



RESEARCH METHODOLOGY IN PSYCHOLOGY – AN INDIAN PERSPECTIVE

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KEYWORDS :

INTRODUCTION

Research is central to the various activities that one engages in, as a scientist or as psychologists, with increased relevance in modern life, in general. Research is a careful and detailed study into a specific problem, concern, or issue using a scientific method of investigation. It is constant and competitive; it begins with an issue that comes from observation. The strict definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question. Research must be systematic and follow a series of steps and standard guidelines.

Psychological researchers want to learn and understand human behavior. It can be about how people think, how they feel, how they behave, or some combination of these issues. More specifically, psychological research is used to measure, describe, and categorize human behavior. This results in the understanding of behaviors of the clinical and non-clinical populations. Keeping in the mind the diversity of topics that are investigated and studied under the framework of research, there are diverse sets of research methodology that are applicable to study an area of interest depending upon the topic under study and the context in which it is placed.

PRELIMINARY CONCEPTS OF RESEARCH

Some of the preliminary concepts in research are –

1. Hypothesis
2. Variables
3. Operational Definition
4. Research Methods

HYPOTHESIS

Hypotheses are statements, framed formally in a clear and precise form. They serve as the purpose of research on the basis of which the entire research study is designed. Hypotheses are the basic building blocks of much of psychology. Some research attempts to test hypotheses, other research attempts to explore hypotheses, and yet other research seeks to generate hypotheses. In their simplest form, hypotheses propose that a relationship exists between a minimum of two variables [1-2].

VARIABLES

A variable is anything that can vary, i.e. changed or be changed. Variables are generally used in psychology experiments to determine if changes to one variable results in change in another. One is called the independent variable (IV) and the other the dependent variable (DV).

Independent variable (IV) is the variable that the experimenter manipulates (i.e. changes) – it is assumed to have a direct effect on the dependent variable. Dependent variable (DV) is the variable that the experimenter measures, after making changes (manipulating) to the IV that are assumed to affect the DV.

Apart from the IV and DV, controls are important variables that kept as constant or kept same throughout the experiment, and it is not of primary concern in the experimental outcome. Any change in a control variable invalidates the correlation of dependent variables (DV) to the independent variable (IV), thus creating invalid and unreliable results.

Variables that are present in the environment and that cannot be controlled by the experimenter are called as extraneous variables. They affect the relationship between the IV and the DV. For example, noise, mental or physical state of the participant, etc [3-4].

OPERATIONAL DEFINITION

Before conducting a psychology experiment or study, it is essential to create firm operational definitions for both the independent variable and dependent variable. Operational variables (or operational definitions) refer to how the researcher will define and measure a specific variable as it is used in the study. An operational definition describes how the variables are measured and defined within the study that has made it absolutely clear what the researcher means by the terms as they were studied and measured in the experiment. Operationally defining the variables in a study or experiment is important because variables are subject to holding multiple meanings depending upon the context in which they are being used. For example, studying health in children in different from studying health in adults. An advantage of operational definitions is that provides a clear, relevant and objective definition of complex variables. It also makes it easier for other researchers to replicate a study and check for reliability [5-6].

RESEARCH METHODS

The process used to collect information and data for the purpose of a research study is referred to as a research method. A wide range of research methods are used in psychology. These methods vary by the sources of information that are drawn on, how that information is sampled, and the types of instruments that are used in data collection. Methods also vary by the nature of data that is collected for the purpose of study and thus may be studying qualitative data, quantitative data or both [7].

Research methods may be of various types as listed below –

- **Qualitative Research Methods** – Qualitative psychological research is where the research findings are not arrived at by statistical or other quantitative procedures. Qualitative research is said to be naturalistic. Qualitative research is the examination, analysis and interpretation of observations for the purpose of discovering underlying meanings and patterns of relationships, including classifications of types of phenomena and entities, in a manner that does not involve mathematical models. That is, its goal is to understand behavior in a natural setting. Two other goals attributed to qualitative research are the understanding of a phenomenon from the perspective of the research participant and understanding the meanings people give to their experience. Qualitative researchers believe in studying phenomena in its context rather than concentrating on narrow aspects of the phenomena. Qualitative psychological research has crystallized as one of the most effective ways of gathering insight into the behaviors, attitudes and decision-making processes of marketing research, educational psychology and several other settings [8-9].
- **Quantitative Research Methods** – Quantitative psychological research is where the research findings result from mathematical modeling and statistical estimation or statistical inference. Quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques. The objective of quantitative research is to develop and employ mathematical models, theories and/or hypotheses pertaining to phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and

mathematical expression of quantitative relationships. Quantitative data is any data that is in numerical form such as statistics, percentages, etc. Statistics is widely used in quantitative psychological research. Typically a project begins with the collection of data based on a theory or hypothesis, followed by the application of descriptive or inferential statistical methods [10-11].

- **Experimental Research Methods** – An experiment is an investigation in which a hypothesis is scientifically tested. In an experiment, an independent variable (the cause) is manipulated and the dependent variable (the effect) is measured; any extraneous variables (all variables, which are not the independent variable, but could affect the results (DV) of the experiment. Experiments should be controlled where possible) are controlled. The key features of experimental research method are control over variables, careful measurement, and establishing cause and effect relationships. An advantage of experiments is that the study is objective in nature [12]. The views and opinions of the researcher are less likely to affect the results of the study, making it more reliable and valid.

There are three types of experiments in psychological research viz.

1. **Laboratory / Controlled Experiments** – This type of experiment is conducted in a well-controlled environment – not necessarily a laboratory – and therefore accurate measurements are possible. The researcher decides where the experiment will take place, at what time, with which participants, in what circumstances; using a standardized procedure. Participants are randomly allocated to each independent variable group. A strength of this method is that it is easier to replicate (i.e. copy) a laboratory experiment. This is because a standardized procedure is used. They allow for precise control of extraneous and independent variables. This allows a cause and effect relationship to be established. A limitation of this method is that the artificiality of the setting may produce unnatural behavior that does not reflect real life, i.e. low ecological validity. This means it would not be possible to generalize the findings to a real life setting. Demand characteristics or experimenter effects may bias the results and become confounding variables [13-14].
 2. **Field Experiments** – Field experiments are done in the everyday (i.e. real life) environment of the participants. The experimenter still manipulates the independent variable, but in a real-life setting (so cannot really control extraneous variables). The behavior in a field experiment is more likely to reflect real life because of its natural setting, i.e. higher ecological validity than a lab experiment. There is less likelihood of demand characteristics affecting the results, as participants may not know they are being studied. This occurs when the study is covert. The limitation is that there is less control over extraneous variables that might bias the results. This makes it difficult for another researcher to replicate the study in exactly the same way [15-16].
 3. **Natural Experiments** – Natural experiments are conducted in the everyday (i.e. real life) environment of the participants, but here the experimenter has no control over the IV as it occurs naturally in real life. Behavior in a natural experiment is more likely to reflect real life because of its natural setting, i.e. very high ecological validity. There is less likelihood of demand characteristics affecting the results, as participants may not know they are being studied. Can be used in situations in which it would be ethically unacceptable to manipulate the independent variable. They may be more expensive and time consuming than lab experiments. There is no control over extraneous variables that might bias the results. This makes it difficult for another researcher to replicate the study in exactly the same way [17-18].
- v **Quasi-Experimental Research Methods** – The prefix *quasi* means “resembling.” Thus quasi-experimental research is research that resembles experimental research but is not true experimental research. Although the independent variable is manipulated and quasi experiments resemble quantitative and qualitative experiments, participants are not randomly assigned to conditions or orders of conditions. Quasi-experiments are most likely to be conducted in field settings in which random assignment is difficult or impossible. They are often conducted to evaluate the effectiveness of a treatment. It eliminates the directionality problem because it involves the manipulation of the independent variable. It does not eliminate the problem of confounding variables, however, because it does not involve random assignment to conditions. The inherent weaknesses in the

methodology do not undermine the validity of the data, as long as they are recognized and allowed for during the whole experimental process [19-20].

Example – if we study the effect of maternal alcohol use when the mother is pregnant, we know that alcohol does harm embryos. A strict experimental design would include that mothers were randomly assigned to drink alcohol. This would be highly illegal because of the possible harm the study might do to the embryos

- **Opinion Based Research Methods** – Opinion based researcher includes mainly questionnaires, interviews and polls. A questionnaire is a set of questions that can either have open ended answers or closed ended questions. Some questionnaires ask participants to rate statements such as in a personality questionnaire these are called linker type questions. Questionnaires are cheap and relatively easy to produce. The downside of questionnaires is that if they are printed they are not eco-friendly. Another disadvantage is that they can produce a lot of qualitative data that can be hard to wholly collect and interpret. In a way the fact it can produce qualitative data can be an advantage to the researcher if this provides them with the data needed to complete the study. An example of a questionnaire is the Attribution Style Questionnaire, this is can be used to predict and diagnose depression [21-22]. Interviews are another tool that involve either a face to face or over telephones or emails a reciprocal exchange, between the interviewer and interviewee, of thoughts, beliefs and opinions on a construct being measured in a study. Polls are a simple, yet another tool to record the opinion of people on a construct, theme or issue.
- **Observational Research Methods** – An observational research method is where an experimenter researches participants by watching their behavior in their natural setting. Participant observations involve an experimenter partaking in the observed behavior from within the culture. For this to work effectively the researcher must be accepted into the participant's culture or group. If they are not accepted they will not observe the true natural behavior of others. The data that is collected from participant observations is mainly qualitative. Participant observations are extremely demanding and intensive. This is because they are very time consuming taking months or even years to complete. Direct observations are when an experimenter watches a culture or group behavior without intruding; to watch without intervening. Direct observations are more focused onto a smaller group and are intensively investigated. Direct observation is advantageous as it allows the experimenter to gather the actual behavior however the bias or faking of behavior may also take place. If the participant is aware of the experimenter's presence, they may not behave naturally. Also, observations may be time consuming and the experimenter may have to wait till the desired behavior occurs [22-23].

