conditions due to certain characteristics of the subjects, etc. Some of these factors can be countered by using placebo control and double-blind techniques. Data analysis is done by using both descriptive and inferential statistics for analyzing and presenting the data. Though confidence interval and null hypothesis are two powerful techniques to test the hypotheses, but statistical analysis does not necessarily lead to meaningful findings or be of practical use. One needs to make sure that external validity of the experiment is also high. External validity can be increased by conducting field experiments, by doing partial replication and conceptual replication. Another technique for conducting experiments is matched groups design. This method is used when only a small number of participants are available and when experimenter needs separate groups for each treatment.

Repeated measures designs are useful when the available number of participants is small or independent variable can be tested over repeated trials. This type of design is useful in fields like psychophysics. It is more sensitive than other designs. In this design, each participant goes through all conditions in an experiment. There are two types of repeated measure designs – complete and incomplete repeated measures design. In an incomplete repeated measure design, each participant is exposed to each

treatment only once, and the practice effect is balanced across the participants.

However, this method is susceptible to practice effect. Practice effect can be balanced by using either block randomization or ABBA counter balancing technique. Block randomization should be used when practice effect is expected to be nonlinear or if there is possibility of anticipation effect taking place. In an incomplete repeated measure design practice effect is balanced through either all possible orders or selected orders. In selected orders, we can use either the Latin square technique or rotation of a random starting order technique. Differential transfer is the biggest problem in any repeated measures design.

When two or more independent variables are studied in the same experiment, it is called a complex design. Complex designs can be used to reveal the main effect as well as interaction effect between independent variables. 2 X 2 design is the simplest possible complex design, in which both independent variables are studied at two levels. Additional independent variables can also be included to yield designs such as the 2 X 2X 2, the 2X 3X 3, etc. Complex designs can provide lot of information to the researcher, irrespective of whether statistically significant interaction effect is present or not present. Complex designs are also used to resolve the contradictions arising from theories and to draw causal inferences based on the natural groups design.

If a true experiment is not possible the researcher should use quasi-experimental approach. A particularly strong quasi-experimental procedure is the non-equivalent control group design. All major threats to internal validity except those associated with additive effects of (1) selection and history, (2) selection and maturation, (3) selection and instrumentation, and (4) threats due to differential statistical regression are controlled by non-equivalent control group design. An experimenter must be sensitive to possible contamination resulting from communication between groups of participants, problems of experimenter expectancy effects (observer bias); questions of external validity; and novelty effects, including the Hawthorne effect also.

In pretest-posttest design, simple interrupted time-series design can also be used. In this design, the researcher needs to look for an abrupt change (discontinuity) in the time series that coincides with the introduction of the treatment. Some of the threats to internal validity in this design are history and instrumentation. But instrumentation threat can be controlled by using an equivalent control group and history threat can be controlled by using non-equivalent control group.

Apart from psychologists, other professionals such as educators, political scientists, and sociologists, are often involved in this process. Types of program evaluation encompasses assessment of needs, process, outcome, and efficiency.

3.9 QUESTIONS

a) Why psychologists conduct experiments?

b) Describe three conditions necessary for causal inference.

c) What are the threats to internal validity and how external validity can be established by the researchers?

d) Compare matched group design with random group design.

e) In which type of experiments, natural group design should be used?

f) What is practice effect and how it can be countered?

g) What is meant by complex designs. Discuss in detail the main effect and interaction effect in complex design?

h) What is the difference between analysis plan with interaction effect and without interaction effect in complex design?

i) Elaborate on the threats to internal and external validity of interaction effect.

j) What are the characteristics of true experiments?

k) Discuss in detail the threats to internal and external validity of true experiments.

l) What is meant by quasi experiments? Elaborate on the threats to internal and external validity of quasi experiments.

m) What is program evaluation and why it should be done

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4

QUALITATIVE RESEARCH

Unit Structure

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4.1 INTRODUCTION

Psychologists have increasingly become concerned about the restrictive nature of nomothetic approach (quantitative research) to research. Psychologists have been acknowledging the fact that in psychology it is the human beings doing research on other human beings and therefore some other methods need to be used. Though various branches of psychological research, such as clinical psychology, developmental psychology, personality research, ergonomics, etc., had been using qualitative research methods in the past but due to the dominance of quantitative methods, it is only now that qualitative methods are getting due recognition in psychological research. Some of the methods they have found useful to understand and interpret the individualistic experiences are interpretative phenomenological analysis, discourse analysis, narrative analysis and conversational analysis. Qualitative research methods have become popular now due to specifically three reasons:

a) Growth in Theoretical Positions:

In the past, psychology was dominated by the philosophical idea of positivism that favoured quantification. But in last few decades, psychologists had been embracing social constructionism and phenomenology and this has made them move towards qualitative research methods. For example, since early 1980s, psychologists have been paying more attention to language as they have started believing that language is not just a tool to express our inner world but also a tool that creates the reality of the world that a person lives in. This belief gave impetus to discourse analysis.

b) Critique of Social-Cognitive Approaches to Psychology:

The second reason for qualitative research methods becoming popular is that there is growing dissatisfaction of social -cognitive approach among psychologists. Psychologists are of the opinion that research should study people in context of their social worlds instead of conducting individualistic, de-contextualised experiments.

c) Recognition of the Limitations of Quantitative Methods:

There has been an increasing criticism of psychology's over dependence on producing knowledge that is predominantly based on experimental studies and quantitative measures. The argument was that quantitative studies do not cover the entire richness of the human behavior and it is not possible to generalize experimental conditions to other conditions. In other words, quantitative studies are low in ecological validity. Critics believe

that naturalistic studies can give much more information that is related to context and can be generalize to real world.

d) Influences from Outside Psychology:

Psychologists have been getting influenced by other social sciences that are closest to psychology, e.g., sociology , social anthropology, etc. These other social sciences have been predominantly using qualitative methods. Psychologists felt that these qualitative methods can be gainfully used in psychology too. Apart from that, even funding bodies also gave a push to psychology towards qualitative research methods, without undermining the importance of quantitative methods.

Basically, quantitative and qualitative research, psychologists are interested in finding out how people think, feel and behave, what influences their thoughts, emotions and behavior, what are the meanings that people attach to things, how ideas, events or things are represented in language and how people make sense of them and what are their consequences. To investigate these areas, researcher needs to raise research questions and make predictions (hypotheses). Research questions help us to explain what is happening, these explanations are called theories.

However, quantitative and qualitative research differ in certain areas, such as:

Research Questions:

In qualitative research, we don't make predictions (or raise hypotheses), we only raise research questions. These questions are much different from the type of research questions raised in quantitative research. The focus of research questions in quantitative research is on statistical relationships or differences, while in qualitative research focus is on participants' experiences and making sense of those experiences.

Gathering evidence, in the form of data – in quantitative research it is numerical while in qualitative research, it can be in the form of words, pictures, etc.

Possible explanations or theories:

Some qualitative methodsaim to generate theories and examine how good these theories are for explaining what is happening in the data.

Grounded theory is developed by analyzing qualitative data in an inductive manner. The data analysis is influenced by researcher's theoretical sensitivity. In this theory, the analysis and reflection takes place through memos. Memos are considered to be live entities and can be in variety of forms depending on the data. Memos help the researcher in raising new questions, comparing cases, developing concepts and identifying their relationships. While writing report of grounded theory, to gain credibility, it is necessary for the researcher to overtly explain how he has adhered to principles of inductive logic.

Now let us turn our attention to how qualitative research has moorings in philosophical assumptions.

4.2 PHILOSOPHY AND CONCEPTUAL FOUNDATIONS; PROPOSING AND REPORTING QUALITATIVE RESEARCH

Philosophical issues are the bases on which psychologists conceptualize and conduct research. Two branches of philosophy are especially relevant to research in psychology. They are epistemology and ontology.

Epistemology:

Epistemology refers to that branch of philosophy that asks questions about knowledge, beliefs and truth.

It deals with questions like what is truth and how do we know whether what we have got is truth or no, what is the difference between knowledge and beliefs, what are facts, etc.

Ontology:

Ontology refers to a branch of philosophy that asks questions about what things exist in the world. It is about what is in existence and real. It focuses on defining and cataloguing the things that exist. For example, ontology will deal with question like does personality really exists?

Researchers' beliefs (either explicitly or implicitly) about epistemological questions, such as, how do we recognize knowledge, what can be considered as evidence, what is truth and how do we recognize it, etc., will determine how they do research and how they evaluate research done by other people. In other words, we can say that there are many different approaches and different assumptions about philosophical issues that a researcher can adopt to do research in psychology. Let us look at some of these approaches for better understanding,

4.2.1 Approaches to building body of knowledge:

Till 20th century, Positivism had been a dominant school of thought in research in psychology, but now there are other approaches that are entering in research in psychology, e.g., social constructionism. Let us look at both of these schools of thoughts.

4.2.2 Positivism:

The main characteristics of positivism are:

- Science states that objective knowledge or facts can only be gained from direct experiences or observation. There is no place in science for hypothetical or simply speculative things such as theories and concepts.

- If proper methods and tools are used then science can be value free and objective process. Positivist believe that science gives us objective tools that we can use to measure the world objectively, and thus, we can bypass our own subjectivity to create objective knowledge.

- Science is based on the analysis of numerical (quantitative) data that are collected through a strictly defined set of procedures. These procedures are different from those that are used to gather 'common sense' or lay knowledge.

- The proposition made within science are based on facts. Hypotheses are tested to find out whether the facts are in congruence with the propositions(theories) that have been put forward.

- The main purpose of science is to create universal causal laws- that is, overarching explanations of what things directly cause other things. This is derived from the search for empirical regularities where two things consistently occur together (this is also known as 'constant conjunction').

- According to positivism, cause is nothing more than constant conjunction – and all that we need to demonstrate a causal relationship is to observe (reliably and often- not just once) constant conjunction.

- We don't need anything other than these types of general laws to explain the world.

- Psychologists can simply transfer the methods and assumptions of the natural sciences to our discipline.

let us see how Positivistic approach influences the methodology of research:

1. As positivists believes in directly observing the phenomena under investigation, they will be skeptical about using participants' accounts and self-reports as useful data.

