Fundamentals

of

Research Methodology

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Dr. Jayanta Kumar Nayak
Dr. Priyanka Singh

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***Fundamentals of Research Methodology:* Problems and Prospects**

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Preface

As a teacher of anthropological research at graduate and post graduate levels and as a supervisor of M. Phil. and Ph. D. dissertation; my students always encouraged me to write a research methodology text book which will be conceptual in nature and will cover fundamental aspects of all topics related to research methodology. Students' constant request and encouragement and also inspiration from my colleagues from Anthropology and other subjects, I started writing this book. Writing a text book single handed with busy schedule of daily teaching and research activities are really a herculean task. For completing this work, I needed the help of my co-author. With her support, we are able to complete this text book entitled "Fundamentals of Research Methodology –Issues and Concerns".

There are no anthropological or sociological or psychological methods. The questions we ask about the human condition may differ across the social sciences, but methods belong to all subjects. As you go through this book, you will learn about methods that were developed in other fields as well as methods that were developed in anthropology. So this book will be very much useful for students and research scholars of any discipline who want to study research methodology either in under-graduate, graduate, post graduate and research level. The book will help the reader to understand research methods and also utilize this knowledge for their research work.

Many authors have explained that the design of research has to undergo many changes and modifications as the study progresses and insights into it deepen. As a result, every researcher ends up with a research design of his own having his own methodological strategies.

This book includes 27 chapters as main body part and Bibliography as supplementary part. Chapter-1 basically tries to explain about what is research and to create a perception about research. Chapter-2 explains science and scientific research. It introduces new terms like ontology, epistemology, positivism, anti-positivism, post-positivism, critical theory, empiricism and rationalism, etc.

Chapter-3 cracks to develop the readers' research thinking skill. This chapter introduces the vocabulary of research. There is a lot of jargon, but it is the good kind. Important concepts deserve words of their own and this chapter is full of important concepts like constructs, variables, reliability, validity, level of measurement, etc. Chapter- 4 bashes to generate some key questions in the mind of readers for preparing her/his research such as what is to be studied, when to study, where to study, and how to study? This chapter also tries to explain different steps of research.

Chapter- 5 is divided into two parts. In the first part it explains about different sources for research literatures and in the second part it strains to explain about how to review the literature and how to make synthesis from the available research literatures.

Chapter- 6 attempts to explain the readers about what is hypothesis and how to formulate good research hypothesis. Chapter- 7 attempts to explain about different aspect of research design such as survey research design and experimental research design. In addition to conceptual explanation on different types of research design, elaborate explanation given on case-control and cohort study design. Chapter- 8 stabs different sampling techniques followed for different nature of research.

In chapter- 9 and chapter- 10, two basic research tools such as questionnaires and schedule are explained. In these chapters both advantages and disadvantages of these tools and basic difference among these tools are also explained.

Chapter- 11 is a combination of tools and techniques. In it different scaling techniques are explained. Also about different research scales, and when these scales are implemented in research for data collection are explained.

Chapter- 12 and chapter- 13 attempt to shade light on two different research techniques such as interviewing and observation. Here different types of interviewing techniques and observation techniques are explained and also attempt to give a picture on both advantages and disadvantage aspect of use of these techniques.

Chapter- 14 and chapter- 15 deal with different nature of data such as qualitative data and quantitative data. On the basis of nature of data, these two chapters explain about qualitative research and quantitative research. In these chapters as a beauty, the difference between these two and how both types of researches combined to formulate a new type of research such as mixed method research also explained.

Chapter- 16 tries to explain about survey research, its characteristics, different questions for survey research, biases in survey research, etc. In chapter- 17, what is experimental research and about different types of experimental research models are explained.

Chapter- 18 attempts to explain how to conduct intensive fieldwork. Chapter- 19 is an extension of chapter- 18 which explains about ethnography technique. Chapter- 20 gives explanation about participant observation technique, its strength and weakness, ethical guidelines of participant observation, what to do, what not to do, and how to do participant observation.

Chapter- 21 tries to explain about a new research technique of qualitative research that is Focus Group Interview. It also explains different steps in planning focus groups and principles of research ethics for focus group interview. Chapter- 22 is also attempts to describe about a new research technique of qualitative research especially in social sciences for applied and action researches i.e. Rapid Rural Appraisal & Participatory Rural Appraisal.

Chapter- 23 is on basic statistics and statistical analysis. In this chapter statistical/mathematical formula wise explanations are not given for different statistical tests. This chapter tries to explain about when to do which statistical tests, how to do it by using IBM SPSS software and how to interpret findings.

Chapter- 24 is an attempt to explain how to write an effective research proposal. Doing research without preparing research report is meaningless. Chapter- 25 makes an effort to explain how to write research report.

Chapter- 26 tries to explain how to use previous research literatures, how to cite them in researcher's report and how to prepare references. This chapter attempts to shade light on different style of referencing.

Researcher should follow research ethics during research work. So chapter- 27 is an attempt to explain research ethics, and research ethics essential for different research programs where human beings were involved.

For writing this book, I got help from so many persons. So here I want to **acknowledge** them. For preparing this book my debt to colleagues, students and friends is enormous. I am thankful to Dr. S. K. Palita, Dean, School of Biodiversity and Conservation of Natural Resources at Central University of Orissa, for motivating me to write this book. My colleagues and friends from different subjects at Central University of Orissa such as Mr. B. K. Srinivas from Anthropology, Dr. D. Panda from Biodiversity, Dr. P. K. Rath from Journalism and Dr. A. Baral from Odia Language & Literature, who constantly encouraged me to do this work. I am very much thankful to them. My friend Mr. B, Pradhan, Librarian I/C of Central University of Orissa, is always heightening me for not to worry about publisher. He gave me contact of the publisher for publishing this book. So I am very thankful to Mr. Pradhan. I would like to express my gratitude to SSDN Publishers & Distributors, New Delhi for his initiative to bring out this book. Finally, I am also thankful to Dr. P. Singh, my co-author without her involvement in writing this book; it will not be possible for me to complete this book.

Dr. Jayanta Kumar Nayak

Dr. Priyanka Singh

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1 Introduction

What is research?

Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation. Research is a craft (Bernard, 2006). The Advanced Learner's Dictionary of Current English lays down the meaning of research as "a careful investigation or inquiry especially through search for new facts in any branch of knowledge." Research is an original contribution to the existing stock of knowledge making for its advancement. It is the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding solution to a problem is research. The systematic approach concerning generalisation and the formulation of a theory is also research. As such the term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analysing the facts and reaching certain conclusions either in the form of solutions(s) towards the concerned problem or in certain generalisations for some theoretical formulation. The research can be called "Scientific research", if it contributes to a body of science, and follows the scientific method.

Methodology is a research strategy that translates ontological and epistemological principles into guidelines that show how research is to be conducted and principles, procedures, and practices that govern research. Generally speaking there are varieties of research methodologies with no single accepted research methodology applicable to all research problems. Each research methodology has its own relative weakness and strength. No single research methodology is necessarily ideal and that selection inevitably involves loss as well as gain (Schulze, 2003). The selection of research methodology depends on the paradigm that guides the research activity, more specifically, beliefs about the nature of reality and humanity (ontology), the theory of knowledge that informs the research (epistemology), and how that knowledge may be gained (methodology). As we view ourselves through anthropological lenses, each day we can experience a world made more interesting and understandable. Individual researchers draw on multiple methods; in others, researchers with different skills form teams but work closely together rather than taking sole responsibility for different components of the research. The scope of such efforts—across kinship studies, human adaptability, economic and environmental anthropology, and the study of art—demonstrates the great potential for such integration. Taken together, these efforts also indicate that methodological integration itself provides a route toward theoretical advances within anthropology.

Difference between Methodology and Methods:

Methodology	Methods
• Underlying theory and analysis of how research does or should proceed, often influenced by discipline	• Techniques for gathering evidence • Various ways of proceeding in gathering information

Methods of Acquiring Knowledge

There are many procedures by which we obtain information about a given phenomenon or situation. We acquire a great deal of information from the events we experience as we go through life. Experts also provide us with much information. We will briefly discuss four ways by which we acquire knowledge

Intuition is the first approach to acquiring knowledge that is not based on a known reasoning process. Webster's Third New International Dictionary defines intuition as "the act or process of coming to direct knowledge or certainty without reasoning or inferring." The problem with the intuitive approach is that it does not provide a mechanism for separating accurate from inaccurate knowledge. The use of intuition is sometimes used in science and it is probably seen most readily in the process of forming hypotheses. Although most scientific hypotheses are derived from prior research, some hypotheses arise from hunches and new ways of looking at the literature.

Authority as an approach to acquiring knowledge represents an acceptance of information or facts stated by another because that person is a highly respected source. The problem with the authority approach is that the information or facts stated by the authority might be inaccurate. If the authority approach dictates that we accept whatever is decreed, how can this approach be used in science? In the beginning stages of the research process, when the problem is being identified and the hypothesis is being formed, a scientist might consult someone who is considered "theauthority in the area to assess the probability that the hypothesis is one that is testable and addresses an important research question. Virtually every area of endeavour has a leading proponent who is considered the authority or expert on a given topic. This is the person who has the most information on a given topic. Authority plays a part in the development of hypotheses. A person who is perceived as an authority can be incorrect. Authority is also used in the design stage of a study. If you are unsure of how to design a study to test a specific variable, you might call someone who is considered an authority in the area and get his or her input. Similarly, if you have collected data on a given topic and you are not sure how to interpret the data or how they fit with the other data in the field; you might consult with someone who is considered an authority in the area and obtain input. As you can see, the authority approach is used in research. However, an authority is an expert whose facts and information are subject to testing using the scientific process.

A third approach to gaining knowledge is rationalism. This approach uses reasoning to arrive at knowledge and assumes that valid knowledge is acquired if the correct reasoning process is used. Reasoning is a vital element in the scientific process. Scientists make use of reasoning not only to derive some hypotheses but also to identify the outcomes that would indicate the truth or falsity of the hypotheses. Mathematics, which is a type of rationalism, is used extensively in many areas of science such as physics. There is also a well-developed line of research in mathematical psychology. In short, rationalism can be very important for science, but only by itself it is insufficient for gaining knowledge and scientific research.

A fourth approach to gaining knowledge is through empiricism. Empiricism is the acquisition of knowledge through experience. Empiricism is probably the most obvious approach that is used in science. Science is based on observation, and empiricism refers to the observation of a given phenomenon. Empiricism is a vital element in science, but in science, empirical observations must be conducted under controlled conditions and systematic strategies must be used to minimize researchers' bias and to maximize objectivity.

General Characteristics of Research

The general characteristics of 'Research' are as follows:

1. It gathers new knowledge or data from primary or first-hand sources.
2. It places emphasis upon the discovery of general principles.
3. It is an exact systematic and accurate investigation.
4. It uses certain valid data gathering devices.
5. It is logical and objective.
6. The researcher resists the temptation to seek only the data that support his hypotheses.
7. The researcher eliminates personal feelings and preferences.
8. It endeavours to organise data in quantitative terms.
9. Research is patient and unhurried activity.
10. The researcher is willing to follow his procedures to the conclusions that may be unpopularand bring social disapproval.
11. Research is carefully recorded and reported.
12. Conclusions and generalisations are arrived at carefully and cautiously.

Specific Characteristics of Research

The following are the specific characteristics of research:

1. A sound philosophy is the basis of research
2. Research is based on insight and imagination
3. Research requires an inter-disciplinary approach
4. Research should come out of a desire to do things better
5. Research is not the field of the specialist only
6. Research generally requires inexpensive material

7. Research is based on the subjectivity and intangibility of social phenomena
8. Research is perhaps incapable of being dealt through empirical method
9. Research is based on inter dependence of causes and effect
10. Research cannot be a mechanical process

The Functions of Research

The main function of research is to improve research procedures through the refinement andextension of knowledge. The refinement of existing knowledge or the acquisition of new knowledge is essentially an intermediate step toward the improvement of the research process. The improvement is associated with various aspects:

1. Research encourages scientific and inductive thinking, besides promoting the development of logical habits of thinking and organisation.
2. The function of research is to make a decision concerning the refinement or extensionof knowledge in this particular area.
3. Research assumes significant role in the formation of policies, for the government and business. Research also tries to solve various operational and planning problems.
4. Another function of research is to aid administrators to improve the Social systems. Research is equally important to social scientists for analysing social relationships and seeking explanations to various social problems.
5. The function of research is to improve the students learning and classroom problem withwhich teacher is encountering with problems. The more effective techniques for teachingcan be developed.
6. Research helps in carrier development.

Objectives of Research

The research has the following three objectives:

1. *Theoretical objective*(formulate the new theories, principles or laws; explanatory in nature)
2. *Factual objective*(find out new facts; descriptive in nature)
3. *Application objective*(suggests new applications; improvement and modification in practice)

The first two types of objectives of research contribute new knowledge in the form of new theory and facts in a particular field of study or discipline. The third objective does not contribute to knowledge but suggests new application for practical problems.

Classification of Research

In actual practice, research is conducted at different levels and for different immediate purposes. Thelevel at which a person operates in the field depends on the objectives she/he intends to accomplish.

Generally research has two levels:

1. *Basic level*(Basic research is designed to add an organized body of scientific knowledge and does not necessarily produce results of immediate practical value)
2. *Applied level* (to solve an immediate practical problem and the goal of adding to scientific knowledge is secondary)

Kinds of Research

There are various bases to classify the research.

A. On the basis of *objectives of research* it is of two types:
1. Fundamental research and
2. Action research

B. On the basis of *approach of research* it is of two types:
1. Longitudinal research
2. Cross sectional research

C. On the basis of *precision (accuracy) of the researches* it is of two types:
1. Experimental research and
2. Non-experimental research.

D. On the basis of *nature of findings*, researches are of two types:
1. Explanatory research
2. Descriptive research

E. The *National Science Foundation* formulated a three-fold classification of research.
1. Basic research
2. Applied research
3. Development research

Steps to Follow When Conducting Research

The research process as a planned sequence that consists of the following six steps:
1. Developing a statement of the research question
2. Developing a statement of the research hypothesis
3. Defining the instrument
4. Gathering the data
5. Analysing the data
6. Drawing conclusions regarding the hypothesis

2 Science and Scientific Research

Science

What is science?

Science is the most trustworthy way of acquiring reliable and valid knowledge about the natural world. Etymologically (what it means to know), the word "science" is derived from the Latin word *scientia* meaning knowledge. **Science** refers to a systematic and organized body of knowledge in any area of inquiry that is acquired using "the scientific method".

Science can be grouped into two broad categories: natural science and socialscience. **Natural science** is the science of naturally occurring objects or phenomena, such aslight, objects, matter, earth, celestial bodies, or the human body. Natural sciences can be furtherclassified into physical sciences, earth sciences, life sciences, and others. Physical sciencesconsist of disciplines such as physics (the science of physical objects), chemistry (the science ofmatter), and astronomy (the science of celestial objects). Earth sciences consist of disciplinessuch as geology (the science of the earth). Life sciences include disciplines such as human biology (thescience of human bodies), zoology (the science of animals) and botany (the science of plants), etc. In contrast, **social science** is thescience of people or collections of people, such as groups, firms, societies, or economies, andtheir individual or collective behaviours. Social sciences can be classified into disciplines such aspsychology (the science of human behaviours), sociology (the science of social groups), andeconomics (the science of firms, markets, and economies), etc.

The natural sciences are different from the social sciences in several respects. The natural sciences are very precise, accurate, deterministic, and independent of the person making the scientific observations. However, the same cannot be said for the social sciences, which tend to be less accurate, deterministic, or unambiguous.

Sciences can also be classified based on their purpose. **Basic sciences**, also called pure sciences, are those that explain the most basic objects and forces, relationships between them, and laws governing them. Examples include physics, mathematics, and biology. **Applied sciences**, also called practical sciences, are sciences that apply scientific knowledge from basic sciences in a physical environment. For instance, engineering is an applied science that applies the laws of physics and chemistry for practical applications such as building stronger bridges or fuel efficient combustion engines, while medicine is an applied science that applies the laws of biology for solving human ailments. Both basic and applied sciences are required for human development. However, applied sciences cannot stand on their own right, but instead relies on basic sciences for its progress. Of course, the industry and private enterprises tend to focus more on applied sciences given their practical value, while universities study both basic and applied sciences.

Scientific Knowledge

The purpose of science is to create scientific knowledge. **Scientific knowledge** refers toa generalized body of laws and theories to explain a phenomenon or behaviour of interest thatare acquired using the scientific method. **Laws** are observed patterns of phenomena or behaviours, while **theories** are systematic explanations of the underlying phenomenon or behaviour.

The goal of scientific research is to discover laws and postulate theories that can explain natural or social phenomena, or in other words, build scientific knowledge. It is important to understand that this knowledge may be imperfect or even quite far from the truth. Sometimes, there may not be a single universal truth, but rather equilibrium of "multiple truths." We must understand that the theories, upon which scientific knowledge is based, are only explanations of a particular phenomenon, as suggested by a scientist. As such, there may be good or poor explanations, depending on the extent to which those explanations fit well with reality, and consequently, there may be good or poor theories. The progress of science is marked by our progression over time from poorer theories to better theories, through better observations using more accurate instruments and more informed logical reasoning.

We arrive at scientific laws or theories through a process of logic and evidence. Logic (theory) and evidence (observations) are the two, and only two, pillars upon which scientific knowledge is based. In science, theories and observations are interrelated and cannot exist without each other. Theories provide meaning and significance to what we observe, and observations help to validate or refine existing theory or to construct new theory.

Any other means of knowledge acquisition, such as faith or authority cannot be considered science.

Depending on a researcher's training and interest, scientific inquiry may take one of two possible forms: inductive (reasoning process that involves going from the specific to the general)or deductive (reasoning process that involves going from the general to the specific). In **inductive research**, the goal of a researcher is to infer theoretical concepts and patterns from observed data. In **deductive research**, the goal of the researcher is to test concepts and patterns known from theory using new empirical data.

Hence, inductive research is also called *theory-building* research, and deductive research is *theory-testing* research. Note here that the goal of theory-testing is not just to test a theory, but possibly to refine, improve, and extend it.

Inductive and deductive researches are two halves of the research cycle that constantly repeats between theory and observations.

Though both inductive and deductive research are important for the advancement of science, it appears that inductive (theory-building) research is more valuable when there are few prior theories or explanations, while deductive (theory-testing) research is more productive when there are many competing theories of the same phenomenon and researchers are interested in knowing which theory works best and under what circumstances.

Conducting scientific research, therefore, requires two sets of skills – theoretical and methodological – needed to operate in the theoretical and empirical levels respectively. Methodological skills ("know-how") are relatively standard, invariant across disciplines.However, theoretical skills ("know-what") is considerably harder to master, requires years of observation and reflection, and are tacit skills that cannot be "taught" but rather learned though experience.

Scientific Method

Scientific method refers to astandardized set of techniques for building scientific knowledge, such as how to make validobservations, how to interpret results, and how to generalize those results. The scientificmethod allows researchers to independently and impartially test pre-existing theories and priorfindings, and subject them to open debate, modifications, or enhancements. The scientificmethod must satisfy four characteristics:

Replicability: Others should be able to independently replicate or repeat a scientificstudy and obtain similar, if not identical results.

Precision: Theoretical concepts, which are often hard to measure, must be defined withsuch precision that others can use those definitions to measure those concepts and testthat theory.

Falsifiability: A theory must be stated in a way that it can be disproven. Theories thatcannot be tested or falsified are not scientific theories and any such knowledge is notscientific knowledge. A theory that is specified in imprecise terms or whose conceptsare not accurately measurable cannot be tested, and is therefore not scientific.

Parsimony: When there are multiple explanations of a phenomenon, scientists mustalways accept the simplest or logically most economical explanation. This concept iscalled parsimony or "Occam's razor." Parsimony prevents scientists from pursuingoverly complex or outlandish theories with endless number of concepts andrelationships that may explain a little bit of everything but nothing in particular.

Any branch of inquiry that does not allow the scientific method to test its basic laws or theories cannot be called "science."

The scientific method, as applied to social sciences, includes a variety of research approaches, tools, and techniques, such as qualitative and quantitative data, statistical analysis, experiments, field surveys, case research, and so forth.The scientific method operates primarily at the empirical level of research, i.e., how to make observations and analyse and interpret these observations.

The critical component parts of scientific method are:
1. Observation and experimentation
2. Instrumentation and instrumental techniques
3. Theoretical analysis and model building
4. Theory construction and validation
5. Paradigm development and integration.

Types of Scientific Research

Depending on the purpose of research, scientific research projects can be grouped into three types: exploratory, descriptive, and explanatory.

Exploratory research is often conducted in new areas of inquiry, where the goals of the research are:
1. to scope out the magnitude or extent of a particular phenomenon, problem, or behaviour,
2. to generate some initial ideas (or "hunches") about that phenomenon, or
3. to test the feasibility of undertaking a more extensive study regarding that phenomenon.

This research may not lead to a very accurate understanding of the target problem, but may be worthwhile in scoping out the nature and extent of the problem and serve as a useful precursor to more in-depth research.

Descriptive research is directed at making careful observations and detailed documentation of a phenomenon of interest. These observations must be based on the scientific method (i.e., must be replicable, precise, etc.), and therefore, are more reliable than casual observations by untrained people.

Explanatory research seeks explanations of observed phenomena, problems, or behaviours. While descriptive research examines the what, where, and when of a phenomenon, explanatory research seeks answers to why and how types of questions. It attempts to "connect the dots" in research, by identifying causal factors and outcomes of the target phenomenon. Seeking explanations for observed events requires strong theoretical and interpretation skills, along with intuition, insights, and personal experience.

Evolution of Scientific Thought

Science began when the scientific method of inquiry was established as the systematic way of understanding nature – basing theory construction and validation upon experimental data. Empirical and Theoretical techniques in scientific method enable the construction of empirically grounded theories of nature.The terms "science," "scientists," and the "scientific method" were coined only in the 19th century. Prior to this time, science was viewed as a part of philosophy, and coexisted with other branches of philosophy such as logic, metaphysics, ethics, and aesthetics, although the boundaries between some of these branches were blurred.

In the earliest days of human inquiry, knowledge was usually recognized in terms of theological precepts based on faith. This was challenged by Greek philosophers such as Plato, Aristotle, and Socrates during the 3rd century BC, who suggested that the fundamental nature of being and the world can be understood more accurately through a process of systematic logical reasoning called **rationalism**. In particular, Aristotle's classic work *Metaphysics* (literally meaning "beyond physical [existence]") separated *theology* (the study of Gods) from *ontology* (the nature of truth or the study of being and existence) and *universal science* (the study of first principles, upon which logic is based). Rationalism (not to be confused with "rationality") views reason as the source of knowledge or justification, and suggests that the criterion of truth is not sensory but rather intellectual and deductive, often derived from a set of first principles or axioms (such as Aristotle's "law of non-contradiction").

The next major shift in scientific thought occurred during the 16th century, when British philosopher Francis Bacon (1561-1626) suggested that knowledge can only be derived from observations in the real world. Based on this premise, Bacon emphasized knowledge acquisition as an empirical activity (rather than as a reasoning activity), and developed **empiricism** as an influential branch of philosophy. Bacon's works led to the popularization of inductive methods of scientific inquiry, the development of the "scientific method" (originally called the "Baconian method"), consisting of systematic observation, measurement, and experimentation, and may have even sowed the seeds of atheism or the rejection of theological precepts as "unobservable."

Empiricism continued to clash with rationalism throughout the Middle Ages, as philosophers sought the most effective way of gaining valid knowledge. French philosopher Rene Descartes sided with the rationalists, while British philosophers John Locke and David Hume sided with the empiricists. Other scientists, such as Galileo Galilei and Sir Isaac Newton,attempted to fuse the two ideas into **natural philosophy** (the philosophy of nature), to focusspecifically on understanding nature and the physical universe, which is considered to be theprecursor of the natural sciences. Galileo (1564-1642) was perhaps the first to state that thelaws of nature are mathematical, and contributed to the field of astronomy through aninnovative combination of experimentation and mathematics.

Box 2.1: Ontology and Epistemology

Ontology and Epistemology are the two major aspects of a branch of philosophy called metaphysics. Metaphysics is concerned with two fundamental questions. First, what are the characteristics of existence? Or, what are the characteristics of things that exist? Or, what are the universal characteristics of things that exist? These are the ontological questions. The second aspect of metaphysics is the question, "How can we know the things that exist?" This is an epistemological question.

Ontology is concerned with the nature of reality (or being or existence), and various ontological positions reflect different prescriptions of what can be real and what cannot. Materialism is one of the major ontological positions, and it is the foundation for much of the research conducted in the natural sciences. However, a competing view of reality is idealism, which proposes that reality is mental and spiritual rather than material (Craig, 1998). Another ontological position is metaphysical subjectivism. Proponents of that position assert that perception, what we perceive through our senses, creates reality and that there is no other reality than what is in our heads. That is, there is no reality other than what humans create in their own minds. You can see how different ontological positions can lead to very different positions on many issues. Most of Western natural science is based on modern versions of Descartes's dualism, the idea that both material and mental entities exist.

Epistemology is concerned with what we can know about reality and how we can know it. At the risk of oversimplification, ontology is about what can exist or what is real, and epistemology is about knowledge. In fact, the English term comes from the Greek word *episteme*, which means "knowledge." When you ask questions such as "What is knowledge?" "How do I acquire knowledge?" "How can I be sure of my knowledge?" and "What are the limits of human knowledge?" you are asking epistemological questions. Epistemology is a crucial foundation for research in both the natural and the social sciences. (Source: Willis, 2007)

In the 18th century, German philosopher Immanuel Kant sought to resolve the disputebetween empiricism and rationalism in his book *Critique of Pure Reason*, by arguing thatexperience is purely subjective and processing them using pure reason without first investigatinginto the subjective nature of experiences will lead to theoretical illusions. Kant's ideas led to thedevelopment of **German idealism**, which inspired later development of interpretive techniquessuch as phenomenology, hermeneutics, and critical social theory.

Our design and conduct of research is shaped by our mental models or frames of references that we use to organize our reasoning and observations. These mental models or frames (belief systems) are called **paradigms**. The word "paradigm" was popularized by Thomas Kuhn (1996) in his book *The Structure of Scientific Revolutions*, where he examined the history of the natural sciences to identify patterns of activities that shape the progress of science. Paradigms are often hard to recognize, because they are implicit, assumed, and taken for granted.

Table 2.1: Four Worldviews of Research

Postpositivism	**Constructivism**
• Determination	• Understanding
• Reductionism	• Multiple Participant Meanings
• Empirical Observation and Measurement	• Social and Historical Construction
• Theory Verification	• Theory generation
Advocacy / Participatory	**Pragmatism**
• Political	• Consequences of actions
• Empowerment Issue-oriented	• Problem-Centred
• Collaborative	• Pluralistic
• Change-oriented	• Real-world practice oriented

(*Source:* Creswell, 2009)

Two popular paradigms today among social science researchers are positivism and post-positivism.

At about the same time, French philosopher Auguste Comte (1798–1857), founder of the discipline of sociology, attempted to blend rationalism and empiricism in a new doctrine called **positivism**. He suggested that theory and observations have circular dependence on each other. While theories may be created via reasoning, they are only authentic if they can be verified through observations. The emphasis on verification started the separation of modern science from philosophy and metaphysics and further development of the "scientific method" as the primary means of validating scientific claims. Comte's ideas were expanded by Emile Durkheim in his development of sociological positivism (positivism as a foundation for social research) and Ludwig Wittgenstein in logical positivism.

In the early 20th century, strong accounts of positivism were rejected by interpretive sociologists (anti-positivists) belonging to the German idealism school of thought. Positivism was typically equated with quantitative research methods such as experiments and surveys and without any explicit philosophical commitments, while **anti-positivism** employed qualitative methods such as unstructured interviews and participant observation. Even practitioners of positivism, such as American sociologist Paul Lazarsfield who pioneered large-scale survey research and statistical techniques for analysing survey data, acknowledged potential problems of observer bias and structural limitations in positivist inquiry. In response, anti-positivists emphasized that social actions must be studied through interpretive means based upon an understanding the meaning and purpose that individuals attach to their personal actions, which inspired Georg Simmel's work on symbolic interactionism, Max Weber's work on ideal types, and Edmund Husserl's work on phenomenology.

In the mid-to-late 20th century, both positivist and anti-positivist schools of thought were subjected to criticisms and modifications. British philosopher Sir Karl Popper suggested that human knowledge is based not on unchallengeable, rock solid foundations, but rather on a set of tentative conjectures that can never be proven conclusively, but only disproven. Empirical evidence is the basis for disproving these conjectures or "theories." This meta-theoretical stance, called **post-positivism** (or post-empiricism), amends positivism by suggesting that it is impossible to verify the truth although it is possible to reject false beliefs, though it retains the positivist notion of an objective truth and its emphasis on the scientific method.

Likewise, anti-positivists have also been criticized for trying only to understand society but not critiquing and changing society for the better. The roots of this thought lie in *Das Capital*, written by German philosophers Karl Marx and Friedrich Engels, which critiqued capitalistic societies as being social inequitable and inefficient, and recommended resolving this inequity through class conflict and proletarian revolutions. Marxism inspired social revolutions in countries such as Germany, Italy, Russia, and China, but generally failed to accomplish the social equality that it aspired. **Critical research** (also called critical theory) propounded by Max Horkheimer and JurgenHabermas in the 20th century, retains similar ideas of critiquing and resolving social inequality, and adds that people can and should consciously act to change their social and economic circumstances, although their ability to do so is constrained by various forms of social, cultural and political domination. Critical research attempts to uncover and critique the restrictive and alienating conditions of the status quo by analysing the oppositions, conflicts and contradictions in contemporary society, and seeks to eliminate the causes of alienation and domination (i.e., emancipate the oppressed class).

Table 2.2: Differences between Positivism and Post-Positivism

	Empiricism or Positivism	Post-Positivism
Nature of reality	External to the human mind	External to the human mind
Purpose of research	Find universals	Find universals
Acceptable methods and data	• Scientific method • Objective data	• Scientific method • Objective data
Meaning of data	• Mirror to reality • Use to develop theory	• Falsification • Use to test theory
Relationship of research to practice	• Separate activities • Research guides practice	• Separate activities • Research guides practice

(*Source:* Willis, 2007)

Table 2.3: Differences between Post-Positivism and Critical Theory

	Post-Positivism	Critical Theory
Nature of reality	Material and external to the human mind	Material and external to the human mind
Purpose of research	Find universals	Uncover local instances of universal power relationships and empower the oppressed
Acceptable methods and data	• Scientific method • Objective data	Subjective inquiry based on ideology and values; both quantitative and qualitative data are acceptable
Meaning of data	• Falsification • Use to test theory	Interpreted through ideology; used to enlighten and emancipate
Relationship of research to practice	• Separate activities • Research guides practice	•Integrated activities • Research guides practice

(*Source:* Willis, 2007)

Box 2.2: Positivism

Seventeenth-century French philosopher Auguste Comte established positivism in Western philosophy. He believed societies passed through three stages of explanation. In the first and least enlightened stage, *theological* explanations dominate. In the second and more enlightened stage, *metaphysical* or philosophical explanations emerge. And in the third and highest stage, *positivism*, scientific explanations are the rule. Comte advocated the emerging sciences, such as astronomy, biology, physics, and chemistry, but he was also a founder of sociology and was concerned that this field of human study should be based on solid scientific foundation. He argued that the methods that were so successful in the natural sciences should also be applied to the human sciences. He advocated the use of the scientific method to validate theories of human behaviour:

"Scientifically speaking, all isolated, empirical observation is idle, and even radically uncertain; …science can use only those observations which are connected, at least hypothetically, with some law; that it is such a connection which makes the chief difference between scientific and popular observation, embracing the same

facts, but contemplating them from different points of view; and that observation empirically conducted can at most supply provisional materials, which must undergo an ulterior revision…..The observer would not know what he ought to look at in the facts before his eyes, but for the guidance of a preparatory theory…..This is undisputed with regard to astronomical, physical, and chemical research, and in every branch of biological study…..Carrying on the analogy, it is evident that in the corresponding divisions….of social science, there is more need than anywhere else of theories which shall scientifically connect the facts that are happening with those that have happened. (Comte, 1854)
(Source: Willis, 2007)

Box 2.3: Empiricism and Rationalism

The broadest meaning of the term *empiricism* is that what we know about the world comes from experience. The idea is often traced back to Aristotle, who advocated the careful observation and study of nature in order to understand it. Aristotle's emphasis on careful study of the world was in contrast to Plato's idealistic approach. For Plato, the things in the world were no more than flawed and inaccurate copies of ideal forms. Plato's approach is called rationalism because the path to understanding is rational thinking rather than intensive observation. Aristotle thus supported a materialist ontology and an empirical epistemology. In contrast, Plato advocated idealist ontology and a rational epistemology. These two approaches lead to very different conclusions about many basic issues.
(Source: Willis, 2007)

There are no anthropological or sociological or psychological methods. The questions we ask about the human condition may differ across the social sciences, but methods belong to all of us (Bernard, 2006). The boundaries between the social science disciplines remain strong, but those boundaries are less and less about methods and even less and less about content.

Using these two sets of assumptions, we can categorize social science research as belonging to one of four categories.

If researchers view the world as consisting mostly of social order (ontology) and hence seek to study patterns of ordered events or behaviours, and believe that the best way to study such a world is using objective approach (epistemology) that is

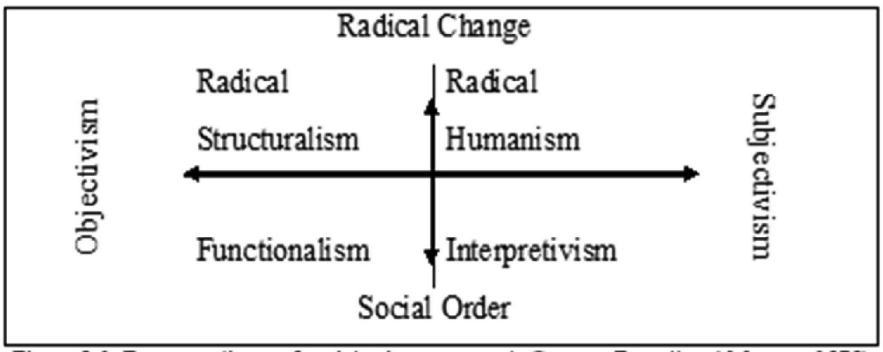

Figure 2.1: Four paradigms of social science research (Source: Burrell and Morgan, 1979)

independent of the person conducting the observation or interpretation, such as by using standardized data collection tools like surveys, then they are adopting a paradigm of functionalism. However, if they believe that the best way to study social order is though the subjective interpretation of participants involved, such as by interviewing different participants and reconciling differences among their responses using their own subjective perspectives, then they are employing an interpretivismparadigm. If researchers believe that the world consists of radical change and seek to understand or enact change using an objectivist approach, then they are employing a radical structuralism paradigm. If they wish to understand social change using the subjective perspectives of the participants involved, then they are following a radical humanism paradigm. To date, the majority of social science research has emulated the natural sciences, and followed the functionalist paradigm. Functionalists believe that social order or patterns can be understood in terms of their functional components, and therefore attempt to break down a problem into small components and studying one or more components in detail using objectivist techniques such as surveys and experimental research. However, with the emergence of post-positivist thinking, a small but growing number of social science researchers are attempting to understand social order using subjectivist techniques such as interviews and ethnographic studies. Radical humanism and radical structuralism continues to represent a negligible proportion of social science research, because scientists are primarily concerned with understanding generalizable patterns of behaviour, events, or phenomena, rather than idiosyncratic or changing events. Social and organizational phenomena generally consists elements of both order and change. Hence, a holistic and more complete understanding of social phenomena such as why are some organizations more successful than others, require an appreciation and application of a multi-paradigmatic approach to research.