RESEARCH DESIGN

A research design is a systematic plan and structure to study a scientific problem. The design of a study defines the study type (whether it will be descriptive, correlational, semi-experimental, experimental, review, meta-analytic) and sub-type (e.g., descriptive-longitudinal case study), research question, hypotheses, independent and dependent variables, experimental design, and, if applicable, data collection methods and a statistical analysis plan. Research design is the framework that has been created to find answers to research questions. It gives direction to research and ensures it is systematic in nature. The choice of a research design helps the researcher determine if the study will generate reliable results [23].

There are different types of research designs that are used with specific advantages and disadvantages kept in mind. The choice of a particular research design depends on the aims of the study and the nature of the phenomenon. They can be discussed as below –

DESCRIPTIVE RESEARCH DESIGN

Descriptive research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. This method is used to obtain a general overview of the subject. The results from a descriptive research cannot be used as a definitive answer or to disprove a hypothesis but, if the limitations are understood, they can still be a useful tool in many areas of scientific research. Advantage of the descriptive design is that the subject is

being observed in a completely natural and unchanged natural environment, giving a chance to observe and study the authentic behaviors. True experiments, whilst giving analyzable data, often adversely influence the normal behavior of the subject [24].

Descriptive research is often used as a pre-cursor to quantitative research designs, the general overview giving some valuable pointers as to what variables are worth testing quantitatively. This research design is used to describe characteristics of a population or phenomenon being studied. It does not answer questions about how/when/why the characteristics occurred. Rather it addresses the 'what' question. The characteristics used to describe the situation or population is usually some kind of categorical scheme also known as descriptive categories [25].

Qualitative research often has the aim of description and researchers may follow-up with examinations of why the observations exist and what the implications of the findings are. Hence, descriptive research cannot describe what caused a situation. Thus, descriptive research cannot be used to as the basis of a causal relationship, where one variable affects another. Because there are no variables manipulated, there is no way to statistically analyze the results. Many scientists regard this type of study as unreliable and 'unscientific'. In addition, the results of observational studies cannot be replicated [26].

CASE STUDY RESEARCH DESIGN

The case study research design has evolved over the past few years as a useful tool for investigating trends and specific situations in many scientific disciplines. This method of study is especially useful for trying to test theoretical models by using them in real world situations. A case study is an in depth study of a particular situation rather than a statistical survey. It is a method used to narrow down a very broad field of research into one easily researchable topic. The case study research design is useful for testing whether scientific theories and models actually work in the real world. It is important to understand specific cases and ensure a more holistic approach to research in those cases where a comprehensive and deeper understanding of the subject is required. It is flexible in nature in the sense that a case study might introduce new and unexpected results during the course of a research, and lead to research taking new directions [27]. Some argue that because a case study is such a narrow field that its results cannot be extrapolated to fit an entire question and that they show only one narrow example. On the other hand, it is argued that a case study provides more realistic responses than a purely statistical survey [28]. The truth probably lies between the two and it is probably best to try and synergize the two approaches. It is valid to conduct case studies but they should be tied in with more general statistical processes. The advantage of the case study research design is that you can focus on specific and interesting cases. This may be an attempt to test a theory with a typical case or it can be a specific topic that is of interest. Research should be thorough and note taking should be meticulous and systematic [29].

NATURALISTIC OBSERVATIONS

In many scientific disciplines, naturalistic observation is a useful tool for expanding knowledge about a specific phenomenon or species, where the subject of interest of study is studied in their natural setting/environment. Most naturalistic observation is unobtrusive. There is often little attempt at analysis, quantitative or qualitative, but the observational study does uncover unknown phenomena and behaviors [30]. Naturalistic observation has its own advantages and disadvantages. Where on one hand, it allows the experiment to record and study the authentic and natural behavior of the subject of interest to the study, on the same hand, bias or error may also occur. There are two errors that naturalistic observation is prone to- participant bias (participants, if aware of being observed may not behave in the nature way and may fake behavior to appear socially desirable or to hide natural behavior) and experimenter bias (experimenter sees and records only those behaviors that are of his or her interest) [31].

SURVEY RESEARCH DESIGN

The survey research design is often used because of the low cost and easy accessible information. It is a very valuable tool for assessing opinions and trends. Even on a small scale, such as local government or small businesses, judging opinion with carefully designed surveys can dramatically change strategies, proving in the benefit of the researcher. Despite the drawbacks of some of them being too long or people faking answers to appear socially desirable, surveys are still a powerful tool

and can be an extremely powerful research tool. As long as surveys are designed well and are prepared to be self-critical, one can still obtain an accurate representation of opinion [32].

Surveys can be conducted through various means- face to face, via emails or even on telephones (if the surveys are shorter). Face to face is the most traditional method of the survey research design. It can be very accurate as it allows the researcher to be selective about to whom they want to ask questions to and they can explain anything that is not understandable. In addition, a judgment about utilizing time in the best way to get the accurate responses can be managed. There are a few things to be careful of with this approach; firstly, people can be reluctant to give up their time without some form of incentive. Another factor to bear in mind is that it is difficult to ask personal questions face to face without embarrassing people. It is also very time consuming and difficult to obtain a representative sample [33].

Surveys through mails and post is a good way of targeting a certain section of people and is excellent if the researcher needs to ask personal questions. The problems with this method are that one cannot be sure of how many responses they will receive until a long time period has passed. One must also be wary of collecting personal data; most countries have laws about how much information you can keep about people so it is always wise to check with somebody more knowledgeable [34].

SEMI EXPERIMENTAL DESIGNS

- **Field Experiments** – A field study is an experiment performed outside the laboratory, in the 'real' world. Unlike case studies and observational studies, a field experiment still follows all of the steps of the scientific process, addressing research problems and generating hypotheses. The obvious advantage of a field study is that it is practical and also allows experimentation, without artificially introducing confounding variables. Field experiments can suffer from a lack of a discrete control group and often have many variables to try to eliminate. A major concern shared by all disciplines is the cost of field studies, as they tend to be very expensive. The changeable nature of the external environment and the often-prohibitive investment of time and money mean that field experiments are rarely replicable, so any generalization is always tenuous [15].
- **Quasi-Experimental Design** - Quasi-experimental design is regarded as unscientific and unreliable, by physical and biological scientists, the method is, nevertheless, a very useful method for measuring social variables. The inherent weaknesses in the methodology do not undermine the validity of the data, as long as they are recognized and allowed for during the whole experimental process. Quasi experiments resemble quantitative and qualitative experiments but lack random assignment of groups or proper controls, so firm statistical analysis can be very difficult [20].

Quasi-experimental design involves selecting groups, upon which a variable is tested without any random pre-selection processes. After this selection, the experiment proceeds in a very similar way to any other experiment, with a variable being compared between different groups, or over a period of time. Advantages of quasi experimental design are great. Especially in social sciences, where pre-selection and randomization of groups is often difficult, they can be very useful in generating results for general trends. Quasi-experimental design is often integrated with individual case studies; the figures and results generated often reinforce the findings in a case study, and allow some sort of statistical analysis to take place. In addition, without extensive pre-screening and randomization needing to be undertaken, they do reduce the time and resources needed for experimentation. Disadvantages aside, as long as the shortcomings of the quasi-experimental design are recognized, these studies can be a very powerful tool, especially in situations where "true experiments are not possible. They are very good way to obtain a general overview and then follow up with a case study or quantitative experiment, to focus on the underlying reasons for the results generated [21].

TWIN STUDIES

Twin studies reveal the importance of environmental and genetic influences for traits, phenotypes, and disorders. These studies have been used to track traits ranging from personal behavior to the presentation of severe mental illnesses such as schizophrenia. Twins

are a valuable source for observation because they allow the study of environmental influence and varying genetic makeup viz. 'identical' or monozygotic (MZ) twins share nearly 100% of their genes, which means that most differences between the twins (such as height, susceptibility to boredom, intelligence, depression, etc.) are due to experiences that one twin has but not the other twin. Fraternal or dizygotic (DZ) twins share only about 50% of their genes, the same as any other sibling [35].

Twins also share many aspects of their environment (e.g., uterine environment, parenting style, education, wealth, culture, community) because they are born into the same family. The presence of a given genetic trait in only one member of a pair of identical twins (called discordance) provides a powerful window into environmental effects. Twins are also useful in showing the importance of the unique environment (specific to one twin or the other) when studying trait presentation. Changes in the unique environment can stem from an event or occurrence that has only affected one twin. This could range from head injury or a birth defect that one twin has sustained while the other remains healthy [36-37].

The classical twin design compares the similarity of monozygotic (identical) and dizygotic (fraternal) twins. If identical twins are considerably more similar than fraternal twins (which is found for most traits), this implicates that genes play an important role in these traits. By comparing many hundreds of families with twins, researchers can then understand more about the roles of genetic effects, shared environment, and unique environment in shaping behavior [38].