2. For positivists, it is very important to use tried and tested methods. They believe that psychologists are not objective, they are not free of their subjective experiences and biases. However, they can produce objective knowledge with the help of proper use of standardized tools. They can be trained to use these tools properly.

3. Positivists believe that quantitative data is better than qualitative data. They have more faith in numerical data rather than non-numerical data and its interpretation. However, this attitude is changing gradually.

4. Positivists believe that experimentation is the most important method to do research as it allows a researcher to have necessary control over

the variables and they can conclusively establish the constant conjunction between the things.

5. Consequently, positivists regard repetition as an important criterion to determine the patterns of conjunction and to build the causal laws.

Challenges to Positivistic Approaches:

Realism and Psychology:

Before we look at the challenges to positivistic approach, it is necessary to understand that world can be divided into two parts –

Entities:

Entities mean anything that we consider actually exists in the world. This can include things that we can physically touch and see as well as things that consider that they exist but we can't directly see or touch them, e.g., we can directly see people, things, places, etc. Things that we can't directly see or touch but believe that they exist can be personality, intelligence, obedience, etc. These entities can be straightforward like a person, door, table, etc., or they can be complex ones such as education, justice system, etc.

Our Representation of entities:

This refers to the way we understand these things. It can include the way we conceptualize and describe the entities that exist in the world. For example, it can be our mental representation of things, which are basically the products of our visual perception and cognitive representation. We may describe these representations in the form of words or images.

Realism is the view that our representations of the things in the world are relatively straight forward reflections of the way those things actually are. This is also known as the 'realistic ideology of representation'. Realism believes that entities exist independently of being perceived, or independently of our theories about them. They are represented on the surface in the form of behavior, language, knowledge, thoughts or documents, etc.

A realist scientist tries to establish a link between surface representation and underlying entities (reality). Realists believe that we can meaningfully differentiate between entities and our representations of them and thus can judge the accuracy of the representations.

This realist approach is totally in contrast to positivistic approach, especially if we positivism is applied to psychological entities like memory. Personality, etc. Realism is problematic for positivistic approach because it believes that the link surface representation with underlying entities (reality) is impossible, irrespective of whatever methods we use. Our knowledge of the world is never a simple reflection of the way the world actually is, but is created and sustained through subjective social processes – and particularly through language. It is difficult to

meaningfully separate surface representations from the reality of what they represent. In such a situation, another approach called relativism gives another explanation. Relativism says that we cannot meaningfully reach out to psychological reality, we can only access the representation of it.

Relativism can be defined as the view that our representation of the things in the world are socially constructed and can't be seen as simple reflections of how those things actually are.

It is better to consider relativism and realism as two extremes of same continuum, instead of considering them as two separate approaches.

Objectivity and the socio-political context of research:

In contrast to positivism, many scientists have argued that science and the knowledge that it produces are not completely objective. They argue that objectivity is not an automatic outcome of using correct research methods. After all, research is being carried out and interpreted by human beings. These researchers cannot be completely detached from their values and biases. Secondly, like any other social activity, research is also carried out within historical, political and social contexts and these all have an impact upon the kind of research questions that are being asked and the methods chosen to find answers to those questions. So, we can say, at least to some extent, subjectivity is an inevitable part of research. It is important for researchers to be reflexive – to reflect upon how their own views, attitudes and experiences may influence their research activities.

Experimentation and Ecological Validity:

Positivism's over emphasis on experimental methods and control is often criticized for its lack of generalizability. The concern about how well we can generalize the results from research situations to real world is known as 'ecological validity'. It is argued that positivist approach is very low on ecological validity. It gives us lots of information about how people behave in experiments but not in real world.

The Different views of causality: The importance of meaning

Some psychologists believe that positivism should not be used in psychology, especially in social psychology, as it is not a suitable approach. Positivism assumes that causation takes place because one variable has causal properties that can impact another variable. But now psychologists believe that to understand causation, it is important to pay attention to the significance of 'meaning' while explaining the relationship between two variables.

4.2.3 Relativist Social Constructionism:

Relativist social constructionism has its roots in other social sciences such as sociology and it became popular in 1970s. It has been responsible for giving impetus to qualitative research methods in psychology. The main characteristics of relativist social constructionism are:

- Science is just one way of looking at the world and there are many other ways of looking at the world. Therefore, science and scientific methods should not be considered superior to other approaches.

- According to relativist social constructionism, it is not possible to have a rational procedure to determine the truth or to determine which forms of knowledge are better than others in a truly objective manner. These decisions always get influenced by culture, morale, values, etc.

- Our perceptions and understandings of reality are all we actually have access to, so reality does not meaningfully exist as something separate from our ways of understanding it.

- Language is the most important means of representing and understanding the world and should therefore be the main focus of our research. If truth meaningfully exists in the form of our representations of it, then we should study those representations (means language) to get to truth.

- To understand people, we must understand the context and meaning in its full complexity.

- Research gives us working hunches about the world, and these hunches are inevitably shifting and imperfect and do not give us fixed facts.

- Qualitative methods are more useful as they focus on language and meaning.

Let us look at the methodologies used by relativist social constructionists:

Methodological implication 1:

Social constructionists argued that the veracity of academic attempts to explain what is going on in the world can't be objectively evaluated. We can only check whether those academic explanations are feasible and convincing. However, knowledge can be evaluated by using another criteria. For example, we may ask whether this academic explanation helps me to find solutions to the problem or brings any desirable outcome.

Methodological implication 2:

The goal of psychology is not to find out pre-existing truth. It is more relevant for psychologists to find out the consequences of believing certain things to be true and other things to be false, or finding out the implications of talking about things in a particular way, rather than finding out whether things are actually true or not. Truth is something that we create and derive through social interaction and through actively trying to make sense of the world around us. Truth is not something lying somewhere for psychologists to come and discover.

Methodological implication 3:

Many social constructionist researches use research methods that involves the examination of language, e.g., Discourse Analysis.

Methodological implication 4:

Social constructionists view those research methods more useful that permit us to explore meaning. They value accounts of participants very valuable while positivists consider them as problematic.

Challenges for relativist social constructionism:

1. Many social constructionists are not too happy about the more relativistic form of constructionism as it prevents them from taking any moral, ethical or political standpoints or to question any falsehood and oppression. We cannot compare surface representations with entities, so we can't either support or refute any claims.

2. Extreme relativism is more focused on language while ignoring many other important aspects of the things under consideration. The criticism for this is what came first- the language or reality? The emphasis should be on reality more than the language. Relativists must find an approach that recognizes and accepts both the socially constructed nature of the world and its material reality too.

4.2.4 Attempts to move beyond the relativism-realism debate:

Psychologists have been trying to move away from extremes of relativism and realism and find other approaches that may help to find the balance between these two approaches or find alternative ways of gathering knowledge. There are two such approaches - Critical realism and phenomenology. Let us see each one of them.

Critical Realism:

Many psychologists believe that both extreme realism of positivism and extreme relativism of social constructionism are equally undesirable. The moderate amount of both put together is called 'critical realism'. Some common characteristics of critical realism are –

- It rejects the extreme realism of traditional positivistic approaches.

- Knowledge is considered as historically and culturally specific. It is believed that research methods are not totally objective from this point of view and research is a social process that is always conducted in the context of values.

- Language is not simply a reflection of the 'reality' of the world but also capable of shaping our thoughts and conceptions of the what is real. Consequently, it influences which actions are seen as legitimate and which are not.

- It is possible to gain access to a reality beyond discourse, even if this access is not a perfect one.
- Knowledge of this reality is always distorted to some extent by our perspectives, power and culture.
- Though knowledge and truth are social constructs to some extent but truth claims can be evaluated against evidence.

However, research in psychology seldomly adopts an explicit critical realist position.

Phenomenology:

Phenomenology is a philosophical school of thought as well as a popular research method in psychological research. Edmund Husserl is known to be the founder of phenomenology. In his phenomenological approach, the research process begins with the 'bracketing' of the question whether people's experiences and their reporting of these experiences can be linked to any kind of reality that is separate from those experiences. Bracketing refers to an idea that we can leave aside the question of whether people's experiences are separate from reality. If it is agreed upon that understanding of experiences is the main aim of psychology, then scientific method, investigating the variables and their causal relationships are of no use. It is also irrelevant to see whether the experiences of a person match with some reality or not that is beyond that experience. However, there are some forms of phenomenology that allow us to avoid choosing between extreme realism and extreme relativism.

4.2.5 Theoretical issues:

There are two theoretical issues that may influence the way researchers plan and execute their qualitative research. These are:

i) the link between language, reality and thought

ii) the issue of experience and how we can explore it

Let us look at each one them.

The relationship between language, reality and thought:

Psychologists believe that language is a set of symbols that we use to share information about our inner states such as thoughts, feelings, etc. But relativists believe that language is something that pre-exists and actually shapes our thoughts. Consequently, we can say that the way we experience the world and even our internal states is only through pre existing structures and forms. This also means that we can have thoughts only through the concepts that pre-exist in the language and are given to us by the language. It is due to this belief that some relativist social constructionists say that there is 'nothing beyond the text'. For them, studying language is very important to do research in psychology, as it is the basic requirement for making any sense or thoughts. Relativists

analyze people's talk and interactions to find out how people make sense and use language to achieve certain kind of things in interactions such as to make claim, to lay blame, to defend their position or to work out their identity. They believe that 'talk' is the medium through which the world becomes real. Though there is no denying that there is reality beyond talks too but it is not accessible to the researcher.

Experience and how we can explore it:

As we have already discussed that psychologists can gain insight into the experiences of others through language, but it should be kept in mind that this process gets influenced by their own views about what is language. The question arises, can we gain knowledge about the experiences and perspectives of others by using relativist social constructionism approach. To resolve the issue of experience and subjectivity, some psychologists adopt psychoanalysis, while others adopt critical realist of social constructionism. There are some similarities in phenomenological approach and critical realism too. Proponents of each of these viewpoints believe that research based on these viewpoints can help us in understanding others' experiences.

4.3 GROUNDED THEORY

Grounded theory is an extremely popular and powerful qualitative approach to do research in psychology. The goal of grounded theory is to understand the psycho-social phenomena that is grounded in the data. It is based on the presumption that a 'theory' we might have about a topic or issue should be 'grounded' in the data we collect from people. Grounded theory uses inductive approach to doing research. Generally, when we use hypothetico-deductive model of research, we use deductive approach. We begin with a theory, develop hypotheses to test whether that theory is valid or no. On the other hand, grounded theory does not begin with review of literature, but collects data right from the beginning. It looks at the details of individual cases, uses inductive logic and develops a theory that is true for those cases.