3 Research Thinking Skill

Conducting good research requires first retraining your brain to think like a researcher.This requires visualizing the abstract from actual observations, mentally "connecting the dots"to identify hidden concepts and patterns, and synthesizing those patterns into generalizablelaws and theories that apply to other contexts beyond the domain of the initial observations.Research involves constantly moving back and forth from an empirical plane whereobservations are conducted to a theoretical plane where these observations are abstracted intogeneralizable laws and theories. Some of the mental abstractions needed to think like a researcher include unit of analysis, constructs, hypotheses, operationalization, theories, models, induction, deduction, and so forth.

Unit of Analysis

The unit of analysis refers to the person, collective, or object that is the target of the investigation. Typical unit of analysis include individuals, groups, organizations, countries, technologies, objects, and such. Understanding the unit of analysis is important because it shapes what type of data you should collect for your study and who you collect it from.

Concepts, Constructs, and Variables

Concepts ⟹ Constructs ⟹ Variables ⟹ Hypotheses

Explanations require development of **concepts** or generalizable properties or characteristics associated with objects, events, or people.While objects such as a person, a firm, or a car are not concepts, their specific characteristics or behaviour such as a person's attitude toward immigrants, a firm's capacity for innovation and a car's weight can be viewed as concepts.Knowingly or unknowingly, we use different kinds of concepts in our everyday conversations. Some of these concepts have been developed over time through our shared language. Sometimes, we borrow concepts from other disciplines or languages to explain a phenomenon of interest. For instance, the idea of gravitation borrowed from physics can be used in business to describe why people tend to "gravitate" to their preferred shopping destinations. Likewise, the concept of distance can be used to explain the degree of social separation between two otherwise collocated individuals. Sometimes, we create our own concepts to describe a unique characteristic not described in prior research. For instance, techno-stress is a new concept referring to the mental stress one may face when asked to learn a new technology.

Concepts may also have progressive levels of abstraction. Some concepts such as a person's weight are precise and objective, while other concepts such as a person's personality may be more abstract and difficult to visualize. A **construct** is an abstract concept that is specifically chosen (or "created") to explain a given phenomenon. A construct may be a simple concept, such as a person's weight, or a combination of a set of related concepts such as a person's communication skill, which may consist of several underlying concepts such as the person's vocabulary, syntax, and spelling. The former instance (weight) is a **one-dimensional construct**, while the latter (communication skill) is a **multi-dimensional construct** (i.e., it consists of multiple underlying concepts). The distinction between constructs and concepts are clearer in multi-dimensional constructs, where the higher order abstraction is called a construct and the lower order abstractions are called concepts. However, this distinction tends to blur in the case of one-dimensional constructs.

Constructs used for scientific research must have precise and clear definitions that others can use to understand exactly what it means and what it does not mean. For instance, a seemingly simple construct such as income may refer to monthly or annual income, before-tax or after-tax income, and personal or family income, and is therefore neither precise nor clear. There are two types of definitions: dictionary definitions and operational definitions. In the more familiar dictionary definition, a construct is often defined in terms of a synonym. For instance, attitude may be defined as a disposition, a feeling, or an effect, and affect in turn is defined as an attitude. Such definitions of a circular nature are not particularly useful in scientific research for elaborating the meaning and content of that construct. Scientific research requires **operational definitions** that define constructs in terms of how they will be empirically measured. For instance, the operational definition of a construct such as temperature must specify whether we plan to measure temperature in Celsius, Fahrenheit, or Kelvin scale. A construct such as income should be defined in terms of whether we are interested in monthly or annual income, before-tax or after-tax income, and personal or family income. One can imagine that constructs such as learning, personality, and intelligence can be quite hard to define operationally.

A term frequently associated with, and sometimes used interchangeably with, aconstruct is a variable. Etymologically speaking, a variable is a quantity that can vary (e.g., fromlow to high, negative to positive, etc.), in contrast to constants that do not vary (i.e., remainconstant). However, in scientific research, a variable is a measurable representation of anabstract construct. As abstract entities, constructs are not directly measurable, and hence, welook for proxy measures called variables. For instance, a person's *intelligence* is often measuredas his or her *IQ (intelligence quotient) score*, which is an index generated from an analytical andpattern-matching test administered to people. In this case, *intelligence* is a construct, and *IQscore* is a variable that measures the intelligence construct. Whether IQ scores truly measuresone's intelligence is anyone's guess (though many believe that they do), and depending on whether how well it measures intelligence, the IQ score may be a good or a poor measure of theintelligence construct. Scientific research proceeds along two planes: atheoretical plane and an empirical plane. Constructs are conceptualized at the theoretical(abstract) plane, while variables are operationalized and measured at the empirical(observational) plane. Thinking like a researcher implies the ability to move back and forthbetween these two planes. Depending on their intended use, variables may be classified as independent,dependent, moderating, mediating, or control variables. Variables that explain other variablesare called **independent variables**, those that are explained by other variables are **dependentvariables**, those that are explained by independent variables while also explaining dependentvariables are **mediating variables** (or intermediate variables), and those that influence therelationship between independent and dependent variables are called **moderating variables**.As an example, if we state that higher intelligence causes improved learning among students,then intelligence is an independent variable and learning is a dependent variable. There may beother extraneous variables that are not pertinent to explaining a given dependent variable, butmay have some impact on the dependent variable. These variables must be controlled for in ascientific study, and are therefore called **control variables**. If we believe that intelligence influences (or explains) students' academic achievement, then a measure of intelligence such as an *IQ score* is an independent variable, while a measure of academic success such as *grade point average* is a dependent variable. If we believe that the effect of intelligence on academic achievement also depends on the effort invested by the student in the learning process (i.e., between two equally intelligent students, the student who puts is more effort achieves higher academic achievement than one who puts in less effort), then *effort* becomes a moderating variable. Incidentally, one may also view effort as an independent variable and intelligence as a moderating variable. If academic achievement is viewed as an intermediate step to higher earning potential, then *earning potential* becomes the dependent variable for the independent variable *academic achievement*, and academic achievement becomes the mediating variable in the relationship between intelligence and earning potential. Hence, variable are defined as an independent, dependent, moderating, or mediating variable based on their nature of association with each other. The overall network of relationships between a set of related constructs is called a **nomological network**.

A **variable** is something that can take more than one value. The values canbe words or numbers.

e.g. age=38 years (value is a number)

Marital status = married (value is a word)

Research is based on defining variables, looking for associations among them, and trying to understand whether—and how—variation in one thing causes variation in another.

Variables have dimensions:Variables can be **one-dimensional** or **multidimensional**.

Dichotomous variable, with two values

Dependent Variables - Depends on

Independent Variables - logically prior

It's not always easy to tell whether a variable is independent or dependent.

Failure to understand which of two variables depends on the other is the source of endless shenanigans.

Measurement and Concepts

Variables are measured by their **indicators**, and indicators are defined bytheir **values**. Some variables, and their indicators, are easily observed andmeasured. Others are more conceptual. The difference is important.

Measurement is deciding which value to record.Improving measurement in science means lowering the probability and the amount of error.

All variables are concepts, but some concepts, like height and weight, are easy to measure, while other concepts like religious intensity, jealousy, compassion, willingness to accept new agricultural technologies, and tolerance for foreign fieldwork etc. are complex and difficult to measure.

We led to define constructs by our experience: Some people just seem more religiously intense than others, more jealous than others, more tolerant of foreign fieldwork than others, etc. We verify our intuition about conceptual variables by measuring them, or by measuring their results.

It may be easier to measure some concepts than others, but the fact is, all measurement is difficult.

Measuring variables is one of our biggest challenges because these variables are mostly what we're interested in.

It means that you have to test (and, if necessary, adapt) every measure of every variable in every new culture where you want to use it.

Conceptual and Operational Definitions

While most of the interesting variables are concepts, some of our mostimportant concepts are not variables. The concept of "positivism" is *not* a variable, but the concept of "philosophies of science" *is* a variable, and positivism is one member of the list of those philosophies. The concept of "love" is not a variable, but the concept of "being in love or not" *is* one. The concept of "culture" is not a variable, but the concept of "belonging to a particular culture" *is* one.

There are two ways to define variables—conceptually and operationally. **Conceptual definitions** are abstractions, articulated in words that facilitate understanding. They are the sort of definitions we see in dictionaries, and we use them in everyday conversation to tell people what we mean by some term or phrase. **Operational definitions** consist of a set of instructions on how to measure a variable that has been conceptually defined.

Many concepts that we use in anthropology have volatile definitions: "power", "social class","alienation", "willingness to change", and "fear of retribution". If we are to talk sensibly about such things, we need clear, **intersubjective** definitions of them. Complex variables are conceptually defined by reducing them to a series of simpler variables.

Conceptual definitions are at their most powerful when they are linked together to build theories that explain research results.Conceptual definitions are at their weakest in the conduct of research itself, because concepts have no empirical basis. There is nothing wrong with this. There are three things one wants to do in any science: (1) describe a phenomenon of interest; (2) explain what causes it; and (3) predict what it causes. The existence of a conceptual variable is inferred from what it predicts—how well it makes theoretical sense out of a lot of data.

Conceptual definitions are limited because, while they point us toward measurement, they don't really give us any recipe for measurement. Without measurement, we cannot make useful comparisons.

Operational definitions specify exactly what you have to do to measure something that has been defined conceptually.

Operational definitions are *strictly limited to the content of the operations specified, w*hether it was a good idea or a bad one to make any of these measurements or comparisons. *If the content of an operational definition is bad, then so are all conclusions you draw from using it to measure something*.

Operationism is the best way to expose bad measurement. By defining measurements operationally, we can tell if one measurement is better than another.

Strict operationism creates a knotty philosophical problem. We make up concepts and measurement turns these abstractions into reality. Since there are many ways to measure the same abstraction, the reality of any concept hinges on the device you use to measure it.

Operational definitions permit scientists to talk to one another using the same language. They permit replication of research and the accumulation of knowledge about issues of importance.

Levels of Measurement

Whenever you define a variable operationally, you do so at some **level of measurement**.In his seminal article titled "On the theory of scales of measurement" published in *Science* in 1946, psychologist Stanley Smith Stevens (1946) defined four generic types of rating scales for scientific measurements: nominal, ordinal, interval, and ratio scales.

Four levels of measurement, in ascending order: nominal, ordinal, interval, and ratio. The general principle in research is: Always use the highest level of measurement that you can.

Nominal Variables

A variable is something that can take more than one value. The values of a **nominal variable** comprise a list of names (name is *nomen*in Latin).

The famous "other" category in nominal variables makes the list exhaustive—that is, all possible categories have been named in the list—and the instruction to "check one" makes the list mutually exclusive.

"Mutually exclusive" means that things can't belong to more than one category of a nominal variable at a time.

Nominal measurement—naming things—is **qualitative measurement**.

When you assign the numeral 1 to men and 2 to women, all you are doing is substituting one kind of name for another. Calling men 1 and women 2 does not make the variable quantitative. The number 2 happens to be twice as big as the number 1, but this fact is meaningless with nominal variables. You can't add up all the 1s and 2s and calculate the "average sex".

Assigning numbers to things makes it easier to do certain kinds of statistical analysis on qualitative data, but it doesn't turn qualitative variables into quantitative ones.Nominal scales merely offer *names* or *labels* for different attribute values. The appropriate measure of central tendency of a nominal scale is mode, and neither the mean nor the median can be defined. Permissible statistics are chi-square and frequency distribution, and only a one-to-one (equality) transformation is allowed (e.g., 1=Male, 2=Female).

Ordinal Variables

Like nominal-level variables, **ordinal variables** are generally exhaustive and mutually exclusive, but they have one additional property: Their values can be rank ordered. Any variable measured as high, medium, or low, like socioeconomic class, is ordinal. The three classes are, in theory, mutually exclusive and exhaustive. In addition, a person who is labeled "middle class" is lower in the social class hierarchy than someone labeled "high class" and higher in the same hierarchy than someone labeled "lower class." What ordinal variables do not tell us is *how much* more.

Scales of opinion—like the familiar "strongly agree," "agree," "neutral," "disagree," "strongly disagree" found on so many surveys—are ordinal measures. They measure an internal state, agreement, in terms of *less* and *more*, but not in terms of *how much* more. This is the most important characteristic of ordinal measures: There is no way to tell how far apart the attributes are from one another. A person who is middle class might be twice as wealthy and three times as educated as a person who is lower class. Or they might be three times as wealthy and four times as educated. A person who "agrees strongly" with a statement may agree twice as much as someone who says they "agree"—or eight times as much, or half again as much. There is no way to tell.The central tendency measure of an ordinal scale can be its median or mode, and means are uninterpretable. Hence, statistical analyses may involve percentiles and non-parametric analysis, but more sophisticated techniques such as correlation, regression, and analysis of variance, are not appropriate. Monotonically increasing transformation (which retains the ranking) is allowed.

Interval and Ratio Variables

Interval variables have all the properties of nominal and ordinal variables. They are an exhaustive and mutually exclusive list of attributes, and the attributes have a rank-order structure. They have one additional property, as well: The distances between the attributes are meaningful. Interval variables, then, involve true **quantitative measurement**. Interval scalesare those where the values measured are not only rank-ordered, but are also equidistant from adjacent attributes. For example, the temperature scale (in Fahrenheit or Celsius), where the difference between 30 and 40 degree Fahrenheit is the same as that between 80 and 90 degree Fahrenheit. Likewise, if you have a scale that asks respondents' monthly income using the following attributes (ranges): Rs. 0 to 10,000, Rs.10,000 to 20,000, Rs.20,000 to 30,000, and so forth, this is also an interval scale, because the mid-point of each range (i.e., Rs.5,000, Rs.15,000, Rs.25,000, etc.) are equidistant from each other. The intelligence quotient (IQ) scale is also an interval scale, because the scale is designed such that the difference between IQ scores 100 and 110 is supposed to be the same as between 110 and 120. Interval scale allows us to examine "how much more" is one attribute when compared to another, which is not possible with nominal or ordinal scales. Allowed central tendency measures include mean, median, or mode, as are measures of dispersion, such as range and standard deviation. Permissible statistical analyses include all of those allowed for nominal and ordinal scales, plus correlation, regression, analysis of variance, and so on. Allowed scale transformation are positive linear. Note that the satisfaction scale discussed earlier is not strictly an interval scale, because we cannot say whether the difference between "strongly satisfied" and "somewhat satisfied" is the same as that between "neutral" and "somewhat satisfied" or between "somewhat dissatisfied" and "strongly dissatisfied". However, social science researchers often "pretend" (incorrectly) that these differences are equal so that we can use statistical techniques for analysing ordinal scaled data.

Ratio variables are interval variables that have a true **zero point**—that is, a 0 that measures the absence of the phenomenon being measured. Ratio scalesare those that have all the qualities of nominal, ordinal, and interval scales, and in addition, also has a "true zero" point (where the value zero implies lack or non-availability of the underlying construct). Most measurement in the natural sciences and engineering, such as mass, incline of a plane, and electric charge, employ ratio scales, as are some social science variables such as age, tenure in an organization, and firm size (measured as employee count or gross revenues). For example, a firm of size zero means that it has no employees or revenues. The Kelvin temperature scale is also a ratio scale, in contrast to the Fahrenheit or Celsius scales, because the zero point on this scale (equalling -273.15 degree Celsius) is not an arbitrary value but represents a state where the particles of matter at this temperature have zero kinetic energy. These scales are called "ratio" scales because the ratios of two points on these measures are meaningful and interpretable. For example, a firm of size 10 employees is double that of a firm of size 5, and the same can be said for a firm of 10,000 employees relative to a different firm of 5,000 employees. All measures of central tendencies, including geometric and harmonic means, are allowed for ratio scales, as are ratio measures, such as standardized range or coefficient of variation. All statistical methods are allowed. Sophisticated transformation such as positive similar (e.g., multiplicative or logarithmic) are also allowed.

In general, **concepts** are measured at the ordinal level. Concrete **observables**—are often measured atthe interval level, but not always.Always measure things at the possible highest level of measurement. Don't measure things at the ordinal level if you can measure them as ratio variables.

One of the very first things to do in any research project is decide on the **unit of analysis**.Research designed to test hypotheses requires many units of analysis, usually a sample from a large population. No matter what you are studying, always collect data on the lowest level unit of analysis possible. Collect data about individuals, for example, rather than about households. If you are interested in issues of production and consumption, you can always package your data about individuals into data about

Table3.1: Statistical properties of rating scales

Scale	Central Tendency	Statistics					Transformations
		Single sample	Two related samples	Two independent samples	More than two independent samples	Correlational measures	
Nominal	Mode	Chi-square one sample test		Chi-square test for independent samples with two subclasses	Chi-square test for more than two subclasses	Phi coefficient, Yule's Q	One-to-one (equality)
Ordinal	Median	Percentile, non-parametric Statistics Kolmogorov-Smirnov one sample test	Sign test Wilcoxon matched-pairs, signed-ranks test				Monotonic increasing (order)
Interval	Arithmetic mean, range, standard deviation		Paired t test	t-test for independent samples	analysis of variance	Pearson product moment Correlation, Coefficient, regression,	Positive linear (affine)
Ratio	Geometric mean, harmonic mean		Paired t test	t-test for independent samples	analysis of variance	Pearson product moment Correlation, Coefficient, regression, Coefficient of variation	Positive similarities (multiplicative, logarithmic)

Note: All higher-order scales can use any of the statistics for lower order scales.

households during analysis. But if you want to examine the association between female income and child spacing and you collect income data on households in the first place, then you are locked out. You can always **aggregate** data collected on individuals, but you can never **disaggregate** data collected on groups.Once you select your unit of analysis, remember it as you go through data analysis. Suppose you do a survey of villages in a region. For each village, you have data on such things as the number of people, the average age of men and women, and the monetary value of a list of various consumer goods in each village. That is, when you went through each village, you noted how many refrigerators and kerosene lanterns and radios there were, but you do not have these data for each person or household in the village because you were not interested in that when you designed your study. You were interested in characteristics of villages as units of analysis.

Validity, Reliability, Accuracy, and Precision

Validity refers to the accuracy and trustworthiness of instruments, data, and findings in research. Nothing in research is more important than validity. The validity of data is tied to the validity of instruments. If questions asking people to recall their behaviour are not valid instruments for tapping into informants' past behaviour, then the data retrieved by those instruments are not valid. Assuming, however, that the instruments and data are valid, we can ask whether the findings and conclusions derived from the data are valid.

Reliability refers to whether or not you get the same answer by using an instrument to measure something more than once.‘‘Instruments’’ can be things like machines (apparatuses), scales, or they can be questions that you ask people.

Precision is about the number of decimal points in a measurement.

Accuracy satisfies with the level of precision of the scale.

The data from this instrument are valid; they are reliable (you get the same answer every time you step on it); and they are precise enough for your purposes. But they are not *accurate*. What next?If an instrument is not precise enough for what you want to do with the data, then you simply have to build a more precise one. There is no way out. If it is precise enough for your research and it is reliable, but inaccurate in known ways, then a formula can be applied to correct for the inaccuracy. The real problem is when instruments are inaccurate in unknown ways.

There is several indirect ways to evaluate the validity of an instrument for measuring a concept:

- Face validity,
- Content validity,
- Construct validity,
- Criterion validity.

Establishing **face validity** involves simply looking at the operational indicators of a concept and deciding whether or not, *on the face of it*, the indicators make sense. On the face of it, asking people ‘‘How old were you when you were toilet trained?’’ is not a valid way to get at this kind of information.

A paper-and-pencil test about the rules of the road is not, on the face of it, a valid indicator of whether someone knows how to drive a car. But the paper-and- pencil test is probably a valid test for determining if an applicant for a driver's license can read road signs. These different instruments—the road test and the paper-and-pencil test—have face validity for measuring different things.

Face validity *is based on consensus among researchers*: If everyone agrees that asking people "How old are you" is a valid instrument for measuring age, then, until proven otherwise, that question is a valid instrument for measuring age.

Content validity is achieved when an instrument has appropriate content formeasuring a complex concept, or construct. If you walk out of a test and feelthat it was unfair because it tapped too narrow a band of knowledge, yourcomplaint is that the test lacked content validity.Content validity is very, very tough to achieve, particularly for complex,multidimensional constructs.

For example, "Life satisfaction" is a very complex variable, composed of several concepts—like "having sufficient income," "a general feeling of well-being," and "satisfaction with level of personal control over one's life." In fact, most of the really interesting things that social scientists study are complex constructs, things like "quality of life," "socioeconomic class," "ability of teenagers to resist peer pressure to smoke," and so on.

An instrument has high ***construct validity***if there is a close fit between the construct it supposedly measures and actual observations made with the instrument. An instrument has high construct validity, in other words, if it allows you to infer that a unit of analysis (a person, a country, whatever) has a particular complex trait and if it supports predictions that are made from theory.

Getting people to agree that a particular measure has high construct validity requires that they agree that the construct is valid in the first place.

An instrument has high ***criterion validity***if there is a close fit between the measures it produces and the measures produced by some other instrument that is known to be valid. This is the gold standard test.

The preference in science for simpler explanations and measures over more complicated ones is called the principle of **parsimony**. It is also known as **Ockham's razor**, after William of Ockham (1285–1349), a medieval philosopher who argued "don't make things more complicated than they need to be."

You can tap the power of criterion validity for complex constructs with the **known group comparison** technique. In other words, the known-group scores are the criteria for the validity of your instrument. A particularly strong form of criterion validity is **predictive validity**— whether an instrument lets you predict accurately something else you're interested in. "Stress" is a complex construct. It occurs when people interpret events as threatening to their lives. Some people interpret a bad grade on an exam as a threat to their whole life, while others just blow it off. Now, stress is widely thought to produce a lowered immune response and increase the chances of getting sick. A really good *measure* of stress, then, ought to predict the likelihood of getting sick.

We are never dead sure of anything in science. We try to get closer and closer to the truth by better and better measurement. Science relies on concepts whose existence must ultimately be demonstrated by their effects.

Proposition and Hypotheses:

A **proposition** is a tentative and conjectural relationship between constructs that is stated in a declarative form. The declarative statement does not have to be true, but must be empirically testable using data, so that we can judge whether it is true or false. Propositions are generally derived based on logic (deduction) or empirical observations (induction).

Because propositions are associations between abstract constructs, they cannot be tested directly. Instead, they are tested indirectly by examining the relationship between corresponding measures (variables) of those constructs. The empirical formulation of propositions, stated as relationships between variables, is called **hypotheses.** Propositions are specified in the theoretical plane, while hypotheses are specified in the empirical plane. Hence, hypotheses are empirically testable using observed data, and may be rejected if not supported by empirical observations. Of course, the goal of hypothesis testing is to infer whether the corresponding proposition is valid or not.

Hypotheses can be strong or weak. “Students’ IQ scores are related to their academic achievement” is an example of a weak hypothesis, since it indicates neither the directionality of the hypothesis (i.e., whether the relationship is positive or negative), nor its causality (i.e., whether intelligence causes academic achievement or academic achievement causes intelligence). A stronger hypothesis is “students’ IQ scores are *positively* related to their academic achievement”, which indicates the directionality but not the causality. A still better hypothesis is “students’ IQ scores have positive effects on their academic achievement”, which specifies both the directionality and the causality (i.e., intelligence causes academic achievement, and not the reverse).

Also note that scientific hypotheses should clearly specify independent and dependent variables. In the hypothesis, “students’ IQ scores have positive effects on their academic achievement,” it is clear that intelligence is the independent variable (the “cause”) and academic achievement is the dependent variable (the “effect”). Further, it is also clear that this hypothesis can be evaluated as either true (if higher intelligence leads to higher academic achievement) or false (if higher intelligence has no effect on or leads to lower academic achievement).

Cause and Effect

Cause and effect is among the most highly debated issues in the philosophy of knowledge. We can never be absolutely certain that variation in one thing causes variation in another. Still, if measurements of two variables are valid, you can be reasonably confident that one variable causes another if following four conditions are met.

1. The two variables **covary**—that is, as scores for one variable increase or decrease, scores for the other variable increase or decrease as well.
2. The covariation between the two variables is not **spurious**.
3. There is a **logical time order** to the variables. The presumed causal variable must always precede the other in time.
4. A mechanism is available that explains *how* an independent variable causes a dependent variable. There must, in other words, be a **theory**.

When two variables are related they are said to **covary**. Covariation is also called **correlation** or, simply, **association**. Association is a necessary but insufficient condition for claiming a causal relation between two variables. Whatever else is needed to establish cause and effect, you can't claim that one thing causes another if they aren't related in the first place.

You might think that in order to establish cause, independent variables would have to be strongly related to the dependent variable. Not always. Each independent variable may contribute only a little to the outcome of the dependent variable, but the contribution may be quite direct and causal.

Just as weak correlations can be causal, strong correlations can turn out not to be. When this happens, the original correlation is said to be **spurious**.

Besides a nonspurious association, something else is required to establish a cause-and-effect relation between two variables: **a logical time order**.

Finally, even when you have established nonspurious, consistent, strong covariation, as well as a logical time sequence for two or more variables, you need a **theory** that explains the association. Theories are good ideas abouthow things work.

A **theory** is a set of systematically interrelated constructs and propositions intended to explain and predict a phenomenon or behaviour of interest, within certain boundary conditions and assumptions. Essentially, a theory is a systemic collection of related theoretical propositions. While propositions generally connect two or three constructs, theories represent a *system* of multiple constructs and propositions. Hence, theories can be substantially more complex and abstract and of a larger scope than propositions or hypotheses.

A good scientific theory should be well supported using observed facts and should also have practical value, while a poorly defined theory tends to be lacking in these dimensions. Famous organizational researcher Kurt Lewin once said, "Theory without practice is sterile; practice without theory is blind." Hence, both theory and facts (or practice) are essential for scientific research.

It is important for researchers to understand that theory is not "truth," there is nothing sacrosanct about any theory, and theories should not be accepted just because they were proposed by someone. In the course of scientific progress, poorer theories are eventually replaced by better theories with higher explanatory power. The essential challenge for researchers is to build better and more comprehensive theories that can explain a target phenomenon better than prior theories.

A term often used in conjunction with theory is a model. A **model** is a representation ofall or part of a system that is constructed to study that system (e.g., how the system works orwhat triggers the system). While a theory tries to explain a phenomenon, a model tries torepresent a phenomenon. Models are often used by decision makers to make importantdecisions based on a given set of inputs. Models may be of different kinds, such as mathematical models, network models, andpath models. Models can also be descriptive, predictive, or normative. Descriptive models arefrequently used for representing complex systems, for visualizing variables and relationships insuch systems. Predictivemodels (e.g., a regression model) allow forecast of future events. Normative models are used to guide our activities along commonlyaccepted norms or practices. Models may also be static if it represents the state of a system atone point in time, or dynamic, if it represents a system's evolution over time. The process of theory or model development may involve inductive and deductivereasoning. **Deduction** is the process of drawing conclusions about a phenomenon or behaviour based on theoretical or logical reasons and an initial set of premises. In deduction, the conclusions must be true if the initial premises andreasons are correct. In contrast, **induction** is the process of drawing conclusions based on facts or observedevidence.

Inductive conclusions are therefore only a hypothesis, and may be disproven.Deductive conclusions generally tend to be stronger than inductive conclusions, but a deductiveconclusion based on an incorrect premise is also incorrect.Inductive and deductive reasoning go hand in hand in theoryand model building. Induction occurs when we observe a fact and ask, "Why is this happening?"In answering this question, we advance one or more tentative explanations (hypotheses). Wethen use deduction to narrow down the tentative explanations to the most plausibleexplanation based on logic and reasonable premises (based on our understanding of thephenomenon under study). Researchers must be able to move back and forth betweeninductive and deductive reasoning if they are to post extensions or modifications to a givenmodel or theory, or built better ones, which are the essence of scientific research.

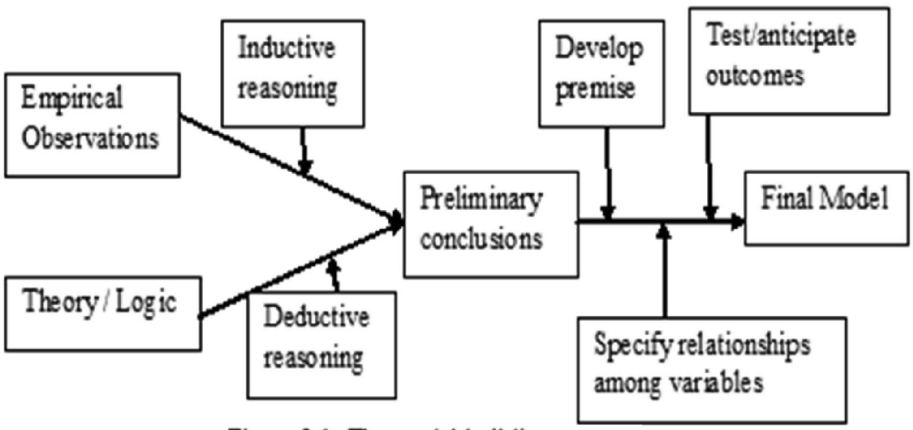

Figure 3.1: The model-building process

(*Source:* Bhattacherjee, 2012)

Characteristics of an Investigator:

A good research worker should possess the following qualities:

1. She/he should have the full understanding about the functions and activities of his job.
2. She/he should have the reflective thinking about various dimensions of his job activities.
3. She/he should be sensitive towards his job. A sensitive person can perceive the problem.
4. She/he should be creative and imaginative. These abilities are essential in formulating the hypotheses for his problem.

5. She/he should have the knowledge and training for doing research.
6. She/he should have insightful into his area.
7. She/he should have the scientific attitude for studying and observing things.
8. There should be objectivity in her/his thinking.
9. Her/his behaviour should be democratic.
10. The most important characteristics is the patience and pursuant of the investigator.
11. She/he should have knowledge and skill of measuring instruments and basic statistics.
12. She/he should have open mind so that he can discuss his problems with his colleagues and experts of the field to have correct picture of the problem.
13. She/he should have an urge to bring about excellence in job performance.
14 She/he should be economical in designing the project from time, energy and money point of view.

4 Preparing for Research

There are some core steps or the fundamental steps which must be followed in conducting a research/study. Before we undertake a study, it would be worthwhile to ask a few questions to one self, i.e.

1. What is to be studied?
2. When to study?
3. Where to study?
4. How to study?

After the researcher has found answers to these questions, may be the answers are at the initial stage, most tentative, but he must not be in complete darkness. It would be also useful for a researcher to know the limitations of her/his study in terms of theme she/he is going to investigate, persons she/he is going to consult or observe for collecting the data. She/he must know the means and the methods of data collection.

Despite all the myths about how research is done, it is actually a messy process that is cleaned up in the reporting of results.

The steps of research may be as follows:

1. The selection or choice of the research problem
2. The statement and definition of the research problem
3. The review of the related literature
4. The preparation of the research design, and formulation of hypothesis
5. The selection of sampling
6. The selection of the tools of data collection
7. The pre-test and pilot study
8. The execution of the research plan
9. The coding and processing of data
10. The preparation of the brief report
11. The preparation of the final report by supporting or rejecting hypothesis or theory

There are five questions to ask yourself about every research question youare thinking about pursuing. Most of these can also be asked about potentialresearch sites and research methods. If you answer these questions honestly, chances are you will do good research every time. If youcheat on this test, even a teeny bit, chances are you will regret it. Here are thefive questions:

1. Does this topic (or research site, or data collection method) really interest researcher?
2. Is this a problem that is amenable to scientific inquiry?
3. Are adequate resources available to investigate this topic? To study this populationat this particular research site? To use this particular data collection method?
4. Will research question or the methods researcherwant to use, lead to unresolvableethical problems?
5. Is the topic of theoretical and/or practical interest?

The identification and analysing a research problem is the first and most crucial step of research process. A problem cannot be solved effectively unless a researcher possesses the intellect and insight to isolate and understand the specific factors giving rise to the difficulty.

Since identifying the exact nature and dimensions of a problem is of major importance in research work, it is very essential that an investigator should learn how to recognize and define a problem. He should proceed step by step in locating the research problem. The following steps are to be followed in identifying a research problem:

1. Determining the field of research in which a researcher is keen to do the research work.
2. The researcher should develop the mastery on the area or it should be the field of his specialization.
3. He should review the earlier researches conducted in area to know the recent trend and studies in the area.
4. On the basis of review, he should consider the priority field of the study.
5. He should draw an analogy and insight in identifying a problem or employ his personalexperience of the field in locating the problem. He may take help of supervisor or expert ofthe field.
6. He should pin-point specific aspect of the problem which is to be investigated.

The following are the major tasks to be performed in analysing a problematic situation as given below:

1. Accumulating the facts that might be related to the problem
2. Setting by observations whether the facts are relevant
3. Tracing any relationship between facts that might reveal the key to the difficulty
4. Proposing various explanations for the cause or the difficulty
5. Ascertaining through observations and analysis whether these explanations are relevant to the problem
6. Tracing relationship between explanations that may give an insight into the problem solution
7. Tracing relationship between facts and explanations
8. Questioning assumptions underlying the analysis of the problem
9. Tracing the irrelevant facts which are not concerned with the problem
10. Locating the irrelevant explanations which are not related to the problem

After going through these processes, the researcher will be able to define or state the problem.

The selection of a suitable problem is a hard task. It is a serious responsibility to commit oneselfto a problem that will inevitably require much time and energy and which is so academically significant.The following are the main sources to which one may proceed for a suitable research problem:

1. Personal experiences of the investigator
2. Researcher can think parallel research problem by drawing analogy from the suggestion of the supervisor and/or through reviewing available literature-research abstracts, journals, hand-books of research, international abstracts etc.
3. By intensively studying in the specific area, researcher may enable to identify a problem from the specific field.
4. The new innovations, technological changes and curricular developments are constantly bringing new problems and new-opportunities for research.
5. It is a general practice that earlier researchers suggest some problems in their research reports as suggestion for further study. The researcher can pick up a suitable problem for his own study.

Defining a Problem

Defining a problem means "To pin-point the problem or defining a problem to reach the core of theproblem i.e. threadbare analysis."

A. Need of defining a problem

The definition of a problem serves the following purposes:

1. The definition of a problem sets the direction of the study.
2. The definition reveals the methodology or procedure of the study.
3. The definition helps the researcher to control subjectivity or biases of the researcher.
4. The definition of the problem suggests and specifies the variables to be taken up into theinvestigation through a problem involved into so many variables.
5. The-definition makes the research work practicable.

B. Precautions are to be taken in identifying the problem

The following precautions should be taken into consideration for identifying problem.

1. The words used for defining a problem should have a single meaning.
2. The statement of the problem must be brief but comprehensive.
3. The assumptions are to be recognised for the study.
4. The problem should have practical importance.
5. The definition or the statement of the problem should have certain rationale.