STUDIES CONDUCTED PRIOR TO DOING LARGE SCALE STUDIES

- **Pilot Study** - A pilot study is a standard scientific tool for 'soft' research, allowing scientists to conduct a preliminary analysis before committing to a full-blown study or experiment. To test the feasibility, equipment and methods, researchers will often use a pilot study, a small-scale rehearsal of the larger research design. Generally, the pilot study technique specifically refers to a smaller scale version of the experiment, although equipment tests are an increasingly important part of this sub-group of experiments. Pilot studies are also excellent for training inexperienced researchers, allowing them to make mistakes without fear of losing their job or failing the assignment. Logistical and financial estimates can be extrapolated from the pilot study, and the research question, and the project can be streamlined to reduce wastage of resources and time [39]. Unfortunately, there are seldom paper reporting the preliminary pilot study, especially if problems were reported, is often stigmatized and sidelined. This is unfair, and punishes researchers for being methodical, so these attitudes are under a period of re-evaluation. Discouraging researchers from reporting methodological errors, as found in pilot studies, means that later researchers may make the same mistakes. The other major problem is deciding whether the results from the pilot study can be included in the final results and analysis, a procedure that varies wildly between disciplines. Pilots are rapidly becoming an essential pre-cursor to many research projects. Whilst there are weaknesses, they are extremely useful for driving procedures in an age increasingly dominated by technology, much of it untested under field conditions [40].
- **Usability testing** - Usability testing is a technique used in user-centered interaction design to evaluate a product or idea for research by testing it on users and identifying the importance of the issue under study. Usability testing focuses on measuring a human-made product's capacity to meet its intended purpose. Usability testing measures the usability, or ease of use, of a specific object, set of objects or ideas and behaviors and their relevance to human interaction and human motivation of that object/behavior on a daily basis [41]. It usually involves systematic observation under controlled conditions to determine how well people can use a product. However, often both qualitative and usability testing are used in combination to better understand users' motivations/perceptions, in addition to their actions. Rather than showing users a rough draft and asking, "Do you understand this?", usability testing involves watching people trying to use something for its intended purpose. Setting up a usability test involves carefully creating a scenario, or realistic situation, wherein the person performs a list of tasks using the product being

tested while observers watch and take notes. Several other test instruments such as scripted instructions, paper prototypes, and pre and post-test questionnaires are also used to gather feedback on the product being tested. The aim is to observe how people function in a realistic manner, so that developers can see problem areas, and what people like. Techniques popularly used to gather data during a usability test include think aloud protocol, co-discovery learning and eye tracking [42].

1. **Proof of Concept Study** - Proof of concept (POC) is a realization of a certain method or idea in order to demonstrate its feasibility or a demonstration in principle with the aim of verifying that some concept or theory has practical potential and use. A proof of concept is usually small and may or may not be complete. Concept Testing is how people, without prompting, interpret a sketchy idea for a new product or service. Concept testing is most often used in concept development to test the success of a new product idea before it is marketed. Potential consumers are involved to provide their reactions to written statements, images or graphics, or actual implementations of the basic idea for the product. Concept testing is most often a Go/No Go screening that serves to eliminate those concepts that have very little potential [43-44].

REVIEWING EXISTING RESEARCH

- **Literature Review** – A literature review is a critical and in depth evaluation of previous research. It is a summary and synopsis of a particular area of research, allowing anybody reading the paper to establish why you are pursuing this particular research program. A good literature review expands upon the reasons behind selecting a particular research question. A literature review can be a precursor in the introduction of a research paper, or it can be an entire paper in itself, often the first stage of large research projects. A literature review should not be mistakenly understood as a chronological catalog of all of the sources, but it is an evaluation, integrating the previous research together, and also explaining how it integrates into the proposed research program. All sides of an argument must be clearly explained, to avoid bias, and areas of agreement and disagreement should be highlighted. A good literature review should also have some evaluation of the quality and findings of the research. A good literature review should avoid the temptation of impressing the importance of a particular research program. Whilst some literature reviews can be presented in a chronological order, it is best avoided [45-46].
- **Systematic Reviews** - Systematic reviews are a powerful way of isolating and critically evaluating previous research. The principle behind the systematic reviews process is that the researcher critically evaluates previous studies, in a much more comprehensive and systematic way than a standard literature review. In many cases, statistical meta-analysis tools are used to give the review a quantitative foundation, allowing correlations to be documented and conclusions to be drawn. After a critical analysis, there is a process of combining all of the findings in a systematic review, sometimes qualitatively, but usually quantitatively, using meta-analysis and is usually a combination of both. Whilst the techniques are mainly used by medicine and psychology, there is a growing trend towards using system reviews in other branches [47]. As with most systems, despite the protocols, systematic reviews do have some inherent weaknesses. The main problem is the rapid advancement of research and technology, often meaning that many reviews are out of date before they are even published, forcing researchers to update their findings constantly. There is the problem of selection bias, as with any subjective review, where contradictory research is jettisoned. Whilst not a perfect system, systematic reviews are far superior to the traditional narrative approach, which often allows a lot of good research to fall through the cracks [48].
- **Meta Analysis** – Meta analysis is a statistical technique developed by social scientists that are limited in the type of experiments they can perform. Meta-analysis is the process of drawing from a larger body of research, and using powerful statistical analyzes on the conglomerated data. This gives a much larger sample population and is more likely to generate meaningful and usable data. The field of meta-study is also a lot more rigorous than the traditional literature review, which often relies heavily upon the individual interpretation of the researcher [49]. Meta-analysis is an excellent way of reducing the complexity and breadth of research. For rare researchable conditions, it allows researchers to collect data from

further afield than would be possible for one research group. As the method becomes more common, database programs have made the process much easier, with professionals working in parallel able to enter their results and access the data. This allows constant quality assessments and also reducing the chances of unnecessary repeat research, as papers can often take many months to be published, and the computer records ensure that any researcher is aware of the latest directions and results [50].

When used with the databases, a meta study allows a much wider net to be cast than by the traditional literature review, and is excellent for highlighting correlations and links between studies that may not be readily apparent as well as ensuring that the compiler does not subconsciously infer correlations that do not exist [51]. However, there are a number of disadvantages to meta-analysis, of which a researcher must be aware before relying upon the data and generated statistics. The main problem is that there is the potential for publication bias and skewed data. Research generating results not refuting a hypothesis may tend to remain unpublished, or risks not being entered into the database. If the meta-study is restricted to the research with positive results, then the validity is compromised. The researcher compiling the data must make sure that all research is quantitative, rather than qualitative, and that the data is comparable across the various research programs, allowing a genuine statistical analysis [52].

It is important to pre-select the studies, ensuring that all of the research used is of a sufficient quality. One erroneous or poorly conducted study can place the results of the entire meta-analysis at risk. On the other hand, setting almost unattainable criteria and criteria for inclusion can leave the meta-study with too small a sample size to be statistically relevant. Meta-analysis is an invaluable tool for research, and is rapidly gaining momentum as a stand-alone discipline [53].

SYSTEMATIC REVIEW OF REVIEWS

Systematic reviews of individual studies were required to appraise, summarize and bring together existing studies in a single place. However, decision makers are increasingly faced by a plethora of such reviews and these are likely to be of variable quality and scope, with more than one review of important topics. Systematic reviews (or overviews) of reviews are a logical and appropriate next step, allowing the findings of separate reviews to be compared and contrasted, providing clinical decision makers with the evidence they need. There are different methods used to identify and appraise published and unpublished reviews systematically, drawing on the researcher experiences and good practice in the conduct and reporting of systematic reviews. The process of identifying and appraising all published reviews allows researchers to describe the quality of this evidence base, summarize and compare the review's conclusions and discuss the strength of these conclusions [54].

Methodological challenges and possible solutions occur within the context of (i) sources, (ii) study selection, (iii) quality assessment (i.e. the extent of searching undertaken for the reviews, description of study selection and inclusion criteria, comparability of included studies, assessment of publication bias and assessment of heterogeneity), (iv) presentation of results, and (v) implications for practice and research. Locating and retrieving relevant literature is challenging, yet crucial to the success of a systematic review [55].

The material sourced provides the information from which evidence, conclusions and recommendations are drawn. However, establishing a systematic search strategy, before commencing the literature search, is fundamental to appropriate and successful information retrieval. This planning assists in meeting the requirements of the systematic review and in answering the research question. In developing a search strategy, the scope of the search, its thoroughness and the time available to conduct it, all need to be considered. The aim is to ensure that the systematic review of reviews is comprehensive, thorough and objective. Conducting a systematic review of reviews highlights the usefulness of bringing together a summary of reviews in one place, where there is more than one review on an important topic. The methods described here should help clinicians to review and appraise published reviews systematically, and aid evidence-based clinical decision-making [56].

INTEGRATIVE REVIEW

Integrative review is the most comprehensive methodological approach of reviews, and it allows including experimental and non-

experimental studies to fully understand the phenomenon analyzed. It also combines data from theoretical and empirical literature, and has a wide range of purposes, such as definition of concepts, review of theories and evidence, and analysis of methodological problems of a particular topic [57].