4.3.1 Background and definition:

Charmaz defined grounded theory as a set of systematic inductive methods for conducting qualitative research having the goal of theory development.

The term grounded theory highlights two things:

(a) a method having flexible methodological strategies

(b) the products or outcomes of this type of inquiry.

Grounded theory was originally developed by Barney Glaser and Anselm Strauss. Glaser believed in standard hypothetico – deductive type of research while Strauss was more interested in symbolic interaction. In 1965, both these researchers teamed up to conduct a study on the process of dying in hospital. After two years , they formalised the grounded theory

by publishing it in a seminal 'Discovery of Grounded Theory : Strategies for qualitative research (1967)'. In 1990s, Strauss joined hands with Corbin and jointly they shifted from the concept of the natural emergence of theory. They also believed that researcher using grounded theory should not totally abstain from literature review. This led to split between Glaser and Strauss.

It was argued that a study can be called grounded theory study only if it produces a substantive theory, i.e., a theory that may not postulate universal laws of human behavior, but has its own context. Apart from developing theory, it is also necessary that researcher himself should have theoretical sensitivity.

Theoretical sensitivity means a researcher should have characteristics and skills that are important for developing codes and categories. Theoretical sensitivity helps the researcher to become 'more-in-time to the meanings embedded in the data'. Charmaz (2009) explained that theorizing means stopping, pondering and rethinking…To gain theoretical sensitivity, we look at studied life from multiple vantage points, make comparisons, follow leads and build on ideas…When you theorize, you reach down to basics, go up to abstractions, and then probe into experience.

Researchers with theoretical sensitivity can insightfully reflect on the subtleties of a developing theory in a way that is creative and conceptual, rather than merely descriptive.

Theoretical sensitivity determines the way a researcher chooses the sample and collects the data. This is known as theoretical sampling that uses gradual sampling strategy. In qualitative research, usually purposive sampling is used as generalization from sample to population is not emphasized. The participants can be either chosen a priori, that is, before the start of the study, or they can be chosen gradual, i.e., participants are chosen individually while analysis is still going on. Most of the grounded theory studies start with a priori method of sampling and then use a gradual strategy to select further participants, after the analysis of initial data has begun. The process of theoretical sampling helps the researcher to look at all the possibilities of a theory that is developing from that study, so this process goes on till the end of the study. When a researcher has collected sufficient data to fully develop all his conceptual categories and is satisfied with the theory that he has developed, he reaches a point called theoretical saturation. Theoretical saturation is a point where adding new data does not contribute new details or properties to the conceptual categories already developed.

4.3.2 Analysis: Memo Writing & Coding:

Grounded theory develops when researcher reflects or analyses qualitative data based on his theoretical sensitivity. This analysis is an inductive process that moves from the details of the participants' lives to a theory that explains the underlying process and dynamics in more general terms. The analytical process goes on throughout the life of a grounded theory

project – it starts as soon as the researcher has collected some data and continues until he has finished writing his report.

Memo Writing:

Analysis and reflection take place in the form of memos. A memo is a written reflection of researcher's analysis. It is through memos that a researcher reflects on the definitions and properties of emerging concepts, ask questions, compares one case with another, record insights, advances tentative ideas about develop theories, etc. Memos can include diagrams too, depicting the relationship between concepts that the researchers is trying to specify. Grounded theorists keep writing memos, sketching their ideas, recording their 'Aha' moments, etc. Much of the analytical work gets done by producing the memos. Memo-writing starts at the very beginning of the research process and continues until the final product of a grounded theory project, i.e., the theory itself, is produced from memos written at a late stage of this process. In the initial stage, these memos may be just thoughts noted down when the researcher is reading the transcript for the first time. This may be like open codes and they are tentative in nature. Later on, as the study progresses and the researcher becomes surer of the concepts and categories, the memos become more formal. However, they still remain flexible and a researcher can change his mind and consequently the memos too.

According to Corbin and Strauss (2008) 'memos and diagrams are more than just repositories of thought. They are working and living documents.

Corbin and Strauss (2008) gave a list of 13 analytic tools. Some of the common ones we will discuss here:

- Constant comparison is a most popular analytic tool among grounded theorists. It is used in all stages of the research. The researcher constantly compares concepts to see how they might fit in the greater scheme of things. This comparison shows the possible relationships between concepts and that will help in structuring the conceptual categories.

Asking Questions:

The grounded theorist constantly checks out his own analysis and generates more questions, as he proceeds. This technique of constantly questioning yourself will either provide the answers needed or it may highlight to the researcher that the collected data does not have the answer to a specific question and the researcher needs to collect more data through theoretical sampling.

Coding:

There are many techniques for analyzing the data, but the most obvious one that is used in grounded theory is coding. Coding here refers to three types of coding:

a) Initial coding/open coding:

When data is broken down into the conceptual components, it is known as initial coding. It begins as soon as some data is collected to work on. It basically means taking a large portion of text from the data and giving it a label (code title). While Glaser (1978) and Strauss and Corbin (1998), called it open coding, Charmaz (2014). Referred to it as initial coding. The size of the portion of text taken differs from one stage to another stage, e.g., in the beginning, a theorist may go through a transcript line by line or phrase by phrase. Later on, as the theorist starts getting some ideas to work on and develops certain questions, the portion size may increase to one whole paragraph having one title. These code titles are the first step towards naming the concepts, and those concepts can be the building stones of the theory. It is suggested that in these initial codes, it is better to use verbs rather than topics or themes.

b) Intermediate coding / Axial coding:

When these conceptual components are arranged in to categories it is called intermediate coding. Glaser (1978) named this stage of coding as 'selective coding', while Strauss and Corbin (1998) called it as 'axial coding' and Charmaz (2014) labelled it as 'focused coding'. In intermediate coding we look for relationships that might indicate aspects of a developing theory, such as causal connections or indications of basic social processes. At this stage memos in the form of diagrams are very useful. Sometimes the spatial arrangement of the categories can very easily depict the nature of the theoretical relationship between them. A grounded theorist can write an addition to these memos adding his reflections about the idea that is developing. This process of reflecting will generate new ideas and new perspectives that also can be jotted down and coded.

c) Advanced coding:

This is the final stage of coding in grounded theory. Strauss and Corbin (1998) labelled this as 'selective coding', whilst Glaser (1978) and Charmaz (2014) both called it 'theoretical coding'. At this stage, from various categories, a core category is chosen and then all other categories are organized around that core category. At this stage, the grounded theorist needs to thoroughly check all concepts that he has developed.

Corbin and Strauss (2008) gave some tips for the core category:

1. It must be abstract; i.e., one should be able to relate all other major categories with it and placed under it.
2. It must show up in the data frequently.
3. It must be logical and congruent with the data. There should be no forcing of the data.

4. It should be abstract enough, so that it can be used to do research in other substantive areas, leading to the development of a more general theory.

5. It should increase in depth and explanatory power as each of the other categories are related to it.

Strauss and Corbin (1998) suggest that at this stage one should use 'coding paradigm'. Coding paradigm refers to a set of ways of thinking about intermediate (axial) categories to make sure that the relationships between and within the categories are fully explained. Elements of the coding paradigm include:

Conditions:

The researcher must explain which conditions might have a causal relationship between concepts or stages of a process, and which conditions might show an important context or intervening function.

Actions and interactions:

How people (and organisations) deal with the situations as they arise, and what habitual activities and rituals can be identified in these instances.

Consequences:

The ground theorist must also explain what are the outcomes of an event? How extensively are these outcomes felt and how complex are their effects?

However, Glaser has been very critical of this approach and said that this approach is too prescriptive and it may force grounded theory analysts to think about their data in a fixed manner and may deter the emergence of the full detail of a theory from the data and the categories that arise from the data. He suggested an alternative and said that the ground theory analysts should use a wider set of theoretical coding families, which can help them to 'conceptualise how the substantive [intermediate] codes may be related to each other'

Finalising Theory:

Finally, while writing the theory, the grounded theorist must keep in mind that the theory should not be just the description of the data. It should be strong enough to explain, in psycho-socio and cultural terms, the dynamics of the contexts in which our participants carry out their lives. Though the theory will be embedded in the specific situation, it should have more extensive principles that can allow future researchers to test hypotheses that might be generalization oriented.

One should also keep in mind that collected data does not throw up only one 'right' theory. Researchers' own subjective experiences, beliefs, and philosophical orientations may influence their analysis of the data which

may be totally different from the theory already developed. There is no right or wrong theory, they just have different perspectives.

4.3.3 Writing up the analysis:

Grounded theory reports is generally written in a more or conventional manner. Though it was explained in the beginning that literature review is not essential in the beginning of the grounded theory study but in report it is included in the beginning only just like other conventional reports.

It is very important for grounded theorists to be very clear and transparent about the details of their research process. The readers will be able to trust a researcher's analysis as a good example of grounded theory research only if he gives enough detail to show them that he has actually implemented the entire approach to full extent. If the researcher does not provide the evidence of his interpretations, it may lead readers to believe that he might have just 'borrowed' the grounded theory coding process and applied that to data collected from people selected with little forethought to what the requirements of the study might have been. The researcher must make sure that he gives evidence (such as interview transcripts or field notes) from the data that he has analyzed to support his claims.

The analysis section of grounded theory generally tends to be the largest part of the report. It covers almost half of the total report. There is no fixed rule about how to write the analysis section. But the most common way to write analysis section is to write in detail about the core category and about as many of the other categories as necessary to explain the grounded theory that the researcher is proposing. The results section will mostly be combining and clarifying some of the later memos. The reader should be able to follow at least some of the major ideas right from transcript to theory.

Lastly, in the discussion section the researcher must clearly show how his grounded theory increases the readers' understanding of the area under investigation. Though it is not essential, but if the researcher wants he can end his report by writing one or more testable hypotheses derived from his data.