C. Steps in defining a problem

The following steps are to be followed in defining a problem:

1. Researcher should have to develop a conceptual framework of the problem. The conceptual framework should be such that it can be stated into verbal form.
2. Delimiting the elements of the problem.
3. Classifying the elements in the homogeneous group.

4. Locating the key-points in the conceptual framework.
5. Evaluating the theoretical security of the problem.
6. The final form of the statement can be given into verbal form to a conceptual framework of the problem.
7. Deciding the practical difficulty in conducting the study.

D. Ways to Define the Problem

The following are various ways of defining a problem:

1. Analyse the major problems or problems in terms of subordinate problems.
2. Statement delimits the scope of the study.
3. Orientation of the problem in an unique direction:
   a) A historical account, remote or recent.
   b) A survey of previous study or related studies.
   c) An analysis of previous studies or related subjects.
   d) Preliminary survey.
4. Description of the general nature of the problem.
   a) Type.
   b) Source.
   c) Procedure.
5. Statement of limitations of the technique employed.
6. Recognitions of assumptions and Implications.
7. Importance-value or significance of the study of education.
8. Definition of terms.

Statement of Problem

After selecting a problem, it should be stated carefully the researchers to delimit his task and isolate a specific problem before he can proceed with active planning of the study. This type of decision is culminated in the problem statement.

The following are criteria for good Problem Statements:

1. A problem should be concerned with relation between two or more variables.
2. It should be stated "clearly and unambiguously in question form."
3. It should be amenable to empirical testing.
4. It should not represent a moral or ethical position.

Delimiting a Problem

Delimiting a problem is very important. A study should be delimited by the following aspects:

1. A study should be delimited to certain variables that should be mentioned clearly in the problem.
2. The study is delimited to the area or level as primary level, secondary level, and college or university level.
3. Again study is delimited to size of sample. Considering the time, energy and money, but it should be a representative.
4. Method of Research: A Problem or study may be conducted by different methods but it is not possible. Therefore, the best method should be used so that the study should be delimited to the method only.

5. *Measuring Instrument*: In behavioural science numbers of instruments are available but all tools cannot be used to measure. Thus the best available tool will be used for measuring the variable.
6. *Techniques of Research*: A number of techniques can be used for analysing data but most appropriate techniques should be used.
7. The other limitation should vary from problem to problem as every problem has its own delimitations.

These delimitations may help the researcher for conducting the study and the findings of studiesalso confine to these delimitations.

Assumptions about the Problem

A good statement of a problem is based on some assumptions. The following are the major purposes of assumptions:

1. It makes the research work feasible.
2. It delimits the scope of the problem.
3. It establishes the proper frame of reference.
4. It sets forth certain conditions of the study.
5. It aids in the development of testable hypotheses.
6. It helps in establishing the population and extent of generalization.
7. It also determines the statistical limits for accepting and rejecting of hypotheses.

The assumptions are essential features in the building of scientific model which helps in criticalanalysis.

Evaluating the Problem

Before the proposed research problem can be considered appropriate, several searchingquestions should be raised. Only when those questions are answered in the affirmative,that problem can be effectively solved through the process of research.

1. Do the data existupon which a solution may be based?
2. Is the problem significant? Is an important principle involved? Would the solution make anydifference? If not, there are undoubtedlymore significant problems waiting to be investigated.
3. Is the problem a new one? Is the answer already available? Ignorance of prior studies maylead a student to need spend less time on a problem already investigated by some otherworker.While novelty or originality is an important consideration, the fact that a problem has beeninvestigated in the past does not mean that it is no longer worthy for study. Previousinvestigations might be using newer and better devices and procedures, but there is also aneed for the testing of former findings under changed cultural conditions.
4. Is the problem feasible? After a researcher's project has been evaluated, there remains theproblem of suitability for a particular researcher. While the problem may be a good one, asmay be a good problem for me. The question arises; will I be able to carry it through to asuccessful conclusion? Some of the questions that should be raised are:
   a) Do I have the necessary competence to plan and carry out a study of this type? Do Iknow enough about this field to understand its significant aspects

and to interpret myfindings? Am I skilful enough to develop administer, and interpret the necessary datagatheringdevices and procedures? Am I well-grounded in the necessary knowledgeof statistical techniques?

b) Are pertinent data accessible? Are valid and reliable data gathering devices and procedures available?

c) Will I have the necessary financial resources to carry on this study? What will be theexpense involved in data-gathering equipment, printing, testmaterials, travel and clericalhelp? If the project is an expensive one, what is the possibility of getting a grant froma philanthropic foundations or agency?

d) Will I have enough time to complete the project? Will there be time to devise theprocedures, select the data gathering devices, gather and analyse the data, and completethe research report? Since most academic programmes impose time limitations, certainworthwhile projects of a longitudinal type are precluded.

e) Will I have the courage and determination to pursue the study in-spite of the difficultiesand social hazards that may be involved? Will I be willing to work aggressively whendata are difficult to gather and when others are reluctant to co-operate? Will I be willingto risk the criticism, suspicion, or even opposition that a delicate or controversial studymay raise?

The Research Proposal or Synopsis

A research proposal or research synopsis or an outline of proposed research work serves as a useful basis for the evaluation of a project as well as a guideline for the researcher.The preparation of a research proposal or synopsis is an important step in the research process. A research proposal includes the following essential parts:

1. Problem and statement of the problem.
2. Review of literature or theoretical framework of the study.
3. Hypotheses and objectives.
4. Methodology and procedure of the study.
5. Educational implications or significance of the problem.
6. Definitions, assumptions and delimitations.
7. A tentative structure of the report.
8. Bibliography.

Overview of the Research Process

All scientific research is an iterative process of observation, rationalization, and validation. In the **observation** phase, we observe a natural or social phenomenon, event, or behaviour that interests us. In the **rationalization** phase, we try to make sense of or the observed phenomenon, event, or behaviour by logically connecting the different pieces of the puzzle that we observe, which in some cases, may lead to the construction of a theory. Finally, in the **validation** phase, we test our theories using a scientific method through a process of data collection and analysis, and in doing so, possibly modify or extend our initial theory. However, research designs vary based on whether the researcher starts at observation and attempts to rationalize the observations (inductive research), or whether the researcher starts at a theory and attempts to validate the theory (deductive research). Hence, the observation-rationalization-validation cycle is very similar to the induction-deduction cycle of research.

The first phase of research is **exploration**. This phase includes exploring and selecting research questions for further investigation, examining the published literature in the area of inquiry to understand the current state of knowledge in that area, and identifying theories that may help answer the research questions of interest. The first step in the exploration phase is identifying one or more **research questions** dealing with a specific behaviour, event, or phenomena of interest. Research questions are specific questions about behaviour, event, or phenomena of interest that you wish to seek answers in your research.

The next step is to conduct a **literature review** of the domain of interest. The purpose of a literature review is three-fold:

1. to survey the current state of knowledge in the area of inquiry,
2. to identify key authors, articles, theories, and findings in that area, and
3. to identify gaps in knowledge in that research area.

Literature review is commonly done todayusing computerized keyword searches in online databases. Keywords can be combined using"and" and "or" operations to narrow down or expand the search results. Once a shortlist ofrelevant articles is generated from the keyword search, the researcher must then manuallybrowse through each article, or at least its abstract section, to determine the suitability of thatarticle for a detailed review. Literature reviews should be reasonably complete, and notrestricted to a few journals, a few years, or a specific methodology. Reviewed articles may besummarized in the form of tables, and can be further structured using organizing frameworkssuch as a concept matrix. A well-conducted literature review should indicate whether the initialresearch questions have already been addressed in the literature (which would obviate theneed to study them again), whether there are newer or more interesting research questionsavailable, and whether the original research questions should be modified or changed in light offindings of the literature review. The review can also provide some intuitions or potentialanswers to the questions of interest and/ or help identify theories that have previously beenused to address similar questions.

Since functionalist (deductive) research involves theory-testing, the third step is to identify one or more **theories** whichcan help to address the desired research questions. While the literature review may uncover a wide range of concepts or constructs potentially related to the phenomenon of interest, a theory will help to identify which of these constructs is logically relevant to the target phenomenon and how. Forgoing theories may result in measuring a wide range of less relevant, marginally relevant, or irrelevant constructs, while also minimizing the chances of obtaining results that are meaningful and not by pure chance. In functionalist research, theories can be used as the logical basis for postulating hypotheses for empirical testing.

The next phase in the research process is **research design**. This process is concerned with creating a blueprint of the activities to take in order to satisfactorily answer the research questions identified in the exploration phase. This includes selecting a research method, operationalizing constructs of interest, and devising an appropriate sampling strategy.

Operationalization is the process of designing precise measures for abstract theoretical constructs. Operationalization starts with specifying an "operational definition" (or "conceptualization") of the constructs of interest. Next, the researcher can search the literatureto see if there are existing pre-validated measures matching their operational definition that can be used directly or modified to measure their constructs of interest. If such measures are not available or if existing measures are poor or reflect a different conceptualization than that intended by the researcher, new instruments may have to be designed for measuring those constructs. This means specifying exactly how exactly the desired construct will be measured(e.g., how many items, what items, and so forth). This can easily be a long and laborious process, with multiple rounds ofpre-tests and modifications before the newly designed instrument can be accepted as "scientifically valid."

Simultaneously with operationalization, the researcher must also decide what **research method** they wish to employ for collecting data to address their research questions of interest. Such methods may include quantitative methods such as experiments or survey research or qualitative methods such as case research or action research, or possibly a combination of both. If an experiment is desired, then what is the experimental design? If survey, do you plan a mail survey, telephone survey, web survey, or a combination? For complex, uncertain, and multifaceted social phenomena, multi-method approaches may be more suitable, which may help leverage the unique strengths of each research method and generate insights that may not be obtained using a single method.

Researchers must also carefully choose the target population from which they wish to collect data, and a **sampling** strategy to select a sample from that population. For instance, should they survey individuals or firms or workgroups within firms? What types of individuals or firms they wish to target? Sampling strategy is closely related to the unit ofanalysis in a research problem. While selecting a sample, reasonable care should be taken to avoid a biased sample (e.g., sample based on convenience) that may generate biased observations.

At this stage, it is often a good idea to write a **research proposal** detailing all of the decisions made in the preceding stages of the research process and the rationale behind each decision. This multi-part proposal should address what research questions you wish to study and why, the prior state of knowledge in this area, theories you wish to employ along with hypotheses to be tested, how to measure constructs, what research method to be employed and why, and desired sampling strategy.

Having decided who to study (subjects), what to measure (concepts), and how to collect data (research method), the researcher is now ready to proceed to the **research execution** phase. This includes pilot testing the measurement instruments, data collection, and data analysis.

Pilot testing is an often overlooked but extremely important part of the research process. It helps detect potential problems in your research design and/or instrumentation (e.g., whether the questions asked is intelligible to the targeted sample), and to ensure that the measurement instruments used in the study are reliable and valid measures of the constructs of interest. The pilot sample is usually a small subset of the target population. After a successful pilot testing, the researcher may then proceed with **data collection** using the sampled population. The data collected may be quantitative or qualitative, depending on the research method employed.

Following data collection, the data is analysed and interpreted for the purpose of drawing conclusions regarding the research questions of interest. Depending on the type of data collected (quantitative and/or qualitative), **data analysis** may be quantitative or qualitative or mixed type.

The final phase of research involves preparing the final **research report** documenting the entire research process and its findings in the form of a research paper, dissertation, or monograph. This report should outline in detail all the choices made during the research process (e.g., theory used, constructs selected, measures used, research methods, sampling, etc.) and why, as well as the outcomes of each phase of the research process. The research process must be described in sufficient detail so as to allow other researchers to replicate your study, test the findings, or assess whether the inferences derived are scientifically acceptable. Note that research is of no value unless the research process and outcomes are documented for future generations; such documentation is essential for the incremental progress of science.

5 The Literature Search and Review

This chapter is divided into two parts. In first part authors try to explain on the literature search and in the second part on literature review.

Several questions come to mind for discussing on the searching and reviewing literatures, such as:

- Why is it so important in research?
- What is a literature search?
- What is a literature review?
- How to put a literature review together?

Part-I: Literature Search

What is Literature search?

- Literature search is a systematic and thorough search of all types of published literature in order to identify a breadth of good quality references relevant to a specific topic
- The success of research project is dependent on a thorough review of the academic literature. A critical discussion of existing knowledge – drawn from:
    - Books
    - Articles
    - Journals
    - Research publications
    - Databases
    - Thesis and Dissertations

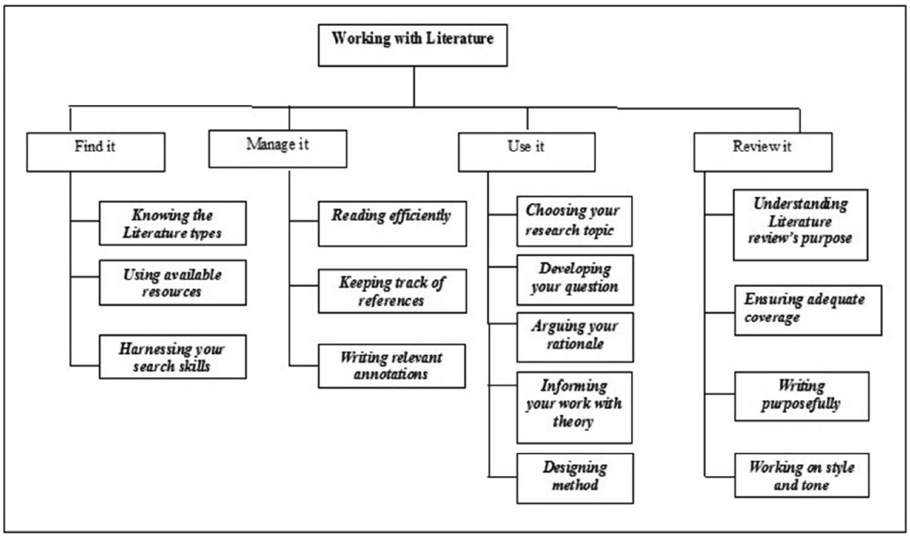

Fig. 5.1: Schematic representation of working with literature

What is Information?

- Information is Data that is
  - accurate and timely,
  - specific and organized for a purpose,
  - presented within a context that gives meaning and relevance, and
  - lead to an increase in understanding and decrease in uncertainty.
- Information is valuable because it can affect our behaviour, decision, or an outcome.

Need of Information for research:

- Availability and use of **relevant** and **useful** information makes lot of difference on the growth and development of the discipline, individual and society and the country at large.
- Increased dependence on the information for our day-to-day activities led to the creation of 'Information Society'.
- The word information is replaced with 'knowledge' to give more emphasis on understanding and now we call ourselves as 'Knowledge Society'.
- It is a fact that the publishing industry is exploiting us by continuously increasing the cost of information which is published in various formats and media.
- It is difficult for individuals to purchase or access the published information and in this context the libraries should take the responsibility to fulfil the information needs.
- We also need to understand the limitations of libraries as well.
- Growth and use of ICT in the libraries make access to the information much easier and faster.
- Information is being published in new formats and the developed countries

made use of the ICT tools and had remote access to the information

- Lack of access to information widened the division between the countries resulting into **digital divide.**
- There are plenty of information resources, which are authentic and valuable over the Internet.
- Gateways provide access to many valuable information resources wherever they are created.
- Internet facilities became a boon to the countries across the World.
- Developing countries have the opportunities to compete with rest of the world in the 21st century

Growth of Information

- The world's information is doubling every two years.
- In 2011 the world created a staggering 1.8 zettabytes.
- By 2020 the world will generate
  - 50 times the amount of information
  - 75 times the number of "information containers"
  - IT staff to manage it will grow 1.5 times.
- New "information taming" technologies such as:
  - duplication,
  - compression, and
  - analysis tools are sliding down the cost of creating, capturing, managing, and storing information.

(source: www.emc.com)

Library Resources for Literature

- Monographs
  - Books, conference proceedings, reports etc.
- Current periodicals
- Bound Volumes
- Theses and Dissertation
- Electronic Resources
- Open Access Resources

What is an 'electronic resource'?

Electronic resources are those which can be accessed by computer - in particular, via email, CD-ROM, or more commonly, via the World Wide Web. Libraries are increasingly making this type of resource available to their users, using these resources a wide range of materials and research tools can be accessed.

- Any Information resource that can be accessed using a computer, e.g.

1. Electronic journals
2. Scholarly databases
3. Information gateways
4. The Internet

§ Also e-books, reports, magazines, grey literature

Electronic journals

- Full-text journal available
  - Electronic version of print
  - Electronic only

Examples at www.oup.co.uk/jnls

- Partial full-text – selected articles only
- Table of contents or abstracts only

Examples at www.ajol.info

E-journals can come in a variety of different formats.

Full text: the complete text of all the articles in a journal are available on-line.

Around 90% of Science Technology and Medicine and 50% of Humanities journals are available online

Partial full-text: only selected articles available as full text, and not the whole journal. In this case it is often things like the editorial, or the forthcoming events section that are missing. In other cases a few selected items from an electronic journal may be accessed for free, but access to the whole journal would only be available to subscribers.

TOCs/Abstracts: you may find that only the Table of Contents and possibly abstracts of the articles will be available to you. This may be because your institution does not have a subscription to the full-text access rights, or possibly because there is a document delivery option, whereby you can pay online to have the full-text of individual articles to be sent to you can still be very useful for literature searches.

Why use e-journals?

- are often the most up-to-date resource available
- electronic articles are sometimes made available as soon as they have been edited etc, without having to wait for enough papers to be processed to make up a whole journal issue. This can be important in research fields which move rapidly.
- access from your desktop PC, if you have the equipment needed to support them.
- value added features such as:
  - ability to search across the whole collection of journals using keywords;
  - cross-linking to other databases or collections of e-journals;
  - direct links from the list references to the cited article;
  - supplementary information, such as detailed experimental data, which there may not have been space for in the print format;
  - inclusion of multimedia examples.

The availability of many free electronic databases and journals gives you access to more resources than might otherwise is available through your local library.

- **Coverage**: they are current/Up-to-date
- **Convenient:** information at our desktop
- **Value-added features**: search facilities, links to other databases, supplementary information, graphics, etc.,

- **Access:** to wider range of materials than the materials available in our local library

Scholarly databases

There are many different types of databases, depending on the type of information involved. Bibliographic databases most frequently used for scholarly work. These consist of information about publications, which can be journal articles, conference papers, books, technical reports etc. The records contain basic descriptive information about each item:

- e.g., the title, author, source, abstract, publisher, date etc.
- provides all the information needed to identify the item.
  - **Bibliographic**: references to published material
  - **Numeric**: e.g. statistical tables
  - **Full text**: complete publications
  - **Audio**: collections of music
  - **Image**: collections of slides etc.
  - **Multimedia**: audio-visual, animation etc.(Examples: EBSCO Host, **www.epnet.com, www.doi.org, www.isinet.com/isilinks/**.)
  - licensed, range of electronic information resources, huge volume of information

Why use scholarly databases?

The information contained in these databases typically consists of a reference to a published document along with a summary of what the document contains. Scholarly databases are used to find out what has been published in your field, and to help you identify material which you need to obtain. They can be used retrospectively, to gain knowledge of the research background and activity in your own area of research. They can also be searched regularly to keep up-to-date with any new developments. Often databases provide an alerting service which regularly runs your search strategy and emails the results to you.

- Provide information for a specific project or topic
- Provide an overview of research activity in a given area
- Up-to-date information on a specific subject area through regular scanning
- Allows searching over large bodies of data and academic type information

Information Gateways: Information Gateways is a web site where people have collectively gathered quality data resources on a particular subject area. Example: PINAKES (information gateway)

Why use information gateways?

Basically, information gateways provide you with a way of finding good quality, subject focussed resources.

- High quality information – selected by subject experts
- Classification and description of resources
- Subject-specific focus
- Good starting place that lead to other quality resources

The Internet: Another major e-resource is the Internet which can be searched using search engines, such as Google, Alta Vista, Excite etc. Huge amounts of information can be retrieved through the Internet. Researchers have to be aware that the quality of information what is retrieved is not always reliable, and often not particularly relevant. Nevertheless, buried among the heaps of irrelevant, trivial and pointless materials on the Internet there is much that is worthwhile and valuable (which may also be sorted into information gateways).

- Huge information resource (>10 billion pages of information)
- Continually growing and changing
- No national, political, or scientific barriers
- Efficient search tools allow relatively easy navigation, e.g.

Strengths of electronic resources: By the use of electronic resources, there is an enormous amount of information available to us. It can be very up-to-date and of high quality, and sometimes free. But it requires new skills – ICT, effective searching - to make full and effective use of it.

Weaknesses of electronic resources: There are also other complications with e-information such as:

- Technical barriers to use
  - need computers, network connection, software, etc.,
- Infrastructural problems
  - bandwidth and telecommunications issues
  - unreliable electricity supplies, etc.,
- Skills and training requirements
- Costs can be high: technology and content
- Variable quality of information

How can we access e-resources?

So, if we decide these resources may be useful to us, how can we get access? Costs of scholarly information (e.g. journals) can be very high. Researchers can access paid e-resources either – by subscribing it individually or through institution / university for certain period. Researcher may access by paying for a particular article. Researchers can also opt for 'Open Access' e-resources which are freely available to all. Whichever method we use, we will usually need to prove that we have the right to access the material by either entering a password or by identifying the machine we are working on via IP address.

Open Access (OA) Resources:

"Old tradition and new technology converged to make possible an unprecedented public good" -Budapest Open Access Initiative, February 14, 2002

- There are two schools of thought on OA
- School # 1 = **"Gratis OA"**
  - "***Open Access***" means free access, use, and store, with no purchase, fees, or registration required (*Owner retains copyright and control over re-use*)
- School # 2 = **"Liberal OA"**
  - "***Open Access***" means all the above plus:
- Freedom to re-use, modify, re-distribute, re-package, make derivative works, etc.

(*Owner retains 'copyright' but grants a Creative Commons license that permits all other uses subject only to attribution requirement*)

Business models of OA

- There are two broad recognized business models
  - **Green OA** (nobody pays)
  - **Gold OA** (author or someone pays)
- Publishers obviously prefer a model where somebody pays

Open access initiatives

- Significant movement in academic community is that ***information should be "free" to all***
- Access problems and costs are universal
- Author pays versus user pays or other models
- Open archiving, pre-prints, open access, self-archiving, institutional archives or subject specific archives
- Tends to be techno-centric at present

Examples of open access e-resources

- PubMed Central – hard sciences (www.pubmedcentral.nih.gov/)
- BioMed Central – medicine (www.biomedcentral.com/)
- DOAJ – all subjects: >**10,036** Journals; >**5,883** searchable at Article level; **135** Countries; and >**1,749,741** Articles (ww.doaj.org/)
- Bioline – research from developing countries (http://www.bioline.org.br/)

Why Open Access?

- Scientists in major research organizations started adopting alternative ways of sharing their research through Open Access Initiatives (OAI).
- Open Access removes restrictions on the access to journal articles and knowledge in general, to the research community world-wide, particularly in Developing Countries
  - Open Access accelerates: research, enriches education, shares learning among rich & poor nations, and enhances return on taxpayer's investment in research.
- Since access to information is essential, the society benefits from the open exchange of ideas.
- There are many forms of Open Access Initiatives, each having its own costs and benefits
- Open access promises to remove both the *price barriers* and the *permission barriers* to provide access to the journal literature.
- More and more authors and institutions are turning towards open access publishing,
- Research is expected to be collaborative and more productive in open access era

Open Access Initiatives in India

Open Access Online Journals:

- ***Indian Academy of Sciences*** (http://www.ias.ac.in/pubs/journals)
- ***Indian National Academy of Sciences*** **(**http://www.insa.ac.in)
- ***Indian MEDLARS Centre (NIC)*** (http://medind.nic.in)
- ***Medknow Publications*** **(**http://www.medknow.com/journals.asp)
- **Indianjournals.com** (http://www.indianjournals.com)

Library Networks and Consortia:

- ***ERNET India****: Educational and Research Network* (*http://www.ernet.in*)
- ***NICNET****: National Informatics Center Network* (*http://www.nic.in*)
- *Information and Library Network Centre* ***(INFLIBNET)*** (*http://www.inflibnet.ac.in*)
- *Developing Library Network* ***(DELNET)*** (*http://delnet.nic.in*)
- Indian National Digital Library in Engineering Sciences and Technology (**INDEST**) (http://paniit.iitd.ac.in/indest)
- **UGC- Infonet**e-journals consortium (http://unicat.inflibnet.ac.in/econ/mindex.htm)
- **CSIR** Consortium (Council of Scientific and Industrial Research) (http://202.54.99.7/ejournal/ejournalhome1.htm)
- **FORSA** Consortium (Forum for Resource Sharing in Astronomy and Astrophysics). (http://www.iiap.res.in/library/forsa.html)

Review Articles: The *Annual Review* series is a good place to start reading. There are *Annual Review* volumes for many disciplines, including psychology (every year since 1950), anthropology (every year since 1972), sociology (since 1975), public health (since 1997), and political science (since 1998). Authors who are invited to publish in these volumes are experts in their fields; they have digested a lot of information and have packaged it in a way that gets you right into the middle of a topic in a hurry. Review articles in journals and bibliographies published as books are two other excellent sources. Every article in the *Annual Review* series is available online, providing your library subscribes to this service. If it doesn't, then use the printed volumes. Don't worry about printed review articles being out of date. The *Web of Science* and other documentation resources have eliminated the problem of obsolescence in bibliographies and review articles.

The Thompson Institute for Scientific Information, or ISI (http://www.isinet.com) produces the *Science Citation Index Expanded* (the SCI), the *Social Sciences Citation Index* (the SSCI), and the *Arts and Humanities Citation Index* (the A&HCI). Together, these three indexes comprise the *Web of Science*, the indispensable resource for doing a literature search.

Besides the *Web of Science*, three very important resources for anthropologists are *Anthropological Index Online* (AIO), *Anthropological Literature* (AL), and *Abstracts in Anthropology* (AIA). Other useful databases include: *International Bibliography of Anthropology,* ERIC, NTIS, MEDLINE, PsycINFO, *Sociological Abstracts*, Lexis-Nexis, and OCLC.

Anthropological Index Online: *Anthropological Index* (AI) began as a quarterly journal, published by the Royal Anthropological Institute in London, and as an index of the periodicals in Museum of Mankind Library of the British Museum. AI became an online product in 1997 and is a free service. (http://aio.anthropology.org.uk/aio/AIO.html)

Anthropological Literature: The Tozzer Library in the Peabody Museum of Archaeology and Ethnology at Harvard University is the largest collection of anthropological literature in the world. In 1979, Tozzer began publishing *Anthropological Literature*, a quarterly journal that indexes the books and articles that come into the library (much as AI indexes the holdings of the Museum of Mankind Library in London). In addition to the library's book holdings, *Anthropological Literature* indexes about 850 journals across the whole field of anthropology and in related fields like demography, economics, and psychology. The database for AL grows by about 10,000 citations every year. The Tozzer Library was founded in 1866, and many of the periodicals received by the library have been indexed since before World War I. You can use AL, then, as a complete index to major journals, such as the *American Anthropologist*, *American Antiquity*, and the like. AL and AIO are available in one combined database, called Anthropology Plus, through the RLG (Research Libraries Group) Eureka database.

Abstracts in Anthropology (AIA): AIA is a quarterly journal, published since 1970 (in print form only, not online), that selectively covers current literature on archeology, cultural anthropology, physical anthropology, and linguistics. Indexing journals, like AIO and AL, simply list all the items and cross-index them by author, title, and subject heading. An abstracting journal summarizes the articles it covers by publishing abstracts of from 50 to 200 words. Indexing services cover more ground; abstracting services provide more depth. AIA publishes 150-word abstracts of the research articles in each of about 130 journals in each issue. AIA publishes the abstracts to all the research articles in the seven most important journals for cultural anthropologists, so browsing through AIA from time to time is a great way to keep up with what's going on in anthropology. The seven top journals are, in alphabetical order: *American Anthropologist*, *American Ethnologist*, *Current Anthropology*, *Ethnology*, *Human Organization*, *Journal of Anthropological Research*, and the *Journal of the Royal Anthropological Institute*.

International Bibliography of Anthropology: This source is part of the *International Bibliography of the Social Sciences* (IBSS) series that began in 1952 as a product of the International Committee on Social Science Information and Documentation (ICSSID), a UNESCO funded body. There were four volumes in the set each year, one each on sociology, political science, economics, and cultural anthropology. In recent years, the IBSS has been published commercially and is now both a paper and an online product.

ERIC: The Educational Resources Information Center, or ERIC, began in 1966 as a microfiche archive to index literature of interest to researchers in education. ERIC is free and online at http://www.eric.ed.gov. Many of the journals that ERIC indexes are of direct relevance to work in anthropology, and with over a million citations, it is a treasure. But the unique advantage of ERIC is the access it gives you to the gray literature—over 100,000, full-text research reports on studies funded by government agencies and by private foundations.

NTIS: The National Technical Information Service (NTIS), indexes and abstracts federally funded research reports in all areas of science. The NTIS is available online at http://www.ntis.gov/.

MEDLINE: MEDLINE is a product of the National Library of Medicine. It covers over 3,700 journals in the medical sciences—including the medical social sciences—going back to 1966. MEDLINE is available at university libraries through services like First-Search and Cambridge Scientific Abstracts, but there is a free version of MEDLINE, called, whimsically, *PubMed*, at http://www.index.nlm.nih.gov/databases/freemedl.html. If you are working on anything that has to do with health care, MEDLINE, with its four million citations and abstracts is a must.

PsycINFO, PsycARTICLES, and Sociological Abstracts: PsycINFO and PsycARTICLES are products of the American Psychological Association. The Jurassic version of PsycINFO goes back to 1887 and has over eight million citations. The database covers 1,800 journals (including the *American Anthropologist*) and adds about 50,000 new references and abstracts each year. The PsycARTICLES database comprises full-text material from journals published since 1985 by the American Psychological Association and by the Educational Publishing Foundation.

Sociological Abstracts is a product of Sociological Abstracts, Inc., a division of Cambridge Scientific Abstracts. It covers about 1,800 journals dating from 1963. SA contains about 650,000 records, with about 28,000 new records added each year.

PsycINFO and *Sociological Abstracts* both have excellent coverage of research methods, the sociology of language, occupations and professions, health, family violence, poverty, and social control. They cover the sociology of knowledge and the sociology of science, as well as the sociology of the arts, religion, and education.

Linguistics and Language Behaviour Abstracts (LLBA): LLBA published by Sociological Abstracts, Inc., indexes and abstracts journals in descriptive linguistics, sociolinguistics, anthropological linguistics, psycholinguistics, and so on. It is an excellent resource for work on discourse analysis and all forms of text analysis.

LEXIS/NEXIS: LEXIS/NEXIS (http://www.lexis.com/) began in 1973 as a way to help lawyers find information on cases. Today, the Lexis-Nexis Universe database contains the actual text of about ten million articles from over 18,000 sources, including more than 5,600 news, business, legal, and medical sources.

OCLC: OCLC (http://www.oclc.org/oclc/menu/home1.htm), the Online Computer Library Center, is the world's largest library database.

Some Additional Websites:

In addition to the usual library documentation resources, many super information resources of interest to anthropologists are available through the Internet pages of international organizations. A good place to start is the University of Michigan Document Center's page, called "International Agencies and Information on the Web" at http://www.lib.umich.edu/govdocs/intl.html. This page will point you to the big meta-sites that list the websites for thousands of intergovernmental and nongovernmental organizations (widely known as IGOs and NGOs). The Union of International Associations' guide to IGOs and NGOs, for example, lists thousands of sites. It's at http://www .uia.org/website.htm. Go to FAO's archiving site at http://www.fao.org/

documents/ and type that phrase into the search engine to find reports on local farming practices. Go to the site of the United Nations High Commission on Refugees (UNHCR) at http://www.unhcr.ch/ for the latest statistics on the refugees around the world. Go to the site of the Pan American Health Organization (PAHO) at http://www.paho.org/ for the latest statistics on health indicators for countries in North and South America.

There is a world of high-quality documents available on the Internet. No search of the literature is now complete without combing through those resources. The Anthropology Review Database at http://wings.buffalo.edu/ARD/ provides an expanding list of reviews of books, articles, and software of interest to anthropologists. The Scout Report for Social Sciences, at http://scout.cs.wisc.edu/, is an expanding database of Internet sites. It's published weekly. Search the site for "anthropology" and you'll find lots of useful, full-text resources, like the one at http://www.nativetech.org/, devoted to Native American technology and art.

Part-II: Literature Review

What is a literature review?

A literature review is an evaluative report of studies found in the literature related to your selected area. The review should describe, summarize, evaluate and clarify this literature. It should give a theoretical basis for the research and help you determine the nature of your own research. Select a limited number of works that are central to your area rather than trying to collect a large number of works that are not as closely connected to your topic area.

A literature review goes beyond the search for information and includes the identification and articulation of relationships between the literature and your field of research. While the form of the literature review may vary with different types of studies, the basic purposes remain constant:

- Provide a context for the research
- Justify the research
- Ensure the research hasn't been done before (or that it is not just a "replication study")
- Show where the research fits into the existing body of knowledge
- Enable the researcher to learn from previous theory on the subject
- Illustrate how the subject has been studied previously
- Highlight flaws in previous research
- Outline gaps in previous research
- Show that the work is adding to the understanding and knowledge of the field
- Help refine, refocus or even change the topic

A literature review has 3 key components:

1. A search of the literature available on a given subject area.
2. An evaluation of the literature, including its scope.
3. A well-structured and argued written account of the literature that provides an overview and critique.

Table 5.1: Aims of the literature review for thesis writers

To show a thorough professional grasp of the area	• Identifies the relevant literature • Identifies key ideas, schools of thought, debates and problems • Shows understanding of main theories in area, and how applied • Evaluates previous research • Helps avoid unintentional replication of another study • Incorporates newly published research while thesis is in progress
To justify your research	• Identifies gaps in current knowledge • Establishes the need for your research • Helps define focus and boundaries of your research
To justify your approach	• Discusses previous approaches to topic, placing your study in context • Explains your choice of theoretical framework and methodology
To synthesise literature in the appropriate academic style	• Provides a well-structured account that follows a logical progression • Provides a well-argued account that supports your research question • Provides a well-written account, meticulously referenced

Keeping A Record and Evaluating the Literature:

- **Recording full bibliographical details**

For those writing an extended review, keeping a well-organised and full bibliographical record is essential so that you can keep track of sources found, whether or not you eventually include them. Much time can be wasted following up the same promising source twice because inadequate or inconsistent details were kept the first time. Problems often arise, for example, when deciding how to reference sources like websites.

When you decide on the sources to be included in your literature review, you will of course need their full bibliographical details for your bibliography or reference list, as well as citations in your text.

Previewing sources: Skim through the material you find to see whether the source is relevant before you read it in detail, or print it out. **Table-5.2** shows the key areas to check quickly.