An integrative review is a specific review method that summarizes past empirical or theoretical literature to provide a more comprehensive understanding of a particular phenomenon or healthcare problem. Integrative reviews, thus, have the potential to build nursing science, informing research, practice, and policy initiatives. Well-done integrative reviews present the state of the science, contribute to theory development, and have direct applicability to practice and policy. The integrative review contributes to the presentation of varied perspectives on a phenomenon of concern and has been advocated as important to nursing science and nursing practice. However, the complexity inherent in combining diverse methodologies can contribute to lack of rigor, inaccuracy, and bias. Integrative reviews are the broadest type of research review methods allowing for the simultaneous inclusion of experimental and non-experimental research in order to more fully understand a phenomenon of concern. Integrative reviews may also combine data from the theoretical as well as empirical literature. In addition, integrative reviews incorporate a wide range of purposes: to define concepts, to review theories, to review evidence, and to analyze methodological issues of a particular topic [58].

CRITICAL REVIEW

A critical review is the summarization and evaluation of the ideas and information in an article. It expresses the writer's (your) point of view in the light of what you already know on the subject and what is acquired from related texts. Reviewing critically means thinking carefully and clearly and taking into consideration both the strengths and weaknesses in the material under review. Two skills are employed to write a critical review: seeking information (scanning the literature efficiently to become well-informed on the subject and reviewing effectively (questioning the information in the text and presenting an evaluation, or judgment, of it) [59].

Efficient critical reviewing, or evaluating, requires an awareness of the gist (central idea), the purpose and the intended audience of the text. The text is looked at from a variety of perspectives (from related sources) and evaluated in relation to the theories, approaches and frameworks of the expected task. This evaluation involves analyzing the content and concepts of the text, separating them into their main components, and then understanding how these interrelate, connect and influence each other. A critical review is generally one to four pages in length and is structured [60].

MIXED STUDIES REVIEWS

Mixed studies review is a literature review approach in which qualitative, quantitative and mixed method studies are systematically identified, selected, appraised, and synthesized. The topic of mixed-methods systematic reviews arises directly from engaging with decision makers to try to produce more relevant research. Although systematic reviews are a key method for closing the gap between research and practice, they have not always proved to be that useful. The work being done with mixed-methods reviews is an effort to address this issue and make systematic reviews more relevant. By including other forms of evidence from different types of research, mixed-methods reviews try to maximize the findings—and the ability of those findings to inform policy and practice. Integrating qualitative evidence into a systematic review can enhance its utility and impact [61].

There are three ways in which the reviews are mixed viz. (i) The types of studies included in the review are mixed; hence, the types of findings to be synthesized are mixed, (ii) The synthesis methods used in the review are mixed—statistical meta-analysis and qualitative and (iii) The review uses two modes of analysis—theory building and theory testing [62].

UMBRELLA REVIEWS

With the increased number of systematic reviews available, a logical and appropriate next step has been the conduct of reviews of existing systematic reviews, allowing the findings of separate reviews to be compared and contrasted, thereby providing decision makers in healthcare with the evidence they need. Reviews of systematic reviews

are referred to by several different names in the scientific literature, including umbrella reviews, overviews of reviews, reviews of reviews, a summary of systematic reviews and also a synthesis of reviews. Irrespective of their name, all of these types of reviews have a defining feature in common: a systematic review is the principal and often sole 'study type' that is considered for inclusion [63].

In this study, the review of existing systematic reviews and meta-analyses will be referred to as an umbrella review. The term research synthesis is also used to encompass study types, systematic reviews and meta-analyses, throughout this study. The principle reason for the conduct of an umbrella review is to summarize the evidence from multiple research syntheses. Conduct of an umbrella review may also offer a means for a rapid review of the evidence to address a broad and high-quality evidence base in relation to a topic. Umbrella reviews are conducted to provide an overall examination of the body of information that is available for a given topic, and to compare and contrast the results of published systematic reviews. The wide picture obtainable from the conduct of an umbrella review is ideal to highlight whether the evidence base around a topic is consistent or contradictory, and to explore the reasons for the findings [63].

The aim of an umbrella review is not to repeat the searches, assessment of study eligibility, assessment of risk of bias or meta-analyses from the included reviews, but rather to provide an overall picture of findings for particular questions or phenomenon. For example, compared with a systematic review or meta-analysis limited to one treatment comparison, an umbrella review can provide a broader picture of many treatments. This is more useful to inform guidelines and clinical practice when all of the management options need to be considered. The objective of the umbrella review will determine whether the review will include analyses of different interventions for the same condition or investigation of the same intervention and condition, but where different syntheses address and report on different outcomes. Furthermore, a reviewer may wish to summarize more than one research synthesis for different conditions or populations. The growth in the number of systematic reviews has been in part fueled by the development of review methodologies to answer questions of 'how' and 'why' interventions do or do not work, and how recipients of the intervention may experience them rather than being focused on the effectiveness of interventions [64].

TYPES OF RESEARCH EXPERIMENTS

- **Pre and Post test Design** - For many true experimental designs, pretest-posttest designs are the preferred method to compare participant groups and measure the degree of change occurring as a result of treatments or interventions. Pretest-posttest designs grew from the simpler posttest only designs, and address some of the issues arising with assignment bias and the allocation of participants to groups. Pretest-posttest designs are an expansion of the posttest only design with nonequivalent groups, one of the simplest methods of testing the effectiveness of an intervention. With pretest being the test conducted before the experiment or study, post test is the test conducted after the study or experiment and the difference between the results on pre and post tests are studied to see the effect of treatment and change. Statistical analysis can then determine if the intervention had a significant effect. Pre and post designs are of various types depending upon the nature of study- only posttest design, two group design and others [65].

The main problem with this design is that it improves internal validity but sacrifices external validity to do so. There is no way of judging whether the process of pre-testing actually influenced the results because there is no baseline measurement against groups that remained completely untreated. The other major problem, which afflicts many sociological and educational research programs, is that it is impossible and unethical to isolate all of the participants completely [66].

- **Case Control Study** - The case control study uses groups of patients stricken with a disease and compares them with a control group of patients not suffering symptoms. Medical records and interviews are used to try to build up a historical picture of the patient's life, allowing cross-reference between patients and statistical analysis. Any trends can then be highlighted and action can be taken. Statistical analysis allows the researcher to draw a conclusion about whether a certain situation or exposure led to the medical condition. For example, a scientist could compare a group

of coal miners suffering from lung cancer with those clear of the disease, and try to establish the underlying cause. If the majority of the cases arose in collieries owned by one company, it might indicate that the company's safety equipment and procedures were at fault. Possibly the most famous case control study using this method was a study into whether bicycle helmets reduce the chance of cyclists receiving bad head injuries in an accident. Obviously, the researcher could not use standard experimentation and compare a control group of non-helmet wearers with helmet wearers, to measure the chances of head injury, as this would be unethical. The main weakness of the case control study is that it is very poor at determining cause and effect relationships [67-68].

- **Randomization** - Randomization is the process by which each subject has the same chance of being assigned to either intervention or control. Neither the subject nor the investigator should know the treatment assignment before the subject's decision to enter the study. This removes investigator bias which is a systematic error, or 'difference between the true value and that actually obtained due to all causes other than sampling variability'. Randomization tends to produce groups that are comparable with respect to known or unknown risk factors, guarantees the validity of statistical tests. Thus, it prevents the selection bias and insures against the accidental bias. It produces the comparable groups and eliminates the source of bias in treatment assignments. Finally, it permits the use of probability theory to express the likelihood of chance as a source for the difference of end outcome. There are several methods for making random treatment assignments. Many attempt to balance treatment groups over time, over stratification factors, or both. Randomization ensures that each patient has an equal chance of receiving any of the treatments under study, generate comparable intervention groups, which are alike in all the important aspects except for the intervention each group receives. It also provides a basis for the statistical methods used in analyzing the data. The basic benefits of randomization are as follows: it eliminates the selection bias, balances the groups with respect to many known and unknown confounding or prognostic variables, and forms the basis for statistical tests, a basis for an assumption of free statistical test of the equality of treatments. In general, a randomized experiment is an essential tool for testing the efficacy of the treatment [69-70].

ARCHIVAL RESEARCH

An archive is any collection of records. Traditional archives include library records, courthouse records, and business records. Most archives are valuable so pains are taken to keep them safe.. Archival research is a type of primary research which involves seeking out and extracting evidence from original archival records. Archival data are collected for a variety of reasons These records may be held either in institutional archive repositories, or in the custody of the organization (whether a government body, business, family, or other agency) that originally generated or accumulated them, or in that of a successor body [71].

It is another type of observational method that is commonly associated with qualitative data. Archival research is data collected by someone other than the researcher but serves as important complementary data that supports a study. Statistical records, survey archives, and written and mass communication records are examples of archival research and are unobtrusive measures as well. Archival research is generally more complex and time-consuming than library and internet research, presenting challenges in identifying, locating and interpreting relevant documents. Archival records are often unique, and the researcher must be prepared to travel to reach them. Some finding aids to archival documents are hosted online, but many more are not, and some records lack any kind of finding aid at all. Although most archive repositories welcome researchers, and have professional staff tasked with assisting them, the sheer quantity of records means that finding aids may be of only limited usefulness: the researcher will need to hunt through large quantities of documents in search of material relevant to his or her particular enquiry. Some records may be closed to public access for reasons of confidentiality; and others may be written in archaic handwriting, in ancient or foreign languages, or in technical terminology. Archival documents were generally created for immediate practical or administrative purposes, not for the benefit of future researchers, and additional contextual research may be necessary to make sense of them [72].