4.4 INTERPRETIVE PHENOMENOLOGICAL ANALYSIS (IPA)

Interpretive phenomenological analysis is a qualitative method that is influenced by phenomenology and hermeneutics. It aims to understand the meaning of human experience. Phenomenology refers to the study of human experience and the way in which things are perceived as they appear to consciousness (Langridge,2007; extracted from Forrester M,2010)

Hermeneutics refers to a theory of interpretation. In contrast to nomothetic method, IPA adopts an idiographic method of inquiry. Nomothetic method is used in quantitative research, which uses large data and gives

probabilistic conclusions. Idiographic analyses is done on a small scale. It is based on the assumption that all individuals are unique, so the study is done at the level of an individual case and conclusions are drawn on the basis of individualistic studies.

4.4.1 Background, Understanding human experience:

The basic aim of IPA is to understandwhat personal and social experiences mean to those people who experience them. The IPA researchers treat experience as a thing as well as a process that people come across and are active in. So, the unit of inquiry is 'experiential account'.

Understanding human experience:

IPA believes that reality exists but we cannot directly access it, We can access that reality only through the particular perspective of the person describing the event in a particular place and time. Therefore, instead of just trying to understand the experiences of the people, IPA researchers tries to understand in which articular stage of life those experiences occurred as well as what was the social, cultural, political and economic context when those experiences took place. In other words, IPA researcher wants to explore what it is like to empathize with another person and to make analytical interpretations of his experiences as well as make interpretation about the person as the 'experiencer'. The researcher not only pays attention to how the event is described by the participant but also interprets how participant is doing his own sense making during the interview.

4.4.2 Double hermeneutic, Case study approach:

During the interview, IPA researcher encourages a person to not only describe his experiences but also to reflect himself on those experiences and describe what meaning those experiences have for that person. At the same time, the researcher is also trying to make sense of what the participant is describing. Thus, dual hermeneutic takes place where the participant is trying to make sense of his own world and the researcher is trying to interpret or make sense of how the participant is making sense of his world.

Case study approach:

Since IPA is an idiographic method, for data collection it uses tools like semi-structured interviews, participant's diaries, case study method, etc. In case of single case study method, data about one person is collected from multiple sources. If there are more than one participant in the study, analysis is done on a case-by-case basis. Fully worked up analysis is done for case one before going to next case and then in the final stage of analysis, these cases are compared. IPA is interested in getting an in-depth information about each person as getting richness in data is very important for IPA. Interpreting the data also requires lot of patience, time and creativity of IPA researcher.

4.4.3 Analysis:

In IPA analysis, generally transcript is written in 'playscript' style, i.e., verbatim transcript is written down in sequence and only occasional reference is made about non-verbal actions or events. Let us see in detail how IPA analysis is done

Initial thoughts on reflection and quality:

Right from beginning of the research, an IPA researcher should keep a reflexive journal and make notes of anything that comes to his mind regarding the research. As transparency needs to maintained for research to come across as trustworthy, it is advised that the researcher should also keep copies of notes made, key extracts and themes identified at each stage of the analysis. Apart from building up the trustworthiness, maintaining notes helps the researcher in writing a clear detailed report where a reader can understand the process the researcher went through to produce that analysis.

Now let us look at all the stages that a researcher has to go through while analyzing the data.

Familiarizing yourself with the data:

The first step in analysis of the data is that the researcher needs to familiarize himself with the data. If the data was collected in digital audio-visual format, then the researcher must read and re read the transcript and must watch the video again and again. While familiarizing with the data, if researcher comes across anything that he finds interesting or important , worth noting, he must keep making notes in reflexive journal.

Coding and identifying Initial Themes:

The idea behind reading and rereading is that during re reading the researcher must break down the transcript into small sections and describe what is being said in each section. Then he should do 'phenomenological coding' and 'interpretative coding'.

In phenomenological coding, he needs to write down a summary of the participant's description of the experience or story. He should also make a note of issues identified, events relayed and feelings expressed by the participant This will give him an idea about what is important to his participant, what were the topics of their conversation and who are the people mentioned in his story.

Interpretative coding includes initial interpretations about what these issues, events and feelings mean to the participant. This will indicate to the researcher what contributes to participant's making sense of his experiences.

Breaking down transcript into small sections and describing these sections ensures that analysis is data driven and not theory driven. Data driven approach is also known as 'bottoms up' approach, while theory driven

approach refers to deductive logic where a researcher makes a decision whether his analysis fits with existing theory or not. That is known as 'top down' approach. Initial interpretations of these small sections ensure that analytical process can be traced back to the raw data. Giving such audit trial is important for the analyst to make sure that interpretations can be traced back to the data.

4.4.4 Writing descriptive summaries:

As mentioned above, descriptive summaries are known as phenomenological coding. It shows the phenomena under study from the participant's perspective. In the early stage of reading the transcript, the descriptive summaries merely sum up the content of what is said by the participant. At this stage, the researcher should not try to make interpretation of what is being said by the participant. If the researcher feels that he is getting lots of ideas while writing the descriptive summaries, he should make a note of those ideas in reflexive journal.

Making initial interpretation:

Breaking down the transcript into small portions and writing down descriptive summaries (phenomenological coding)of these portions helps the researcher gets to know something about what is important to his participant and about the things which make a difference to the participant in terms of making sense of his experiences (interpretative coding) Phenomenological coding is the building block for interpretative coding.

For doing interpretative coding, the researcher needs to re-read the entire script once again right from the beginning, also read the summaries and think about what inferences can be drawn from the data and how it is linked to the research question. It is important to keep in mind that participant is describing an event in retrospect, an event that may have taken place many years ago. Such description of a retrospective event will include participant's evaluation of the event too, as he also must have thought about and assigned meaning to that event. It is important in IPA analysis to identify the participant's own reflection of the event and make a note in reflexive journal about the participant's own sense making. This will be useful when interpretations are made in the second stage. After all, the main objective of IPA researcher is to understand experience from the experiencer's point of view and make inferences that are specific to the experiencer.

Clustering themes:

The themes are developed through several readings of the transcript (familiarizing oneself with the data initially, reading for gist, dividing the transcript into small chunks), writing descriptive summaries, and a comprehensive interpretative analysis of the transcript and the summaries with regard to the reflexive journal. However, one should keep in mind that themes don't emerge from the data but develop from the data. If we say themes emerged, it means they were pre-existing in the data, waiting to be discovered, which is not correct. Themes develop as the researcher

does close readings, summarizes the small portions, identifies the important meanings from those summaries, finds out the recurrent or notable themes from initial interpretations. The researcher looks for connections between these initial themes and creates a narrative account of participant's experiential account and that also reduces the data. Once the cluster of themes is developed, the next step is to give a title for each new theme.

Establishing the final themes:

A central overall theme is derived from the cluster of themes and this becomes the final theme. This final theme is included in the research report.

Continuing with other cases:

Though, ideally IPA studies can be single case studies, but it is possible to have multiple participants in an IPA study. Once the analysis of the first case is completed, the researcher can move to second person in his sample. With the second person as well as other subsequent cases, he needs to repeat all the steps that he went through for the first case. For each case he needs to make a final list of themes. There might be some cases, where in the final list themes, some themes may be same, and in other cases, there may be no similarity of themes between any two people. The goal of IPA research is to look at similarities as well as uniqueness of the participants' experiences that they share with the researcher.

Writing up the analysis:

The result of an IPA research is a narrative account of participant's account and the researcher's interpretation of it. This is called final stage of analysis. It must briefly define the theme and show the importance of that theme for understanding the meaning of participant's experiences. The report should be persuasive, defensible and must sufficiently represents the participant's story. It must also convey the interplay between the description given by the participant, participant's own reflection on his experiences and the researcher's interpretation of that narration. Reporting in this manner makes the report dynamic, creative, compelling and enlightening.

4.5 DISCOURSE ANALYSIS

Discourse refers to any form of talk or text in any social interaction. Discourse allows the researcher to understand the way language is used in social interaction. This interaction may be in the form of chatting, emailing, talking, etc. The word 'discourse' is used instead of 'language' or 'communication' to encapsulate the social and constructive element of interaction. If we use the word language, instead of discourse, it may focus on grammar, punctuation or other technical aspects of the language system, and the term communication may consider language as a means for thoughts to be transferred between people.

Discourse analysts (DA) are interested to know what is the function of talk. They believe that it is through talk that we discuss, ask, complain, flirt, console and deny, etc. In this process, it is through talk that we claim our identities, move a conversation forward or give details about our version of events that may make it appear more believable. Discourse analysts are interested to know how talk constructs a version of a reality that has an interactional effect in social situation. They are interested to know what is being constructed or what is the effect of the talk at a given point of time. Some of them are interested in finding answers to 'how' (e.g. how people's talk exposes the shared meanings in our culture),' when' and 'why' also. So, we can say that DA is 'social constructionist'. For DA analyst, talk is not just representing the emotions, thoughts or reflecting the world as it is, instead, it constructs the world and the person in interaction.

There are many different types of discourse analysis, each having their own theory and methodology and emphasizing different aspects of what, why, when and how questions. It is a flexible approach and can look at variety of research questions.

4.5.1 Background:

Discursive psychology was developed in the 1980s, taking inspiration from researchers like Austin and Wittgenstein and from theories within ethnomethodology (the study of how people make meaning in interaction), poststructuralism (a philosophical approach that does not accept that there is a fixed meaning to language and considers meanings as relational), conversation analysis and the sociology of scientific knowledge. There are two approaches to the study of talk and text known as Discursive psychology and Foucauldian -informed discursive psychology. Discursive psychology offers a close-up analysis of talk, and Foucauldian-informed discursive psychology (FiDP), looks at language in a broader way. We will now check out each one of these.

Discursive psychology (DP):

Discourse analysis is also known as discursive psychology. Discursive psychology was developed in the 1980s. It was inspired by researchers such as Austin and Wittgenstein and by theories within –

ethnomethodology (the study of how people make meaning in interaction), post structuralism (a philosophical approach that does not accept a fixed meaning of language and considers meanings as relational), conversation analysis and the sociology of scientific knowledge.