Table 5.2: A guide to previewing sources

Key areas to check in books or articles	Why
Abstract	A summary available on electronic databases and at the head of articles in most disciplines. A good starting point, but sometimes too compressed to be really helpful.
Preface and/or Introduction	Should explain the author's topic and argument, give context.
Table of Contents Headings &	Can be a useful guide to the structure and content. subheadings
Topic/argument sentences	Read through the first sentence of each paragraph for a quick summary of the content.
Discussion	This section in many science articles examines the author's findings in the context of previous research.
Conclusion	Usually sums up the writer's argument and comments on its significance

- **Keeping up with the reading**
- **Managing hard copy**
- **Building your own database**

EVALUATING THE LITERATURE AND MAKING NOTES:

- **Working efficiently:** It is very easy to waste time by reading all sources with equal care, and making detailed notes that will never be used in the review.

Always consider:

- How relevant and significant is the source?
- How much space (if any) will it warrant in your review?

These criteria determine how detailed or extensive should your notes be.

•**Evaluating sources:**

1. Relevance: A simple scale, as in **Table 5.3**, is a useful tool for assessing the relevance of the sources you find.

Table 5.3: Evaluating literature sources

1. Importance e.g.·	Directly relevant to topic • Key work frequently cited • Established basis for future researchWill need adequate notes (in database or separately) for discussion in review
2. Relevance e.g.·	Needs to be included, put probably brief reference • Useful for background material • Similar to other studies – can include in group references Might be adequate to highlight useful background, make brief note in database
3. Borderline e.g.·	Somewhat peripheral – might be worth including • Potential relevance, depending on research findings Unlike to need more information than database note
4. Irrelevant e.g.·	Promising title or abstract, but content too distant from your topic

2. Strengths and weaknesses: Remember you are writing a literature review: you are expected to assess the quality of the material you include and comment where appropriate.

- **Making notes and the conventions of literature reviews:**
  1. Introductory survey
  2. Narrowing the focus
  3. Justifying the need for further research
  - **Alternatives to traditional note-taking:** Use the database alone for brief comments about subject / argument / relevance. Note in the database when you have additional information stored, to refer to when you write about that source. With hard copy, highlight material you want to use and note point in a few words on a sticky marker, used to mark the page. This is a quick way of retrieving larger chunks of information. Drawing up a skeleton plan of your review at an early stage can reduce note-making and sort material efficiently. Use the headings in the plan to put notes directly into the appropriate section, so that your material is sorted thematically as you go.

STRUCTURING AN OUTLINE OF THE REVIEW AS YOU RESEARCH:

A far more efficient and less nerve-wracking alternative is to plan the structure of your review as far as you can right at the beginning of your research, and extend the plan as you work.

- **The skeleton plan -** The ideas you have and the key words defined before starting a literature search provide a useful skeleton structure for organising the material you find. Before starting the search, list likely headings and subheadings in a logical order. This will be your master list. Copy the list into another document that will be a working draft of the review.
- **Expanding the plan -** Add notes and references under appropriate headings of the working draft, it is much easier to grasp and synthesise. Update the master list regularly as you change or sub-divide headings. Maintaining this overview of the structure keeps the structure under control and is also a good way to see the emergence of themes. Because material is being placed under the appropriate headings of the working draft, it is much easier to grasp and synthesise what the literature says about any specific area, and the topic as a whole. It is also much easier to critique the literature in each section, that is, consider how well the literature deals with each specific area, and with the topic as a whole.
- **Final analysis -** Typical questions to ask about each section and of the literature as a whole are: Is there a clear line of development, or does the research branch off in different directions? Is there conflicting evidence? What do you think about that? Are there gaps in the literature? Why? If you are writing a thesis, how does your research contribute to the area?

Your conclusions will form the basis of the introduction to your review, and the introduction to each section.

- **The writing plan -** It is well worth taking some time to refine the final writing plan, because it is much easier to do this than spend many hours cutting and pasting to change the order, only to find that some rewriting is necessary to avoid awkward transitions. Move from the broad (e.g. background material, general surveys) to the particular (e.g. sources discussed in detail, case studies). Move from earlier to later material so that there is a clear sense of development in any specific area. There is sometimes conflict between these two principles: decide what will be clearest for the reader.

Introduction: Usually only one or two paragraphs, unless (depending on the size and nature of the literature review) the introduction also includes substantial background/context material. In an extended literature review, usually some explanation of the focus and boundaries of the literature search. Offers a concise synthesis, or overview, of the literature, summing up what you have found and commenting on the conclusions reached (argument/discussion).

Body: Sections and sub-sections are arranged logically. Each new section has a brief critical overview of the literature. Sources are cited to support a point, not merely listed or described without comment. Much of a literature review is factual, but it should be framed by discussion. Avoid repetition and verbosity by grouping sources that have similar findings.

Conclusion or Summary: Concluding paragraph reiterates overall assessment of the literature. In a thesis, should discuss the gap or shortcomings in research that the thesis is intended to satisfy.

WRITING THE LITERATURE REVIEW:

- **Starting a paragraph with an argument sentence -** This technique makes it clear to the reader what conclusion you have reached about the material in the paragraph. It reinforces the fact that you are presenting a review of the literature, not merely a factual report. The argument sentence is then supported by the discussion of sources that follows. Consider the series of sentences. Each sentence quoted introduces a paragraph of literature review. Each sentence sums up the literature about a specific issue indicating where the evidence is strong or uncertain. Reading these opening sentences consecutively, there is a clear logical order to the review material, beginning with the most major and definite findings, then considering other possibilities. Examples of Argument words: most robust and compelling finding, highly prevalent, also highly prevalent, area of extensive Exploration, may confer, etc.
- **Maintaining the argument -** Ideally, comment and discussion should be maintained in the paragraph so that it is clear how you reached the conclusion argued in the opening sentence. Without such comment you are merely describing the literature, not reviewing it. Students often feel there is nothing much to say about many sources beyond factual content. However, framing description or summary with a few words that indicate you have thought about a study not just as an individual publication, but assessed it in the context of other literature on the topic, makes a much stronger review. Examples of argument comments: A limitation of…; Study confirms…; This extensive survey…; An

exception to…; There was little consensus between….; Only one study deals with…; The studies used different criteria to…; Overall, the evidence suggests…; This finding is consistent with…; Neither study can explain why…; These results contribute to the growing body of evidence that…; The validity of the data is flawed because…; A contrary position is taken by…; Conversely X (year) found…; Studies have documented a need for…; This evidence challenges..; etc.

- **Providing adequate detail -** There needs to be enough detail about the literature you are describing to support the conclusions you draw, and avoid misleading the reader. Some typical issues are: a) Generalising on the basis of only one study, especially if it is very limited; b) Comparing studies without noting significant differences in, for example, the size and nature of the study population, the method, and any other relevant factors.
- **Avoiding a repetitive style -** Avoid beginning every sentence with a citation e.g. Xs' (year) study found…. Y et al.'s (year) research revealed…. A and B's (year) findings showed….

These styles - is tedious to read, encourages the descriptive listing of sources rather than review, suggests the literature has not been adequately analysed, and lengthens the review, as sources are less likely to be appropriately grouped. Whereas, sentences that begin with a comment are much more interesting to read, and guide the reader through a well-digested overview of the literature.

6 Hypothesis

The place of hypothesis is important in general quest as well as in the social research also. The word hypothesis consists of two words: Hypo + thesis = Hypothesis. ‘Hypo’ means tentative or subject to the verification and ‘Thesis’ means statement about solutionof a problem.The word meaning of the term hypothesis is a tentative statement about the solution of theproblem. Hypothesis offers a solution of the problem that is to be verified empirically and based onsome rationale.

Hypothesis is the composition of some variables which have some specific position or role of the variables i.e. to be verified empirically. It is a proposition about the factual and conceptual elements. A tentative generalization or theory formulated about the character of phenomena under observation are called hypothesis.

Hypothesis is a tentative supposition or provisional guess which seems to explain the situation under observation. A hypothesis is a tentative generalisation the validity of which remains to be tested. In its most elementary stage the hypothesis may be any hunch, guess, imaginative idea which becomes the basis for further investigation.

The terms assumption, postulate and hypothesis occur most frequently in the research literature, butare often confused by research scholars. Hence these terms need clear explanation.

Assumption: Assumption means taking things for granted so that the situation is simplifiedfor logical procedure. They merely facilitate the progress of an agreement a partial simplification by introducingrestrictive conditions. Assumptions are made on the basis of logical insight and their truthfulnesscan be observed on the basis of data or evidences.

Postulate: Postulates are the working beliefs of most scientific activity. The postulates are the basis and form the original point of an argument. Postulates are not proven; they are simply accepted at their facevalue so that their basic work for the discovery of other facts of nature can begin.

Hypothesis: A hypothesis is different from both of these. It is the presumptive statement ofa proposition which the investigator seeks to prove. It is a condensed generalization. Thisgeneralization requires knowledge of principles of things or essential characteristics whichpertain to entire class of phenomena. The hypothesis furnishes the germinal basis of the whole investigation and remains to test it out by facts.

Hypothesis remains tentative unless it is substantiated by facts. In order to go ahead with the research proposal we make hypothesis and make efforts to verify them. Till a hypothesis is tested, some final results come about we call them working hypothesis. The researcher is trying to establish cause-effect relationship among several factors. Every hypothesis is based on some bases or logic. It is not purely imaginary investigation.

Characteristics of Hypothesis

There are several characteristics of hypothesis as mentioned bellow:

1. The hypothesis is a guess work, a tentative generalisation or a working strategy.
2. The hypothesis aims at finding out relationship between variables or different set of variables.
3. The hypothesis is put in the form of a major question, a central concern as to what we are looking for.
4. The hypothesis is a systematic conjecturing of propositions.
5. The hypothesis does not drive toward the goal of the inquiry, rather it goes along a set of belief which may on the basis of facts be confirmed or rejected.

Criteria of a Good Hypothesis

1. The hypothesis is in agreement with the observed facts.
2. The hypothesis does not conflict with any law of nature which is known to be true.
3. The hypothesis is stated in the simplest possible term.
4. The hypothesis should express clearly the relationship between two or more variables.
5. The statement of hypothesis should be unambiguous.
6. The hypothesis permits of the application of deductive reasoning.
7. The hypothesis shows very clear verbalization. It is different from what is generally called hunch.
8. The hypothesis ensures that the methods of verification are under control of the investigator.
9. The hypothesis guarantees that available tools and techniques will be effectively used for the purpose of verification.
10. The hypothesis takes into account the different types controls which are to be exercised for the purpose of verification.
11. The hypothesis ensures that the sample is readily approachable.
12. The hypothesis indicates clearly the role of different variables involved in the study.
13. The hypothesis could be stated in such a manner that it can be tested.
14. The hypothesis maintains a very apparent distinction with what is called theory, law, facts, assumption and postulate.

Functions of Hypothesis

The following are the main functions of hypothesis in the research process:

1. The hypothesis makes researcher sensitive to his research work so that he should work selectively and have very realistic approach to the problem.

2. The hypothesis performs the function of an intelligent guide.
3. The hypothesis establishes relationship among data.
4. It helps in the formulation of the relevant concepts.
5. It helps in explanation of the data.
6. It suggests methodology to be followed in a particular inquiry.
7. The hypothesis also functions as a stimulator for the researcher.
8. The hypothesis gives a definite point to the inquiry.
9. The hypothesis aids in establishing the direction in which to proceed.
10. The hypothesis delimits the scope and the field of an inquiry.
11. The hypothesis offer the simple means for collecting evidences to the verification.

Sources of Hypotheses

Hypotheses are originated from essentially the same background that serves to reveal problem. These sources are namely theoretical background, knowledge, insight and imagination that come from instructional programme and wide reading experiences, familiarity with existing practices. The major sources of hypotheses are given below:

1. Specialization of an educational field.
2. Programme of reading: Published studies, abstracts research journals. Hand books, seminars on the issue, current trends on the research area.
3. Instructional programmes persuaded.
4. Analyse of the area studied.
5. Considering existing practices and needs.
6. Extension of the investigation.
7. Offshoots of research studies in the field.

KINDS OF HYPOTHESES

Hypotheses vary in form and some extent. A working hypothesis or a tentative hypothesis is described as the best guess or statement derivable from known or available evidence.

There are four kinds of hypotheses:

1. Question
2. Declaration Statement
3. Directional Statement
4. Null form or Non-Directional.

1. Question form of Hypotheses**:** Some writers assert that a hypothesis may be stated as a question; however, there is no general consensus on this view. At best, it represents the simplest level of empirical observation. In fact, it fails to fit most definitions of hypothesis.
2. Declarative Statement**:** A hypothesis may be developed as a declarative that provides an anticipated relationship or difference between variables. The anticipation of a difference between variables would imply that the hypothesis developer has examined existing evidence which led him to believe a difference may be anticipated as processes additional evidence. It is merely a declaration of the independent variables effect on the criterion variable.

3. Directional Hypothesis**:** A hypothesis may be directional which connotes an expected direction in the relationship or difference between variables.This kind of hypothesis is less safe thanthe others because it reveals two possible conditions. The first condition is that the problem of seeking relationship between variables is so obvioustthat additional evidence is scarcely needed. The second condition derives because researcherhas examined the variables very thoroughly and the available evidence supports the statementof particular anticipated outcomes. An example of the obviously safe hypothesis would be'Hypothesis' that high intelligence students learn better than low intelligent students. Theabove hypothesis is in the directional statement form but it requires evidence for the relationshipof these two variables reinforcement and personality.
4. Non-Directional Hypothesis: A hypothesis may be stated in the null form which is an assertion that no relationship or no difference exists between or among the variables. This form null hypothesis is a statistical hypothesis which is testable within the framework of probability theory. It is also a non- directional form of hypothesis. The following is the example of null form of hypothesis.

H0: There is no significant relationship between intelligence and achievement of students.

Recent trend is to employ or develop null hypotheses in research work. A null hypothesis accepted is tentatively to stating that on the basis of evidence tested it could be thatthere is no difference. If the null hypothesis is rejected, there is a difference but we do not know thealternative or the differences. In this form of hypothesis, researcher has not to anticipate or give therationale for the declaration or directional form. Secondly, it does not make researcher biased or prejudiced.

Researcher can be objective about the expected outcomes of the research or findings.

Null hypothesis means zero hypotheses which are self-explanatory in nature. A researcher has not to do anything in developing such form ofhypothesis. In the process of reflective thinking research hypothesis is second step whereas nullhypothesis is fifth step of research process.In order to accommodate the object of the inquiry for extracting this information, a null hypothesisis an appropriate form. A null hypothesis does not necessarily reflect the expectations of the researcherso much as the utility of the null form as the best fitted to the logic of chance in statistical knowledgeor science.

A statistical hypothesis must be testable within the framework of probability theory. The theoryrequires one or the other of two hypotheses forms: the 'null' form and the 'delta' form.The null form is the no difference form i.e. there is no difference or relationship between oramong variables under certain conditions.

Null hypothesis provides the basis of accepting or rejecting the general hypothesis. Null Hypothesis is a statistical hypothesis which is used in analysing the data. It assumes that observed difference is attributable by sampling error and true difference is zero.

Formulation of Testable Hypothesis:

The hypothesis formulation is one of the most difficult steps in the entire scientific process. A poorly chosen or poorly worded hypothesis can be prevented by:

1. obtaining of enough pertinent data,
2. drawing of conclusions and generalizations,
3. application of certain statistical measures in the analysis of the result.

A study may be devoted to the testing of one major hypothesis, a number of subsidiary hypotheses,or both major and subsidiary hypotheses. When several hypotheses are used, each should be statedseparately in order to anticipate the type of analysis required and in order to definitely accept or rejecteach hypothesis on its own merit. Regardless of the number or type of hypotheses used, it is extremelyimportant that each be specific testable, and based upon a logical foundation.

The chief characteristic of a usable hypothesis is that it must be empirically testable.

The hypothesis derived from theories is termed as research hypothesis or working hypothesis.

Difficulties in the Formation of Useful Hypothesis: The following are the difficulties in the formation of hypothesis:

1. Absence of knowledge of a clear theoretical framework.
2. Lack of ability to make use of the theoretical framework logically.
3. Lack of acquaintance with available research technique resulting in failure to be able to phrase the hypothesis properly.

Testing the Hypothesis:

The evidence of the work of hypothesis lies in its abilities to meet test of its validity. The purpose oftesting a hypothesis is to determine the probability that it is supported by fact. Because a hypothesis isa general expectation about the relationship between variables there is an extremely large number ofinstances under which it can be tested, and it would be impractical to attempt to gain support in all ofthese instances. Validity of a hypothesis is established in two stages:

1. The statement of hypothesis allows the investigator to develop deduction and certainimplications which when stated in operational terms can lead to rejection of hypothesis thatare in conflict with accepted knowledge at the logical level.
2. If a hypothesis passes the test of logic, it then must be subjected to an empirical test,perhaps through an experiment or a series of measurement.

A hypothesis is never proved it is merely sustained or rejected. If it fails to meet the test of itsvalidity, it must be modified or rejected.The confirmation of a hypothesis, on the other hand, is always, tentative and relative, subject tolater revision and even rejection as further evidence appears or as more adequate hypotheses is introduced.The form of the hypotheses to be tested can be very controversial. The null form is probablypreferred by most experienced research personnel. The null hypothesis states that there is no differencebetween two groups or treatments. It is generally used to spell out what would be the case if the nullhypotheses were true. The no difference statement assumes that the two groups will be tested andfound to be equal.

Formal Conditions for Testing Hypotheses:

There are two types of hypothesis statements:

a) Null hypothesis, and
b) Hypothesis prediction form (research hypothesis).

Whether the experimenter chooses the hypothesis prediction or the null form, there are certainformal conditions which must be met in order for the hypothesis to be considered testable. These arelisted below:

1. It must be stated so that deductions can be made from it and so that decisions can bereached as to whether or not it explains the facts being considered.

2. It should be worded clearly and unequivocally in operational terms. This should leave nodoubt as to what action, what prediction, what quality or quantity, or who is involved?
3. It must be capable of being refuted. There must be some comparisons possible which willallow the researcher to give either a 'yes' or 'no' answer to the hypothesis stated.
4. It should be specific and testable, with all predictions and operations to be tested spelled out.
5. It should have simplicity. If it is too complex, consideration should be given to dividing it intosub-hypothesis.
6. It should be directly related to the empirical phenomena.
7. It must be stated in final form early in the experiment before any attempt at verification ismade.
8. It should be so designed that its test will provide an answer to the original problem whichforms the primary purpose of the investigation.
9. It must be related to available techniques of design procedure, and statistical analysis.
10. It should be related to available knowledge or theory concerning the original problem area.

Steps in Testing Hypothesis:
Step-1: State the research hypothesis
Step-2: Formulate the null hypothesis
Step-3: Choose a statistical test
Step-4: Specify a significance level
Step-5: Compute the statistical test
Step-6: Reject / accept the null hypothesis
Step-7: Draw the inference

7 Research Design

A research design is the logical and systematic planning and directing the research. The design results from translating a general scientific model into varied research problems. But, in practice, in most of the cases, it is just a plan of study, generally vague and tentative. It undergoes many changes and modifications as the study progresses and insights into it deepen. Research design is a comprehensive plan for data collection in an empirical research project. It is a "blueprint" for empirical research aimed at answering specific research questions or testing specific hypotheses, and must specify at least three processes:

1. the data collection process,
2. the instrument development process, and
3. the sampling process.

A research design outlines how the research study will be carried out. It addresses itself to certain key issues involved in carrying out the research.

Research design may be either informal if it is only for researcher's own use, or formal when it is a part of a grant proposal. Research design addresses itself to certain questions about the research projects such as:

- Ø What is the problem under study?
- Ø What is major research question?
- Ø What is the area of the study (the population)?
- Ø How many people will be studied?
- Ø How these people will be selected?
- Ø What methods and techniques will be used to analyse data?
- Ø What statistical methods and techniques will be used to draw inferences?

To be more specific, a research design includes the details about the problem, objectives, research questions, area of study, sampling plan, and method and techniques of data collection and analysis. Keeping in view the various dimensions, research designs can be organised into three groups:

1. Research designs indicating the purpose of doing research
2. Research designs indicating its intended use, and
3. Research designs indicating the effects of time,

Research designs are closely linked with the purpose / objectives of a research study. Studies may have a combination of purposes, e.g., a study may aim at exploring a new topic as well as describing a social phenomenon. It is very common that many researchers label their research design as exploratory research design or descriptive research design.

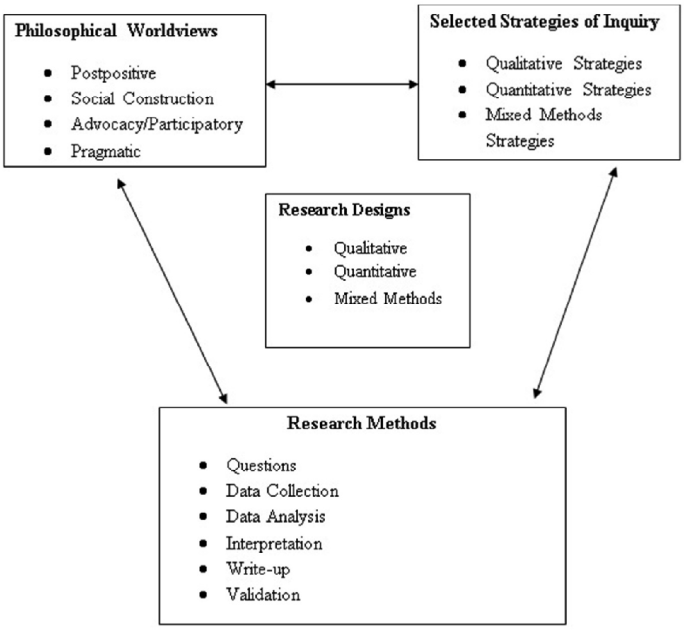

Fig. 7.1: A Framework for Design (Source: Creswell, 2009)

Most quantitative research designs in social sciences falls into one of the following two categories:

1. Survey Research Designs, or
2. Experimental Research Designs.

Survey Research Designs follow Property-Disposition Research paradigm which is further categorized into three types on the basis of the purpose of the study as mentioned below.

Survey Research Designs

Research Designs	**Purpose of Study**
• Exploratory Study	• Exploration
• Descriptive Study	• Description
• Explanatory Study	• Explanation

Exploratory Research Design:

Exploratory research often starts with reviewing available literature and/or data, or qualitative approaches such as informal discussions, in-depth interviews, focus groups, or case studies. Therefore, data collected are, basically, qualitative in nature. Thus, researchers quantify the data and then draw conclusions. Exploratory research is not generalizable to the population at large. Exploratory research studies do not have hypotheses. The purpose of exploratory studies is to formulate a problem for a more precise investigation or to develop hypotheses. The results of exploratory research are *inconclusive* but they can provide significant insight into a given situation. An exploratory study can also be conducted to enhance the familiarities of researcher with the phenomena he/she wishes to study. Researchers employ exploratory research design when *little is known* about the topic and *previous theories* do not explain the phenomenon.

Descriptive Research Designs:

Descriptive studies, as name suggests, describe as accurately as possible the *interrelationship between characteristics* of a group of people or a community and their opinions/beliefs/feelings /attitudes etc. A researcher, who has already some knowledge about a phenomenon but he / she wishes to know more about it, adapts descriptive study design. Therefore, descriptive research studies must have hypothesis.

Explanatory Study:

When we have a problem that is already known and have a description of it, we may like to know why things are the way they are. The purpose of explanatory research studies is to explain “why”. In explanatory research studies, the researcher goes beyond focusing on a topic or portraying it. He or she looks for causes and reasons.

Experimental Research:

The experimental method, gives a sense of evidence, a realization of the difficulties of human observation, and a kind of scientific conscience. Most anthropologists don’t do experiments, but a solid grounding in the **logic of experiments** is one of the keys to good research skills, no matter what kind of research is going on. Experimental researches follow stimulus-response paradigm. Two most important features of experimental research:

1. Manipulation of an Independent Variable.
2. Control of Extraneous Variables

Experimental studies are concerned with testing of causal hypothesis. A causal hypothesis refers to causal relationships between two variables where one variable X (cause) determines another variable Y (effect). Experimental studies are those that are intended to test cause-effect relationships (hypotheses) in a tightly controlled setting by separating the cause from the effect in time, administering the cause to one group of subjects (the “treatment group”) but not to another group (“control group”), and observing how the mean effects vary between subjects in these two groups.

On the basis of sampling, **experiments** can be categorised into two types**:**

1. **true experiments** (participants are assigned randomly; either a **treatment group** or a **control group**)
2. **quasi-experiments** (participants are selected)

On thebasis of place of **experiment,** it can be categorised into two types**:**

1. **laboratory experiments**
2. **field experiments**

In a true experimental design, subjects must be randomly assigned between each group. If random assignment is not followed, then the design becomes quasi-experimental. Experiments can be conducted in an artificial or laboratory setting or in field settings. Laboratory experiments allow the researcher to isolate the variables of interest and control for extraneous variables, which may not be possible in field experiments. Hence, inferences drawn from laboratory experiments tend to be stronger in internal validity, but those from field experiments tend to be stronger in external validity. Experimental data is analysed using quantitative statistical techniques. The primary strength of the experimental design is its strong internal validity due to its ability to isolate, control, and intensively examine a small number of variables, while its primary weakness is limited external generalizability since real life is often more complex (i.e., involve more extraneous variables) than contrived lab settings. Furthermore, if the research does not identify formerstake relevant extraneous variables and control for such variables, such lack of controls may hurt internal validity and may lead to spurious correlations.

True Experiments

There are five steps in a **classic experiment**:

1. Formulate a hypothesis.
2. Randomly assign participants to the intervention group or to the control group.
3. Measure the dependent variable(s) in one or both groups. This is called *O*1 or "observation at time 1."
4. Introduce the treatment or intervention.
5. Measure the dependent variable(s) again. This is called *O*2 or "observation at time 2."

Before doing an experiment, a clear hypothesis about the relation between some independent variable (or variables) and some dependent variable (or variables) is needed. Experiments thus tend to be based on **confirmatory** rather than **exploratory research** questions.

For experiment, at least two groups needed, i.e. the **treatment group** (or the **intervention group** or the **stimulus group**) and the **control group**. One group gets the intervention and the other group doesn't. The treatment group (or groups) and the control group(s) are involved in different **experimental conditions**.

One or both groups are measured on one or more dependent variables. This is called the **pre-test**. Dependent variables in people can be physical things like weight, height, systolic blood pressure, or resistance to malaria etc. They can also be attitudes, moods, knowledge, or mental and physical achievements.

The intervention (the independent variable) is introduced.The dependent variables are measured again. This is the **post-test**.

Good experiments test narrowly defined questions. This is what gives them knowledge-making power.True experiments, with randomized assignment and full control by the researcher, produce knowledge that has high **internal validity**. This means that changes in the dependent variables were probably *caused by*—not merely related to or correlated with—the treatment. Continual replication produces **cumulative knowledge** with high **external validity**—that is, knowledge that you can generalize to people who were not part of your experiment.

True experiments and quasi-experiments are *conducted* and the results are *evaluated* later. **Natural experiments**, by contrast, are going on around us all the time. They are not conducted by researchers at all—they are simply evaluated. Here are four examples of common natural experiments: (1) some people choose to migrate from villages to cities, while others stay put. (2) Some villages in a region are provided with electricity, while some are not. (3) Some middle-class students go to college, some do not. (4) Some cultures practice female infanticide, some do not. Each of these situations is a natural experiment that tests *something* about human behaviour and thought. The trick is to ask: "what hypothesis is being tested by what's going on here?" To evaluate natural experiments—that is, to figure out what hypothesis is being tested—you need to be alert to the possibilities and collect the right data.

Naturalistic field experiments are excellent for comparative research, and comparison is so important for developing theory.

Most experiments involve analysing the effects of several independent variables at once. A **factorial design** lays out all the combinations of all the categories of the independent variables.

In assessing the results of a factorial experiment, researchers look for **main effects** and **interaction effects**. Main effects are the effects of each independent variable on each dependent variable. Interaction effects are effects on dependent variables that occur as a result of *interaction* between two or more independent variables.

Cross-Sectional Design

- Involves the collection of data from any given sample only once.

Longitudinal Designs

- A given sample is studied repeatedly on the same variables.

Field surveys are non-experimental designs that do not control for or manipulate independent variables or treatments, but measure these variables and test their effects using statistical methods. Field surveys capture snapshots of practices, beliefs, or situations from a random sample of subjects in field settings through a survey questionnaire or less frequently, through a structured interview. In **cross-sectional field surveys**, independent and dependent variables are measured at the same point in time (e.g., using a single questionnaire), while in **longitudinal field surveys**, dependent variables are measured at a later point in time than the independent variables. The strengths of field surveys are their external validity (since data is collected in field settings), their ability to capture and control for a large number of variables, and their ability to study a problem from multiple perspectives or using multiple theories. However, because of their non-temporal nature, internal validity (cause-effect relationships) are difficult to infer, and surveys may be subject to respondent biases (e.g., subjects may provide a "socially desirable" response rather than their true response) which further hurts internal validity.

Secondary data analysis is an analysis of data that has previously been collected and tabulated by other sources. Secondary data analysis may be an effective means of research where primary data collection is too costly or infeasible, and secondary data is available at a level of analysis suitable for answering the researcher's questions. The limitations of this design are that the data might not have been collected in a systematic or scientific manner and hence unsuitable for scientific research, since the data was collected for a presumably different purpose, they may not adequately address the research questions of interest to the researcher, and interval validity is problematic if the temporal precedence between cause and effect is unclear.

Case research is an in-depth investigation of a problem in one or more real-life settings (case sites) over an extended period of time. Data may be collected using a combination of interviews, personal observations, and internal or external documents. Case studies can be positivist in nature (for hypotheses testing) or interpretive (for theory building). The strength of this research method is its ability to discover a wide variety of social, cultural, and political factors potentially related to the phenomenon of interest that may not be known in advance. Analysis tends to be qualitative in nature, but heavily contextualized and nuanced. However, interpretation of findings may depend on the observational and integrative ability of the researcher, lack of control may make it difficult to establish causality, and findings from a single case site may not be readily generalized to other case sites. Generalizability can be improved by replicating and comparing the analysis in other case sites in a **multiple case design**.

Focus group research is a type of research that involves bringing in a small group of subjects (typically 6 to 10 people) at one location, and having them discuss a phenomenon of interest for a period of 1.5 to 2 hours. The discussion is moderated and led by a trained facilitator, who sets the agenda and poses an initial set of questions for participants, makes sure that ideas and experiences of all participants are represented, and attempts to build a holistic understanding of the problem situation based on participants' comments and experiences. Internal validity cannot be established due to lack of controls and the findings may not be generalized to other settings because of small sample size. Hence, focus groups are not generally used for explanatory or descriptive research, but are more suited for exploratory research.

For different research purposes, different methods are used, i.e. positivist methods and interpretive methods. The differences between these two methods are mentioned bellow.

Positivist methods	**Interpretive methods**
· laboratory experiments and survey research	· action research and ethnography
· aimed at theory (or hypotheses) testing	· are aimed at theory building
· employ deductive approach	· employ inductive approach
· uses predominantly quantitative data, but can also use qualitative data	· relies heavily on qualitative data, but can sometimes benefit from including quantitative data as well

Action research assumes that complex social phenomena are best understood by introducing interventions or "actions" into those phenomena and observing the effects of those actions. In this method, the researcher is usually a consultant or an organizational member embedded within a social context such as an organization, who initiates an action such as new organizational procedures or new technologies, in response to a real problem such as declining profitability or operational bottlenecks.

The researcher's choice of actions must be based on theory, which should explain why and how such actions may cause the desired change. The researcher then observes the results of that action, modifying it as necessary, while simultaneously learning from the action and generating theoretical insights about the target problem and interventions. The initial theory is validated by the extent to which the chosen action successfully solves the target problem. Simultaneous problem solving and insight generation is the central feature that distinguishes action research from all other research methods, and hence, action research is an excellent method for bridging research and practice. This method is also suited for studying unique social problems that cannot be replicated outside that context, but it is also subject to researcher bias and subjectivity, and the generalizability of findings is often restricted to the context where the study was conducted.

Ethnography is an interpretive research design inspired by anthropology that emphasizes that research phenomenon must be studied within the context of its culture. The researcher is deeply immersed in a certain culture over an extended period of time (8 months to 2 years), and during that period, engages, observes, and records the daily life of the studied culture, and theorizes about the evolution and behaviours in that culture. Data is collected primarily via observational techniques, formal and informal interaction with participants in that culture, and personal field notes, while data analysis involves "sense-making". The researcher must narrate her experience in great detail so that readers may experience that same culture without necessarily being there. The advantages of this approach are its sensitiveness to the context, the rich and nuanced understanding it generates, and minimal respondent bias. However, this is also an extremely time and resource-intensive approach, and findings are specific to a given culture and less generalizable to other cultures.

Case-Control & Cohort Study Designs

A. Case-Control Study

Case control studies, often called "retrospective Studies" are a common first approach to test causal hypothesis. In recent years, the case control approach has emerged as a permanent method of epidemiological investigation. The case control method has three distinct features:

a) Both exposure and outcome (disease) have occurred before the start of the study
b) The study proceeds backwards from effect to cause; and
c) It uses a control or comparison group to support or refute an inference.

By definition, a case control study involves two populations – cases and controls. In case-control studies, the unit is the individual rather than the group. The focus is on a disease or some other health problem that has already developed.

Case-control studies are basically comparison studies. Cases and controls must be comparable with respect to known "confounding factors" such as age, sex, occupation, social status, etc. The questions asked related to personal characteristics and antecedents exposures which may be responsible for the condition studied. The **basic design of a case control study is shown in Table 7.1.**

Table 7.1: Framework of a case control study (the 2x2 contingency table)

Suspected or risk factors	Cases (Disease Present)	Control (Disease absent)
Present	a	b
Absent	c	d
	a+c	b+d

It is a 2x2 table which provides a very useful framework to discuss the various elements which make up a case control study. If the frequency of a/(a+c) is higher than b/(b/d) then there is an association exists between exposed condition and disease. Case control studies have their major use in the chronic disease problem when the causal pathway may span many decades.

There are four **basic steps** in conducting a case control study:

1. Selection of cases and controls
2. Matching
3. Measurement of Exposure, and
4. Analysis and interpretation

1. Selection of cases and controls

Selection of cases:

a) *Definition of a case* involves two criteria, i.e. (i) Diagnostic criteria of the disease and the stage of disease, if any to be included in the study must be specified before the study is undertaken, (ii) eligibility criteria which specify period of time of the case such as newly diagnosed (incident) cases or cases in advance stages of the disease (prevalent cases).

b) *Source of cases* (from where cases may be drawn such as hospitals or general population). It is often convenient to select cases from a single hospital or a network of hospitals, whereas in a population-based case control study, all cases of the study disease occurring within a defined geographic area during a specified period of time are ascertained, often through a survey, a disease registry or hospital network. The entire case series or a random sample of it is selected for study. The case should fairly representative of all cases in the community.

Selection of controls

The controls must be free from the disease under study. They must be as similar to the cases as possible, except for the absence of the disease under study. As a rule, a comparison group is identified before a study is done, comprising of persons who have not been exposed to the disease or some other factor whose influence is being studied. Difficulties may arise in the selection of controls if the disease under investigation occurs in subclinical forms whose diagnosis is difficult. Selection of an appropriate control group is therefore an important prerequisite for drawing inferences and making judgements about the outcome of the investigation.