FIXED VERSUS FLEXIBLE RESEARCH

In fixed designs, the design of the study is fixed before the main stage of data collection takes place. Fixed designs are normally theory driven; otherwise it is impossible to know in advance which variables need to be controlled and measured. Often, these variables are measured quantitatively.

Flexible designs allow for more freedom during the data collection process. One reason for using a flexible research design can be that the variable of interest is not quantitatively measurable, such as culture. In other cases, theory might not be available before one starts the research. An example of flexible research designs is Grounded theory research which is a systematic research process that works to develop "a process, and action or an interaction about a substantive topic" [73].

QUANTITATIVE VERSUS QUALITATIVE RESEARCH

Quantitative research is considered to have as its main purpose the quantification of data. This allows generalizations of results from a sample to an entire population of interest and the measurement of the incidence of various views and opinions in a given sample. Yet, quantitative research is not infrequently followed by qualitative research which then aims to explore select findings further.

Qualitative research is considered to be particularly suitable for gaining an in-depth understanding of underlying reasons and motivations. It provides insights into the setting of a problem. At the same time, it frequently generates ideas and hypotheses for later quantitative research.

The main differences between quantitative and qualitative research consist in respect to data sample, data collection, data analysis, and last but not least in regard to outcomes [74].

CONFIRMATORY VERSUS EXPLORATORY RESEARCH

Confirmatory research tests a priori hypotheses—outcome predictions that are made before the measurement phase begins. Such a priori hypotheses are usually derived from a theory or the results of previous studies. Exploratory research on the other hand seeks to generate a posteriori hypotheses by examining a data-set and looking for potential relations between variables. It is also possible to have an idea about a relation between variables but to lack knowledge of the direction and strength of the relation. If the researcher does not have any specific hypotheses beforehand, the study is exploratory with respect to the variables in question (although it might be confirmatory for others). The advantage of exploratory research is that it is easier to make new discoveries due to the less stringent methodological restrictions. Here, the researcher does not want to miss a potentially interesting relation and therefore aims to minimize the probability of rejecting a real effect or relation, this probability is sometimes referred to as β . In other words, if you want to see whether some of your measured variables could be related, you would want to increase your chances of finding a significant result by lowering the threshold of what you deem to be significant [75].

STATE PROBLEMS VERSUS PROCESS PROBLEMS

A distinction can be made between state problems and process problems. State problems aim to answer what the state of a phenomenon is at a given time, while process problems deal with the change of phenomena over time. An example of state problems is the types of failure in a communication system. An example of process problems is the build-up of packet queue under a particular communication scenario. State problems are easier to measure than process problems. State problems just require one measurement of the phenomena of interest, while process problems always require multiple measurements [76].

EXPERIMENTAL VERSUS NON-EXPERIMENTAL RESEARCH

In a good experimental design, a few things are of great importance. First of all, it is necessary to think of the best way to operationalize the variables that will be measured. Therefore, it is important to consider how the variable(s) will be measured, as well as which methods would be most appropriate to answer the research question. In addition, the statistical analysis has to be taken into account. The researcher should consider what the expectations of the study are as well as how to analyze this outcome. Finally, in an experimental design the researcher must think of the practical limitations including the availability of data-set or experimental set-up that are representative of the real

situations. It is important to consider each of these factors before beginning the experiment. Non-experimental research designs do not involve a manipulation of the situation, circumstances or experience of the participants [77].

CORRELATION STUDIES

Correlation does not imply causation, and rather identifies dependence of one variable on another. Correlational designs are helpful in identifying the relation of one variable to another, and seeing the frequency of co-occurrence in two natural groups. There are three types of correlations that are identified—[78-79]

1. **Positive correlation** – Positive correlation between two variables is when an increase in one variable leads to an increase in the other and a decrease in one leads to a decrease in the other. For example, the amount of money that a person possesses might correlate positively with the number of cars he owns.
2. **Negative correlation** – Negative correlation is when an increase in one variable leads to a decrease in another and vice versa. For example, the level of education might correlate negatively with crime. This means if by some way the education level is improved in a country, it can lead to lower crime. Note that this doesn't mean that a lack of education causes crime. It could be, for example, that both lack of education and crime have a common reason: poverty.
3. **No correlation** – Two variables are uncorrelated when a change in one doesn't lead to a change in the other and vice versa. For example, among millionaires, happiness is found to be uncorrelated to money. This means an increase in money doesn't lead to happiness.

A correlation coefficient is usually used during a correlational study. It varies between +1 and -1. A value close to +1 indicates a strong positive correlation while a value close to -1 indicates strong negative correlation. A value near zero shows that the variables are uncorrelated. It is very important to remember that correlation doesn't imply causation and there is no way to determine or prove causation from a correlational study. This is a common mistake made by people in almost all spheres of life.

COMPARITIVE RESEARCH

The second type is **comparative research**. These designs compare two or more groups on one or more variable, such as the effect of gender on grades. Comparative research, simply put, is the act of comparing two or more things with a view to discovering something about one or all of the things being compared. This technique often utilizes multiple disciplines in one study. When it comes to method, the majority agreement is that there is no methodology peculiar to comparative research. The multidisciplinary approach is good for the flexibility it offers, yet comparative programs do have a case to answer against the call that their research lacks a seamless whole [80].

There are certainly methods that are far more common than others in comparative studies, however. Quantitative analysis is much more frequently pursued than qualitative, and this is seen by the majority of comparative studies which use quantitative data. The general method of comparing things is the same for comparative research as it is in our everyday practice of comparison. Like cases are treated alike, and different cases are treated differently; the extent of difference determines how differently cases are to be treated. If one is able to sufficiently distinguish two carry the research conclusions will not be very helpful. Secondary analysis of quantitative data is relatively widespread in comparative research. Comparative research can take many forms. Two key factors are space and time. Spatially, cross-national comparisons are by far the most common, although comparisons within countries, contrasting different areas, cultures or governments also subsist and are very constructive. Recurrent interregional studies include comparing similar or different countries or sets of countries, comparing one's own country to others or to the whole world [81].

LONGITUDINAL DESIGN RESEARCH

The third type of non-experimental research is a **longitudinal design**. A longitudinal design examines variables such as performance exhibited by a group or groups over time. A longitudinal study is observational research performed over a period of years or even decades.

Longitudinal studies allow social scientists and economists to study

long-term effects in a human population. A cohort study is a subset of the longitudinal study because it observes the effect on a specific group of people over time. Quite often, a longitudinal study is an extended case study, observing individuals over long periods, and is a purely qualitative undertaking [82].

Longitudinal research is used to discover relationships between variables that are not related to various background variables. This observational research technique involves studying the same group of individuals over an extended period. Data is first collected at the outset of the study, and may then be repeatedly gathered throughout the length of the study.

They are observational in nature and are a type of correlational research. Longitudinal research is often contrasted with cross-sectional research, but longitudinal research involves collecting data over an extended period, often years or even decades. Cross-sectional research involves collecting data at a single point in time [83].

The benefit of this type of research is that it allows researchers to look at changes over time. Because of this, longitudinal methods are particularly useful when studying development and lifespan issues. Researchers can then look at what the participants have in common versus where they differ to see which characteristics are more strongly influenced by either genetics or experience. As longitudinal studies take place over a period of years (or even decades), they can be very useful when looking at changes in development over time. Researchers can utilize this kind of research to establish a sequence of events when looking at the aging process. However, longitudinal studies require enormous amounts of time and are often quite expensive. Because of this, these studies often have only a small group of subjects, which makes it difficult to apply the results to a larger population. Another problem is that participants sometimes drop out of the study, shrinking the sample size and decreasing the amount of data collected [84].

Types of Longitudinal Research - there are three major types of longitudinal studies viz. [85]

- **Panel Study** – Involves sampling a cross-section of individuals.
- **Cohort Study** – Involves selecting a group based on a specific event such as birth, geographic location or historical experience.
- **Retrospective Study** – Involves looking to the past by looking at historical information such as medical records.

QUALITATIVE METHODS IN PSYCHOLOGY

Qualitative research allows investigators to develop a deeper understanding of a topic than can be obtained through quantitative research alone. Qualitative research uses methodologies such as focus groups, in-depth interviews, and direct observation so researchers can investigate stakeholders' attitudes, beliefs, and preferences – the how and why of decision-making. Qualitative research methods provide an opportunity for a systematic, in-depth evaluation of a question that may not be easily answered through quantitative methods. Furthermore, these methods can add to quantitative results through explanations and clarifications with the target population [86].

There are three most common Qualitative methods of Research employed in conducting studies, and are enumerated as below –

PARTICIPANT OBSERVATION STUDIES

Participant-observation is one of the key research methods in anthropology. It is often used by socio-cultural anthropologists, and other academics, in attempt to thoroughly understand the various aspects of a culture. Participant-observation is a method where researchers choose to live directly in the cultural group they are studying. By living and immersing oneself within a culture for a long period of time, participant-observation allows anthropologists to get deeper into the complexity of culture. Participant-observation is a type of field research that produces qualitative data. It can involve note-taking, interviewing, and journaling about experiences in a different cultural group. Often researchers choose different theoretical approaches to guide the type of information they're interested in, but participant-observation is largely a holistic study—meaning it considers all aspects of a culture to be interrelated and relevant. There are different types of participant-observation that researchers can undertake. In some situations, the researcher chooses and requests to play an active role in that culture—including living with a local family, participating in cultural rituals and activities, speaking the language,

and much more [87].