All these diverse influences had something in common. They were all concerned with the action-orientation of discourse (that words do things), the empirical study of social interaction, and the development of methods that enabled researchers to audio-record, transcribe and analyse real-life conversations

Derek Edwards and Jonathan Potter (1992) combined many of these previous ideas and came out with a methodology that allowed researchers to psychologically analyze every day interaction. It looks at the role of psychological concepts such as identities or emotions, to manage and enable social actions within everyday interaction. DP does not try to understand emotions as a mental or physiological state, rather it tries to understand how emotions are produced in discourse and then used by the participant to deal with psychological or social matters. It focuses on both the turn-taking details of talk and the words used: on the sequence and structure of conversations as well as the content of what is said. In other words, discursive psychology considers discourse as something that can be used to construct individuals' versions of the world and answers questions such as what, how and when psychological concepts are utilized to perform particular actions in social interaction.

Foucauldian-informed discursive psychology (FiDP) was developed from the late 1970s . It was also influenced by same influencers as discursive psychology but mainly it is inspired by poststructuralist philosopher Michel Foucault. FiDP examines how talk or text construct particular versions of reality and the consequences in using one version and not another version of what people can say, think or do. Often these constructions are part of shared cultural 'common sense' and take the form of relatively coherent ways of talking about objects and events in the world. It focuses on the words people use in talk and writing (and sometimes images) and considers how this helps us to understand ourselves and our world in the wider social context that supports this talk. In other words, FiDP is interested in the different ways that the issue is constructed because it sees the society as consisting of different discourses competing for how we understand an issue. People are thought to be moving fluidly between different discourses.

There are many different versions of discourses, each one of them offers, different ways to make sense of our world, either within a particular sociohistorical moment or across time. This obviously leads to subjectivity. FIDP is also interested to know what people can do with those constructs. (subject positions) and what are the consequences of the talk.

Steps in the research process:

Since DP and FiDP approaches are different, their methods are also differ to some extent. We will discuss methods of each one of them. We first begin with DP analysis.

Devising a research question:

In DP research, research questions are framed to get an answer to what are the various ways in which people manage psychological matters in everyday life, such as identities, accountabilities and mental states and how these psychological issues become relevant in social interaction.

4.5.2 Designing your study and collecting data:

In DP, we collect ‘‘naturally occurring data’, means data taken from everyday social interaction that would have taken place even if our research project was not occurring. Alternatively, we can use other methods also such as interviews and focus groups.

Before you actually start collecting data, you need to plan your data collection on the basis of your research question. Be very clear about what you want to study and how to get access to this topic or area of social interaction. Once you are clear about what information you need to collect, then you need to identify and approach the potential participants for individual interviews. You need to get informed consent from the participants and then ensure that interviews are video- recorded, while maintaining all other ethical guidelines. Collect sufficient number of interviews to enable you to identify any recurring patterns or different issues pertaining to your research question, emerging out of this data. But do not collect so much data that it overburdens you and you find it cumbersome to transcribe and analyze it. Next step is transcribing and analyze the data.

4.5.3 Transcription and Coding:

Transcription:

After collecting the data in audio or video format, you need to convert that data into written document. First the data is transcribed in ‘playscript style’, where the focus is on the content of the talk and other features of the talk such as length of pause, intonation, etc. are ignored. In the second step of transcription, the researcher identifies those sections of the data that he wants to examine in more detail, and as a third step in transcription DP researcher uses ‘Jeffersonian’ transcription system for only those portions of data that were identified in the second step of transcription. Jeffersonian system includes features of talk such as length and location of pauses, changes in intonation, emphases and overlapping speech. This helps the researcher to know, not only what was said, but also when and how it was said.

Coding:

Coding of data in DP refers to organizing data into smaller portions on the basis of relevance to research questions. These smaller portions are clubbed together into a ‘corpus’ of data on the basis of emerged patterns in the data. The process of transcription is iterative, i.e., a researcher needs to keep examining the data, making tentative analyses and interpretations, re-checking and examining the data, and focusing on small sections of transcript each time. Consequently, to get final coded ‘corpus’, the researcher needs to do coding many times. Discourse analysis is considered as ‘data driven’, i.e., how analysis will be done is influenced by research question.

4.5.4 Analysis and interpretation of the data:

The researcher should ensure that coding is as inclusive as possible so that no potentially important extract is left out inadvertently. The researcher must remain focused on what is there in the data, instead of paying attention to what he expects to find.

Analysis process in DP is not a linear process. There searcher needs to work backward and forward through a series of stages while examining the data. The researcher must read transcript line by line and must describe in a simple manner what is happening on each line. He must note down how, when and what is being said. He should not try to answer why it is being said or what the participant meant.

Then comes the second stage of analysis, where the researcher starts looking at internal states or psychological constructs. The pauses, quieter talk and references are called internal states or psychological constructs. He must begin to pay attention to things such as how one is 'feeling and thinking' or 'not liking' something, as these influence social actions of a person.

The second stage analysis will most likely highlight some features of the talk where psychological issues are particularly noticeable. At this stage, DP uses 'discursive devices': that is, identifiable features of discourse that help to perform social actions. This helps in interpret the data and to identify the way the discourse is constructed.

Next step in analysis is to focus on specific analytical issues.

Focus on Specific Analytical Issues:

It can be very frustrating task for a researcher to choose and focus only on some topics out of a cluster of themes that he has identified. It will help researcher if he goes back to research question and existing literature to identify and focus on something that will be within the limits of his research and also contribute to research in that area. But he should be as specific as possible.

Re-code the Data for all Instances of this Issue:

Once he has decided what will be the focus of his research, he needs to go back through the full data set to check for all instances where this occurs. He needs to go through this step even if he feels that he was very thorough when he did coding for the first time. He can check both the original recording as well as the transcript, since some matters are easier to spot in visual form than in written form. This step will ensure that your research is very rigorous and methodical.

Refine & Writing up the analysis:

Based on re-coding of the data, a new file is made. The researcher now needs to go through each data extract in turn, comparing them with each other and searching for any patterns or differences. The researcher can

now begin to write up his analyses. He can turn his analytical notes into sentences that can be used to provide some insight into the data and form the basis of his report. He may not be able to use all his extracts in a written report, so he needs to select only those extracts that represent his analysis and give the clearest and most engaging examples of the issue that he is focusing on.

Analysis Process in FiDP Research:

Devising a Research Question:

FiDP research questions are 'what' or 'how' questions. FiDP focuses on the reality being constructed, including different and sometimes even contradictory constructions, the consequences for what people can say, think and do when drawing on these constructions; and the wider discourses and socio-historic context that enables these constructions to make sense. To begin with, the researcher may start with a general question and later as the data is collected, research question starts getting crystallized.

Data Collection:

For FiDP almost everything is a text that can be analysed. This is because talk, writing, images, actions and everyday objects are part of symbolic systems that can be read for the meanings they employ.

Transcription:

If the data is not already in textual form, the researcher will have to transcribe it from his sound or video recordings. FiDP, generally, uses audio recordings instead of videos as it wants to be less intrusive and also because the focus is on language and not on visual cues. FiDP uses a simplified and less detailed transcription notation than DP. FiDP sometimes uses the tools of DP, so some more detail might be given, such as intonation, emphasis or rough length of pauses.

Data Coding and Analysis in FiDP:

Just as in DP, here also, the researcher has to read the entire data to familiarize himself. Then he needs to re-read it to make notes, ensuring that codes are as inclusive as possible. It's important to be inclusive and to write as many keywords as the researcher sees, because at this stage he doesn't know what will be the most relevant issues, and if he doesn't code them at this stage, he might miss them later.

Coding through a Discursive Lens: What, How, Why?

In the previous step we searched for FiDP questions: what are the issues, how are they constructed and why? 'what' question can be answered by summarizing what is being said. Researcher can summarize by Paying attention to the exact words and phrases, summarizing what the participant is saying in less words but staying close to the data. How question can be answered by looking at how it is said. He can look for rhetorical devices

(these are called discursive devices in FiDP). An example of rhetorical device can be 'hundreds of people' in talk.

Researcher might also notice if there's any 'trouble' in the talk. When people find it hard to say something they often pause, change direction, stop and start, or make 'um' and 'er' sounds. This tells him that something difficult to say is being managed, so he needs to look for what that something is. By seeing what's not being said he might get hints at the functions of what is being said. For example, avoiding being labelled as unpopular. If the researcher gets an idea about the functions of the talk at this stage, he should write it down. Thinking about 'what' and 'how' questions can leas the researcher towards 'why' questions. He might think, why is this participant saying this, to think about the consequences of talk for the speaker. Alternatively, he might be asking why it is in our society that this talk would make sense. He might think about where else he might have hear similar constructions of reality such as in the media, government policy or psychological discourse. The same text or section of a transcript can be coded for many issues

Stop, Review, Consolidate and Conceptualise:

After coding through discursive devices, once again look at the keywords. You will notice that many of the keywords refer to the same thing. For example, the researcher may have coded different sections of the text as contentment, pleasure, glad, joy, enjoyment etc., but they all can be described by just one word, i.e., happiness. This becomes researcher's key word and he needs to go back to the beginning of the data and again analyze the text to further analyze the text in terms of this new conceptualized key word. For example, the researcher may find that when participants talk about happiness in relationships, they talk about 'reciprocity'. In this case, 'reciprocity' becomes the defining feature of interpersonal relationships. The researcher may find that the data appears differently with this new conceptualized word and gives an new insight about the data. This is known as shifting from descriptive analysis to conceptual analysis.

Collate, Confirm, Develop:

Next you need to collate all the extracts coded under each conceptual keyword. This can be done either physically or by using a software such as Transana and NVivo. Many discourse analysts prefer to use physical sorting method as sorting printed extracts again and again helps to make creative associations. Extracts may be coded with either single conceptual keyword or may have multiple keywords. Next step is to look at each extract and identify what is being constructed and then combine two or more extracts together to make a bunch that is defined by the construction. If extracts do not share same construct, just divide all extracts in two bunches and label them. The researcher can look at the answer 'what' question to facilitate him in creating these two bunches. If at this stage, the researcher feels that these two piles should be coded differently, he will

have to start all over again by comparing the extracts till he again finds a way to conceptually categorize them. So this is a cyclical process.

Identify Discourses to Focus on and Confirm the Research Question:

Discourse is like building up an object or bringing an issue into existence. The researcher needs identify the extracts that enables him to explore the different ways your research topic is being brought into being. These extracts are chosen on the basis of quantity (i.e., whether they were regularly occurring in talk) or on the basis of interest (i.e. an extract that has not been said in other discourses). In this process, the researcher can either stick to his original research question or if some other new reoccurring topic emerges, he can decide to focus on that issue and rewrite his research question.