The possible *sources of control* may be selected from hospitals, relatives, neighbours and general population. The controls may be selected from the same **hospital** as the cases, but with different illness other than the study disease. Usually it is unwise to choose a control group from a group of patients with one disease. This is because hospital controls are often a source of "selection bias". The controls may also be taken up from **relatives** (Spouses and siblings). Sibling controls are unsuitable where genetic conditions are under study. The controls may be drawn from persons living in the same locality (**neighbourhood**) as cases, persons working in the same factory or children attending same school. **Population** controls can be obtained from defined geographic areas, by taking a random sample of individuals free of the study disease. We must use great care in the selection of controls to be certain that they accurately reflect the population that is of the disease of interest.

How many controls are needed? If many cases are available, and large study is contemplated, and if the cost to collect case and control is about equal, then one tends to use one control for each case.

2. Matching

The controls may differ from the cases in a number of factors such as age, sex, occupation, social status, etc. An important consideration is to ensure comparability between cases and controls. This involves what is known as "matching". Matching is defined as the process by which we select control in such a way that they are similar to cases with regard to certain pertinent selected variables (e.g., age) which are known to influence the outcome of disease and which, if not adequately matched for comparability, could distort or confound the results. A "confounding factor" is defined as one which is associated both with exposure and disease, and is distributed unequally in study and control groups. While matching it should be borne in mind that the suspected aetiological factor or the variable to measure should not be matched, because by matching, its aetiological role is eliminated in that study. The cases and controls will then become automatically alike with respect to that factor. There are several kinds of matching procedures. One is group matching. This may be done by assigning cases to sub-categories (strata) based on their characteristics (e.g., age, occupation, social class) and then establishing appropriate controls. The frequency distribution of the matched variable must be similar in study and comparison groups. Matching is also done by pairs. One can obtain pairs of patients and controls of the same sex, age, duration and severity of illness, etc. But there may be great difficulties in obtaining cases and controls matched on all characteristics, and it may be necessary to wait a considerable period of time before obtaining a sufficient number of matched pairs. It should be noted that if matching is overdone, it may be difficult to find controls. Further with excess zeal in matching, there may be a tendency to reduce the odds ratio.

3. Measurement of Exposure

Information about exposure should be obtained in precisely the same manner both for cases and controls. This may be obtained by interviews, by questionnaires or by studying past records of cases such as hospital records, employment records, etc. It is important to recognise that when case control studies are being used to test associations, the most important factor to be considered, even more important than the p-values obtained, is the question of "bias" or systematic error which must be ruled out.

4. Analysis and interpretation

The final step is analysis, to find out: (a) Exposure rates among cases and controls to suspect factor, (b) Estimation of disease risk associated with exposure (Odds ratio)

As per the above **table,** the **exposure rates** for:

cases = a/(a+c)

controls = b/(b+c)

The next step will be to ascertain whether there is a statistical association between exposure status and occurrence of disease. This question can be resolved by calculating the p-value (p-value less than or equal to 0.05 is statistically significant; the smaller the p-value, the grater the statistical significance or probability that the association is not due to chance alone; however, statistical association does not imply causation). The particular test of significance will depend upon the variables under investigation. If we are dealing with discrete variables, the results are usually presented as rates or proportions of those present or absent in the study and the control group. The test of significance usually adopted is the standard error of difference between two proportions or the Chi-square test. On the other hand, if we are dealing with continuous variables, the data will have to be grouped and the test of significance used is likely to be the standard error of difference between two means, or test.

The second analytical step is estimation of disease risk associated with exposure, which is obtained by an index known as "relative risk" or "risk ratio", which is defined as the ratio between the incidence of disease among exposed persons and incidence of disease among non-exposed. It is given by the formula:

$$Relative\,risk = \frac{incidence\ among\ exposed}{incidence\ among\ nonexposed} = \frac{a}{(a+b)} \div \frac{c}{(c+d)}$$

A typical case control study does not provide incidence rate from which relative risk can be calculated directly, because there is no appropriate denominator or population at risk, to calculate these rates. In general, the relative risk can be exactly determined only from a cohort study.

From a case control study Odds Ratio is calculated. Odds Ratio is a measure of the strength of the association between risk factor and outcome. The derivation of Odds ratio is based on three assumptions: (a) the disease being investigated must be relatively rare; (b) the cases must be representative of those with disease, and (c) the controls must be representative of those without the disease. The Odds ratio is the cross product of the entries in Table 7.2.

Table 7.2: Framework of a case control study for Odds ratio calculation (the 2x2 contingency table)

	Cases (Disease Present)	Control (Disease absent)
Exposed	a	b
Not exposed	c	d
	Odds ratio = ad/bc	

Bias in case control studies: Bias is a systematic error in the determination of the association between the exposure and disease. The relative risk estimate may increase or decrease as a result of the bias; it reflects some type of non-comparability between the study and control groups. The possibility of bias must be considered when evaluating a possible cause and effect relationship. Many varieties of bias may arise in case control study. Some of these are:

a) *Bias due to confounding* – This bias can be removed by matching in case control studies.

b) *Memory or recall bias* – When cases and controls are asked questions about their past history, it may be more likely for the cases to recall the existence of certain events or factors, then the controls who are healthy persons. Thus cases may have a different recall of past events than controls.

c) *Selection bias* – The cases and controls may not be representative of cases and controls in the general population. There may be systematic differences in characteristics between cases and controls. The selection bias can be best controlled by its prevention.

d) *Berkesonian bias* – A special example of bias termed after Dr. Joseph Berkeson who recognised this bias, which arises because of the different rates of admission to hospitals for people with different diseases (i.e., hospital case controls).

e) *Interviewer's bias* – Bias may also occur when the interviewer knows the hypothesis and also knows who the cases are. This prior information may lead to him to question the cases more thoroughly than controls regarding a positive history of the suspected causal factor. A useful check on this kind of bias can be made by noting the length of time taken to interview the average case and the average control. This type of bias can be eliminated by double-blinding.

Advantages of case control study:

1. Relatively easy to carry out.
2. Rapid and inexpensive (compared with cohort studies).
3. Require comparatively few subjects.
4. Particularly suitable to investigate rare diseases or diseases about which little is known. But a disease which is rare in the general population may not be rare in special exposure group.
5. No risk to subjects.
6. Allows the study of several different aetiological factors.
7. Risk factors can be identified. Rational prevention and control programmes can be established.
8. No attrition problems, because case control studies do not require follow-up of individuals into the future.
9. Ethical problems minimal.

Disadvantages of case control study:

1. Problems of bias rely on memory or past records, the accuracy of which may be uncertain; validation of information obtained is difficult or sometimes impossible.
2. Selection of an appropriate control group may be difficult.

3. We cannot measure incidence, and can only estimate the relative risk.
4. Do not distinguish between causes and associated factors.
5. Not suited to the evaluation of therapy or prophylaxis of disease.
6. Another major concern is the representativeness of cases and controls.

B. Cohort Study:

Cohort study is another type of analytical (observational) study which is usually undertaken to obtain additional evidence to refute or support the existence of an association between suspected cause and disease. Cohort study is known by a variety of names: prospective study, longitudinal study, incidence study, and forward-looking study. The most widely used term; however, is "cohort study". The distinguishing features of cohort studies are:

a) The cohorts are identified prior to the appearance of the disease under investigation
b) The study groups, so defined, are observed over a period of time to determine the frequency of disease among them
c) The study proceeds forward from cause to effect.

The term "cohort" is defined as a group of people who share a common characteristic or experience within a defined time period (e.g., age, occupation, exposure to a drug or vaccine or hazardous environment, pregnancy, insured persons, etc.). Thus a group of people had born on the same day or in the same period of time form a "birth cohort". Persons exposed to a common drug, vaccine or infection within a defined period constitutes an "exposure cohort". A group of males or females married on the same period of time from a "marriage cohort". The comparison group may be the general population from which the cohort is drawn, or it may be another cohort of persons thought to have had little or no exposure to the substance in question, but otherwise similar.

Cohort studies are indicated: (a) when there is good evidence of an association between exposure and disease, as derived from clinical observations and support by descriptive and case control studies; (b) when exposure is rare, but the incidence of disease high among exposed; (c) when attrition of study population can be minimized, e.g., follow-up is easy, cohort is stable, co-operative and easily accessible; and (d) when ample funds are available.

In contrast to case control studies which proceed from "effect to cause", the basic approach in cohort studies is to work from "cause to effect". That is in a case control study, exposure and disease have already occurred when the study is initiated. In a cohort study, the exposure has occurred, but the disease has not. The basic design of a simple cohort study is shown in Table 7.3. A group or cohort (a+b) exposed to a particular factor thought to be related to disease occurrence, and a group (c+d) not exposed to that particular factor. The former is known as "study cohort", and the latter "control cohort".

Table 7.3: Framework of a cohort study

Cohort	Disease		Total
	Yes	No	
Exposed to putative aetiologic factor	a	b	a+b
Not exposed to putative aetiologic factor	c	d	c+d

In assembling cohorts, the following general considerations are taken into account:

a) The cohorts must be free from the disease under study.
b) Insofar as the knowledge of the disease permits, both the groups (i.e., study and control cohorts) should be equally susceptible to the disease under study, or efficiently reflect any difference in disease occurrence.
c) Both the groups should be comparable in respect to all the possible variables, which may influence the frequency of the disease.
d) The diagnostic and eligibility criteria of the disease must be defined beforehand; this will depend upon the availability of reliable methods for recognizing the disease when it develops.

The groups are then followed under the same identical conditions over a period of time to determine the outcome of exposure (e.g., onset of disease, disability or death) in both the groups. A well-designed cohort study is considered the most reliable means of showing an association between a suspected risk factor and subsequent disease because it eliminates many of the problems of the case control study and approximates the experimental method of the physical sciences.

Three types of cohort studies have been distinguished on the basis of the time of occurrence of disease in relation to the time at which the investigation is initiated and continued:

1. Prospective cohort studies
2. Retrospective cohort studies, and
3. A combination of retrospective and prospective cohort studies.

A prospective cohort study (or "current" cohort study) is one in which the outcome (e.g., disease) has not yet occurred at the time the investigation begins. Most prospective studies begin in the present and continue into future. A retrospective cohort study (or "historical" cohort study) is one in which the outcomes have all occurred before the start of the investigation. The investigator goes back in time, sometimes 10 to 30 years, to select his study groups from existing records of past employment, medical or other records and traces them forward through time, from a past date fixed on the records, usually up to the present. This type of study is known by a variety of names: retrospective cohort study, historical cohort study, prospective study in retrospect and non-concurrent prospective study. In the combination of retrospective and prospective cohort studies, the cohort is identified from past records and is assessed of date for the outcome. The same cohort is followed up prospectively into future for further assessment of outcomes.

The elements of a cohort study are:

1. Selection of study subjects
2. Obtaining data on exposure

3. Selection of comparison groups
4. Follow-up, and
5. Analysis

1. Selection of study subjects

The subjects of a cohort study are usually assembled of two ways – either from general population or select groups of the population that can be readily studied (e.g., persons with different degrees of exposure to the suspected causal factor).

(a) *General population* – When the exposure or cause of death is fairly frequent in the population, cohorts may be assembled from the general population, residing in well-defined geographical, political and administrative areas. If the population is very large, an appropriate sample is taken, so that the results can be generalized to the population sampled. The exposed and unexposed segments of the population to be studied should be representative of the corresponding segments of the general population.

(b) *Special groups* – These may be special groups or exposure groups that can readily be studied: (i) **select groups** are usually a homogeneous population (these may be professional groups e.g., doctors, nurses, lawyers, teachers, civil servants, etc.; insured persons, government employees, volunteers, etc.); (ii) **Exposure groups** (If the exposure is rare, a more economical procedure is to select a cohort of persons known to have experienced the exposure. In other words, cohorts may be selected because of special exposure to physical, chemical, and other disease agents.

2. Obtaining data on exposure

Information about exposure may be obtained directly from the:

a) Cohort members
b) Review of records
c) Medical examination or special tests
d) Environmental surveys

Information about exposure (or any other factor related to the development of the disease being investigated) should be collected in a manner that will allow classification of cohort members:

a) According to whether or not they have been exposed to the suspected factor, and
b) According to the level or degree of exposure, at least in broad classes, in the case of special exposure groups.

3. Selection of comparison groups

There are many ways of assembling comparison groups:

a) *Internal comparisons* – In some cohort studies, no outside comparison group is required. The comparison groups are in-built. That is, single cohort enters the study, and its members may, on the basis of information obtain, be classified into several comparison groups according to the degrees or levels of exposure to risk before the development of the disease in question.

b) *External comparisons* – When information on degree of exposure is not available, it is necessary to put up an external control, to evaluate the experience of the exposed group. The study and control cohorts should be similar in demographic and possibly important variables other than those under study.

c) *Comparison with general population rates* – If none is available; the mortality experience of the exposed group is compared with the mortality experience of the general population in the same geographic area as the exposed people. Rate for disease occurrence in sub-groups of the control cohort by age, sex, and other variables considered important may be applied to the corresponding sub-groups of the study cohort to determine the "expected" values provides a measure of the effect of the factor under study. The limiting factors in using general population rates for comparison are: (i) non-availability of population rates for the outcome required; and (ii) the difficulties of selecting the study and comparison groups which are representative of the exposed and non-exposed segments of the general population.

4. Follow-up

One of the problems in cohort studies is the regular follow-up of all the participants. Therefore, at the start of the study, methods should be devised depending upon the outcome to be determined (morbidity or death), to obtain data for assessing the outcome. The procedures required comprise:

a) Periodic examination of each member of the cohort
b) Reviewing records
c) Routine surveillance of death records, and
d) Mailed questionnaires, telephone calls, periodic home visits – preferably all three on an annual basis.

However, in spite of best efforts, a certain percentage of losses to follow-up are inevitable due to death, change of residency, migration or withdrawal of occupation. These losses may bias the results. It is therefore necessary to build into the study design a system for obtaining basic information on outcome for those who cannot be followed up in detail for the full duration of the study. The safest course recommended is to achieve as close to a 95% follow-up as possible.

5. Analysis

The data are analysed in terms of:

a. Incidence rates of outcome among exposed and non-exposed
b) Estimation of risk

In a cohort study, incidence rate can determine directly in those exposed and those not exposed. Having calculated the incidence rate, the next step is to estimate the risk of outcome (e.g., disease or death) in the exposed and non-exposed cohorts. This is done in terms of two well-known indices: relative risk and attributable risk.

Relative risk (RR) is the ratio of the incidence of the disease (or death) among exposed and the incidence among non-exposed.

$$\text{Relative risk (RR)} = \frac{\text{incidence of the disease (or death) among exposed}}{\text{incidence of the disease (or death)among nonexposed}}$$

Estimation of relative risk is important in aetiological enquires. It is a direct measure (or index) of the "strength" of the association between suspected cause and effect. A relative risk of one indicates no association; relative risk greater than one suggests "positive" association between exposure and the disease under study.

Attributable risk (AR) is the difference in incidence rates of disease (or death) between an exposed group and non-exposed group. Attributable risk is often expressed as a percent.

$$\text{Attributable risk (AR)} = \frac{\text{Incidence of disease rate among exposed} - \text{incidence of disease rate among nonexposed}}{\text{Incidence rate among exposed}} \times 100$$

Attributable risk indicates to what extent the disease under study can be attributed to the exposure.

Advantages of cohort study:

a) Incidence can be calculated.
b) Several possible outcomes related to exposure can be studied simultaneously.
c) Cohort studies provide a direct estimate of relative risk.
d) Dose-response ratios can also be calculated.
e) Since comparison groups are formed before disease develops, certain forms of bias can be minimized like misclassification of individuals into exposed and unexposed groups.

Disadvantages of cohort study:

Cohort studies also present a number of problems:

a) Cohort studies involve a large number of people. They are unsuitable for investigating uncommon diseases.
b) It takes a long time to complete the study and obtain results by which time the investigator may have died or the participants may have changed their classification. It is difficult to keep a large number of individuals under medical surveillance indefinitely.
c) Certain administrative problems such as loss of experienced staff, loss of funding and extensive record keeping are inevitable.
d) It is not unusual to lose a substantial proportion of the original cohort – they may migrate, lose interest in the study or simply refuse to provide any required information.
e) Selection of comparison groups which are representative of the exposed and unexposed segments of the population is a limiting factor. Those who volunteer for the study may not be representative of all individuals with the characteristic of interest.
f) There may be changes in the standard methods or diagnostic criteria of the disease over prolonged follow-up. Once we have established the study protocol, it is difficult to introduce new knowledge or new tests later.
g) Cohort studies are expensive.
h) The study itself may alter people's behaviour.
i) With any cohort study there are ethical problems of varying importance.
j) In cohort study, practical considerations dictate that we must concentrate on a limited number or factors possibly related to disease outcome.

Table 7.4: Main difference between case control and cohort studies

Case control study	Cohort study
Proceeds from "effect to cause"	Proceeds from "cause to effect"
Starts with the disease	Starts with people exposed to risk factor or suspected cause
Tests whether the suspected cause occurs more frequently in those with the disease than among those without the disease	Tests whether disease occurs more frequently in those exposed, than in those not similarly exposed.
Usually the first approach to the testing of a hypothesis, but also useful for exploratory studies	Reserved for testing of precisely formulated hypothesis
Involves fewer number of subjects	Involves larger number of subjects
Yields relatively quick results	Long follow-up period often needed, involving delayed results
Suitable for the study of rare diseases	Inappropriate when the disease or exposure under investigation is rare
Generally yields only estimate of RR (odds ratio)	Yields incidence rate, RR as well as AR
Cannot yield information about diseases other than that selected for study	Can yield information about more than one disease outcome
Relatively inexpensive	Expensive

8 Sampling

A sample is a "subgroup of a population". A sample is a group of people, objects, or items that are taken from a larger population for measurement. It has also been described as a representative "taste" of a group. The sample should be "representative in the sense that each sampled unit will represent the characteristics of a known number of units in the population". The sample should be representative of the population to ensure that we can generalize the findings from the research sample to the population as a whole. To draw conclusions about populations from samples, we must use inferential statistics, to enable us to determine a population's characteristics by directly observing only a portion (or sample) of the population. We obtain a sample of the population for many reasons as it is usually not practical and almost never economical. Using correct sampling methods allows researchers the ability to reduce research costs, conduct research more efficiently (speed), have greater flexibility, and provides for greater accuracy.

There are difficulties in measuring whole populations:

- The large size of many populations
- Inaccessibility of some of the population
- Destructiveness of the observation
- Accuracy and sampling

Sampling Error

A sample is expected to mirror the population from which it comes; however, there is no guarantee that any sample will be precisely representative of the population. Sampling error can make a sample unrepresentative of its population. Sampling error comprises the differences between the sample and the population that are due solely to the particular participants that have been selected. The main cause of sampling error is *chance*. This is otherwise called random-error. That is the error that occurs just because of bad luck. This may result in untypical choices. Unusual units in a population do exist and there is always a possibility that an abnormally large number of them will be chosen. The main protection against this kind of error is to use a large enough sample.

Sampling bias is a tendency to favour the selection of participants that have particular characteristics. Sampling bias is usually the result of a poor sampling plan. The most notable is the bias of non-response when for some reason some participants have no chance of appearing in the sample. There can be two causes of this type of bias:

- The wrong study population were selected
- The study population was all inclusive but the poor design of the study introduced the bias e.g. only one group within the study population agreed to participate in the study

Non-sampling error (measurement error):

A non-sampling error is an error that results solely from the manner in which the observations are made. It can occur whether the total study population or a sample is being used. It may either be produced by participants in the study or be an innocent by product of the sampling plans and procedures. The simplest example of a non-sampling error is inaccurate measurements due to malfunctioning instruments or poor procedures. These biased observations can be innocent but very devastating to the findings of the study.

In studies observing personal characteristics, unintended errors may result from:

- The manner in which the response is elicited
- The social desirability of the persons surveyed
- The purpose of the study
- The personal biases of the interviewer or survey writer

Checks need to be put in place to ensure this type of error is minimal.

The interviewers' effect:No two interviewers are alike and the same person may provide different answers to different interviewers. The manner in which a question is formulated can also result in inaccurate responses. Individuals tend to provide false answers to particular questions.

The respondent effect: Participants may deliberately give incorrect answers (for many reasons). This type of error is the most difficult to prevent because it results from outright deceit. It is important to acknowledge that certain psychological factors induce incorrect responses and great care must be taken to design a study that minimizes their effect.

Knowing the study purpose: Respondent may create incorrect responses after knowing why a study is being conducted? If you are looking at a particular behaviour and the study participant knows what you are studding this may change that behaviour in the study participant. There are two ways of avoiding this:

- Change your study methodology
- Ask a sequence of questions rather than just one question.

It should be noted that the personal prejudices of either the designer of the study or the data collector may tend to *induce bias*. In designing a questionnaire, questions can be slanted in such a way that a particular response will be obtained even though it is inaccurate. To protect against induced bias, share your questionnaire widely, particularly with your professional peer group and if available seek the advice of an individual trained in statistics and someone else who can look at the questionnaire objectively. Don't forget to Pilot the questionnaire this not only checks for ambiguities but also could give an indication of bias if the questions are slanted in a particular direction.

Types of Samples

Two standard categories of the sampling method exist. These two categories are called probability sampling and non-probability sampling. Probability sampling is sometimes called random sampling and non-probability sampling is sometimes called non-random sampling.

Sampling methods are broadly categorized into two groups:

1. Probability sampling methods.
2. Non probability sampling methods.

The choice to use probability or non-probability sampling depends on the goal of the research. When a researcher needs to have a certain level of confidence in the data collection, probability sampling should be used.

Probability samples can be "rigorously analysed to determine possible bias and likely error". Non-probability sampling does not provide this advantage but is useful for researchers "to achieve particular objectives of the research at hand".Probability and non-probability sampling have advantages and disadvantages and the use of each is determined by the researcher's goals in relation to data collection and validity. Each sampling category includes various methods for the selection process.

Probability Sampling*:*

Probability sampling provides an advantage because of researcher's ability to calculate specific bias and error in regards to the data collected. Probability sampling is defined as having the "distinguishing characteristic that each unit in the population has a known, nonzero probability of being included in the sample"

In probability sampling, every subject or unit has an equal chance of being selected" from the population. It is important to give everyone an equal chance of being selected because it "eliminates the danger of researchers biasing the selection process because of their own opinions or desires". When bias is eliminated, the results of the research may be generalized from the sample to the whole of the population because "the sample represents the population".

There are four types of probability sampling that are standard across disciplines. These four include simple random sampling, systematic random sampling, stratified random sampling, and cluster sampling.

1. *Probability sampling methods* are of four types:

   i. Simple random sampling
   ii. systematic random sampling
   iii. Stratified random sampling
      a) Proportionate stratified random sampling
      b) Disproportionate stratified random sampling
   iv. Cluster sampling

Randomness means that any individual in a group is likely to be chosen as any other individual. For example, if there were 100 people in a given caseload, then the likelihood of drawing any one person from that group of clients would be 1/100 or 0.01

or 1%. When we use the term **random sample**, we usually are referring to a type of selection procedure that, it is hoped, will provide a sample that is representative of the population. A representative sample is one that reflects the characteristics of the population from which it was selected in true population proportions. Randomness is important as a foundation for statistical testing because it assures the researcher the opportunity to apply laws of chance to sampling theory.

The easiest and most reliable way to draw a random sample is to use a table of random numbers like Table 8.1. For the selection of, let us say, 60 samples out of a population of 500, we would assign all 500 individuals a number. Then using consecutive numbers with three digits beginning with any row or column we would select individuals based on their assigned number that was found in the table of random numbers. We would keep drawing individuals until we had 60. Because 500 is a 3-digit number we will need 3 columns. To decide which 3 of the 15 columns in the table, we close our eyes and place the pencil on the table. This provides us with a random selection of the columns, and whichever column the pencil touches we then select the 2 adjacent columns. Let us assume that the pencil points to column (8). We decide to use column (8), (9), and (10) making up the 3-digit number for the number 500. We next take all the individuals in the population and assign each a number starting with 1 and going to 500. We then begin reading down the column. The first 3-digit number is obtained from column (8), which is a 3; from column (9), which is a 4, and from column (10), which is a 1. The number is 341 and we include that person in the sample. We continue down the 3 columns with the next number being 826. However, remember we have only 500 names so we cannot use the number 826 because no one assigned that number. We continue down the column to the next set of 3-digit numbers which is 154; that individual is then selected for the sample. The procedure continues in this same manner until 60 individuals have been selected for the sample. After finishing one set of columns we would continue on through the table, moving next to the group of 3 columns labelled (11), (12, and (13) and proceed the same way.

Table 8.1: Table of random numbers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	0	9	2	4	6	8	3	4	1	2	6	9	8	7
0	5	9	6	3	4	5	8	2	6	9	7	4	3	0
1	4	8	9	3	6	2	1	5	4	8	7	9	9	2
2	4	3	2	1	0	8	7	4	2	8	6	6	2	3
5	0	5	2	0	8	9	9	0	1	8	7	6	3	2
7	8	1	0	1	4	5	6	7	9	0	8	8	3	8
6	5	4	0	1	4	5	9	6	3	9	0	8	7	6

(*Source:* Krishef, 1987)

Table 8.2: Probability Sampling Methods

Type of Sampling	*Selection Strategy*
Simple	Each member of the study population has an equal probability of being selected.
Systematic	Each member of the study population is either assembled or listed, a random start is designated, then members of the population are selected at equal intervals
Stratified	Each member of the study population is assigned to a group or stratum, and then a simple random sample is selected from each stratum.
Cluster	Each member of the study population is assigned to a group or cluster, then clusters are selected at random and all members of a selected cluster are included in the sample.
	(Henry,1990)

A simple random sample

A simple random sample is obtained by choosing elementary units in such a way that each unit in the population has an equal chance of being selected. A simple random sample is free from sampling bias. However, using a *random number table* to choose the elementary units can be cumbersome. If the sample is to be collected by a person untrained in statistics, then instructions may be misinterpreted and selections may be made improperly.

A systematic random sample

A systematic random sample is obtained by selecting one unit on a random basis and choosing additional elementary units at evenly spaced intervals until the desired number of units is obtained. For example, there are 100 students in your class. You want a sample of 20 from these 100 and you have their names listed on a piece of paper may be in an alphabetical order. If you choose to use systematic random sampling, divide 100 by 20, you will get 5. Randomly select any number between 1 and five. Suppose the number you have picked is 4, that will be your starting number. So student number 4 has been selected. From there you will select every 5th name until you reach the last one, number one hundred. You will end up with 20 selected students.

A stratified sample

A stratified sample is obtained by independently selecting a separate simple random sample from each population stratum. A population can be divided into different groups may be based on some characteristic or variable like income of education. Like anybody with ten years of education will be in group A, between 10 and 20 group B and between 20 and 30 group C. These groups are referred to as strata. You can then randomly select from each stratum a given number of units which may be based on proportion like if group A has 100 persons while group B has 50, and C has 30 you may decide you will take 10% of each. So you end up with 10 from group- A, 5 from group- B and 3 from group C.

A cluster sample

A cluster sample is obtained by selecting clusters from the population on the basis of simple random sampling. The sample comprises a census of each random cluster selected. For example, a cluster may be something like a village or a school, a state. So you decide all the elementary schools in Odisha State are clusters. You want 20 schools selected. You can use simple or systematic random sampling to select the schools, and then every school selected becomes a cluster. If your interest is to interview teachers on their opinion of some new program which has been introduced, then all the teachers in a cluster must be interviewed. Though very economical, cluster sampling is very susceptible to sampling bias. Like for the above case, you are likely to get similar responses from teachers in one school due to the fact that they interact with one another.

Matched-pairs sampling – This is also a kind of cluster sample.Sometimes, researchers may want to compare two subgroups within one population based on a specific criterion. Matched-pairs sampling technique is often an ideal way of understanding bipolar differences between different subgroups within a given population.

Multi-stage sampling – The probability sampling techniques described previously are all examples of single-stage sampling techniques. Depending on researcher's sampling needs, researcher may combine these single-stage techniques to conduct multi-stage sampling.

Non-probability Sampling – The advantage of non-probability sampling is that it a convenient way for researchers toassemble a sample with little or no cost and/or for those research studies that do notrequire representativeness of the population. Non-probability sampling is agood method to use when conducting a pilot study, when attempting to question groupswho may have sensitivities to the questions being asked and may not want answer thosequestions honestly, and for those situations when ethical concerns may keep theresearcher from speaking to every member of a specific group. In nonprobabilitysampling, subjective judgments play a specific role. Researchersmust be careful not to generalize results based on non-probability sampling to the generalpopulation.Non-probability sampling includes various methods.

1. Non probability sampling methods are of four types:

   i. Conveniences samples

   ii. Purposive sampling
      a. Most similar/most dissimilar samples
      b. Typical case samples
      c. Critical case samples

   iii. Snow ball sampling

   iv. Quota sampling

Table 8.3: Non-probability Sampling Methods

Type of Sampling	Selection Strategy
Convenience	Select cases based on their availability for the study.
Purposive	Select cases that judged to represent similar characteristics.
Snowball	Group members identify additional members to be included in the sample.
Quota	Interviewers select a sample that yields the same proportions as the population proportions on easily identified variables.

(Henry,1990)

Convenience sample – Convenience sampling includes participants who are readily available and agree to participate in a study. Convenience sampling is often called accidental or haphazard. Convenience is just that… convenient. This is a relatively easy choice for researchers when a group of people cannot be found to survey or question. The research population is chosen out of convenience from a population for observation e.g. recruiting patients with a particular illness from support groups. While convenience sampling includes only those ready and available, there is no excuse for sloppiness.

Purposeful sample – Purposive non-probability sample is also known as judgment or judgmental. Purposive sampling method can be categorised into three different methods: Most similar/dissimilar cases, typical cases, and critical cases. Purposive sampling is selecting a sample on the basis of researcher's own knowledge of the population, its elements, and the nature of aims of the research. That is, the population is non-randomly selected based on a particular characteristic. The individual characteristics are selected to answer necessary questions about a certain matter or product. The researcher is then able to select participants based on internal knowledge of said characteristic. This method is useful if a researcher wants to study a small subset of a larger population in which many members of the subset are easily identified but the enumeration of all is nearly impossible. Pilot studies are well suited to this type of non-probability sampling method. Purposive non-probability sampling and stratified probability sampling are very similar but warn that there is a crucial difference between the two. Researchers using purposive sampling do not select respondents randomly from each group within the stratification categories whereas stratified sampling includes random sampling at its core. All respondents, not only those randomly selected, who possess the characteristic are included. It is important to note that purposive sampling precludes that the researcher understand the characteristics clearly and thoroughly enough to choose the sample and relate those findings only to that specific group and not to the population as a whole. There are many good reasons for using purposive samples. They are used widely in (1) pilot studies, (2) intensive case studies, (3) critical case studies, and (4) studies of hard-to-find populations.

Snowballsample – Snowball sampling also named as "network" sampling. Snowball sampling is used in those rare cases when the population of interest cannot be identified other than by someone who knows that a certain person has the necessary experience or characteristics to be included. Snowball sampling also includes relying on previously identified group members to identify others who may share the same characteristics as the group already in place.

Quota sample – Quota sampling is a good method to use to non-randomly select groups based on gender, age, race, and ethnicity, to name a few. In quota sampling respondents are selected non-randomly on the basis of their known proportion to the population. Quota sampling also dividing the population group into subgroups and based on the proportions, interviewers are given a number of units from each subgroup that they are to select and interview. Quota non-probability sampling and stratified probability sampling are different. Quota sampling allows the interviewer discretion in the selection of the individuals for the sample. In *proportional quota sampling*, the proportion of respondents in each subgroup should match that of the population. *Non-proportional quota sampling*is less restrictive in that you don't have to achieve a proportional representation, but perhaps meet a minimum size in each subgroup. Neither type of quota sampling will be representative of the population. The non-proportional technique is even less representative of the population but may be useful in that it allows capturing the opinions of small and underrepresented groups through oversampling. There are a number of problems that researchers should be aware of when choosing to use this method of non-probability sampling:

- The list of subgroups and the proportions identified must be accurate before the sampling begins.
- The selection of the sample elements within a given cell (for proportion choice) may include bias although the proportion of the population is estimated correctly.
- Non-response is hidden in quota sampling because the interviewer may simply select another household to interview and may under represent the proportion of the population that is difficult to reach.
- Generalizations to the population cannot be made when using quota sampling.

Sample Size

Before deciding how large a sample should be, you have to define your study population. The question of how large a sample should be is a difficult one. Sample size can be determined by various constraints (funding available, the time constraints etc.). Sample size depends on:

- The type of data analysis to be performed
- The desired precision of the estimates one wishes to achieve
- The kind and number of comparisons that will be made
- The number of variables that have to be examined simultaneously
- How heterogeneous the sampled population is?

Deciding on a sample size for qualitative inquiry can be even more difficult than quantitative because there are no definite rules to be followed. It will depend on what you want to know, the purpose of the inquiry, what is at stake, what will be useful, what will have credibility and what can be done with available time and resources? You can choose to study one specific phenomenon in depth with a smaller sample size or a bigger sample size when seeking breadth.

Sample Size Determination

There are several approaches to determining sample size and the most popular of these is the one that studies the power of a test of hypothesis (Power calculation).

Therefore to undertake this approach the researcher must be clear what the researcher is looking at and what it hopes to find at the end of the study. That is research must have a hypothesis. For projects, other than small-scale projects, it is advisable to employ the skills of a statistician to help you with your power calculation. This will ensure that your sample size is large enough to ensure that your results are statistically significant but not so big that you could have achieved the same results with a much smaller size. The detail of sample size determination is explained in chapter-23.

9 Research Tool: Questionnaires

Invented by Sir Francis Galton, a **questionnaire** is a research instrument consisting of a set of questions (items) intended to capture responses from respondents in a standardized manner. Questionnaire is simply a 'tool' for collecting and recording information about a particular issue of interest. Questionnaire is a form prepared and distributed to secure responses to certain questions. It is a device for securing answers to questions by using a form which the respondent fills by himself. It is a systematic compilation of questions that are submitted to a sampling of population from which information is desired. It is mainly made up of a list of questions, and also includes clear instructions and space for answers or administrative details. Questionnaires should always have a definite purpose that is related to the objectives of the research, and it needs to be clear from the outset how the findings will be used. Respondents also need to be made aware of the purpose of the research wherever possible, and should be told how and when they will receive feedback on the findings.The information from questionnaires tends to fall into two broad categories – 'facts' and 'opinions'. It is worth stressing that, in practice, questionnaires are very likely to include questions about both facts and opinions.

The purpose of the questionnaire is to gather information from widely scattered sources. It is mostly used in cases where one can not readily see personally all of the people from whom he desires responses. It is also used where there is no particular reason to see them personally.

Questions may be unstructured or structured. Unstructured questions ask respondents to provide a response in their own words, while structured questions ask respondents to select an answer from a given set of choices. Subjects' responses to individual questions (items) on a structured questionnaire may be aggregated into a composite scale or index for statistical analysis. Structured questionnaires are usually associated with quantitative research, i.e. research that is concerned with numbers (how many? how often? how satisfied?). Within this context, questionnaires can be used in a variety of survey situations, for example postal, electronic, face-to-face and telephone. Postal and electronic questionnaires are known as self-completion questionnaires, i.e. respondents complete them by themselves in their own time. Face-to-face (F2F) and telephone questionnaires are used by interviewers to ask a standard set of questions and record the responses that people give them. Questionnaires that are used by interviewers in this way are sometimes known as interview schedules.