While this type of participant-observation allows researchers to delve deeper into a culture by forming relationships, it could potentially entail less objective results, since the researcher is emotionally invested in the culture and its people. In contrast, a less involved type of participant observation would include simply being a bystander in the culture in question. This allows for a more objective approach, yet individuals may be more hesitant to answer questions—creating a less in-depth study. Limitations of participant observation include that it can be difficult to get time / privacy for recording. For example, with covert observations researchers can't take notes openly as this would blow their cover. This means they have to wait until they are alone and reply on their memory. This is a problem as they may forget details and are unlikely to remember direct quotations [88].

INDEPTH INTERVIEWS

In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation. In-depth interviews are useful when one wants detailed information about a person's thoughts and behaviors or wants to explore new issues in depth. Interviews are often used to provide context to other data (such as outcome data), offering a more complete picture of what happened in the program and why [89].

In-depth interviews should be used in place of focus groups if the potential participants may not be included or comfortable talking openly in a group, or when one wants to distinguish individual (as opposed to group) opinions about the program. They are often used to refine questions for future surveys of a particular group.

The primary advantage of in-depth interviews is that they provide much more detailed information than what is available through other data collection methods, such as surveys. They also may provide a more relaxed atmosphere in which to collect information— people may feel more comfortable having a conversation with you about their program as opposed to filling out a survey. However, there are a few limitations and pitfalls, each of which is described below. These interviews are prone to bias- the respondent may say socially desirable things merely for the sake of 'proving' or being in good light. Responses from community members and program participants could also be biased due to their role or for a number of other reasons. Every effort should be made to design a data collection effort, create instruments, and conduct interviews to allow for minimal bias [90].

In depth interviews are time-intensive: Interviews can be a time-intensive evaluation activity because of the time it takes to conduct interviews, transcribe them, and analyze the results. Interviewer must be appropriately trained in interviewing techniques to provide the most detailed and rich data from an interviewee. They must also be sure to use effective interview techniques, such as avoiding yes/no and leading questions, using appropriate body language, and keeping their personal opinions in check. It is not a generalized technique because in-depth interviews are conducted, generalizations about the results are usually not able to be made because small samples are chosen and random sampling methods are not used [91].

FOCUS GROUPS

Focus groups share many common features with less structured interviews, but there is more to them than merely collecting similar data from many participants at once. A focus group is a group discussion on a particular topic organized for research purposes. This discussion is guided, monitored and recorded by a researcher (sometimes called a moderator or facilitator) [92].

Focus groups are used for generating information on collective views, and the meanings that lie behind those views. They are also useful in generating a rich understanding of participants' experiences and beliefs. Suggested criteria for using focus groups include –As a standalone method, for research relating to group norms, meanings and processes

- In a multi-method design, to explore a topic or collect group language or narratives to be used in later stages
 - To clarify, extend, qualify or challenge data collected through other methods
 - To feedback results to research participants.
- The composition of a focus group needs great care to get the best

quality of discussion. There is no 'best' solution to group composition, and group mix will always impact on the data, according to things such as the mix of ages, sexes and social professional statuses of the participants. What is important is that the researcher gives due consideration to the impact of group mix (eg, how the group may interact with each other) before the focus group proceeds [93].

Interaction is the key to a successful focus group. Sometimes this means a pre-existing group interacts best for research purposes, and sometimes stranger groups. Pre-existing groups may be easier to recruit, have shared experiences and enjoy a comfort and familiarity which facilitates discussion or the ability to challenge each other comfortably. Group size is an important consideration in focus group research. Small groups risk limited discussion occurring, while large groups can be chaotic, hard to manage for the moderator and frustrating for participants who feel they get insufficient opportunities to speak. The venue for a focus group is also important and should, ideally, be accessible, comfortable, private, quiet and free from distractions. Focus groups are usually recorded, often observed (by a researcher other than the moderator, whose role is to observe the interaction of the group to enhance analysis) and sometimes videotaped. At the start of a focus group, a moderator should acknowledge the presence of the audio recording equipment, assure participants of confidentiality and give people the opportunity to withdraw if they are uncomfortable with being taped [94].

NOTE TAKING IN QUALITATIVE RESEARCH

Notes can have many uses in research. Researchers point out that notes are useful when one compares projects as they use them to get an idea of what project to do or not do. Notes are unique to the researcher and they can help in understanding projects in relation to other projects. Notes help to identify what a researcher would like to follow or not follow in the course of the study. They can also help set parameters against which to evaluate possible research ideas. Therefore, even when two people are reviewing the same projects, their notes may not be the same because they may be looking for different things in the projects. Sometimes even when they are looking for the same things, they may differ in what they consider important and essential; thus their notes may be different hence the uniqueness [95].

CHARACTERISTICS OF FIELD NOTES –

- **Be accurate.** You only get one chance to observe a particular moment in time so, before you conduct your observations, practice taking notes in a setting that is similar to your observation site in regards to number of people, the environment, and social dynamics. This will help you develop your own style of dynamically observations quickly and accurately.
- **Be organized.** Taking accurate notes while you are actively observing can be difficult. It is therefore important that you plan ahead how you will document your observation study. Notes that are disorganized will make it more difficult for you to interpret the data.
- **Be descriptive.** Use descriptive words to document what you observe. For example, instead of noting that a classroom appears "comfortable," state that the classroom includes soft lighting and cushioned chairs that can be moved around by the study participants. Being descriptive means supplying yourself with enough factual evidence that you don't end up making assumptions about what you meant when you write the final report.
- **Focus on the research problem.** Since it's impossible to document everything you observe, include the greatest detail about aspects of the research problem and the theoretical constructs underpinning your research; avoid cluttering your notes with irrelevant information.
- **Record insights and thoughts.** As you observe, be thinking about the underlying meaning of what you observe and record your thoughts and ideas accordingly. This will help if you to ask questions or seek clarification from participants after the observation. To avoid any confusion, subsequent comments from participants should be included in a separate, reflective part of your field notes and not merged with the descriptive notes.

VIDEO RECORDINGS IN QUALITATIVE RESEARCH

Video and film have featured in the development of social. Video is increasingly a significant resource for many contemporary social researchers. The increased presence of video in the people's everyday lives as well as institutional practices and public environments means researchers often have access to 'naturally occurring' video data.

Video is increasingly the data collection tool of choice for researchers interested in the multimodal character of social interaction. The use of video has also been expanded by increased access through the low cost of video cameras high quality video facilities on mobile phones, cheap webcams and free easy to use computer applications for editing. The qualities of video differ from any other form of data (recording). It provides a fine-grained multimodal record of an event detailing gaze, expression, body posture, and gesture. It is a sharable, malleable digital record in which all modes are recorded sequentially.

Video can be used in a number of ways for research including participatory video, videography, the use of existing video data, video interviews and elicitation and video based fieldwork. Each of these ways of using video embeds video data in a particular disciplinary history and trajectory of practice and debates about the place of truth, objectivity and subjectivity, and the roles and power of researcher and participant.

Participatory video has an underlying aim to reduce the gap between the concepts and models of researchers and those of individuals and communities by giving participants control of the camera and the process of making their experiences visible. It has parallels with data collection techniques of diary keepers. Participatory video is a process or an intervention in which research participants are provided with access to video recording equipment and training to ensure they can use it in order to document an aspect of their lives.

Videography is an ethnographic approach to video making which often goes hand in hand with participatory video and visual ethnography. It involves a different understanding and focus of video than say workplace studies or traditional observational video studies. It uses video primarily to gather data 'rich nonverbal cues' to stimulate critical reflection rather than as a way to collect observational data or descriptions of phenomena. Videography understands and uses video as a tool to re-orientate the power of the researcher gaze and to give voice to research subjects/participants.

The use of existing videos as data is increasingly common for research to be undertaken with videos that are already available rather than video generated by researchers for research. There are many examples of research re-purposing videos for research including 'home-made' domestic video, broadcast media, automated CCTV recordings and YouTube videos. The repurposing of existing video data, whether it is from an archive, YouTube, or an institutions video database raises many issues that are key for video-based and visual research. Including the need to understand the history of a video, its context of production, its original purpose and audience, and how these factors are embedded in the video as an artifact, as well as what is missing in the video record. Video elicitation can be used alongside interviews or focus groups to prompt a discussion, stimulate recall or provide a basis for reflection. This is usually done by asking teachers to narrate a sequence of video or select a sample for detailed discussion, asking participants to 'call out' what they consider is noteworthy in viewing; 'stopping points' – pausing the video to comment; or developing participants 'selective attention' by focusing on a range of different events that are visible in a video and developing techniques for reasoning about the phenomena that they view on video.

Video elicitation can be a useful way for researchers to validate and cross check their interpretations when working with video of 'naturally occurring' data [95-96].

AUDIO RECORDING IN QUALITATIVE RESEARCH

Technology, recording and transcription of interviews have become a staple of qualitative research. It was not until the 1970s, when portable audio recording could be taken directly into the field, that transcription became a viable method and researchers could analyze, interpret, and report participants' own words.