Analyzing Each Extract: What, How, Why?

Once again you need to analyze the extracts categorized under the same discourse and check for each extract what is constructed, how it is constructed and the consequences for using these constructions.

4.5.5 Writing up Analysis:

After this repetitive analysis the researcher will havea set of discourses that construct your research topic in different ways, and an analysis of the extracts that articulate them. He needs to decide which extracts he wants to use for his report. While choosing extracts, he has to keep in mind to draw from his whole data instead of just picking up a few particularly expressive and articulate participants. For each discourse, he needs to explain how it constructs reality, how the talk makes this reality appear credible, the consequences for constructing the reality in this way and the wider discourse that supports this sense making.

4.6 NARRATIVE ANALYSIS

A narrative can be defined as the telling of a series of connected events for an intended audience. It is an answer to the question ‘and then what happened?’

Very often the word ‘narrative’ is used interchangeably with the word ‘story’ but in real sense narration is the recounting of a story. While recounting an event, a narrator selects which aspects of that event to emphasize or leave out. He includes those aspects of the event that he thinks are important and links them in a manner that will hold the audience’s attention. He collaborates with the audience of his story to decide what can be told and how it is to be told.

Psychologists realize that people share their experiences with others in the form of stories. These stories are very useful to understand what sense and meaning people derive from the things that they come across and how these meanings change when people experience life changing events. So these stories can be used to understand the shifts in a person’s identity

across changing situations in his life. To study how people subjectively construct or reconstruct their identities across different developmental milestones in their lives or across any significant events, narrative analysis is the most apt method that psychologists can use.

Psychologists also recognize that people may describe the same event in different ways, depending upon to whom they are narrating the story, in what context and at what point of time in their lives they are telling the story. For example, they might be telling the story immediately after experiencing the incident or may be after many years. This time gap will have the impact on the story that is being told. The context can include family, historical, cultural or any other context that may have influenced the story teller's life. In narrative analysis, the psychologist looks at not only the content of the story but also the way the story was told. There are various different types of narrative analysis models. Each one of them focuses on one aspect of the story, such as, content, structure or function.

These stories are studied through semi-structured interviews using predominantly open-ended questions. Other methods of analyzing stories are visual, auditory and performance records, diary entries, letters, etc. While analyzing the story, narrative analysts have to keep in mind that the story should not be fragmented so that there is no risk of analysts unintentionally changing the meaning of the stories while relaying them. To systematically analyze stories different models of narrative analysis can be used depending upon where they are situated, what they are about, and how and why they are being told. At the same time, the analyst must use reflexive practices to be aware of his own role in the construction and interpretation of the story.

4.6.1 Background:

It was in 1970s that narrative analysis became popular, as a method of understanding the context, different perspectives on experiences or for generating new theories using bottoms up approach to data analysis. Narrative analysis is influenced by both modernist and post modernist's concerns. It makes sure that participant's representation and the agency remain the main focus of the study. Narrative truth is not a record of factual records, rather it is concerned with the constructed account of experience.

Let us look at some of the technical words that we have used here.

Modernism:

In the late nineteenth and early twentieth centuries, a philosophical movement focused on breaking from traditional forms of expression to developing new and innovative ways of doing so. It views a person as being a fixed entity with a whole and stable identity.

Post-modernism:

It is a philosophical movement that came in the wake of the modernist movement, concerned with challenging the modernist idea of a fixed and stable identity. It views a person as being multiple, fluctuating, contradictory and fragmented, and is interested in how these processes occur.

Agency:

Refers to the capacity of an individual to act freely and independently, and to make their own choices in the world.

Bottom-up (or inductive) approach:

This involves identifying patterns or meanings through the analysis of the data without trying to fit it into theoretical interests or the researcher's preconceptions, and so the findings and interpretations are strongly linked to the data itself. This is in contrasts with a 'top-down' (or deductive) approachwhere the analysis is driven by existing theoretical or analytical concerns.

Subjectivity:

Subjectivity refers to the personal perspectives of the individuals. It influences the ways research participants and the researcher view their world, such as through their perceptions, experiences, expectations and desires, as well as their social, cultural and historical understanding.

As mentioned above, there are various ways in which narrative analysis can reflect on above mentioned issues. In fact, narrative analysis is an umbrella approach for the various ways in which stories can be told and explored. Each model of narrative analysis uses different types of questions to find out the content, structure and function of the narrative. For instance, one approach looks at story, as told by the participant to find out what meaning it makes for that narrator. The story teller does not tell everything related with the experience that he is narrating in the form of the story, rather, he chooses what to include and what to exclude from the story. He makes sense of the event by adding interpretive elements, which allows him to construct a coherent narrative.

There is another approach, known as critical approach. This approach proposes that coconstruction of the story takes place between the narrator and the researcher (his audience) during the interview as well as during the interpretation and representation. This coconstruction takes place through researcher's role, words and interventions in the story, through immediate context such as interview setting, as well as through wider context like socio-cultural setting. Let us now look at how exactly narrative analysis take place.

Steps in the Research Process:

Keeping in mind the subjectivity of the participants and the researcher, it is necessary for the researcher to show how the narrative data was obtained, analysed and interpreted and reported in the report. It is already mentioned that there are various models of conducting narrative analysis. We will be concentrating on Labov's model of structural narrative analysis. This model looks at the manner in which an event is described in a story's context and shows how the meaning and identity are constructed in narratives about the experiences.

a) Devising a Research Question:

Narrative analysis research's main focus is to investigate how individuals reconstitute their identities following a life-changing event. The researcher explores the identity of an individual by encouraging him to do personal reflection and meaning making of the life changing event. He helps the narrator to make sense of changes in the sense of self and in the relationship with his surroundings. So, the questions asked by the researcher will aim to understand the narrator's self and identity, meaning of experience and intimate and social relationships. For example, the researcher may have research questions such as How do war veterans describe their experiences of learning to surf following diagnosis of PTSD?

What is the transition to second-time motherhood feel like for women whose second child is labelled as having a disability?

How do the stories that couples narrate together construct their relationship across the transition to second-time parenthood?

As you can see, these questions are open ended and broad questions. They are concentrating on a topic as well as on how the narrative is told.

b) Eliciting and Collecting Data:

In narrative analysis method, generally the data is collected through semi-structured interviews. These semi- structured interviews are considered as collaborations between the storyteller (participant) and the listener (researcher) in which the story teller is supported and encouraged to speak freely of what is significant to him about the topic under inquiry. He is encouraged to reflect on personal experiences through the telling (and sometimes retelling) of stories.

To elicit the stories from the participants during the semi- structured interviews, it is necessary for the researcher to pay attention to the words used in each question. The questions should be able to not only elicit the stories from the participants but also get the details about the experiences as much as possible in follow up questions.

Forrester, M. A. (2010) gave example of some of the narrative eliciting questions such as:

"Can you tell me about a particular time when …?

Can you tell me about …?

Can you tell me what you do when …?

Can you remember your …/a time when …?

Can you tell me what you think about …?

Can you tell me what it means to …?

Can you tell me what it is like for you …?

Can you tell me the story of …?"

However, while initial questions should concentrate in getting story related with the researcher's research question, follow up questions will depend upon the immediate context of the interaction.

c) Transcription:

Once the interview is over, the researcher needs to transcribe it verbatim. The transcription needs to be done so that the researcher does not unintendedly impose meanings of his own and also does not miss out on the subtle aspects of participants' story. To ensure that no such biases creep into transcription, some narrative analysts prefer to have 'rough' transcription. They carefully look at not only what is being said, but also how it is said. To avoid the risk of unintentionally changing the meaning that the narrator intended, they do not try to 'clean up' the speech and keep the insertion of grammar and punctuations to the minimum. If they clean up the speech, it may run the risk of not only endangering the important information but may also lead to risk of co-authoring the narrative.

While narrative analysts transcribe every spoken word by the participant, they make only side notes of laughs, pauses, hesitations, etc. The next question that a analyst faces is whether to present this transcript as one piece or it should be broken into lines. While breaking the data into lines with line numbers makes it easy to identify units for analysis, but it changes the flow of reading the data, and they may lead to making undesirable assumptions and additional meanings. Rough transcription, on the other hand, may allow to include different accents and the rhythmicity of speech that can help in recognizing the subtle aspects of the interview. Though breaking the data into line numbers may help the reader to know where in the transcript the narrative has occurred to enable them to refer to the topic that was being talked about or what has been asked before and after it. This is also possible in rough transcription without breaking the data into line numbers. The analyst can give this information through explanation and inclusion of the interviewer's question. It should also show how far into the interview the narrative was recounted to allow readers to understand the context in which it has been told.

4.6.2 Analysis and Interpretation of the Data:

After the process of transcription, the next step will be analysis of the data. Though there are many ways of analysing narrative data, here we will be using Labov's (1972) model of structural narrative analysis as a guiding procedure.

Labov's (1972) model of structural narrative analysis:

This model first of all identifies the different parts that make up the structure of the narrative.

a) Identifying Narratives:

First of all, the analyst familiarizes himself with the text of narrative that he is going to analyze. To familiarize himself, he reads and re-reads the text, listens to the interview and transcribes it. Next, he tries to identify the narratives in the text, by searching for the narration of events that follow the conventional story form of having a beginning, a middle and an end. In other words, he looks for sequences of events that can be temporally ordered. For example, he may look for words such as 'and' 'and then'. The entire semi structured interview may form as a single narrative or it may contain many narratives. This depends upon how the narrative eliciting questions were asked.

b) Coding the Narratives into Component Elements:

Labov (1972) believed that stories that attract the attention of the audience have identifiable elements. These elements are shown in

table 1:

Elements in Labov's model of structural narrative analysis

Abstract (A):	Summary of the story
	What is the story about?
Orientation (O):	Time, place, characters and situation to orient the listener
	Who is the story about, when did it happen, what happened, where did it happen?
Complication Action (CA):	Events of the story
	Then what happened?
Evaluation (E):	Where the narrator steps back from the story to tell the listener its meaning
	So what?
Resolution (R):	Outcome of the story
	What finally happened?
Coda (C):	Ending the story and returning to the present
	Does not answer any question and signs off the narrative.