Question Types

Questionnaire can be of various types on the basis of its preparation. They are like:

- Structured vs.Non Structured
- Closed vs.Open
- Fact vs.Opinion
- single vs. multiple responses
- ranking, and rating.

Structured v/s Non-Structured Questionnaire:

The structured questionnaire contains definite, concrete and directed questions; where as non-structured questionnaire is often used in interview and guide. It may consist of partially completed questions.

Open vs. Closed Questions

Many advise against using open-ended questions and advocate using closed questions. However, open questions can be useful. The questions that call for short check responses are known as restricted or closed form type. For Example, they provide for marking a yes or no, a short response or checking an item from a list of responses. Here the respondent is not free to write of her/his own, she/he was to select from the selected from the supplied responses. On the other hand, increase of open ended questionnaire, the respondent is free to response in her/his own words. Many questionnaires also included both close and open type questions. The researcher selects the type of questionnaire according to his need of the study.

Format of Question / Response.........

- *Dichotomous response*, where respondents are asked to select one of two possible choices, such as true/false, yes/no, or agree/disagree. Examples of such questions are:

What is your sex? (Circle one): Male / Female

Are you married? (Circle one): yes / no.

Do you think that the death penalty is justified under some circumstances (circle one): yes / no.

- *Nominal response*, where respondents are presented with more than two unordered options. These types of questions are called *open-end questions*. Such as:
  - What is your industry of employment? Manufacturing / consumer services / retail / education / healthcare / tourism & hospitality / other
  - What was the attitude of the authorities regarding maternity leave in your case or may be in someone else's case? He readily gave maternity leave / He was hesitant to give maternity leave / He was terribly annoyed / He gave leave but warned / Any other, please specify

Closed–End and Multiple ResponsesQuestion

Q. Why do you work?

A. 1. To supplement the family income. ()
2. To have independent income of one's own. ()
3. To achieve a position or status of one's own. ()
4. To utilize plenty of spare time. ()
5. To be away from the unhappy atmosphere of home. ()
6. To escape from domestic work. ()

Single vs. Multiple Response

When designing questions make sure you have thought through whether you want the respondent to give a single or a multiple response.

Contingency Questions

Q. Are you married?

A. Yes / No

Q. If yes, how many children do you have?

A. One/Two/Three/....../Not Applicable

Matrix Questions

Q. What do you think about the following welfare services at your work place?

'A.	Satisfactory	Fairly Satisfactory	Unsatisfactory
Crèches	()	()	()
Maternity Benefits	()	()	()
Canteen (common)	()	()	()
Canteen (separate)	()	()	()

Multiple Choices Questions

Q. Which one of the following is the reason for continuing the present job?

a. Nature of work
b. Duration of work
c. Wages/Salary
d. Promotion

• Factual Question

Q. What is your age?

A. 23 years

• Opinion/Attitude Question

Q. "Child labour should be banned".

A. (a) Agree (b) Undecided (c) Disagree

- *Ordinal response*, where respondents have more than two ordered options, such as: what is your highest level of education: high school / college degree / graduate studies?
- *Interval-level response*, where respondents are presented with a 5-point or 7-point Likert scale, semantic differential scale, or Guttman scale.
- *Continuous response*, where respondents enter a continuous (ratio-scaled) value with a meaningful zero point, such as their age or tenure in a firm. These responses generally tend to be of the fill-in-the blanks type.

Ranked Responses

Sometimes it is useful for the respondent to rank a set of options by numbering them in order from 1 to the maximum number you are interested in.

Rated Responses

A popular approach in the social sciences is to use Likert scales.

Decide on Question Wording

Responses obtained in survey research are very sensitive to the types of questions asked. Poorly framed or ambiguous questions will likely result in meaningless responses with very little value.

Some general rules can be stated on question wording:

- Be concise and unambiguous
- Avoid double questions
- Avoid questions involving negatives
- Ask for precise answers
- Avoid leading questions

Be Concise and Unambiguous

Make questions brief and clear. Avoid jargon.

Check for ambiguity and make sure that the answer may be competently answered. E.g. asking "have you been to the cinema recently" is more ambiguous than "have you been to the cinema in the last two weeks?"

Avoid Double Questions

Sometimes questions hide a dual question.

Avoid Questions Involving Negatives

Don't confuse the respondent by language like this:

(Please circle relevant number)

	Yes	No
Are you against a ban on smoking	1	2

Ask for Precise Answers

Ask for precise answers if you think the information is available and there are no other constraints (e.g. too intrusive on privacy).

Avoid Leading Questions

Leading questions such as "Do you agree with the majority of people that the health service is failing?" should be avoided for obvious reasons that any right-minded individual can see. Don't you agree?

- *Leading Questions*

Q. Is it true……?

Q. Do you agree with…..?

Q. Are you satisfied with….. ?

- *Threatening Questions*

Question that inquires about the respondent's gambling habits, drinking habits, child abuse or sexual behaviours.

Q. Do you drink?

Or

Q. Do you gamble?

Fact and Opinion

In case of fact questionnaire, the respondent is expected to give information of facts without any reference to his opinion or attitude about them. But in case of opinion questionnaire the respondent gives the information about the facts with his own opinion and attitude.

Every single question in a survey should be carefully scrutinized for the following issues:

- *Is the question clear and understandable:* Survey questions should be stated in a very simple language, preferably in active voice, and without complicated words or jargon that may not be understood by a typical respondent. All questions in the questionnaire should be worded in a similar manner to make it easy for respondents to read and understand them. The only exception is if your survey is targeted at a specialized group of respondents, such as doctors, lawyers and researchers, who use such jargon in their everyday environment.
- *Is the question worded in a negative manner:* Negatively worded questions, such as should your local government not raise taxes, tend to confuse many responses and lead to inaccurate responses. Such questions should be avoided, and in all cases, avoid double-negatives.
- *Is the question ambiguous:* Survey questions should not words or expressions that may be interpreted differently by different respondents (e.g., words like “any” or “just”). For instance, if you ask a respondent, what is your annual income, it is unclear whether you referring to salary/wages, or also dividend, rental, and other income, whether you referring to personal income, family income (including spouse’s wages), or personal and business income? Different interpretation by different respondents will lead to incomparable responses that cannot be interpreted correctly.
- *Does the question have biased or value-laden words:* Bias refers to any property of a question that encourages subjects to answer in a certain way. A biased language or tone tends to skew observed responses. It is often difficult to anticipate in advance the biasing wording, but to the greatest extent possible, survey questions should be carefully scrutinized to avoid biased language.
- *Is the question double-barrelled:* Double-barrelled questions are those that can have multiple answers,

Q. Have you stopped beating your wife?

Q. Do you think urbanisation leads to the breaking up of the family <u>*and*</u> makes an individual extremely selfish?

It is always advisable to separate double-barrelled questions into separate questions.

- *Is the question too general:* Sometimes, questions that are too general may not accurately convey respondents’ perceptions. If you asked someone how they liked a certain book and provide a response scale ranging from “not at all” to “extremely well”, if that person selected “extremely well”, what does he/she mean? Instead, ask more specific behavioural questions, such as will you recommend this book to others, or do you plan to read other books by the same author? Likewise, instead of asking how big is your firm (which may be interpreted

differently by respondents), ask how many people work for your firm, and/or what is the annual revenues of your firm, which are both measures of firm size.
- *Is the question too detailed:* Avoid unnecessarily detailed questions that serve no specific research purpose. For instance, do you need the age of each child in a household or is just the number of children in the household acceptable? However, if unsure, it is better to err on the side of details than generality.
- *Is the question presumptuous:* If you ask, what do you see are the benefits of a tax cut, you are presuming that the respondent sees the tax cut as beneficial. But many people may not view tax cuts as being beneficial, because tax cuts generally lead to lesser funding for public schools, larger class sizes, and fewer public services such as police, ambulance, and fire service. Avoid questions with built-in presumptions.
- *Is the question imaginary:* A popular question in many television game shows is "if you won a million dollars on this show, how will you plan to spend it?"
- *Do respondents have the information needed to correctly answer the question:* Often times, we assume that subjects have the necessary information to answer a question, when in reality, they do not. Even if a response is obtained, in such case, the responses tend to be inaccurate, given their lack of knowledge about the question being asked. For instance, we should not ask the CEO of a company about day-to-day operational details that they may not be aware of, or asking teachers about how much their students are learning, or asking high-schoolers "Do you think the Government acted appropriately?"

Answers to Be Avoided

- No Response
- Don't know
- Can't say
- Neither agree nor disagree
- Indifferent
- Undecided

Decide on a Layout and Sequence

However, it is good practice to ensure that the questionnaire has a title and that the revision or date of the version is printed on the questionnaire. A brief introductory statement is useful, especially if the introductory letter could go adrift. Contact and return information should be included on the questionnaire, irrespective of whether addressed return envelopes are provided; these can easily become separated. Similarly it is good practice to number or otherwise identify individual questions for reference purposes; this is particularly helpful to deal with queries during the data entry and analysis stage.

Lay out the questions and answer choices attractively and neatly. Try to be consistent in aspects such as wording and try to standardise by using as few question types as possible.

Be careful not to overfill the page. Avoid using lots of lines, borders and boxes since these can make the page look too 'dense'. A key factor that affects the response rate is the length of the questionnaire; questionnaires perceived as long will deter respondents. Using a small font can cut down the number of pages and hence make the questionnaire look shorter; but remember that small fonts can put people off – particularly those with less than perfect eyesight. Use a good legible font.

Make good use of italics and bold types: think of using italics consistently to give instructions, e.g. tick the relevant box. Consider using bold for the questions themselves or for headings.

If you are relying on the respondent to complete the questionnaire, begin with questions that will raise interest. However, there are different views on sequencing of questions. For example, someone might argue that the easier questions to answer should be at the beginning to get the respondent in to the swing of things. However, someone else might suggest that questions about personal data, which are easy to answer, should be left until the end when the respondent has committed themselves to answering and they are less likely to object to giving such data. Whatever approach you choose you should try to have a logical sequence, e.g. group together all questions that relate to similar areas.

You should try to keep the flow through a questionnaire logical and very simple, i.e. avoid complex branching. Although some questions may be consequent upon earlier answers, keep the number of branches to the minimum. If necessary, use two or three versions of the questionnaire for respondents in different situations.

In general, questions should flow logically from one to the next. To achieve the best response rates, questions should flow from the least sensitive to the most sensitive, from the factual and behavioural to the attitudinal, and from the more general to the more specific.

Sequence of questions

- Simple to Complex
- Logical
- Sections
- Subsections

Some general rules for question sequencing:

- Start with easy non-threatening questions that can be easily recalled. Good options are demographics (age, gender, education level) for individual-level surveys and firm-graphics (employee count, annual revenues, industry) for firm-level surveys.
- never start with an open ended question.
- if following an historical sequence of events, follow a chronological order from earliest to latest.
- Ask about one topic at a time. When switching topics, use a transition, such as "The next section examines your opinions about …"
- Use filter or contingency questions as needed, such as:
    - "If you answered "yes" to question 5, please proceed to Section 2. If you answered "no" go to Section 3."
    - Q. Are you married?

      A. Yes / No

Q. If yes, how many children do you have?

A. One/Two/Three/....../Not Applicable

Other golden rules: Be attentive and appreciative of respondents' time, attention, trust, and confidentiality of personal information. Always practice the following strategies for all survey research:

- People's time is valuable. Be respectful of their time. Keep your survey as short as possible and limit it to what is absolutely necessary. Respondents do not like spending more than 10-15 minutes on any survey, no matter how important it is. Longer surveys tend to dramatically lower response rates.
- Always assure respondents about the confidentiality of their responses, and how you will use their data (e.g., for academic research) and how the results will be reported (usually, in the aggregate).Firstly allow for privacy and do not ask questions which may offend, or ask for data that is not essential. Apart from anything else, your response rate will suffer. Secondly, especially if you need to ask some personally searching questions, it helps to explain as much as you are able about your research to the respondent, both at the beginning and throughout the questionnaire. In surveys promises of confidentiality are often made to the respondents to reassure and encourage replies. The researcher should comply with any such promises. However, it might help to explain to the potential respondent what is meant rather than give a blanket assurance of confidentiality, e.g. "your responses will be treated with confidence and at all times data will presented in such a way that your identity cannot be connected with specific published data". This is still compatible with publishing, with respondents' permissions, a list of participants who have co-operated in the survey. In connection with issues of privacy researchers should be aware that the Data Protection and Human Rights legislation has implications for privacy and confidentiality of survey data. Where the data is particularly sensitive or substantial you may want to include a statement in the questionnaire granting permission for the data to be used in connection with the research and ask respondents to sign. Apart from the legal issues, it is unethical to obtain data from respondents by misleading them about the survey purpose and the method of analysis.
- For organizational surveys, assure respondents that you will send them a copy of the final results, and make sure that you follow up with your promise.
- Thank your respondents for their participation in your study.
    - Finally, always pre-test your questionnaire, at least using a convenience sample, before administering it to respondents in a field setting. Such pretesting may uncover ambiguity, lack of clarity, or biases in question wording, which should be eliminated before administering to the intended sample.

Planning the Use of Questionnaire:

The successful use of questionnaire depends on devoting the right balance of effort to the planning stage, rather than rushing too early into administering the questionnaire. Therefore, the researcher should have a clear plan of action in mind and costs, production, organization, time schedule and permission should be taken care in the beginning. When designing a questionnaire, the characteristics of a good questionnaire should be kept in mind.

Characteristics of a Good Questionnaire:

- Questionnaire should deal with important or significant topic to create interest among respondents.
- It should seek only that data which cannot be obtained from other sources.
- It should be as short as possible but should be comprehensive.
- It should be attractive.
- Directions should be clear and complete.
- It should be represented in good Psychological order proceeding from general to more specific responses.
- Double negatives in questions should be avoided.
- Putting two questions in one question also should be avoided.
- It should avoid annoying or embarrassing questions.
- It should be designed to collect information which can be used subsequently as data for analysis.
- It should consist of a written list of questions.
- The questionnaire should also be used appropriately.

When is it appropriate to use a questionnaire for research?

Different methods are better suited to different circumstances and questionnaires are no exception to it. Questionnaires are used at their most productive:

- When used with large numbers of respondents.
- When what is required tends to be fairly straight forward information.
- When there is a need for standardize data from identical information.
- When time is allows for delays.
- When resources allow for the cast of printing and postage.
- When respondents can be expected to be able to read and understand the questions.

Designing Questionnaire:

Design of the questionnaire can be split in to three elements:

1. determine the questions to be asked,
2. select the question type for each question and specify the wording, and design the question sequence and overall questionnaire layout.

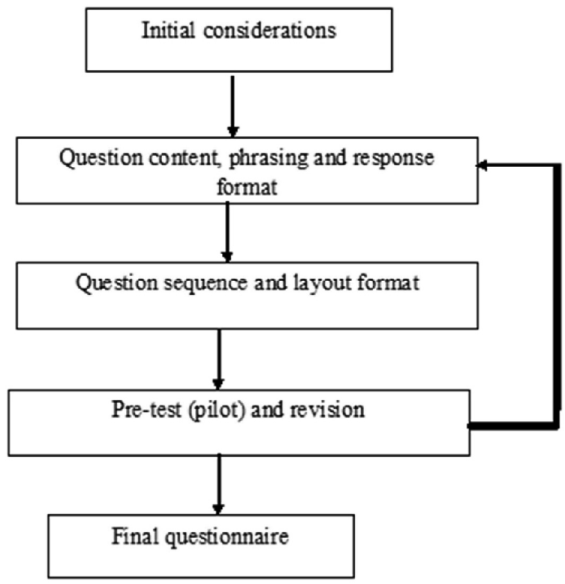

Fig. 9.1: Steps for questionnaire design

After construction of questions on the basis of its characteristics it should be designed with some essential routines like:

- Background information about the questionnaire.
- Instructions to the respondent.
- The allocation of serial numbers and
- Coding Boxes.

Background Information about the Questionnaire

Both from ethical and practical point of view, the researcher need to provide sufficient background information about the research and the questionnaire. Each questionnaire should have a cover page, on which some information appears about:

- The sponsor
- The purpose
- Return address and date
- Confidentiality
- Voluntary responses and
- Thanks

Instructions to the Respondent

It is very important that respondents are instructed to go presented at the start of the questionnaire which indicates what is expected from the respondents. Specific instructions should be given for each question where the style of questions varies throughout the questionnaire. For Example – Put a tick mark in the appropriate box and circle the relevant number etc.

The Allocation of Serial Numbers

Whether dealing with small or large numbers, a good researcher needs to keep good records. Each questionnaire therefore should be numbered.

Questionnaires are commonly used

- to collect factual information in order to classify people and their circumstances
- to gather straightforward information relating to people's behaviour
- to look at the basic attitudes/opinions of a group of people relating to a particular issue
- to measure the satisfaction of customers with a product or service
- to collect 'baseline' information which can then be tracked over time to examine changes

Questionnaires should not be used

- to explore complex issues in great depth
- to explore new, difficult or potentially controversial issues
- as an 'easy' option which will require little time or effort

Advantages of Questionnaire

Questionnaires are economical. In terms of materials, money and time it can supply a considerable amount of research data.

- It is easier to arrange.
- It supplies standardized answers
- It encourages pre-coded answers.
- It permits wide **coverage**.
- It helps in conducting depth study.

Disadvantages

- It **is reliable** and **valid, but** slow.
- Pre-coding questions can deter them from answering.
- Pre-coded questions can bias the findings towards the researcher.
- Postal questionnaire offer little opportunities to check the truthfulness of the answers.
- It cannot be used with illiterate and small children.

Irrespective of the limitations general consensus goes in favour of the use of questionnaire. Its quality should be improved and we should be restricted to the situations for which it is suited.

Table 9.1: Advantages and disadvantages of using questionnaires

Advantages	Disadvantages
Can contact a large number of people at a relatively low cost (postal and telephone)	Response rates can be low (postal) and refusal rates high [telephone, face to face (F2F)]
Easy to reach people who are spread across a wide geographical area or who live in remote locations (postal and phone)	There is little control over who completes a postal questionnaire, which can lead to bias
Respondents are able to complete postal questionnaires in their own time and telephone call-backs can be arranged for a more convenient time	Postal questionnaires are inappropriate for people with reading difficulties or visual impairments and those who do not read English

Contd.

Advantages	Disadvantages
Telephone questionnaires can make it easier to consult some disabled people	Postal and phone questionnaires must be kept relatively short
F2F questionnaires can make it easier to identify the appropriate person to complete the questionnaire	F2F and phone questionnaires require the use of trained interviewers
F2F questionnaires can be longer than postal and phone questionnaires, collect more information and allow the use of 'visual aids'	F2F questionnaires are time consuming for respondents, more costly and more labour intensive than other methods

Coding Boxes

When designing the questionnaire, it is necessary to prevent later complications which might arise at the coding stage.
Therefore, you should note the following points:

- Locate coding boxes neatly on the right hand side of the page.
- Allow one coding box for each answer.
- Identify each column in the complete data file underneath the appropriate coding box in the questionnaire.

Besides these, the researcher should also be very careful about the length and appearance of the questionnaire, wording of the questions, order and types of questions while constructing a questionnaire.

Criteria of Evaluating a Questionnaire

You can evaluate your questionnaire whether it is a standard questionnaire or not on the basis of the following criteria:

- It should provide full information pertaining to the area of research.
- It should provide accurate information.
- It should have a decent response rate.
- It should adopt an ethical stance and
- It should be feasible.

Like all the tools, it also has some advantages and disadvantages based on its uses.

Issues and questions can be determined through a combined process of exploring the literature and thinking creatively.

10 Research Tool: Schedule

Schedule is the tool or instrument used to collect data from the respondents while interview is conducted. **Schedule** contains questions, statements (on which opinions are elicited) and blank spaces/tables for filling up the respondents.

Goode and Hatt (1952) say “Schedule is the name usually applied to a set of questions which are asked and filled in by an interviewer in a face to face situation with another person.”

Bogardus (1933) defines “The schedule represents a formal method for securing facts that are in objective form and easily discernible…The schedule is filled out by the investigator himself.”

The features of schedules are:

- The schedule is presented by the interviewer. The questions are asked and the answers are noted down by interviewer.
- The list of questions is a more formal document, it need not be attractive.
- The schedule can be used in a very narrow sphere of social research.

The main purposes of schedule are three fold:

1. To provide a standardized tool for observation or interview in order to attain objectivity,
2. To act as memory tickler i.e., the schedule keeps the memory of the interviewer/observer refreshed and keeps him reminded of the different aspects that are to be particularly observed, and
3. To facilitate the work of tabulation and analysis.

Types of Schedule:

There are several kinds of schedule.

1. The observation schedule
2. The rating schedule
3. The document schedule
4. The institutional or evaluation schedule
5. The interview schedule
6. The survey schedule

Observation Schedules are schedules used when observational method of data collection is used. In anthropological research, observation means observation of an event, a community or an institution. Every study has a specific purpose and the tools are prepared in order to meet that goal, that purpose. There are various types of observation technique; as such there are different types of questions therein. The questions included in observation schedule are different from that of another schedule used in observation of or study of social phenomena. In a simple study based on observation the use of a schedule is not needed, but in a systematic study based on observation, the use of a schedule results into uniform collection of the data. The observation schedule saves from the fault of memory. Another positive gain of the use of this tool is to maintain objectivity, because not only the data are collected in a uniform manner, rather a particular standard is also set accordingly. The observer knows and seeks directions from the observation schedule as to what is to be noted and what is to be left out or ignored. The use of observation schedule sets a pattern and a standard for data collection.

Rating Schedules is a schedule used to obtain opinions, preferences etc., respondents over statements on the phenomenon studied. The schedule consists of positive and negative statements of opinion on the phenomenon. The rating schedule is an important tool which is frequently used in the study of socio-psychological problem. The use of this schedule is increasing in the commercial, consultancy, guidance and the field of social work. The very goal of this study is to measure the degrees of properties, intensity of opinion or something like that. A rating schedule can consist of merely rating questions, and such schedule can be called independent rating schedule, on the other hand, a schedule which may be called a semi rating schedule consisting of some rating questions and some ordinary questions. The construction or even the use of rating schedule requires a lot of skill and expertise. The use of a rating schedule is a difficult work; this is because of the fact that a lot of psychological dimensions are incorporated in rating questions. The rating of individuals of a group into the different categories in the light of efficiency, achievement or performance is a very skilful as well as a difficult work.

Documents Schedules are very commonly used. As a tool, it has its own distinct place. The documentary schedule is used by a researcher to collect data from written sources viz. files, autobiographies, newspapers, etc. It is used to collect data/information from recorded evidences and/or case histories. Here the blanks, functional issues related blanks and the like to be filled up from records and documents are present. Specifically, when the very purpose of the study is to verify or examine any proposition or hypothesis on the basis of written document then this tool is used. The documentary schedule aims at intensive and systematic study of the already existing material. When using this tool, there is no dependency upon the oral responses or the opinion of the respondents. The printed world is a vast one, a complicated and big one. Researcher has to be selective, purposive and goal oriented while making studies. The collection of data without predicted plan is bound to result into a hotchpotch compilation giving very little sense to what has been collected or written. There are two means of classification and/or tabulation of data collected through documentary schedules, viz., manual and mechanical. If a study is formulated in an intelligent way, the data collected through documentary schedule can yield very fine results and has useful research output.

Institutional or evaluation schedule construction is traced to an institution. When an institution formulates and adopts a particular type of schedule for its own evaluation, precisely evaluation of its activities, its functioning, its programmes and schemes, it is known as an institutional schedule. Such schedule becomes a permanent feature because it is used for a period of very longer time. There must be some rationality behind accepting such schedule as a permanent feature. Every institution prepares a schedule keeping in view of its own ideology and objectives for which it exists. Due to its speciality, institutional schedule differs from each other. Consequently, no institutions can make use of the schedule of another institution.

Interview Schedule is very popular tool in social science research. An interview schedule is constructed by the researcher after pre-test. It is administered by the interviewer. The questions have logical relationships and there is an evidence of coherence in the total format of the schedule. The use of interview schedule has proved its credibility. There are certain qualities which must be borne by the tool for data collection and so is the case for an interview schedule. These days use of interview schedule has become very popular in all types of studies. These could be structured or unstructured interview schedules which are used for collecting data when interview method of communication with the respondents is used. There are certain qualities which must be borne by the tool for data collection, and so is the case for an interview schedule. It should be noted that the construction aspects and the use aspects of both of them make the job of the researcher more difficult and challenging. It is not the construction of the tool, but also the end product or the net result is very important. The success of the study is almost predetermined if the proper selection of the tool is made. The importance of the interview schedule can be analysed as below:

1. Help in making intensiveness of the study problem
2. Due to face to face relationship between interviewer and interviewee, more and more responses come out
3. There is a chance of explaining the un-understood questions to the respondent
4. It works, where questionnaire fails
5. There is a chance of observing the behaviour of the respondent through the use of interview schedule
6. By the use of this schedule, the interviewer can achieve goal through directly or indirectly approaching the respondent.

There are some weaknesses of using interview schedule, such as:

1. It requires more time, more money and more personnel
2. There is a possibility of high level of mixing of partiality and personal elements, because of the establishment of personal relationship between interviewer and interviewee
3. Administration of an interview schedule is possible only by a skilled interviewer; untrained researcher would spoil the outcome of interview because of the unskilful handling of the tool of the data collection.

Survey Schedules are like questionnaires.

Essentials of a Good Schedule:

A good schedule must have the following features

- **Content:** Should cover questions or statements relating to all significant aspects of the study.
- **Dissection:** Should look into the problem analytically; dissecting every, major and significant components of the problem.
- **Context:** Should suit the context in which it is applied. Different types of studies need different schedules.
- **Criterion:** Should use sound logic in classifying respondents based on opinions expressed.
- **Construction:** Should be constructed in such a way that questions statements progress gradually and in order. Better it is sub-divided into parts, each part deeding with a certain sub topic of the issue studied. For each objective, a separate part may be devoted.
- **Language:** Should be linguistically superbly designed. Clear and straight forward language is used.
- **Reliable:** Should be reliable such that same results are obtained whenever the schedule is used when everything else remains same.
- **Mechanical Aspects:** Paper used, margin space given, spacing, printing, size of letters, etc. should be normal.
- **Size:** Should not too length nor too short. Should give fair coverage to the topic.
- **Qualities to be avoided:** Long, complex, presumptuous, personal, embarrassing, hypothetical issues, morality oriented, upsetting type and unnecessary questions must be avoided.

To sum up, accurate information and accurate response are the two essential conditions of a good schedule. Accurate communication is effected by proper wording of questions so as to produce desired sense without any ambiguity. Accurate response is said to have been achieved when replies contain the information sought for. The response is achieved by stimulating the respondents to fill the schedule. Besides, the physical structure of the schedule should be attractive; the questions asked or information sought should be adequate and relevant to the enquiry, so that final generalization may be based upon it. The information sought should not only be valid, it should also be capable of being tabulated and if possible being subjected to statistical analysis.

Procedure for Formulating a Schedule:

1. Study the different aspects of the problem. The problem under study should first of all be split up into various aspects. The determination of these aspects will depend upon clear understanding of the problem under study.
2. Sub-divide the problem to get necessary information. Each aspect has again to be broken up into a number of sub-parts. These sub-parts should be quite exhaustive to give a full and complete picture of-the aspect under study.
3. Class questions. Care should be taken to see that the questions convey the exact sense. Respondents will be willing to supply information without any

hesitation, bias or distortion of facts, if questions are exact and clear.

4. Serialization of Questions. In order to obtain well-organized information, it is necessary that the questions should be presented to the respondents in a well-ordered serial. It has been experienced to various field studies that the change in the order of questions affects the answers adversely.
5. Testing the validity of schedule whatever may be the degree of precaution taken, some slips are based to be left out and these can be located when the schedule is put into a reliability and validity test.
6. Division. The schedule be divided into adequate number of divisions. Introductory part, instructional part, issues related parts, etc. are certain parts by which the schedule is divided into parts.
7. Appropriate form of questions. Use appropriate forms of questions at appropriate places. Open ended, close ended, pictorial, Yes or No (Questions), multiple choice questions, etc. can be used.

Table 10.1: Difference between Schedule and Questionnaire

Sl.No.	Questionnaire	Schedule
1.	Questionnaire is generally sent through mail to informants to be answered as specified in a covering letter, but otherwise without further assistance from the sender.	A schedule is generally filled by the research worker or enumerator, who can interpret the questions when necessary.
2.	Data collection is cheap and economical as the money is spent in preparation of questionnaire and in mailing the same to respondents.	Data collection is more expensive as money is spent on enumerators and in imparting trainings to them. Money is also spent in preparing schedules.
3.	Non response is usually high as many people do not respond and many return the questionnaire without answering all questions. Bias due to non-response often remains indeterminate.	Non response is very low because this is filled by enumerators who are able to get answers to all questions. But even in this their remains the danger of interviewer bias and cheating.
4.	It is not clear that who replies.	Identity of respondent is not known.
5.	The questionnaire method is likely to be very slow since many respondents do not return the questionnaire.	Information is collected well in time as they are filled by enumerators.
6.	No personal contact is possible in case of questionnaire as the questionnaires are sent to respondents by post who also in turn returns the same by post.	Direct personal contact is established
7.	This method can be used only when respondents are literate and cooperative.	The information can be gathered even when the respondents happen to be illiterate.
8.	Wider and more representative distribution of sample is possible.	There remains the difficulty in sending enumerators over a relatively wider area.
9.	Risk of collecting incomplete and wrong information is relatively more under the questionnaire method, when people are unable to understand questions properly.	The information collected is generally complete and accurate as enumerators can remove difficulties if any faced by respondents in correctly understanding the questions. As a result the information collected through schedule is relatively more accurate than that obtained through questionnaires.
10.	The success of questionnaire methods lies more on the quality of the questionnaire itself.	It depends upon the honesty and competence of enumerators
11.	The physical appearance of questionnaire must be quite attractive.	This may not be the case as schedules are to be filled in by enumerators and not by respondents.
12.	This is not possible when collecting data through questionnaire.	Along with schedule, observation method can also be used.

11 Scales and Scaling

The scale is a measuring instrument. Scaling techniques are methods of turning a series of qualitative facts (known as attributes) into a quantitative series (known as variables). The social scientists have given their attention largely to two types of scales:

1. Those concerned with social behaviour and personality, and
2. Those used to measure certain other aspects of the cultural and social environment.

The first type includes the well-known attitude scales, moral scales, character tests, social participation scales etc. The second type is illustrated by scales used in the studies like socio-economic status, communities, social institutions, etc.

Scalingis a branch of measurement that involves the construction of measures by associating qualitative judgments about unobservable constructs with quantitative measurable metric units. Scaling is the assignment of objects to numbers according to a rule. This process of measuring abstract concepts in concrete terms remains one of the most difficult tasks in empirical social science research.

Scaling emerged from the social sciences in an attempt to measure or order attributes with respect to quantitative attributes or traits. Scaling provides a mechanism for measuring abstract concepts. A comparative scale is an ordinal or rank order scale that can also be referred to as a nonmetric scale. Respondents evaluate two or more objects at one time and objects are directly compared with one another as part of the measuring process.

The outcome of a scaling process is a **scale**, which is an empirical structure for measuring items or indicators of a given construct. Understand that "scales" are a little different from "rating scales". A rating scale is used to capture the respondents' reactions to a given item, for instance, such as a nominal scaled item captures a yes/no reaction and an interval scaled item captures a value between "strongly disagree" to "strongly agree." Attaching a rating scale to a statement or instrument is not scaling. Rather, scaling is the formal process of developing scale items, before rating scales can be attached to those items. Scales can be one-dimensional or multidimensional, based on whether the underlying construct is one-dimensional (e.g., weight, wind speed, firm size, etc.) or multidimensional (e.g., academic aptitude, intelligence, etc.). One-dimensional scale measures constructs along a single scale, ranging from high to low. Note that some of these scales may include multiple items, but all of these items attempt to measure the same underlying dimension. This is particularly the case with many social science constructs such as self-esteem, which are assumed to have a single dimension going from low to high. Multi-dimensional scales, on the other hand, employ different items or tests to measure each dimension of the construct separately, and then combine the scores on each dimension to create an overall measure of the multidimensional construct. For instance, academic aptitude can be measured using two separate tests of students' mathematical and verbal ability, and then combining these scores to create an overall measure for academic aptitude. Since most scales employed in social science research are one-dimensional.

One-dimensional scaling methods were developed during the first half of the twentieth century and were named after their creators. The three most popular one-dimensional scaling methods are:, (1) Likert's summative scaling, and (2) Guttman's cumulative scaling, (3) Thurstone's equal-appearing scaling. The three approaches are similar in many respects, with the key differences being the rating of the scale items by judges and the statistical methods used to select the final items.

A scale is a device for assigning units of analysis to categories of a variable. The assignment is usually done with numbers, and questions are used a lot as scaling devices. What single question could you ask an ethnic tribal people living outside from his community in a metro city, to measure how assimilated they were to metro city culture? Could you measure the amount of stress people are experiencing by asking them a single question? We try to measure complex variables like these with complex instruments—that is, instruments that are made up of several indicators. These complex instruments are what people commonly call scales.

The function of **single-indicator scales** is to assign units of analysis to categories of a variable. The function of **composite measures**, or complex scales, is exactly the same, but they are used when single indicators won't do the job. The most common composite measure is a **cumulative index**. Indexes are made up of several items, all of which count the same. Indexes are everywhere. We use indexes to measure people's health risks: the risk of contracting HIV, of getting lung cancer, of having a heart attack, of giving birth to an underweight baby, of becoming an alcoholic, of suffering from depression, and so on. And, of course, we use indexes with a vengeance to measure cognitive and physical functions. Children in the industrial societies of the world begin taking intelligence tests, achievement tests, and tests of physical fitness from the first day they enter school—or even before that.

Indexes can be **criterion referenced** or **norm referenced**. If you've ever taken a test where the only way to get an "A" was to get at least 90%, you've had your knowledge of some subject assessed by a criterion-referenced index. If you've ever taken a test where getting an "A" required that you score in the top 10% of the class—even if the highest grade in the class were 70%—then you've had your knowledge of some subject assessed by a norm-referenced index. Standardized tests (whether of achievement, or of performance, or of personality traits) are usually norm referenced: Your score is compared to the norms that have been established by thousands of people who took the test before you.

Multiple-choice exams are cumulative indexes. The idea is that asking just one question about the material in a course would not be a good indicator of students' knowledge of the material. Instead, students are asked a bunch of multiple-choice questions. If you take a test that has 60 multiple-choice questions and you get 45 correct, you get 45 points, one for each correct answer. That number, 45 (or 75%), is a cumulative index of how well you did on the test. A series of multiple-choice questions will fairly assess a student's knowledge. We pretend that: (1) Knowledge is a one-dimensional variable; (2) A fair set of questions is chosen to represent knowledge of some subject; and, therefore (3) A cumulative index is a fair test of the knowledge of that subject. We know that the system is imperfect, but we pretend in order to get on with life.