The process of audio recording, transcribing, and analyzing textual data is the accepted norm. The latest methodological shift has been brought on by the use of video analysis. Video analysis extends the ability of researchers to visit a site by enabling them to virtually re-visit the studied scene repeatedly and as many times as necessary, gaining greater insight and interpretation of transpired events.

Researchers can either take notes during their interviews (transcribing) or observations, or take a recording, or they may using a tape recorder.

In audio recording, the researcher can concentrate and listen and respond better, the discussion flows better when there are no distractions, in note taking there is an increased risk of the researcher being more subjective, the entire interview/observation is recorded, which gives a better, more holistic picture of what is going on, the participants may feel less observed if the tape recorded is used in a discreet way and during analysis, the researcher has the opportunity to go back over material.

Ideally, the audio recording of interviews gives an accurate summary of the interview, as all the answers captured during the interview, as well as the comments by the researcher, are saved for reference. The interviewing committee can rewind and listen to them repeatedly to get clarity on the interview. Moreover, the tone, body language, pitch of the voice, speed of the speech etc. can be assessed. The recorded interviews can be used for transcription of the answers, which is necessary for including relevant quotes in the research report.

The disadvantage of audio recording the interviews is that one needs to depend on the equipment and if it fails to function properly then there must be a backup plan. In order to overcome the problems of equipment failure, one can check it beforehand and take note of the important points during the interview. With this, you will be having some record even if the equipment fails. Some interviewers may be nervous of the tape-recorders, which may spoil their performance in the interview. In some interviews, the non-verbal information may be as necessary as the spoken part. Here, audio recording will not be adequate and video recording is necessary [97-98].

TRANSCRIPTS IN QUALITATIVE RESEARCH

Qualitative research in primary care deepens understanding of phenomena such as health, illness and health care encounters. Many qualitative studies collect audio or video data (e.g. recordings of interviews, focus groups or talk in consultation), and these are usually transcribed into written form for closer study. Transcribing appears to be a straightforward technical task, but in fact involves judgments about what level of detail to choose (e.g. omitting non-verbal dimensions of interaction), data interpretation (e.g. distinguishing 'I don't, no' from 'I don't know') and data representation (e.g. representing the verbalization 'hurryuhh' as 'How are you?').

Representation of audible and visual data into written form is an interpretive process which is therefore the first step in analyzing data. Different levels of detail and different representations of data will be required for projects with differing aims and methodological approaches. This article is a guide to practical and theoretical considerations for researchers new to qualitative data analysis. Data examples are given to illustrate decisions to be made when transcribing or assigning the task to others [99].

ADVANTAGES OF QUALITATIVE RESEARCH

- Issues and subjects covered can be evaluated in depth and in detail.
- Interviews are not limited to particular questions and can be redirected or guided by researchers in real time.
- The direction and framework of research can be revised quickly as soon as fresh information and findings emerge.
- The data in qualitative research depends on human experience and this is more compelling and powerful than data gathered through quantitative research.
- Complexities and subtleties about the subjects of the research or the topic covered is usually missed by many positivistic inquiries.
- Data is usually gathered from few individuals or cases therefore findings and outcomes cannot be spread to larger populations. However, findings can be transferred to another setting.
- With this type of research, the researcher has a clear vision on what to expect. They collect data in a genuine effort of plugging data to bigger picture.

SAMPLING

Sampling is the process of choosing a representative sample from a target population and collecting data from that sample in order to understand something about the population as a whole. Sampling means to select a particular group or sample to represent the entire population. Sampling methods are majorly divided into two categories probability sampling and non-probability sampling. In probability sampling every member of the population gets a fair chance of selection which is not in the case with non-probability sampling. Probability sampling is a sampling technique, in which the subjects of

the population get an equal opportunity to be selected as a representative sample. Non-probability sampling is a method of sampling wherein, it is not known that which individual from the population will be selected as a sample [100].

There are several types of non-probability samples that researchers use. These include purposive samples, snowball samples, quota samples, and convenience samples. While the latter two strategies may be used by quantitative researchers from time to time, they are more typically employed in qualitative research, and because they are both non-probability methods, we include them in this section of the chapter.

PURPOSIVE SAMPLING

Purposive sampling, also known as judgmental, selective or subjective sampling, is a type of non-probability sampling technique. It is a sampling technique in which researcher relies on his or her judgment when choosing members of population to participate in the study. To draw a purposive sample, a researcher begins with specific perspectives in mind that he or she wishes to examine and then seeks out research participants who cover that full range of perspectives.

While purposive sampling is often used when one's goal is to include participants who represent a broad range of perspectives, purposive sampling may also be used when a researcher wishes to include only people who meet very narrow or specific criteria [101].

SNOWBALL SAMPLING

Snowball sampling is an especially useful strategy when a researcher wishes to study some stigmatized group or behavior. Snowball sampling is sometimes referred to as chain referral sampling. One research participant refers another, and that person refers another, and that person refers another—thus a chain of potential participants is identified. In addition to using this sampling strategy for potentially stigmatized populations, it is also a useful strategy to use when the researcher's group of interest is likely to be difficult to find, not only because of some stigma associated with the group, but also because the group may be relatively rare [102].

QUOTA SAMPLING

Quota sampling is another non-probability sampling strategy. This type of sampling is actually employed by both qualitative and quantitative researchers, but because it is a non probability method, we'll discuss it in this section. When conducting quota sampling, a researcher identifies categories that are important to the study and for which there is likely to be some variation. Subgroups are created based on each category and the researcher decides how many people (or documents or whatever element happens to be the focus of the research) to include from each subgroup and collects data from that number for each subgroup [103].

CONVENIENCE SAMPLING

Finally, convenience sampling is another non-probability sampling strategy that is employed by both qualitative and quantitative researchers. A convenience sample is made up of people who are easy to reach. To draw a convenience sample, a researcher simply collects data from those people or other relevant elements to which he or she has most convenient access. This method, also sometimes referred to as haphazard sampling, is most useful in exploratory research. It is also often used by journalists who need quick and easy access to people from their population of interest. If you've ever seen brief interviews of people on the street on the news, you've probably seen a haphazard sample being interviewed. While convenience samples offer one major benefit—convenience—we should be cautious about generalizing from research that relies on convenience samples [104].

ACCEPTABLE RECRUITMENT METHODS

In preparing recruitment materials the researcher should consider the purpose of the research, the setting in which the research will be conducted, and be particularly cognizant of the special problems of research involving vulnerable populations, such as children, prisoners, pregnant women, mentally disabled persons, or economically or educationally disadvantaged persons [105]. There may, however, be extenuating circumstances in which one of the methods might not be appropriate for a particular study.

- **Direct recruitment of potential study participants** – With this method considerable care will have to be taken so that the person

contacted does not feel pressured to participate.

- **Recruitment letters** – Ideally the recruitment letter would come from someone or some agency or clinic known to the prospective subject informing the prospective participant about the study. Preferably, the letter would ask the person to call for additional information or if interested in participating in the study or return a post card or send an e-mail. However, there may be situations, for example for large scale low risk studies, in which it would be acceptable to ask the person to opt out if not interested or when contacted by phone or e-mail or in person. The recruitment letter can be brief but it should include information about how the person was identified to be sent the letter, what is involved if the person participates and an overview of any risks or potential benefits. It should also let the person know how to inform someone if he or she wants to participate, not to participate, or where to get answers to additional questions, and, of course, who is doing the study and why.
- **Random or other probability sampling** – This could include snowball sampling, random digit dialing, or other methods used primarily in the social and behavioral sciences.
- **Referrals** – Referrals may be from non-investigator healthcare providers, snowball sampling, participants referring other participants.
- **Participant Pool** – These are pools for which potential research participants have given permission for future contact.
- Review of medical records to identify potential research participants
- Review of publicly available records.
- Review of other records.

The following elements should be included in recruitment materials that you distribute – [106]

- **The word “research.”** Participants need to know that they are responding to a research study, not to a promise for free treatment or payment.
- **A general description of the purpose of the study.** Potential participants should have a basic idea of what the study entails. This information does not need to be detailed, but it should be explained in layman's terms. Where possible, include information about what participants will do and the time required of the participant.
- **Details on how to enroll.** It will be difficult for participants to enroll if they don't have your contact information.
- **Inclusion/ Exclusion criteria (where appropriate).** You may be looking for a participant with certain criteria, or there may be reasons why a participant would not be eligible to participate. Including this information in your recruitment materials will prevent wasting the ineligible participant's time and yours.

You may include the following –

- **Payment incentives.** You can inform participants that you are including an incentive for participation, but this should not be the emphasis of the advertisement, letter, email, etc.
- **Benefits.** This can be a tricky element to include and generally the Board will not allow it. A benefit to an individual must be something that the researcher can guarantee. If you are offering a treatment, for example, that is recognized and known to be beneficial, this can be considered a benefit. A “potential benefit,” however, is not guaranteed and is not allowed on recruitment materials.

The following elements should not be included in your recruitment – [107]

- **Misleading information.** Recruitment materials should never lead a participant to believe in something that is untrue about a study. For studies where deception is involved, the recruitment materials should not be a part of the deception. The Board recognizes that it is important in a deception study (and other similar studies) not to bias participants by providing full disclosure; however, the participants should be provided with true information that will help them to make the right decision about their participation.
- **Overemphasis of payment incentives.** The title of an advertisement should never be “Free Money!” or “Easy Cash!” Instead, payment information should be clearly described at the bottom of the advertisement after the purpose of the study is described. Such payment should not be bolded or otherwise emphasized.