(**Source:** extracted from Forrester, M. A. (2010). Doing Qualitative Research in Psychology: A Practical Guide. Sage.)

Researchers can easily understand the intended meaning in the stories if they can recognize the structural elements in the narratives. They can understand the meaning of events and experiences of the participants by questioning the function of each element and finding out the sequence of these events. Entire data must be coded into different elements. The elements may appear in different order in different stories. Single element may get repeated many times or some elements may be missing within each narrative. But complicating action cannot be missing. If complicating action element is missing, it indicates that there is no event, consequently, there cannot be any narrative.

c) Writing Analytical Comments for Each Narrative:

Once the narrative is coded with elements, the next step will be to make analytical notes about the function of each element in constructing the story.

Keeping in mind the research question, analytical notes are also made for note the presence, absence, repetition and interruption of the individual elements in the narrative, as it is relevant to the structure of the narrative.

Such an in-depth analysis enables the narrative analyst to make detailed investigation of the functions of each elements, their interplay and suggested overall structure of the narrative. The analyst can seek answers to why the narrative has been told in the way that it has been and what it suggests about how the storyteller is constructing his experience, sense of self and his relationships with others. He can also determine which analytical notes are related to research question in hand.

Re-contextualising the Narratives:

Till this point, narratives are analysed outside of their context. But at this point, recontextualization is done. The analysts goes back to the entire data and again reads it keeping in mind the analysis. To interpret the narrative within the context of data, the analyst may pick up some other pieces of data that may come other narratives but support the analysis.

4.6.3 Writing Up the Analysis:

Writing of analytical notes and observations are loose first draft of the report. The final step of analysis contains the story and its interpretation that is relevant to research question. The final report may be restricted by practical reasons such as word-number limit, etc, so the analyst will need to select the most representative narratives of his analysis, to include in the report of his interpretation. Moreover, the report must carry a clear example of narrative itself, and these examples should be linked to the research question. Each narrative coded into its elements and selected to be included in the final report, can be presented in table. In the table, each elements' content can be described, functions and interplay of the elements can be discussed and overall structure can be described.

4.6.4 Other Models of Narrative Analysis:

The structural models cannot answer the questions about why a story was told or what message the teller intended to convey. Therefore, other models of narrative analysis can be used instead of, or in addition to, a structural model.

For example, an analysts may want to know more about the content of narratives, because they want to compare a data set of narratives collected from different participants. This comparison can give insight to patterns and meanings across and within narratives which can help to develop conceptual categories of the self.

Researchers can choose the model of narrative analysis depending upon their research question – whether they are interested in function of the story, or its content, or the manner in which it was told, or finding out the reason for why it was told to the researcher. If the researcher is interested in all of these questions or more than one question, then he can use a pluralistic narrative analysis, that means, he can combine the analysis models.

4.6.5 Critical Issue: Does Narrative Analysis Always Analyse Text?:

Narrative analysts do not always use text to analyse the story. Apart from using semi-structured interview, researchers can collect data through many other ways. For example, while textual data can be collected through collection of poems, diary entries, etc. The stories can be retold for an audience through dance, or through the use of visual artefacts such as drawings or photographs.

4.7 CONVERSATION ANALYSIS (CA)

4.7.1 Introduction:

Psychologists have been increasingly interested in studying naturalistic everyday interactions between people such as talking to other people. In psychology, the study of conversation is known as conversational analysis.

Background:

The origin of CA as a qualitative methodology is in ethnomethodology which is part of research in sociology. Harold Garfinkel (1967), an ethnomethodologists, explained that people spontaneously produce sequences of activities that appear fairly random or even uncoordinated, but in fact are very orderly. These are sense-making practices and are methodical in ordinary conventional ways.

Ethnomethodology is defined as the study of the methods people use to produce and interpret social interaction. Ethnomethodology concentrates on providing a rational analysis of the structures, procedures and strategies that people themselves use when they are making sense out of their own everyday world and their interactions within it.

With the advent of portable sound recorders, conversation analysts started recording conversations and analyzing them to identify many different kinds of structures within conversation. They found that when conversations were converted into transcripts, one could find many regular patterns in these conversations. For examining such data, conversation analysts used ethnomethodological approach that focuses on how people themselves produce and recognize their own 'sense-making' practices as they are going along.

Conversation is converted into Jeffersonian-style transcription as CA is very much interested in the structure of talk, the sequence of the interaction and the numerous things that people do when having an everyday conversation.

While analyzing the extract, CA approach looks at:

1. The who, how and what people do as they are conversing.
2. How a person says something is plausibly significant and can give an idea about something of what they are doing.
3. The transcript is organized so that researcher can analyze the various structures that people use, such as turn-taking patterns, and identifying when trouble in the talk might occur.
4. The way a person says something (e.g. said something at a particular point that was noticeably faster than the utterances around it) can form part of the analytic rationale that the CA researcher employs.
5. Whatever has been said can be analyzed with a focus on the sequence of the interaction. CA often asks: 'Why that (utterance) now?'
6. By analyzing the fine detail of the structures of the conversation the researcher can understand how, and what, people themselves orient to as they produce their own conversations.

Steps followed in CA:

Step 1: Record conversations either in audio- or video-recorded form.

Step 2: Write down the conversations in full using a Jeffersonian style transcription to describe all relevant actions.

Step 3: find out the elements and structures in the conversation.

Step 4: Stress on participant-oriented evidence for the methods that people use for doing 'talk-in-interaction'.

4.5.2 Taking turns in conversation: How people use a 'locally managed system':

In 1960s, Harvey Sacks et.al. (1974; extracted from Forrester,2010) developed a model of conversational turn-taking that is called 'Local Management System'(LMS). This model explains what people themselves

do while conducting a conversation either with each other or in a group; that is, sorting out whose turn it is talk to talk now has the current turn at talk, who might have the next turn and so on. The entire thing is conducted 'locally' on a 'turn-by-turn' basis in the immediate setting of the interaction. This model represents a highly organized system and it is called local because it always takes place in the immediate local context. It is called 'management' because it is the people who are talking, they are managing it as they proceed. The locally managed system is based on two components, and a set of rules that operate on these components. The two components are:

1. **A turn-constructional element (TCU):** This refers to any kind of utterance, gesture or sound (e.g. 'ehm') and it can be of any length in the conversation.

2. **A turn-allocation element:** According to turn-allocation element, allocation of turns can work in two ways:

a) somebody choosing or selecting the next person to talk, or

b) the next person selecting themselves.

The point at which the turn-allocation occurs in the conversation is known as transition-relevant place (or TRP). TRP can be in the form of short pause and generally at TRP the speaker changes. For example, if you are speaking to someone, the pitch and emphasis of your voice will typically change, even before you actually get to the end. This will indicates to the other person to whom you're talking to that you are just about to give up your turn at talk and hand it over. If the other person is speaking to you, you know precisely when to enter the conversation and select yourself as the next speaker.

In short, a turn is made up of a turn constructional unit (TCU), which can be of any length or form. A transition-relevant place (TRP), on the other hand, defines the gap between one speaker and the next speaker.

Sacks et al. (1974), while identifying the turn-taking constructional and allocation units (TCUs and TRPs), identified a set of rules as follows:

Turn-taking Rules:

Rule 1: This rule applied to the first transition-relevant place of any turn.

(a) if the speaker who is speaking right now, selects the next speaker during the current turn, then the current speaker must stop speaking and the next speaker must speak next. And the current speaker must speak next at the first transition-relevant place after this 'next speaker' selection.

For example, imagine how odd it weird it would be if, the minute you ask somebody a question and they are about to answer, you start talking.

(b) If the speaker does not select a next speaker during a current turn, then anybody else present (after parties) can self-select and the first person to do this will gain 'speaker rights' at the next turn.

For example, don't you think, it is quite a skill to learn to recognize just the right moment to come into a conversation without appearing rude.

(c) If the current speaker has not yet selected the next speaker and no other speaker self-selects, then the current speaker can continue (although this is not a requirement). In such a case, the current speaker gains a right to have a further turn-constructional unit (TCU).

Rule 2:

When rule 1 (c) has been applied by the current speaker, then, at the next transition-relevant place, rules 1 (a) to 1 (c) apply again, and will remain enforce or re-applying until speaker change is accomplished.

For example, the whole system is 'recursive' going around and around as the talk proceeds. Does this mean we sometimes feel fixated in a conversation?

This system and all its elements incorporate an assembling of all procedures, strategies and social conventions designed and used by ordinary participants going about the 'doing' of everyday conversation. Ethnomethodology calls it 'member method'. All these practices and the structures that make them up are produced to take care of at least one inherent problem of interaction, that is, the taking of turns. If such rules are not there, one can imagine, how messy and disorganized the turn taking in conversation can be. One can see such chaotic situation in children's conversation before they actually learn conversational skills. Some of the features of conversation ensured by LMS are:

1. Speaker changes occur with relative ease.
2. Mostly only one speaker has a turn at talk.
3. Transitions (from one turn to the next) are exceptionally sophisticated and very often occur with no gaps or overlaps.
4. The length of any person's turn and the order of turns is not normally fixed in advance.,
5. The distribution of turns is not specified in advance, nor is what people will say during a turn.
6. Repair mechanisms exist for dealing with turn-taking errors and violations (e.g., when two people start talking simultaneously, one of them normally stops very quickly).

4.7.3 Sequence in conversation:

One regular element of interaction and conversation is that one thing always follows another in sequence. whenever we are in the presence of

other human beings we are forever monitoring, either very subtly or most of the time unnoticeably, our own and their behaviour. Not only we watch our own and others' behavior, we present ourselves to others in such a way that our own behavior can be monitored by whomever happens to be around us. We are unconsciously very sensitive to a continually 'unfolding' sequence of 'what happens next' and 'what's meant to happen next', given what has just been said. We become conscious of it only when this implicit attention to sequence seems to go wrong somehow or somebody talking doesn't seem to be paying attention to it.. As sequence and 'what happens next' is important, we realize that we are always accountable in some way for what we are doing when in a conversation. In CA this is called 'sequential implicativeness'. It underlines the observation that what you do 'next', following something that another person has done, is automatically monitored by both parties. If any of the parties in conversation, do not follow the rules of normal conversational conventions, it is assumed that something is wrong or the conversation was not understood by the other party. This may annoy the first party in the conversation and he will look for reasons for breaking the rules of normal conversational conventions. This indicates that no matter how small or insignificant a behaviour might be, in the presence of other people, we are always accountable for our actions as a member of the culture.