Since the purpose of weighting is to secure scales which will more accurately measure the continuum, it significances to measure, and it is not surprising to find these closely related to the techniques of validation.

Types of scales

According to Goode and Hatt (1952), there are five major categories of scales with their appropriate subjects:

1. Social distance scales
2. Rating scales
3. Ranking scales
4. Scales based upon international consistency, and
5. Latent – structure scales

In terms of the basic statistical theory and the techniques which underlies various scales, such as intelligence, personality, attitude, social status, institutional etc. All these can be subsumed under the following headings:

1. Arbitrary scales
2. Scales in which the items, scale values and other characteristics are largely determined by a panel of judges
3. Scales based on item analysis
4. Scales constructed in accordance with the 'scale analysis' techniques devised by Louis Guttman and his co-workers, and
5. Projective tests

Scales may represent a combination of two or more of the five basic types included in the above classifications.

1. Attitude Scales: Thses scales are very popular and extensively used. These scales consist of short but carefully formulated statements or propositions dealing with several selected aspects or many appropriate aspects of the issues, institutions, or groups of people under consideration.
2. Equal-appearing intervals: This scale is linked with the name of L. L. Thurstone, who attempted to devise a method that would represent the attitudes of a group on a specified issue in the form of a frequency distribution, the baseline indicating the whole range of attitude gradation from the most favourable at one end to the least favourable at the other, with a neutral zone in between. The various opinions or items on a scale are allocated to different positions in accordance with the attitudes they express.

3. Social Distance Scale: This scale is also known as Bogardus' social distance scale, because he had framed such a seven point scale. Scale gradation depends on a panel of judges. However, the first problem is to obtain an even spaced series of social distance items out of almost hundred items indicating the mode of social relations, seven items were selected. These items were given arbitrary numbers from 1 to 7, respectively, representing increasing farness in this proportion. On the one hand, we have some categories of social relations and on the other; we have ethnic groups or nationalities.
4. Summated Rating: This is also known as **Likert** technique and the method of internal consistency. This technique is similar to the Thurstone technique of equal appearing intervals. However, the important difference is in determination of the scale values. Likert also emphasized the importance of each item as a scale in itself, made comparisons of the sigma and arbitrary methods of scoring, and compared the summated rating method with the Thurstone method. This method avoids judges. It requires less labour, and it is also reliable. Subjective influence of the judges is eliminated. While constructing this scale, propositions expressive of extreme and positive attitudes are selected, they are carefully edited.
5. Scale Analysis: This type of scale is also known as Guttman scale and it is also called **scalogram.** This evinces substantial methodological contribution.

Ordinal scales are those that measure *rank-ordered* data, such as the ranking of students in a class as first, second, third, and so forth, based on their grade point average or test scores. Ordinal scales can also use attribute labels (anchors) such as "bad", "medium", and "good", or "strongly dissatisfied", "somewhat dissatisfied", "neutral", or "somewhat satisfied", and "strongly satisfied". In the latter case, we can say that respondents who are "somewhat satisfied" are less satisfied than those who are "strongly satisfied", but we cannot quantify their satisfaction levels.

Based on the four generic types of scales discussed above, we can create specific rating scales for social science research. Common rating scales include binary, Likert, semantic differential, or Guttman scales.

Binary scales. Binary scales are nominal scales consisting of binary items that assume one of two possible values, such as yes or no, true or false, and so on. For example, a typical binary scale for the "political activism" construct may consist of the six binary items.

Table 11.1: A six-item binary scale for measuring political activism

Have you ever written a letter to a public official?	Yes	No
Have you ever signed a political petition?	Yes	No
Have you ever donated money to a political cause?	Yes	No
Have you ever donated money to a candidate running for public office?	Yes	No
Have you ever written a political letter to the editor of a newspaper or magazine?	Yes	No
Have you ever persuaded someone to change his/her voting plans?	Yes	No

Each item in this scale is a binary item. If we code Yes =1 and No = 2, then the total number of "yes" indicated by a respondent (a value from 0 to 6) can be used as an overall measure of that person's political activism. Binary scales can also employ other values, such as male or female for gender, fulltime or part-time for employment status, and so forth. If an employment status item is modified to allow for more than two possible values (e.g., unemployed, full-time, part-time, and retired), it is no longer binary, but still remains a nominal scaled item.

Likert Scales

Perhaps the most commonly used form of scaling is attributed to Rensis Likert (1932). This scale includes Likert items that are simply-worded statements to which respondents can indicate their extent of agreement or disagreement on a five or seven-point scale ranging from "strongly disagree" to "strongly agree".

The 5-point scale might become 3 points or 7 points, and agree-disagree scale may become approve-disapprove, favour-oppose, or excellent-bad, but the principle is the same. These are all **Likert-type** scales. It is named "Likert-type scales" rather than just "Likert scales" because Likert did more than just introduce a format. He was interested in measuring internal states of people (attitudes, emotions, orientations) and he realized that most internal states are multidimensional. You hear a lot of talk these days about conservatives and liberals, but the concept of political orientation is very complex. A person who is liberal on matters of domestic policy—favouring government-supported health care, for example—may be conservative on matters of foreign political policy—against involvement in any foreign military actions. Someone who is liberal on matters of foreign economic policy—favouring economic aid for all democracies that ask for it—may be conservative on matters of personal behaviour—against same-sex marriage, for example. The liberal-conservative dimension on matters of personal behaviour is also complicated. There is no way to assign people to a category of this variable by asking one question. People can have live-and-let-live attitudes about sexual preference and extramarital sex and be against a woman's right to an abortion on demand. Of course, there are packaging effects. People who are conservative on one dimension of political orientation are *likely* to be conservative on other dimensions, and people who are liberal on one kind of personal behaviour are *likely* to be liberal on others. Still, no single question lets you scale people in general on a variable as complex as "attitude toward personal behaviour," let alone "political orientation." That is why we need composite scales.

Steps in Building a Likert Scale

Likert's method was to take a long list of possible scaling items for a concept and find the subsets that measured the various dimensions. If the concept were one-dimensional, then one subset would do. If it were multidimensional, then several subsets would be needed.

Here are the steps in building and testing a Likert scale.

1. Identify and label the variable you want to measure. This is generally done by induction—that is, from your own experience (Spector 1992). After you work in some area of research for a while, you'll develop some ideas about the variables you want to measure. The task is then to scale (measure) people on a variable with all its multidimensionality.
2. Write a long list of indicator questions or statements. This is usually another exercise in induction. Ideas for the indicators can come from reading the literature

on whatever research problem has captured you, from personal experience, from ethnography, from reading newspapers, from interviews with experts. Be sure to use both negative and positive indicators. And don't make the indicator items extreme. In wording items, remember who your respondents are and use *their* language. Make the items as short and as uncomplicated as possible. No double negatives. No double-barrelled items. When you get through, you should have four or five times the number of items as you think, you will need in your final scale.

3. Determine the type and number of response categories. Some popular response categories are agree-disagree, favour-oppose, helpful–not helpful, many-none, like me–not like me, true-untrue, suitable-unsuitable, always-never, and so on. Most Likert scale items have an odd number of response choices: three, five, or seven. The idea is to give people a range of choices that includes a midpoint. The midpoint usually carries the idea of neutrality—neither agree nor disagree, for example. An even number of response choices forces informants to "take a stand," while an odd number of choices lets informants "sit on the fence." There is no best format. But if you ever want to combine responses into just two categories (yes-no, agree-disagree, like me–not like me), then it's better to have an even number of choices. Otherwise, you have to decide whether the neutral responses get collapsed with the positive answers or the negative answers—or thrown out as missing data.
4. Test your item pool on some respondents. Ideally, you need at least 100—or even 200—respondents to test an initial pool of items. This will ensure that: (a) You capture the full variation in responses to all your items; and (b) The response variability represents the variability in the general population to which you eventually want to apply your scale.
5. Conduct an **item analysis** to find the items that form a one-dimensional scale of the variable you're trying to measure.
6. Use your scale in your study and run the item analysis again to make sure that the scale is holding up. If the scale does hold up, then look for relations between the scale scores and the scores of other variables for persons in your study.

A typical example of a six-item Likert scale for the "employment self-esteem" construct is shown in Table 11.2.

Table 11.2: A six-item Likert scale for measuring employment self-esteem

	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
I feel good about my job	1	2	3	4	5
I get along well with others at work	1	2	3	4	5
I'm proud of my relationship with mysupervisor at work	1	2	3	4	5
I can tell that other people at work areglad to have me there	1	2	3	4	5
I can tell that my co-workers respect me	1	2	3	4	5
I feel like I make a useful contributionat work	1	2	3	4	5

Likert scales are summated scales, that is, the overall scale score may be a summation of the attribute values of each item as selected by a respondent. Likert items allow for more granularities (more finely tuned response) than binary items, including whether respondents are neutral to the statement. Three or nine values (often called "anchors") may also be used, but it is important to use an odd number of values to allow for a "neutral" (or "neither agree nor disagree") anchor. Some studies have used a "forced choice approach" to force respondents to agree or disagree with the Likert statement by dropping the neutral mid-point and using even number of values and, but this is not a good strategy because some people may indeed be neutral to a given statement and the forced choice approach does not provide them the opportunity to record their neutral stance. A key characteristic of a Likert scale is that even though the statements vary in different items or indicators, the anchors ("strongly disagree" to "strongly agree") remain the same. Likert scales are ordinal scales because the anchors are not necessarily equidistant, even though sometimes we treat them like interval scales.

Item Analysis

This is the key to building scales. The idea is to find out which, among the many items you are testing, need to be kept and which should be thrown away. The set of items that you keep should tap a single social or psychological dimension. In other words, the scale should be one-dimensional. Until understanding the logic of scale construction itself, use factor analysis for scale construction. There are three steps to doing an item analysis and finding a subset of items that constitute a one-dimensional scale: (1) scoring the items, (2a) taking the **inter-item correlation** and (2b) **Cronbach's alpha** and (3) taking the **item-total correlation**.

Scoring the Responses

The first thing to do is make sure that all the items are properly scored. You can let the big and small numbers stand for any direction you want, but you must be consistent.

Taking the Inter-item Correlation

Next, test to see which items contribute for measuring the construct you're trying to get at, and which don't. This involves two calculations: the inter-correlation of the items and the correlation of the item scores with the total scores for each informant. Table 11.3(a) shows the scores for three people on three items, where the items are scored from 1 to 5.

To find the inter-item correlation, we would look at all pairs of columns. There are three possible pairs of columns for a three-item matrix. These are shown in table 11.3(b).

A simple measure of how much these pairs of numbers are alike or unalike involves, first, adding up their actual differences, Ód, and then dividing this by the total possible differences, Max.$_d$.

In the first pair, the actual difference between 1 and 3 is 2; the difference between 5 and 2 is 3; the difference between 4 and 1 is 3. The sum of the differences is (Ód) 2+3+3=8.

For each item, there could be as much as 4 points difference—in Pair 1, someone could have answered 1 to item-1 and 5 to item-2, for example. So for three items, the total possible difference, Max.$_d$, would be 4 X 3 = 12. The actual difference is 8 out of a possible 12 points, so items 1 and 2 are 8/12 =0.67 different, which means that these two items are 1 - Ód/Max.$_d$ = 0.33 alike. Items- 1 and 3 are also 0.33 alike, and items- 2 and 3 are 0.67 alike.

Items that measure the same underlying construct should be related to one another. If everyone who answers "strongly agree" to the first statement answers and "strongly disagree" to the second, then the items are perfectly correlated.

Table11.3(a): The Scores for Three People on Three Likert Scale Items

	Item		
Person	1	2	3
1	1	3	5
2	5	2	2
3	4	1	3

Table 11.3(b): The matrix scores for three people on Likert scale items

Pair 1		*Diff*	*Pair 2*		*Diff*	*Pair 3*		*Diff*
1	3	2	1	5	4	3	5	2
5	2	3	5	2	3	2	2	0
4	1	3	4	3	1	1	3	2
$\sum_d$ (Sum of the diff's)		**8**			**8**			**4**
$\sum_d$ / Max.$_d$		0.67			0.67			0.33
1-($\sum_d$ / Max.$_d$)		0.33			0.33			0.67

Cronbach's Alpha

Cronbach's alphais a statistical test of how well the items in a scale are correlated with one another. One of the methods for testing the one-dimensionality of a scale is called the **split-half reliability** test. If a scale of, say, 10 items, were one-dimensional, all the items would be measuring parts of the same underlying concept. In that case, any five items should produce scores that are more or less like the scores of any other five items. This is shown in table 11.4.

Table 11.4: The Schematic for the Split-Half Reliability Test

Person	*Split A: Score on items 1–5*	*Split B: Score on items 6–10*
1	X1	Y1
2	X2	Y2
3	X3	Y3
.	.	.
.	.	.
N	X_n	Y_n
	Total for A	Total for B

Split Halves and the Combinations Rule

There are many ways to split a group of items into halves and each split will give you a different set of totals. Here's the formula for selecting *n* elements from a set of *N* elements, paying no attention to the ordering of the elements:

N! / n!(N-n)!

If you have 10 respondents, then there are 10! /5! (10-5)! =252 ways to split them into halves of five each. For 20 items, there are 184,756 possible splits of 10 each. Cronbach's **coefficient alpha** provides a way to get the average of all these split-half calculations directly. The formula for Cronbach's alpha is:

$\alpha = N_r / 1 + r(N-1)$

Where r (the Greek letter rho) is the average inter-item correlation—that is, the average correlation among all pairs of items being tested. By convention, a good set of scale items should have a Cronbach's alpha of 0.80 or higher.

Be warned, though, that if you have a long list of scale items, the chances are good of getting a high alpha coefficient. An inter-item correlation of just 0.14 produces an alpha of 0.80 in a set of 25 items.

Eventually, you want an alpha coefficient of 0.80 or higher for a short list of items, all of which hang together and measure the same thing. Cronbach's alpha will tell you if your scale hangs together, but it won't tell you which items to throw away and which to keep. To do that, you need to identify the items that do not discriminate between people who score high and people who score low on the total set of items.

Finding the Item-Total Correlation

First, find the total score for each person. Add up each respondent's scores across all the items. Table 11.5, shows what it would look like if you tested 50 items on 200 people (each x is a score for one person on one item).

Table 11.5: Schematic representation of responses of a 50 item scale for 200 respondents

Person	*Item 1*	*Item 2*	*Item 3*	.	.	*Item 50*
1	X	X	X	.	.	X
2	X	X	X	.	.	X
3	X	X	X	.	.	X
.	.	.	.	.	.	.
200	X	X	X	.	.	X

For 50 items, scored from 1 to 5, each person could get a score as low as 50 (by getting a score of 1 on each item) or as high as 250 (by getting a score of 5 on each item). In practice, of course, each person in a survey will get a total score somewhere in between.

A rough-and-ready way to find the items that discriminate well among respondents is to divide the respondents into two groups, the 25% with the highest total scores and the 25% with the lowest total scores. Look for the items that the two groups have in common. Those items are not discriminating among informants with regard to the concept being tested. Items that fail, for example, to discriminate between people who strongly favour training in methods (the top 25%) and people who don't (the bottom 25%) are not good items for scaling people in this construct. Throw those items out. There is a more formal way to find the items that discriminate well among respondents and the items that don't. This is the **item-total correlation**.

With 50 items, the total score gives you an idea of where each person stands on the concept, you are trying to measure. If the inter-item correlation were perfect, then every item would be contributing equally to our understanding of where each respondent stands. Of course, some items do better than others. The ones that don't contribute a lot will correlate poorly with the total score for each person. Keep the items that have the highest correlation with the total scores. You can use any statistical analysis package to find the inter-item correlations, Cronbach's alpha, and the item-total correlations for a set of preliminary scale items. Your goal is to get rid of items that detract from a high inter-item correlation and to keep the alpha coefficient above 0.80.

Testing for one-dimensionality with Factor Analysis

Factor analysis is a technique for data reduction. If you have 30 items in a pool of potential scale items, and responses from a sample of people to those pool items, factor analysis lets you reduce the 30 items to a smaller set—say, 5 or 6. Each item is given a score, called its **factor loading**. This tells you how much each item ''belongs'' to each of the underlying factors. If a scale is one-dimensional, there will be a single, overwhelming factor that underlies all the variables (items) and all the items will ''load high'' on that single factor. If a scale is multidimensional, then there will be a series of factors that underlie sets of variables. Scale developers get a large pool of potential scale items (at least 40) and ask a lot of people (at least 200) to respond to the items. Then they run the factor analysis and select those items that load high on the factor or factors (the underlying concept or concepts) they are trying to understand.

Likert's summative scaling method. The Likert method, a one-dimensional scaling method developed by Murphy and Likert (1938), is quite possibly the most popular of the three scaling approaches. As with Thurstone's method, the Likert method also starts with a clear definition of the construct of interest, and using a set of experts to generate about 80 to 100 potential scale items. These items are then rated by judges on a 1 to 5 (or 1 to 7) rating scale as follows: 1 for strongly disagree with the concept, 2 for somewhat disagree with the concept, 3 for undecided, 4 for somewhat agree with the concept and 5 for strongly agree with the concept. Following this rating, specific items can be selected for the final scale can be selected in one of several ways: (1) by computing bivariate correlations between judges rating of each item and the total item (created by summing all individual items for each respondent), and throwing out items with low (e.g., less than 0.60) item-to-total correlations, or (2) by averaging the rating for each item for the top quartile and the bottom quartile of judges, doing a t-test for the difference in means, and selecting items that have high t-values (i.e., those that discriminates best between the top and bottom quartile responses). In the end, researcher's judgment may be used to obtain a relatively small (say 10 to 15) set of items that have high item-to-total correlations and high discrimination (i.e., high t-values). The Likert method assumes equal weights for all items, and hence, respondent's responses to each item can be summed to create a composite score for that respondent. Hence, this method is called a summated scale. Note that any item with reversed meaning from the original direction of the construct must be reverse coded (i.e., 1 becomes 5, 2 becomes 4, and so forth) before summating.

Semantic Differential Scales

It was developed in 1950s by Charles Osgood and his associates at the University of Illinoisand has become an important research tool in cognitive studies, including psychology, anthropology, and sociology. It has also been used by thousands of researchers across the social sciences, and with good reason: The semantic differential test is easy to construct and easy to administer.

Osgood was interested in how people interpret things—inanimate things (like artefacts or monuments), animate things (like persons or the self), behaviours (like incest, or buying a new car, or shooting a deer), and intangible concepts (like gun control or literacy). Of course, this is exactly what Likert scales are designed to test, but instead of asking people to rate questionnaire items about things, Osgood tested people's feelings differently: He gave them a target item and a list of paired adjectives about the target. The adjective pairs could come from reading of the literature or from focus groups or from ethnographic interviews. Target items can be ideas (land reform, socialism, aggression), behaviours (smoking, running, hunting deer with a bow and arrow), objects (the mall, a courtroom, horses), environmental conditions (rain, drought, jungle) . . . almost anything.

This is a composite (multi-item) scale where respondents are asked to indicate their opinions or feelings toward a single statement using different pairs of adjectives framed as polar opposites. For instance, the construct "attitude toward national health insurance" can be measured using four items shown in Table 11.6.

Table 11.6: A semantic differential scale for measuring attitude toward national health insurance
How would you rate your opinions on national health insurance? (put tick mark)

	Very much	Somewhat	Neither	Somewhat	Very much	
Good						Bad
Useful						Useless
Caring						Uncaring
Interesting						Boring

As in the Likert scale, the overall scale score may be a summation of individual item scores. Notice that in Likert scales, the statement changes but the anchors remain the same across items. However, in semantic differential scales, the statement remains constant, while the anchors (adjective pairs) change across items. In a semantic differential scale, you name the target concept and ask people to rate their feelings toward it on a series of variables. Semantic differential is believed to be an excellent technique for measuring people's attitude or feelings toward objects, events, or behaviours. The semantic differential is usually a 7-point scale.

Osgood and his associates did hundreds of replications of this test, using hundreds of adjective pairs, in 26 different cultures. Their analyses showed that in every culture, just three major kinds of adjectives account for most of the variation in people's responses: adjectives of evaluation (good-bad, difficult-easy), adjectives of potency (strong-weak, dominant-submissive, etc.), and adjectives of activity (fast-slow, active-inactive, sedentary-mobile, etc.).

As the target changes, of course, you have to make sure that the adjective pairs make sense.

Guttman Scales

Designed by Louis Guttman, this composite scale uses a series of items arranged in increasing order of intensity of the construct of interest, from least intense to most intense. As an example, the construct "attitude toward immigrants" can be measured using five items shown in Table 11.7.

Table 11.7: A five-item Guttman scale for measuring attitude toward immigrants

How will you rate your opinions on the following statements about immigrants?		
Do you mind immigrants being citizens of your country?	Yes	No
Do you mind immigrants living in your own neighbourhood?	Yes	No
Would you mind living next door to an immigrant?	Yes	No
Would you mind having an immigrant as your close friend?	Yes	No
Would you mind if someone in your family married an immigrant?	Yes	No

Each item in the above Guttman scale has a weight (not indicated above) which varies with the intensity of that item, and the weighted combination of each response is used as aggregate measure of an observation.

To understand the pattern we're looking for, consider the following three questions.

1. How much is 124 plus 14?
2. How much is 1/2+1/3+1/5+2/11?
3. If 3X=133, then how much is X?

If you know the answer to question 3, you probably know the answer to questions 1 and 2. If you know the answer to question 2, but not to 3, it's still safe to assume that you know the answer to question 1. This means that, in general, *knowledge about basic math* is a one-dimensional variable.

Now consider a Mundari speaking tribal village. As part of your study, you need to measure the level of acculturation of each person. That is, you want to assign a single number to each person—a number that represents how acculturated to Oida culture each person is. After some time in the community, you come to understand that there are three key points of acculturation: dress, language, and housing. As acculturate, they dress in modern clothes, learn to speak Odia fluently and build modern-style pacca houses. From your ethnographic work, you reason that people need significant wealth to afford a modern house, with all the imported materials that building one entails. People who have wealth participate in the state economy, which means that they must be fluent in Odia. Anyone, however, can afford to adopt modern style clothes, especially used clothing. According to your theory, modern dress is the easiest item to adopt; Odialanguage comes next; and then comes modern houses. To test whether the indicators you have identified form a one-dimensional, or Guttman scale, set up a table 11.8. It's not pretty. Persons 1, 2, and 3 scored positive on all three items. They each get 3 points. The next three (4, 5, and 6) wear modern clothes and speak fluent Odia, but live in indigenous-style houses. They each get 2 points. Person 7 wears modern clothes, but does not speak fluent Odia, and does not live in a modern-style house. This informant gets 1 point on the acculturation index. Persons 8 and 9 have no acculturation points. They wear traditional dress, speak little Odia, and live in traditional homes. The next three (10, 11, 12) speak fluent Odia but wear traditional dress and live in traditional houses. The next three (13, 14, 15) live in Modern-style homes but wear traditional dress and are not fluent in Odia. Finally, person 16 wears modern clothes and lives in a modern house, but is not fluent in Odia. If we had data from only the first nine respondents, the data would form a perfect Guttman scale. For those first nine respondents, in other words, the three behaviours are indicators of a one-dimensional variable, acculturation.

Table 11.8: An Index That Scales with a Guttman Coefficient of Reproducibility <0.90

Informant	*Modern clothes*	*Fluent odia*	*Modern house*
1	Y	Y	Y
2	Y	Y	Y
3	Y	Y	Y
4	Y	Y	-
5	Y	Y	-
6	Y	Y	-
7	Y	-	-
8	-	-	-
9	-	-	-
10	-	Y	-
11	-	Y	-
12	-	Y	-
13	-	-	Y
14	-	-	Y
15	-	-	Y
16	Y	-	Y

The Coefficient of Reproducibility

Unfortunately, we have got those other seven people to deal with. For whatever reasons, informants 10–16 do not conform to the pattern produced by the data from informants 1–9. The data for persons 10–16 are "errors" in the sense that their data diminish the extent to which the index of alienation forms a perfect scale. To test how closely any set of index data reproduces a perfect scale, apply Guttman'scoefficient of reproducibility, or CR. The formula for Guttman's CR is:

1 – (Number of errors / number of entries)

Given the pattern in table11.8 (and from our hypothesis about the order in which people adopt the three indicators of acculturation), we don't expect to see those minus signs in column 1 for respondents 10, 11, and 12. If the data scaled according to our hypothesis, then anyone who speaks fluent Odia and lives in a traditional house should wear modern-style clothes, as is the case with informants 4, 5, and 6. *Those* informants have a score of 2. It would take three corrections to make cases 10, 11, and 12 conform to the hypothesis (you'd have to replace the minus signs in column one with 'Y' for respondents 10, 11, and 12), so we count cases 10, 11, and 12 as having one error each. We don't expect to see the 'Y' signs in column 3 for informants 13, 14, and 15. If our hypothesis were correct, anyone who has a 'Y' in column 3 should have all 'Y' s and a score of 3 on acculturation. If we give respondents 13, 14, and 15 a scale score of 3 (for living in a modern-style house), then those three cases would be responsible for *six* errors—you'd have to stick in two 'Y' s for each of the cases to make them come out according to the hypothesis. Yes, you could make it just three, not six errors, by sticking a minus sign in column 3. Finally, we don't expect that minus sign in column 2 of respondent 16's data. That case creates just one error (you only need to put in one plus to make it come out right). Altogether, that makes 3+6+1=10 errors in the attempt to reproduce a perfect scale. For table 11.8, the CR is

1-(10/48)=0.79

which is to say that the data come within 21% of scaling perfectly. By convention, a coefficient of reproducibility of 0.90 or greater is accepted as a significant approximation of a perfect scale (Guttman 1950). Only data scale, not variables. If the items in a cumulative index form a Guttman scale with 0.90 CR or better, we can say that, for the sample we've tested, the concept measured by the index is one-dimensional. That is, the items are a composite measure of one and only one underlying concept.

Guttman's cumulative scaling method. Designed by Guttman (1950), the cumulative scaling method is based on Emory Bogardus' social distance technique, which assumes that people's willingness to participate in social relations with other people vary in degrees of intensity, and measures that intensity using a list of items arranged from "least intense" to "most intense". The idea is that people who agree with one item on this list also agree with all previous items. In practice, we seldom find a set of items that matches this cumulative pattern perfectly. A scalogram analysis is used to examine how closely a set of items corresponds to the idea of cumulativeness.

Like previous scaling methods, the Guttman method also starts with a clear definition of the construct of interest, and then using experts to develop a large set of candidate items. A group of judges then rate each candidate item as "yes" if they view the item as being favourable to the construct and "no" if they see the item as unfavourable. Next, a matrix or table is created showing the judges' responses to all candidate items. This matrix is sorted in decreasing order from judges with more "yes" at the top to those with fewer "yes" at the bottom. Judges with the same number of "yes", the statements can be sorted from left to right based on most number of agreements to least. The resulting matrix is resembled in Table 11.9. Notice that the scale is now almost cumulative when read from left to right (across the items). However, there may be a few exceptions, as shown in Table 11.9, and hence the scale is not entirely cumulative. To determine a set of items that best approximates the cumulativeness property, a data analysis technique called scalogram analysis can be used (or this can be done visually if the number of items is small). The statistical technique also estimates a score for each item that can be used to compute a respondent's overall score on the entire set of items.

Table 11.9: Sorted rating matrix for a Guttman scale

Respondent	Item 12	Item 5	Item 3	Item 22	Item 8	Item 7….
29	Y	Y	Y	Y	Y	Y
7	Y	Y	Y	-	Y	
15	Y	Y	Y	Y	-	-
3	Y	Y	Y	Y	-	-
32	Y	Y	Y	-	-	-
4	Y	Y	-	Y	-	-
5	Y	Y	-	-	-	-
23	Y	Y	-	-	-	-
11	Y	-	-	Y	-	-

Y indicates exceptions that prevents this matrix from being perfectly cumulative

Thurstone's equal-appearing scaling method. Louis Thurstone, one of the earliest and most famous scaling theorists, published a method of equal-appearing intervals in 1925. This method starts with a clear conceptual definition of the construct of interest. Based on this definition, potential scale items are generated to measure this construct. These items are generated by experts who know something about the construct being measured. The initial pool of candidate items (ideally 80 to 100 items) should be worded in a similar manner, for instance, by framing them as statements to which respondents may agree or disagree (and not as questions or other things). Next, a panel of judges is recruited to select specific items from this candidate pool to represent the construct of interest. Judges may include academics trained in the process of instrument construction or a random sample of respondents of interest (i.e., people who are familiar with the phenomenon). The selection process is done by having each judge independently rate each item on a scale from 1 to 11 based on how closely, in their opinion, that item reflects the intended construct (1 represents extremely unfavourable and 11 represents extremely favourable). For each item, compute the median and inter-quartile range (the difference between the 75th and the 25th percentile– a measure of dispersion), which are plotted on a histogram. The final scale items are selected as statements that are at equal intervals across a range of medians. This can be done by grouping items with a common median, and then selecting the item with the smallest inter-quartile range within each median group. However, instead of relying entirely on statistical analysis for item selection, a better strategy may be to examine the candidate items at each level and selecting the statement that is the most clear and makes the most sense. The median value of each scale item represents the weight to be used for aggregating the items into a composite scale score representing the construct of interest. We now have a scale which looks like a ruler, with one item or statement at each of the 11 points on the ruler (and weighted as such). Because items appear equally throughout the entire 11-pointrange of the scale, this technique is called an equal-appearing scale.

Thurstone also created two additional methods of building one-dimensional scales – the *method of successive intervals* and the *method of paired comparisons* – which are both very similar to the method of equal-appearing intervals, except for how judges are asked to rate the data. For instance, the method of paired comparison requires each judge to make a judgment between each pair of statements (rather than rate each statement independently on a 1 to 11 scale). Hence, the name paired comparison method. With a lot of statements, this approach can be enormously time consuming and unwieldy compared to the method of equal-appearing intervals.

Some Other Scales

The Cantril Ladder of Life

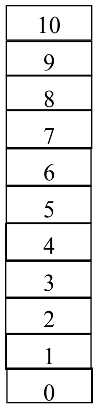

Fig. 11.1: The Cantril ladder of life

There are many interesting variations in the construction of scales. Hadley Cantril (1965) devised a 10-rung **ladder of life.** People are asked to list their concerns in life (financial success, healthy children, freedom from war, and so on). Then they are shown the ladder and are told that the bottom rung represents the worst-possible situation, while the top rung represents the best. For each of their concerns they are asked to point out where they are on the ladder right now, where they were 5 years ago, and where they think they'll be 5 years from now. Note that the ladder of life is a **self-anchoring scale**. Respondents are asked to explain, in their own terms, what the top and bottom rungs of the ladder mean to them. The ladder of life is a useful prop for interviewing non-literate or semiliterate people. Hansen and McSpadden (1993), for example, used the technique in their studies of Zambian and Ethiopian refugees in Zambia and the United States. In Zambia, Hansen actually constructed a small wooden ladder and found that the method worked well. McSpadden used several methods to explore how Ethiopian refugees adjusted to life in the United States. Even when other methods failed, McSpadden found that the ladder of life method got people to talk about their experiences, fears, and hopes. Keith et al. (1994) used a modified version of the ladder of life in their study of aging in seven cultures. In five of the sites (two in the United States, one in Hong Kong, and two in Ireland) where most informants were literate, they used a six-rung ladder. In Hong Kong, people were comfortable placing themselves *between* but not *on* rungs, so the team redesigned the ladder into a flight of stairs. Among the Herero and Kung of Botswana, where many people were not literate, they replaced the ladder with the five fingers of the interviewer's hand. Be careful to tell respondents exactly what you want when you use any kind of visual prop.

Fig. 11.2: Faces Scale

The Faces Scale

Another interesting device is the faces scale. It's a 7- point (or 5-point, or 9-point) scale with stylized faces that change from joy to gloom. This technique was developed by Kunin in 1955 to measure job satisfaction and has been used widely for this ever since. It's a really good device for capturing people's feelings about a wide variety of things—health care, personal safety, consumer items (brands of dresses, titles of current movies), and so on. People are told: "Here are some faces expressing various feelings. Which face comes closest to how you feel about ———————?" Try using this scale with names of well-known political figures or music artists just to get a feel for how interesting it is.

Physicians and psychologists use this scale as a prop when they ask patients to describe pain. It's particularly good when working with children, but it's effective with adults as well.

Indexes

An **index** is a composite score derived from aggregating measures of *multiple constructs* (called components) using a set of rules and formulas. It is different from scales in that scales also aggregate measures, but these measures measure different dimensions or the same dimension of a *single construct*. A well-known example of an index is the consumer price index (CPI). The CPI is a measure of how much consumers have to pay for goods and services in general, and is divided into eight major categories (food and beverages, housing, apparel, transportation, healthcare, recreation, education and communication, and "other goods and services"), which are further subdivided into more than 200 smaller items. Each month, government employees call all over the country to get the current prices of more than 80,000 items. Using a complicated weighting scheme that takes into account the location and probability of purchase of each item, these prices are combined by analysts, which are then combined into an overall index score using a series of formulas and rules.

Another example of index is socio-economic status (SES), also called the Duncan socioeconomic index (SEI). This index is a combination of three constructs: income, education, and occupation. Income is measured in rupees, education in years or degrees achieved, and occupation is classified into categories or levels by status. These very different measures are combined to create an overall SES index score, using a weighted combination of "occupational education" (percentage of people in that occupation who had one or more year of college education) and "occupational income" (percentage of people in that occupation who earned more than a specific annual income). However, SES index measurement has generated a lot of controversy and disagreement among researchers. The process of creating an index is similar to that of a scale. First, conceptualize (define) the index and its constituent components. Though this appears simple, there may be a lot of disagreement among judges on what components (constructs) should be included or excluded from an index. For instance, in the SES index, isn't income correlated with education and occupation, and if so, should we include one component only or all three components? Reviewing the literature, using theories, and/or interviewing experts or key stakeholders may help resolve this issue.

Second, operationalize and measure each component. For instance, how will you categorize occupations, particularly since some occupations may have changed with time? Third, create a rule or formula for calculating the index score. Again, this process may involve a lot of subjectivity. Lastly, validate the index score using existing or new data. Though indexes and scales yield a single numerical score or value representing a construct of interest, they are different in many ways. First, indexes often comprise of components that are very different from each other (e.g., income, education, and occupation in the SES index) and are measured in different ways. However, scales typically involve a set of similar items that use the same rating scale (such as a five-point Likert scale). Second, indexes often combine objectively measurable values such as prices or income, while scales are designed to assess subjective or judgmental constructs such as attitude, prejudice, or self-esteem. Some argue that the sophistication of the scaling methodology makes scales different from indexes, while others suggest that indexing methodology can be equally sophisticated. Nevertheless, indexes and scales are both essential tools in social science research.

Typologies

Scales and indexes generate ordinal measures of one-dimensional constructs. However, researchers sometimes wish to summarize measures of two or more constructs to create a set of categories or types called a typology. Unlike scales or indexes, typologies are multidimensional but include only nominal variables.