Difference Between Qualitative And Quantitative Methods [108]

Qualitative Methods	Quantitative Methods
Methods include focus groups, in-depth interviews, and reviews of documents for types of themes	Surveys, structured interviews & observations, and reviews of records or documents for numeric information
Primarily inductive process used to formulate theory or hypotheses	Primarily deductive process used to test pre-specified concepts, constructs, and hypotheses that make up a theory
More subjective: describes a problem or condition from the point of view of those experiencing it	More objective: provides observed effects (interpreted by researchers) of a program on a problem or condition
Text-based	Number-based
More in-depth information on a few cases	Less in-depth but more breadth of information across a large number of cases
Unstructured or semi-structured response options	Fixed response options
No statistical tests	Statistical tests are used for analysis
Can be valid and reliable: largely depends on skill and rigor of the researcher	Can be valid and reliable: largely depends on the measurement device or instrument used
Time expenditure lighter on the planning end and heavier during the analysis phase	Time expenditure heavier on the planning phase and lighter on the analysis phase
Less generalizable	More generalizable

VALID INFORMED CONSENT

Informed consent is so important that in the 9th revision of the American Psychological Association's Ethical Code it has its own section, 8.02. And, no, you won't be tested on that exact detail. However, it is worth mentioning because informed consent has its own dedicated section. It is that important. Informed consent provides participants with sufficiently detailed information on the study so that they can make an informed, voluntary and rational decision to participate [109].

This includes:

- The purpose of the study
- Expected duration
- Procedures of the study
- Information on their right to decline or withdraw
- Foreseeable consequences of withdrawing or declining
- Potential risk, discomfort or adverse effects
- Prospective research benefits
- Incentives, such as payment or rewards
- Whom to contact for questions

Lastly, as part of obtaining informed consent, a researcher must allow time for questions the participants might have. The answers should provide sufficient information without compromising the study. We will discuss how convoluted this gets with deceptive studies in a second.

All of the previously mentioned aspects must be provided to participants before they are entered into the study. Informed consent must be either documented by written consent or by oral consent in language that is reasonably understandable. Most researchers use a written form that the participants sign and date because there might be problems later on. One can never really predict the future and written proof is valuable in the courtroom setting.

Informed consent is a process for getting permission before conducting a healthcare intervention on a person. A health care provider may ask a patient to consent to receive therapy before providing it, or a clinical researcher may ask a research participant before enrolling that person into a clinical trial. Informed consent is collected according to guidelines from the fields of medical ethics and research ethics [110].

An informed consent can be said to have been given based upon a clear appreciation and understanding of the facts, implications, and consequences of an action. Adequate informed consent is rooted in

respecting a person's dignity.[1] To give informed consent, the individual concerned must have adequate reasoning faculties and be in possession of all relevant facts. Impairments to reasoning and judgment that may prevent informed consent include basic intellectual or emotional immaturity, high levels of stress such as PTSD or a severe intellectual disability, severe mental illness, intoxication, severe sleep deprivation, Alzheimer's disease, or being in a coma.

Some acts can take place because of a lack of informed consent. In cases where an individual is considered unable to give informed consent, another person is generally authorized to give consent on his behalf, e.g., parents or legal guardians of a child (though in this circumstance the child may be required to provide informed assent) and conservators for the mentally ill.

In cases where an individual is provided insufficient information to form a reasoned decision, serious ethical issues arise. Such cases in a clinical trial in medical research are anticipated and prevented by an ethics committee or Institutional Review Board.

Informed Consent Form Templates can be found on the World Health Organization Website for practical use. The process of informed consent is at the very heart of ethical research practice and underpins the design and management of research and clinical trials. Informed consent is essential to protect the rights and safety of patients in research and is the major consideration when ethical and institutional approvals are granted prior to studies being undertaken [111].

How To Write A Research Question And Hypothesis

A Research Question is a statement that identifies the phenomenon to be studied. For example, 'What resources are helpful to new and minority drug abuse researchers?'

To develop a strong research question from your ideas, you should ask yourself these things:

- Do I know the field and its literature well?
- What are the important research questions in my field?
- What areas need further exploration?
- Could my study fill a gap? Lead to greater understanding?
- Has a great deal of research already been conducted in this topic area?
- Has this study been done before? If so, is there room for improvement?
- Is the timing right for this question to be answered? Is it a hot topic, or is it becoming obsolete?
- Would funding sources be interested?
- If you are proposing a service program, is the target community interested?
- Most importantly, will my study have a significant impact on the field?

A strong research idea should pass the "so what" test. Think about the potential impact of the research you are proposing. What is the benefit of answering your research question? Who will it help (and how)? A research focus should be narrow, not broad-based. For example, 'What can be done to prevent substance abuse?' is too large a question to answer. It would be better to begin with a more focused question. A well-thought-out and focused research question leads directly into your hypotheses. What predictions would you make about the phenomenon you are examining? This will be the foundation of your application [112].

Hypotheses are more specific predictions about the nature and direction of the relationship between two variables. Strong hypotheses:

- Give insight into a research question;
- Are testable and measurable by the proposed experiments;
- Spring logically from the experience of the staff;

Normally, no more than three primary hypotheses should be proposed for a research study. A proposal that is hypothesis-driven is more likely to be funded than a "fishing expedition" or a primarily descriptive study.

Make sure to –

- Provide a rationale for your hypotheses—where did they come from, and why are they strong?
- Provide alternative possibilities for the hypotheses that could be

tested—why did you choose the ones you did over others?

If you have good hypotheses, they will lead into your Specific Aims. *Specific aims* are the steps you are going to take to test your hypotheses and what you want to accomplish in the course of the grant period.

Make sure –

- Your objectives are measurable and highly focused;
- Each hypothesis is matched with a specific aim.
- The aims are feasible, given the time and money you are requesting in the grant.

Long-Term Goals –

- Why are you doing this research?
- What are the long-term implications?
- What will happen after the grant?
- What other avenues are open to explore?
- What is the ultimate application or use of the research?

These questions all relate to the long-term goal of your research, which should be an important undercurrent of the proposal. Again, they should be a logical extension of the research question, hypotheses, and specific aims.

It is also helpful to have a long-term plan for your own career development.

FINER criteria for a good research question [113]

F	Feasible	<ul style="list-style-type: none"> • Adequate number of subjects • Adequate technical expertise • Affordable in time and money • Manageable in scope
I	Interesting	• Getting the answer intrigues investigator, peers and community
N	Novel	• Confirms, refutes or extends previous findings
E	Ethical	• Amenable to a study that institutional review board will approve
R	Relevant	<ul style="list-style-type: none"> • To scientific knowledge • To clinical and health policy • To future research

PICOT criteria [114]

P	Population (patients)	What specific patient population are you interested in?
I	Intervention (for intervention studies only)	What is your investigational intervention?
C	Comparison group	What is the main alternative to compare with the intervention?
O	Outcome of interest	What do you intend to accomplish, measure, improve or affect?
T	Time	What is the appropriate follow-up time to assess outcome

GOOD VS BAD HYPOTHESIS [115]

Hypotheses Tips –

- **The question comes first.** Before you make a hypothesis, you have to clearly identify the question you are interested in studying.
- **A hypothesis is a statement, not a question.** Your hypothesis is not the scientific question in your project. The hypothesis is an educated, testable prediction about what will happen.
- **Make it clear.** A good hypothesis is written in clear and simple language. Reading your hypothesis should tell a teacher or judge exactly what you thought was going to happen when you started your project.
- **Keep the variables in mind.** A good hypothesis defines the variables in easy-to-measure terms, like who the participants are, what changes during the testing, and what the effect of the changes will be.
- **Make sure your hypothesis is "testable."** To prove or disprove your hypothesis, you need to be able to do an experiment and take measurements or make observations to see how two things (your variables) are related. You should also be able to repeat your experiment over and over again, if necessary.

To create a "testable" hypothesis make sure you have done all of these things:

- Thought about what experiments you will need to carry out to do

the test.

- Identified the variables in the project.
- Included the independent and dependent variables in the hypothesis statement. (This helps ensure that your statement is specific enough.
- **Do your research.** You may find many studies similar to yours have already been conducted. What you learn from available research and data can help you shape your project and hypothesis.
- **Interest is important.** It is an important for you as a researcher to have interest in the topic or issue that you are hypothesizing and proposing to study. A steady interest helps build stronger research.
- **Competence.** It is also important for you, as a researcher to have enough knowledge about the subject of research. Also, expert suggestions and guidance is necessary to carry out meaningful and rich data based research.
- **Context should be kept in mind.** The context of research is built in hypothesis. It must be remembered throughout the process of research.

Good empirical hypotheses are- testable, internally coherent and elegant, simpler and/or more powerful / more general than competing hypotheses, make predictions that are surprising and come true (if they are predictive), raise new questions and hypotheses and have a high degree of falsifiability/risk. Bad hypotheses cannot be tested, cannot be operationalized, have unjustified assumptions, neglect relevant variables, bring little added value [116].

CONCLUSIONS

Doing research in psychology is a complex task. It involves a lot of thinking and critical analysis prior to the start of research, lot of hard work while carrying out the project and it needs dedication, discipline and determination to see it through from start to end. One may start with simple research projects first and get a knowhow of psychological research before moving on to complex research. Psychological research is a time effort and we need teams that build as we go along for research to be fruitful.

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