4.7.4 Structures in conversation:

While having conversation with another person, we unknowingly show a sensitivity to various structural elements in talk, such as requests, questions, greetings, compliments, interruptions and many others. At the same time, we also produce such structures ourselves, so that others can recognise we have done so. To understand this procedure, we need to look at some of the rules of turn-allocation. Here we will look at three rules of turn allocation. They are:

- Adjacency pairs
- Endings
- Formulations

a) Adjacency Pairs in Conversation: The Talk Unfolded Two-by-Two

In conversation, lot of things come in two parts that are sequentially organized. For example, question-answer, greetings-greetings, invitation-acceptance, etc. Even ringing of telephone is considered as summons. It is similar to someone tapping you on your shoulder to get your attention. When a person picks up the phone and answers it in conversational manner, it is a response to the summons. In CA, these pairings are delineated as adjacency pairs and they come in as 'first and second' parts – a first-pair part (FPP) and a second pair part (SPP). We may not be consciously aware of it but there is a very strong convention that when someone produces an FPP, then an SPP has to come somewhere later. It may not come immediately, but later on it must come.

Some of the characteristics of adjacency pairs are:

1. They must be normally adjacent.
2. They must be produced by distinctly different speakers.
3. They are always sequenced as first-pair part/second-pair part (FPP/SPP).
4. Both the pairs are conditionally relevant. The first pair initiates what may take place as a second, and the second will be based upon what has occurred as the first.

The adjacency pair structure also follows LMS rule that once a first pair part is produced, the current speaker must stop speaking and the next speaker must produce at that specific time in the interchange, a second-pair part to the same pair. This is the conventional practice or 'members' methods' that we all produce and adhere to when we talk.

People unconsciously follow conversational conventions and become conscious of it only when somebody tries to rectify, change or repair the 'breaking of the rule' that has just occurred. So, conversation analysts strongly believe that interpretations, suggestions or claims made about the data being analyzed (the actual conversations) should rest upon identifiable evidence in the conversations themselves.

b) Endings: Closing Sequences and How to End a Conversation

The sequential characteristic of talk-in-interaction indicates that one person's turn will always followed by another's (your turn, my turn, your turn, my turn, and on, and on).This can be never ending activity. People may find it difficult to end the conversation without being rude. It will be rather unconventional to simply walk away from the conversation after the main topic is over. Both the parties in conversation must make the end of the conversation possible in a smooth and acceptable way. Whoever decides to make the first move towards stopping the conversation must produce an FPP (first-pair part) that indicates a move towards possibly finishing the conversation. Where exactly that FPP is produced is important because the orientation of the SPP (second-pair part) to this special kind of FPP will show whether the 'next speaker' to the current speaker has taken up this offer. Generally, a speaker who wants to end the conversation may use pre-closing phrase or word such as 'well….', 'right…..', and may also change his intonation or may use a long pause. Sometimes, the respondent party may not take up the offer of closing down, i.e., they may decline an end move, instead the respondent may introduce a new topic and the conversation may continue. For example, the respondent party may continue by using phrases like –

Oh, there was one more thing …

hmm, by the way, I just wanted to say …

I just wanted to mention one other thing …

By the way, I meant to say …

c) Formulations in Talk:

Formulation is another structure that appears quite frequently in talk. Formulation refers to a moment in the ongoing conversation when somebody refers to, or spells out, what they have been saying. Phrases such as 'Look, what I'm getting at …' or 'Oh I see, what you're suggesting is …' or 'The thing I'm saying is …', It shows that while talking people are also making sense of what is going on as it is happening – in the here and now. Formulation indicates to us that the main aim of talking is to show to each other our understanding of what is being said. This demonstration of understanding becomes part of the ongoing conversation. So, it can be said that, initially the first speaker will produce a formulation, and then the person spoken to will produce a response to the formulation that is either a confirmation or a dis-confirmation. Of course, the preferred response is confirmation or agreement. If the respondent responds with disagreement, disconfirmation or non-commitment, it will be an indicate that participants do not have a shared sense of what is going on. We can say that in typical conversation formulation has four function -

1. to show the accumulative importance of the talk that has preceded the formulation itself;
2. summarizing to make an overall point, a form of 'summing up';
3. to work as a method to move towards ending a conversation;
4. to indicate the combined understandings of what is going on, that is, what is being achieved by both parties.

4.7.5 Transcription in Conversation Analysis:

Conversation Analyst transcribes by playing back small sections of conversation repeatedly, and gradually writing out the words and sounds of the conversation, according to the orthographic conventions used in Jeffersonian transcription. This gives the analyst access to 'lived reality' of the interaction that is not available in any other way. The analyst must listen to the recordings with 'unmotivated attention', i.e., not having any pre-specified goals. He should pay attention to even unremarkable features of the talk or other conduct. He should listen to the talk with unmotivated attention again and again, unless he is sure that he has noted down every sound and can begin analysis. Throughout transcription process, he should be asking, "why that utterance now?". He should pay close attention to the dynamic and sequential nature of the conversation.

4.7.6 Analysis:

Since CA usually studies everyday conversation, the analyst can have a huge body of material to compare talk-in-interaction. This conversation can be in formal as well as in informal settings, e.g., at home or at work. However, most of the research studies have focused on how 'talk-in-

interaction' occurs in interview settings. For example, they look at the questions like:

What particular procedures do people use so as to have extended turns-at-talk?

How exactly does an interviewer indicate that they are listening attentively without being overbearing?

What are the procedures employed at the beginning of an interview to encourage a free-flowing easy conversation?

How people end an interview and what resources they use to close the interaction itself. What kind of formulations and adjacency pairs are used to end the conversation.

Writing Up the Analysis:

Doing the analysis and writing it up really go together. CA is basically interested in 'members' methods'; that is, how people themselves use resources in service of their everyday sense-making practices. Two resources that people call upon in conversation are formulation and adjacency pair structures. Formulations can be short or longer utterances and can be presented in many forms. Formulations highlight the reflexive nature of conversation as action – it indicates what the two parties are doing or have just done, as the conversation is taking place. The sequential structure is the adjacency pair that people produce and respond to, in two-part formats. Formulations help people to overcome 'turn-taking' problem in ending the conversation as formulations sum things up. formulations also serve to indicate 'cumulative understandings. People treat the successful production of formulation– confirmation pairs as reflexion of understandings

4.8 SUMMARY

In this chapter, we have looked at how research gets influenced by epistemological and theoretical issues. The philosophy that a researcher believes in influences the kind of research problems investigated, the methods chosen and the interpretation of the findings. The qualitative methods differ depending on the theoretical assumptions, they are based upon. So, in contrast to quantitative methods, there are variety of qualitative methods. Positivism ruled in the past and led psychologists to go for quantification. Later on, social constructionism became dominant and today psychologists prefer a balanced approach

Grounded theory is an analytic approach to qualitative research that uses inductive approach. Some of the attributes of grounded theory are theoretical sensitivity, theoretical sampling and theoretical saturation. The grounded theory process involves cycling back and forth between data collection and analysis until a substantive theory develops. Grounded theory develops through constant production of reflective documents called memos. Through these memos, the researcher uses the constant

comparative method to develop and explain the conceptual content of the developing grounded theory.

Memo writing is done through coding. Grounded theory commences with early coding, which leads to the development of a structure of intermediate, conceptual categories. A principal category is selected from these, and then a theory is developed that emerges from the relationship between the core category and other major concepts.

IPA is an idiographic from of inquiry that is influenced by phenomenology and hermeneutics. It focuses on the individual level of a person's experience and involves 'double hermeneutic'. It is important in IPA to do phenomenological coding and interpretative coding as well as to maintain reflexive journal. This helps in developing clusters of themes and then a final theme for the final report. Since IPA is data driven, it is important to maintain audit trail.

DA is a term used to describe a range of approaches used for analysing talk and text in all forms of social interaction. DA assumes that discourse constructs reality instead of reflecting reality. There are different forms of discourse analysis and each concentrate on different aspects of discourse. For instance, DP focuses on the micro-management of fact, interest and accountability, and the ways in which psychological terms (such as mental states, identities or personality) are used to perform social actions. FiDP focuses on how talk constructs facts about the world and the people in it; how the talk makes this reality appear credible; the consequences for constructing reality in this way (for subjectivity and practice); and the wider discourses that support this sense-making

Narrative analysis tries to understand more about how people make sense of themselves and their lives through the stories they tell. Narrative analysis views individual meaning-making as emplaced within contexts that include their biography, history, societal and cultural influences. There are variety of models of narrative analysis, and each one focuses on a different aspect of the narrative, for example, its structure, its function or its content. Labov's model of structural narrative analysis looks at how an event is told in a story context by closely analyzing how the different parts in the structure of the narrative function.

Conversation is not simply talk but an interaction between two people. It is ethnomethodologically inspired. It is not important for CA to focus on the content of the talk but he must pay attention to the methods people use to make sense of their social world as they are producing talk. We need to record, attend to and describe the interaction to our maximum personal capacity. CA researcher should analyse the transcription with 'unmotivated attention'. He must develop all his suggestions or arguments based on a careful 'line-by-line' sequential examination of how participants themselves treat 'what happens next'. If there is no evidence or indication for what the analyst is suggesting, then the researcher must be very sceptical about what might be said about the interaction.

4.9 QUESTIONS

1. What is the difference between quantitative and qualitative research and why qualitative research has become popular in recent times?
2. What is positivism and what are the challenges to positivism?
3. Write a detailed note on relativist social constructionism.
4. Discuss in detail the background, analysis and coding in grounded theory.
5. Discuss in detail how IPA analysis is done.
6. What are the steps involved in the discourse analysis research?
7. What is the analysis process in FiDP research?
8. Write in detail the steps involved in narrative analysis research?
9. Discuss Labov's model of structural narrative analysis.
10. Elaborate on the background of conversation analysis research method.
11. Write a short note on

    a. taking turns in conversation

    b. Sequence in conversation
12. Write a detailed note on structure in conversation.

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