Scale (or index) construction in social science research is a complex process involving several key decisions. Some of these decisions are:

- Should you use a scale, index, or typology?
- How do you plan to analyze the data?
- What is your desired level of measurement (nominal, ordinal, interval, or ratio) or rating scale?
- How many scale attributes should you use (e.g., 1 to 10; 1 to 7; “3 to +3)?
- Should you use an odd or even number of attributes (i.e., do you wish to have neutral or mid-point value)?
- How do you wish to label the scale attributes (especially for semantic differential scales)?
- Finally, what procedure would you use to generate the scale items (e.g., Thurstone, Likert, or Guttman method) or index components?

12 Interviewing

Interviews are an attractive proposition for the project researcher. Interviews are something more than conversation. They involve a set of assumptions and understandings about the situation which are not normally associated with a casual conversion. Interviews are also referred as an oral questionnaire by some people, but it is indeed sentimentality more than that. Questionnaire involves indirect data collection, whereas Interview data is collected directly from others in face to face contact. As you know, people are hesitant to write something than to talk. With friendly relationship and rapport, the interviewer can obtain certain types of confidential information which might be reluctant to put in writing.

Therefore research interview should be systematically arranged. It does not happen by chance. The interviews are not done by secret recording of discussions. The consent of the subject is taken for the purpose of interview. The words of the interviews can be treated as 'on the record' and 'for the record'. It should not be used for other purposes besides the research purpose. The discussion therefore is not arbitrary or at the whim of one of the parties. The agenda for the discussion is set by the researcher. It is dedicated to investigating a given topic.

An interview is"A method of data collection in which one person (an interviewer) asks questions of another person (a respondent): interviews are conducted either face-to-face or by telephone."

Importance of Interview:

Whether it is large scale research or small scale research, the nature of the data collection depends on the amount of resources available. Interview is particularly appropriate when the researcher wishes to collect data based on:

·Emotions, experiences and feelings.

- Sensitive issues.
- Privilegedinformation.
  - It is appropriate when dealing with young children, illiterates, language difficulty and limited intelligence.
  - It supplies the detail and depth needed to ensure that the questionnaire asks valid questions while preparing questionnaire.

- It is a follow up to a questionnaire and complements the questionnaire.
- It can be combined with other tools in order to corroborate facts using a different approach.
- It is one of the normative survey methods, but it is also applied in historical research, experimental research, case studies.

Checklist of points for explanation before an interview:

- Purpose of the interview.
- Clarification of topic under discussion.
- Format of the interview.
- Approximate length of interview.
- Assurance of confidentiality.
- Purpose of digital recorder – ask permission to use it. Explain who will listen to the recording.
- Assure participant that he or she may seek clarification of questions.
- Assure participant that he or she can decline to answer a question.
- Assure participant that there will be opportunity during the interview to ask questions.

Requirements for a Good Interview:

As a tool of research good interview requires:

- Proper preparation.
- Skilful execution and
- Adequate recording and interpretation.

Preparation for Interview:

The follow actors need to be determined in advance of the actual interview:

- Purpose and information needed should be clear.
- Which type of interview best suited for the purpose should be decided.
- A clear outline and framework should be systematically prepared.
- Planning should be done for recording responses.

Execution of the Interview:

- Rapport should be established.
- Described information should be collected with a stimulating and encouraging discussion.
- Recording device should lease without distracting the interviewee.

Recording and Interpreting Responses:

- It is best to record through tape recorder.
- If the responses is to be noted down, it should be either noted simultaneously or immediately after it.
- Instead of recording responses, sometimes the researcher noted the evaluation directly interpreting the responses.

Advantages of Interview:

An interviews technique has the following advantages:

- **Depth Information:** Interviews are particularly good at producing data which deal with topics in depth and in detail. Subjects can be probed, issues pursued lines of investigation followed over a relatively lengthy period.

Table 12.1: Examples of probing techniques to use during an interview

Type of probe technique	Description of probe
Silent	Interviewer remains silent and allows the participant to think aloud.
Echo	Interviewer repeats the participant's point, encouraging him or her to develop it further.
Verbal agreement	The interviewer expresses interest in the participant's views with the use of phrases, such as 'uh-huh', or 'yes, okay'.
'Tell me more'	The interviewer clearly asks the participant to expand on a particular point or issue – without the use of echoing.
Long question	The interviewer asks a lengthier question that also suggests that a detailed response is sought.
Leading	The interviewer asks a question that encourages the participant to explain his or her reasoning.
'Baiting'	The interviewer gives the impression that he or she is aware of certain information. This might prompt the participant to explain further.

(Bernard 2006)

- **Insights:** The researcher is likely to gain valuable insights based on the depth of the information gathered and the wisdom of "key informants".
- **Equipment:** Interviews require only simple equipment and build on conversation skills which researchers already have.
- **Information Priorities:** Interviews are a good method for producing data based on informant's priorities, opinions and ideas. Informants have the opportunity to expand their ideas, explain their views and identify what regard as their crucial factors.
- **Flexibility:** Interviews are more flexible method of data collection. During adjustments to the line of enquiry can be made.
- **Validity:** Direct contact at the point of the interview means that data can be checked for accuracy and relevance as they are collected.
- **High response rate:** Interviews are generally pre-arranged and scheduled for a convenient time and location. This ensures a relatively high response rate.
- **Therapeutic:** Interviews can be a rewarding experience for the informant, compared with questionnaires, observation and experiments, there is a more personal element to the method and people end to enjoy the rather rare chance to talk about their ideas at length to a person whose purpose is to listen and note the ideas without being critical.

Disadvantages of Interviews:

Irrespective of the above advantages, it has the following disadvantages.

- **Time Consuming:** Analysis of data can be difficult and time consuming. Data preparation and analysis is "end loaded" compared with, for instance, questionnaires, which are preceded and where data are coding of interview data is a major task for the researcher which occurs after the data have been collected.
- **Difficulty in data analysis:** This method produces non-standard responses. Semi-structured and unstructured interviews produce data that are not pre coded and have a relatively open format.
- **Less Reliability:** Consistency and objectivity are hard to achieve. The data collected are, to an extent, unique owing to the specific content and the specific individuals involved. This has an adverse effect on reliability.
- **Interviewer Effect:** The identity of the researcher may affect the statements of the interviewee. They may say what they do or what they prefer to do. The two may not tally.
- **Inhibitions:** The tape recorder (digital voice recorder) or video recorder may inhibit the important. The interview is an artificial situation where people are speaking for the record and this can be daunting for certain kinds of people.
- **Invasion of Privacy:** Interviewing can be an invasion of Privacy and may be upsetting for the informant.
- **Resources:** The cost of interviewer's time, of travel and of transcription can be relatively high if the informants are geographically widespread. On the basis of the merits and limitations of the interview techniques it is used in many ways for research and non-research purposes. Apart from being an independent data collection tool, it may play an important role in the preparation of questionnaires and check lists which are to be put to extensive use.

Types of Interview:

Interviews vary in purpose, nature and scope. They may be conducted for guidance, therapeutic or research purposes. They may be confined to one individual or extended to several people. The following discussions describe several types of interview.

Structured Interview:

Structured interview involves fight control over the format of questions and answers. It is like a questionnaire which is administered face to face with a respondent. The researcher has a predetermined list of questions. Each respondent is faced with identical questions. The choice of alternative answers is restricted to a predetermined list. This type of interview is rigidly standardised and formal.Structured interviews are often associated with social surveys where researchers are trying to collect large volumes of data from a wide range of respondents.

Semi-Structured Interview:

In semi-structures interview, the interviewer also has a clear list of issues to be addressed and questions to be answered. There is some flexibility in the order of the topics. In this type, interviewee is given chance to develop his ideas and speak more widely on the issues raised by the researcher. The answers are open-ended and more emphasis is on the interviewee elaborating points of interest.

Unstructured Interview:

In case of unstructured interview, emphasis is placed on the interviewee's thoughts. The role of the researcher is to be as un-intrusive as possible. The researcher introduces a theme or topic and then letting the interviewee develop his or her ideas and pursue his or her train of thought. Allowing interviewees to speak their minds is a better way of discovering things about complex issues. It gives opportunity for in-depth investigations.

Single Interview:

This is a common form of semi structured or un-structured interview. It involves a meeting between one researcher and one informant. It is easy to arrange this type of interview. It helps the researcher to locate specific ideas with specific people. It is also easy to control the situation in the part of the interviewer.

Group Interview:

In case of group interview, more than one informant is involved. The numbers involved normally about four to six people. Here you may think that it is difficult to get people together to discuss matters on one occasion and how many voices can contribute to the discussion during any one interview. But the crucial thing to bear in mind is that a group interview is not an opportunity for the researcher to questions to a sequence of individuals, taking turns around a table. 'Group' is crucial here, because it tells us that those present in the interview will interact with one another and that the discussion will operate at the level of the group. They can present a wide range of information and varied viewpoints.

According to Lewis, "Group interviews have several advantages over individual interviews. In particular, they help to reveal consensus views, may generate richer responses by allowing participants to challenge one another's views, may be used to verify research ideas of data gained through other methods and may enhance the reliability of responses."

The disadvantages of this type of interview are that the views of 'quieter' people do not come out. Certain members may dominate the talk. The most disadvantages are that whatever opinions are expressed is acceptable by the group irrespective of their opinions contrary to it. Private opinion does not given importance.

Focus Group Interview:

This is an extremely popular form of interview technique. It consists of a small group of people, usually between six and nine in number. This is useful for non-sensitive and noncontroversial topics. The session usually revolve around a prompt, a trigger, some stimulus introduced by the interviewer in order to 'focus' the discussion. The respondents are permitted to express themselves completely, but the interviewer directs the live of thought. In this case, importance is given on collective views rather than the aggregate view. It concentrates on particular event or experience rather than on a general line of equality.

Table 12.2: Difference between Semi-structured interviews & unstructured interviews

Semi-structured interviews	Unstructured interviews
Scheduled in advance at a designated time.	Guided conversations.
Location normally outside everyday events.	Originate from ethnographic and anthropological traditions.
Organised around a set of predetermined questions.	Key informants are selected.
Other questions emerge from dialogue.	Interviewer elicits information about the meaning of behaviour, interactions, artefacts and rituals – with questions emerging as the investigator learns about the setting.
Usually last from 30 minutes to several hours.	No fixed time

Table 12.3: Difference between structured interviews & unstructured interviews

Structured Interview	Unstructured Interview
All candidates are asked the same questions in the same order.	Candidates may be asked different questions.
All candidates are evaluated using a common rating scale.	A standardized rating scale is not required.
Interviewers are in agreement on acceptable answers.	Interviewers do not need to agree on acceptable answers.

Unstructured Interviews:

Interviews are a widely used tool to access people's experiences and their inner perceptions, attitudes, and feelings of reality. Based on the degree of structuring, interviews can be divided into three categories: structured interviews, semi-structured interviews, and unstructured interviews (Fontana & Frey, 2005). A structured interview is an interview that has a set of predefined questions and the questions would be asked in the same order for all respondents. This standardization is intended to minimize the effects of the instrument and the interviewer on the research results. Structured interviews are similar to surveys, except that they are administered orally rather than in writing. Semi-structured interviews are more flexible. An interview guide, usually including both closed-ended and open-ended questions, is prepared; but in the course of the interview, the interviewer has a certain amount of room to adjust the sequence of the questions to be asked and to add questions based on the context of the participants' responses.

The definitions of an unstructured interview are various. Minichiello et al. (1990) defined them as interviews in which neither the question nor the answer categories are predetermined. Instead, they rely on social interaction between the researcher and the informant. Punch (1998) described unstructured interviews as a way to understand the complex behaviour of people without imposing any *a priori* categorization, which might limit the field of inquiry. Patton (2002) described unstructured interviews as a natural extension of participant observation, because they so often occur as part of ongoing participant observation fieldwork. He argued that they rely entirely on the spontaneous generation of questions in the natural flow of an interaction.

While the definitions are not the same, there is more agreement about the basic characteristics of unstructured interviews. The researcher comes to the interview with no predefined theoretical framework, and thus no hypotheses and questions about the social realities under investigation. Rather, the researcher has conversations with interviewees and generates questions in response to the interviewees' narration. As a consequence, each unstructured interview might generate data with different structures and patterns. The intention of an unstructured interview is to expose the researcher to unanticipated themes and to help him or her to develop a better understanding of the interviewees' social reality from the interviewees' perspectives. While unstructured interviews can be used as the primary data collection method, it is also very common to incorporate unstructured interviews into a study primarily based on participant observation.

Just because unstructured interviews don't use predefined questions doesn't mean that they are random and non-directive. Unstructured interviews cannot be started without detailed knowledge and preparation, if you hope to achieve deep insights into people's lives (Patton, 2002). The researcher will keep in mind the study's purpose and the general scope of the issues that he or she would like to discuss in the interview (Fife, 2005). The researcher's control over the conversation is intended to be minimal, but nevertheless the researcher will try to encourage the interviewees to relate experiences and perspectives that are relevant to the problems of interest to the researcher (Burgess, 1984).

The decision to use unstructured interviews as a data collection method is governed by both the researcher's epistemology and the study's objectives. Researchers making use of unstructured interviews often hold a constructivist point of view of social reality and correspondingly design studies within an interpretive research paradigm. They believe that, to make sense of a study participant's world, researchers must approach it through the participant's own perspective and in the participant's own terms (Denzin, 1989; Robertson & Boyle, 1984). No hypothesis should be made beforehand and the purpose of inquiry is theory development rather than theory testing.

In an ideal unstructured interview, the interviewer follows the interviewees' narration and generates questions spontaneously based on his or her reflections on that narration. It is accepted, however, that the structure of the interview can be loosely guided by a list of questions, called an *aide memoire* or agenda (Minichiello et al., 1990; Briggs, 2000; McCann & Clark, 2005). An *aide memoire* or agenda is a broad guide to topic issues that might be covered in the interview, rather than the actual questions to be asked. It is open-ended and flexible (Burgess, 1984). Unlike interview guides used in structured interviewing, an *aide memoire* or agenda doesn't determine the order of the conversation and is subject to revision based on the responses of the interviewees. Using an *aide memoire* or agenda in an unstructured interview encourages a certain degree of consistency across different interview sessions. Thus, a balance can be achieved between flexibility and consistency. Unstructured interviews can be very useful in studies of people's information seeking and use. They are especially useful for studies attempting to find patterns, generate models, and information system design and implementation.

The Role of the Interviewerin an unstructured interview:

The interviewer has a unique position in an unstructured interview. He or she is an integral part of the research instrument, in that there are no predefined frameworks and questions that can be used to structure the inquiry.To a great extent, the success of the interview depends on the interviewer's ability to generate questions in response to the context and to move the conversation in a direction of interest to the researcher. Thus, an unstructured interview is more open to interviewer effects than its structured and semi-structured counterparts. To become a skilful interviewer takes knowledge and experience (Minichiello et al., 1990).It is generally preferable that the interviewer present him- or herself as a learner, a friend, and a member of the interviewee's group, who has sympathetic interest in the interviewee's life and is willing to understand it (Burgess, 1984). Adopting this kind of role makes building rapport between the interviewer and interviewees possible; it further makes in-depth understanding of the interviewees' lives possible.

The merit of an unstructured interview lies in its conversational nature, which allows the interviewer to be highly responsive to individual differences and situational changes (Patton, 2002). This characteristic of unstructured interviews requires interviewers to have a rich set of skills. First, the interviewer should be able to listen carefully during the conversation. The interviewer often starts the interview with a very broad and open question, such as, "How do you feel about the …?" The interviewee then can take over and lead the conversation. In such conversations, the interviewer usually listens and reflects more than he or she talks. Second, in order to adjust the interview direction in response to the individual interview context, the interviewer has to be able to "generate rapid insights and formulate questions quickly and smoothly" (Patton, 2002)

Most importantly, interviewers should be good at questioning, probing, and adjusting the flow of conversations at an appropriate level. This *skill* is reflected in three aspects of the interviewer's questioning tactics. First, interviewers should be adept at using the *appropriate type of question*, based on the specific interview context. The kinds of questions posed are crucial to the unstructured interview (Burgess, 1984). Spradley (1979) identified three main types of questions: *descriptive questions*, which allow interviewees to provide descriptions about their activities; *structural questions*, which attempt to find out how interviewees organize their knowledge; and *contrast questions*, which allow interviewees to discuss the meanings of situations and make comparisons across different situations. Each type of question is used at different points in the interview to encourage interviewees to talk or to probe for more details. Second, interviewers should be able to monitor and control the *directiveness of their questions*, comments, and even gestures and actions (Burgess, 1984). It is important for interviewers not to ask directive questions when initiating the interview because directive questions may bias the data by leading interviewees to respond in a way that they thought was expected or desired by the researcher. Patton (2002) cautioned that interviewers should "guard against asking questions that impose interpretations on the situation". Denzin (1989) also pointed out that a "sympathetic identification" with interviewees' points of view is necessary, but the interviewer should avoid giving advice and/or passing judgments on respondents (Denzin, 1989). Whyte (1960) provided a six-level scale to evaluate the degree of directiveness in any question or statement made by the interviewer by examining it in the context of what immediately preceded it during the interview. Controlling and adjusting the directiveness of questions and statements is a big challenge for interviewers, especially for those with little interviewing experience. Third, interviewers should be able to *maintain control of the pace and direction of the conversation*. While the interviewer allows the interviewee to raise new topics or move the conversation in directions that the interviewee believes are important, it is the interviewer's responsibility to engage the interviewee in the conversation and keep the conversation focused on the researcher's concerns. As Minichiello et al. (1990) note, an unstructured interview is "always a controlled conversation, which is geared to the interviewer's research interests". A productive conversation is possible when a balance of control is achieved.

Conducting an Unstructured Interview:

When planning and conducting unstructured interviews following steps should practice:

Step-1: *Getting in*: accessing the setting. Various difficulties in gaining access to research settings have been documented, especially when the researcher is an "outsider" in the environment. Negotiation techniques and tactics are required in this situation. The researcher also has to take into consideration the possible political, legal, and bureaucratic barriers that may arise during the process of gaining access to the setting (Lofland et al., 2006).

Step-2: *Understanding the language and culture of the interviewees*: A primary focus of an unstructured interview is to understand the meaning of human experiences from the interviewees' perspectives. Thus, unstructured interviews are governed by the cultural conventions of the research setting. This requires that the researcher can understand the interviewees' language and, further, its meanings in the specific cultural context of the research setting (Minichiello et al., 1990; Fife, 2005).

Step-3: *Deciding on how to present one-self*. An unstructured interview is a two-way conversation. The quality of the conversation is influenced, to a great extent, by how the interviewer represents him- or herself. The interviewer's self-representation will depend on the context he or she is in, but in all cases, the interviewer is a "learner" in the conversation, trying to make sense of the interviewee's experiences from his or her point of view.

Step-4: *Locating an informant*: Not every person in the research setting will make a good informant. The informant (i.e., the interviewee) will be an insider who is willing to talk with you, of course. But even more importantly, the informant must be knowledgeable enough to serve as a guide and interpreter of the setting's unfamiliar language and culture (Fontana & Frey, 2005).

Step 5: *Gaining trust and establishing rapport*: Gaining trust and establishing rapport is essential to the success of unstructured interviews. Only when a trustful and harmonious relationship is established, the interviewee will share his or her experience with the interviewer, especially if the topic of the conversation is sensitive. When endeavouring to cultivate rapport, the interviewer might need to be careful; it's easy to become so involved with your informants' lives that you can no longer achieve your research purposes (Fontana and Frey, 2005).

Step 6: *Capturing the data:* Note-taking is a traditional method for capturing interview data. But in an unstructured interview, note-taking is likely to disrupt the natural flow of the conversation. Thus, when possible, it is preferable to audio record the interviews by tape or digital recorder. In situations where only note-taking is possible, you will need to take brief notes during the interview, writing up more detailed notes immediately after each interview (Fontana and Frey, 2005, Lofland, et al., 2006). As you develop your interviewing skills, you also will want to practice a variety of memory techniques, to be able to capture as much detail as possible from each interview.

The Challenges of Unstructured Interviews

While the flexibility of unstructured interviews offers a number of advantages, there are *three main challenges* that researchers face when using unstructured interviews as a data collection method. The first challenge is that this method requires a significant amount of *time* to collect the needed information (Patton, 2002), especially when the researcher first enters the field and knows little about the setting. It takes time to gain trust, develop rapport, and gain access to interviewees. Because each interview is highly individualized, the length of each unstructured interview session also might be longer than structured or semi-structured interview sessions (Arksey& Knight, 1999). The second challenge for researchers is to *exert the right amount and type of control over the direction and pace of the conversation*. It is difficult to control the degree of directiveness of the questions and statements proposed during the conversation. Also, when a new topic emerges in the discussion, it is difficult for the researcher to know whether to follow it and risk losing continuity, or to stay on the major theme and risk missing additional useful information (Patton, 2002). Furthermore, when the interviewee moves the conversation/interview in a direction that is not useful, the interviewer will need to decide when and how to interrupt the conversation gracefully, to return it to a topic of interest for the purposes of the research (Whyte, 1960). Researchers agree that, to develop your skills in sensitively controlling unstructured interviews, both training and experience are important. The third challenge is *analysing the data* gathered by unstructured interviews. The questions asked in each unstructured interview were dependent on the context of the interview and so can vary dramatically across multiple interviews. Different questions will generate different responses so that a great deal of effort has to be made to analyse the data systematically, to find the patterns within it (Patton, 2002).

Structured Interviews:

In its simplest form, a structured interview involves one person asking another person a list of predetermined questions about a carefully-selected topic. The person asking the questions ("the interviewer") is allowed to explain things to the interviewee (or "respondent" - the person responding to the questions) who does not understand or finds confusing. Structured interviews use a questionnaire format with closed questions and can be beneficial, particularly when participants have either a speech or language impairment. However, they are frequently used to generate quantitative ratherthan qualitative data.*Structured* interviews have demonstrated a high degree of reliability, validity, and legal defensibility.

There are 8 key steps in developing a structured interview:

1. Conduct a research objective Analysis
2. Determine the Competencies to be Assessed by the Interview
3. Choose the Interview Format and Develop Questions
4. Develop Rating Scales to Evaluate Candidates
5. Create Interview Probes
6. Pilot-Test the Interview Questions
7. Create the Interviewer's Guide
8. Document the Development Process

Table 12.4: Strengths & Weaknesses of structured interview

Strengths / Uses of structured interview	Weaknesses / Limitations of structured interview
1. It enables the researcher to examine the level of understanding a respondent has about a particular topic - usually in slightly more depth than with a postal questionnaire.	1. Can be time consuming if sample group is very large (this is because the researcher or their representative needs to be present during the delivery of the structured interview).
2. It can be used as a powerful form of formative assessment. That is, it can be used to explore how a respondent feels about a particular topic before using a second method (such as observation or in-depth interviewing) to gather a greater depth of information. Structured interviews can also be usedto identify respondents whose views you may want to explore in more detail (through the use of focused interviews, for example).	2. The quality and usefulness of the information is highly dependent upon the quality of the questions asked. The interviewer cannot add or subtract questions.
3. All respondents are asked the same questions in the same way. This makes it easy to repeat ("replicate") the interview. In other words, this type of research method is easy to standardise.	3. A substantial amount of pre-planning is required.
4. Provides a reliable source of quantitative data.	4. The format of questionnaire design makes it difficult for the researcher to examine complex issues and opinions. Even where open-ended questions are used, the depth of answers the respondent can provide tend to be more-limited than with almost any other method.
5. The researcher is able to contact large numbers of people quickly, easily and efficiently	5. There is limited scope for the respondent to answer questions in any detail or depth.
6. It is relatively quick and easy to create code and interpret (especially if closed questions are used).	6. There is the possibility that the presence of the researcher may influence the way a respondent answers various questions, thereby biasing the responses. For example,

Contd.

Strengths / Uses of structured interview	Weaknesses / Limitations of structured interview
	an aggressive interviewer may intimidate a respondent into giving answers that don't really reflect the respondent's beliefs. Similarly, a young male researcher asking a middle aged woman how frequently she had sexual intercourse in the past month may be embarrassing for the respondent and make her unlikely to answer truthfully. This is known as the interview effect.
7. There is a formal relationship between the researcher and the respondent with the latter knowing exactly what is required from them in the interview. If, for example, a respondent is unable or unwilling to answer a question the researcher is aware of the reasons for a failure to answer all questions.	7. A problem common to both postal questionnaires and structured interviews is the fact that by designing a "list of questions", a researcher has effectively decided - in advance of collecting any data - the things they consider to be important and unimportant.
8. The researcher does not have to worry about response rates, biased (self-selected) samples, incomplete questionnaires and the like.	

13 Observation

The hallmark of anthropology is the exploration of the complexity and nuances of human interactivity and culture. As a research discipline, anthropology combines humanist and social science strategies. The method that sets anthropology apart from other disciplines is ethnography, the qualitative process of exploring in depth the why and how of human culture, behaviour, and expression. Using this ethnographic method, anthropologists can uncover unexpected insights that are best gained by studying a topic in person, in situ, over time, and from diverse perspectives.

The ethnographic method uses multiple data collection techniques including participant observation, interviews, focus groups, and textual analysis to construct a holistic and contextual view of the phenomena under study. During research, anthropologists make observations and pursue perspectives from diverse angles and in diverse ways. They observe and talk with people from different social categories who have varying relationships to the phenomena under study and conceptualize and respond to those phenomena in unique ways. Anthropological inquiry combines information about people's thoughts gathered through interviews with information collected by observing their behaviour and social interactions.

Anthropologists immerse themselves in the rich, largely qualitative data set that results from their research and conduct iterative analyses to identify emerging themes and glean insights about the meaning of the data. The goal of an anthropological approach is a credible interpretation of the data that is well described, provides valuable insights, and can be replicated.

In conversation one day Sherlock Holmes asked Watson how many steps there were to the Baker Street apartment. Watson responded that he did not know. Holmes replied, "Ah, Watson, you see but you do not *observe*." Although we are constantly looking around in our daily lives, like Dr. Watson we often do not observe in a scientific sense.

Observation becomes a tool for scientific inquiry when it:

- Serves a formulated research purpose
- Is planned systematically
- Is recorded systematically and related to general propositions rather than being presented as reflecting a set of interesting curiosities

- Is subjected to checks or controls on validity and reliability

Goode and Hatt(1952) stated that "science begins with observation and must ultimately return to observation for its final validation.

Scientific observation is the systematic process of recording the behavioural patterns of people, objects and occurrence as they are witnessed. No questioning of or communicating with people occurs. Observation entails the systematic noting and recording of events, behaviours, and artefacts (objects) in the social setting chosen for study. The observational record is frequently referred to as *field notes*—detailed, non-judgmental, concrete descriptions of what has been observed. For studies relying exclusively on observation, the researcher makes no special effort to have a particular role in the setting; to be tolerated as an unobtrusive observer is enough.

Observation is way of gathering data by watching behaviour, events, or noting physical characteristics in their natural setting. Observations can be *overt* (everyone knows they are being observed) or *covert* (no one knows they are being observed and the observer is concealed). The benefit of covert observation is that people are more likely to behave naturally if they do not know they are being observed. However, you will typically need to conduct overt observations because of ethical problems related to concealing your observation.

Observations can also be either *direct* or *indirect*. Direct observation is when you watch interactions, processes, or behaviours as they occur; for example, observing a teacher teaching a lesson from a written curriculum to determine whether they are delivering it with fidelity. Indirect observations are when you watch the results of interactions, processes, or behaviours; for example, measuring the amount of plate waste left by students in a school cafeteria to determine whether a new food is acceptable to them.

This method assumes that behaviour is purposeful and expressive of deeper values and beliefs. Observation can range from a highly structured, detailed notation of behaviour structured by checklists to a more holistic description of events and behaviour.

In the early stages of qualitative inquiry, the researcher typically enters the setting with broad areas of interest but without predetermined categories or strict observational checklists. In this way, the researcher is able to discover the recurring patterns of behaviour and relationships. After these patterns are identified and described through early analysis of field notes, checklists become more appropriate and context-sensitive. Focused observation then is used at later stages of the study, usually to see, for example, if analytic themes explain behaviour and relationships over a long time or in a variety of settings.

Observation is a fundamental and highly important method in all qualitative inquiry.It is used to discover complex interactions in natural social settings. Even in studies using in-depth interviews, observation plays an important role as the researcher notes the interviewee's body language and affect in addition to her words. It is, however, a method that requires a great deal of the researcher. Discomfort, uncomfortable ethical dilemmas and even danger, the difficulty of managing a relatively unobtrusive role, and the challenge of identifying the big picture while finely observing huge amounts of fast-moving and complex behaviour are just a few of the challenges.

Whether a researcher is simply observing from afar or finding a participant-observer role in the setting, some contexts may present dangers. *Street ethnography* is a term that describes research settings which can be dangerous, either physically or emotionally, such as working with the police, drug users, cults, and situations in which political or social tensions may erupt into violence (Weppner, 1977).

Observations involve more than just "hanging out" and observer plan for full and self-aware systematic observation (DeWalt&DeWalt, 2001)**.** At the proposal stage, the researcher should describe the purpose of observing, the phase of the study in which it is likely to be most fruitful, and the use of field notes to respond to the research questions. Observers' comments are often a quite fruitful source of analytic insights and clues that focus data collection more tightly. They may also provide important questions for subsequent interviews.

What can be observed?

A wide variety of information about the behaviour of people and objects can be observed. Seven kinds of phenomena can be observed:

- Human behaviour or action
- Verbal behaviour
- Expressive behaviour
- Spatial relations
- Temporal patterns
- Physical objects
- Verbal and pictorial records

Purpose of Observation:

The purpose of observation techniques are:

- To collect data directly.
- To collect substantial amount of data in short time span.
- To get eye witness first hand data in real like situation.
- To collect data in a natural setting.

Types of Observation

An observation situation in which the observer's presence is known to the subject is *visible observation (overt observation)*. A situation in which the subject is unaware that observation is taking place is *hidden observation (covert observation)*.

Direct observation can produce a detailed record of events or what people actually do. The observer plays a passive role; that is, there is no attempt to control or manipulate a situation. The observer merely records what occurs. So direct observation is a straightforward attempt to observe and record what naturally occurs; the investigator does not create an artificial situation.

Researchers using the direct observation method compile data by recording events as they occur. An observation form is often used to help keep the observations consist and to ensure that all relevant information is recorded. A respondent is not required to recall an event after it has occurred. The recording of the observation is instantaneous. Certain data may be obtained more quickly or easily by direct observation. For example, in a quality-of-life survey, respondents were asked a series of questions that were compiled into an index of well-being. Direct observation was also used by the interviewers because the researchers wanted to investigate whether weather conditions influenced people's answers. The researcher quickly and easily observed and recorded outside weather conditions on the day of the interviews, as well as the temperature and humidity in the building where the interviews were conducted.

Errors associated with direct observation: Although there is no interaction with the subject, direct observation is not error-free; the observer may add subjectivity to the recording. The same visual cues that may influence the interplay between an interviewer and a respondent (e.g., the subject's age or sex) may also come into play in some types of direct observation settings. For example, the observer may subjectively attribute a particular economic status or educational background to the subject. A distortion of measurement resulting from the cognitive behaviour or actions of the witnessing observer is called **observer bias**. If the observer does not record every detail that describes the persons, objects, and events in a given situation, accuracy may suffer. As a general guideline, the observer should record as much detail as possible. However, the pace of events, the observer's memory, and the observer's writing speed, and other factors will limit the amount of detail that can be recorded. What we see depends mainly on what we look for. Interpretation of observation data is another major source of potential error. Facial expressions and other nonverbal communication may have several meanings. Does a smile always mean happiness? Does the fact that someone is standing or seated in close proximity to the president of a company necessarily indicate the person's status?

Contrived Observation is that observation in which the investigator creates an artificial environment in order to test a hypothesis. Contrived observation can increase the frequency of certain behaviour patterns.

Participant vs. Non-participant observationi:

Non Participant Observation

- Observer is an eavesdropper (spy, observer and listener)
- Someone who attempts to observe people without interacting with them
- Without their knowledge that they are being observed
- Used most routinely by psychologists studying children and animals

Participant Observation

- Observer participates actively, for an extended period of time
- May require observer to live or work in that area
- Assumes that observer will become accepted member of the group or community
- Historically field research has been associated most strongly with participant observation.

Structured vs. Unstructured observation:

Unstructured Observation

- Early phase of the research
- May become specific to when and where to observe, what specific aspects of the setting or behaviour to observe, and how to make and record observations.

How to do unstructured observation

- Take a notebook and pen
- Note down when you see something interesting
- Write down theories as you form them
- Don't jump to conclusions straight away
- Look for more evidence
- Ask people to confirm things

Structured Observation

- Greater control of sampling
- Measurement of error
- Permits stronger generalizations and checks on reliability and validity
- This is more like a survey, where every respondent is asked the same set of questions. But in this case, questions are not asked. Instead, particular types of behaviour are looked for and counted

Field observation vs. Scientific Observation:

What is field observation?

Ethnographic research offers an orientation to understand the process and structure of a social setting and employs research techniques consistent with this orientation. It is the study of both explicit and tacit cultural knowledge. Observing user in the field is always the best way to determine their usability requirement. Other characteristics are as follows:

- Focus on community and ethnic groups
- To know immediate impact of an event, and aspects of everyday life
- To get an inside view of reality
- Focus on person & the setting

When do we use field observation?

- To study a dynamics situation
- To preserve the interrelationship of the person & situation
- Methodological problems, resources, or ethics preclude the adoption of other research strategic
- Lack of knowledge about the topic

Characteristics of scientific Observation:

It is necessary to make a distinction between observation as a scientific tool and the casual observation of the man in the street. An observation with the following characteristics will be scientific observation.

- Observation is systematic.
- It is specific.
- It is objective.
- It is quantitative.
- The record of observation should be made immediately.
- Expert observer should observe the situation.
- Its result can be checked and verified.

Table 13.1: Difference between Field Observation & Scientific Observation

Field Observation	Scientific Observation
Casual & everyday	Planned methodology
Direct observation, unaided by any instruments	Direct & indirect observation
Natural setting	Laboratory contrived situation
Less structured & less systematic	Structured & systematic

When should you use observation for evaluation?

- **When you are trying to understand an ongoing process or situation.** Through observation you can monitor or watch a process or situation that your are evaluating as it occurs.
- **When you are gathering data on individual behaviours or interactions between people.** Observation allows you to watch peoples' behaviours and interactions directly, or watch for the results of behaviours or interactions.
- **When you need to know about a physical setting.** Seeing the place or environment where something takes place can help increase your understanding of the event, activity, or situation you are evaluating. For example, you can observe whether a classroom or training facility is conducive to learning.
- **When data collection from individuals is not a realistic option.** If respondents are unwilling or unable to provide data through questionnaires or interviews, observation is a method that requires little from the individuals for whom you need data.

How do you plan for observations?

- **Determine the focus:** Think about the evaluation question(s) you want to answer through observation and select a few areas of focus for your data collection.
- **Design a system for data collection:** Once you have focused your evaluation think about the specific items for which you want to collect data and then determine how you will collect the information you need. There are three primary ways of collecting observation data. These three methods can be combined to meet your data collection needs.
  - **Recording sheets and checklists** are the most standardized way of collecting observation data and include both pre-set questions and responses. These forms are typically used for collecting data that can be easily described in advance.
  - **Observation guides** list the interactions, processes, or behaviours to be observed with space to record open-ended narrative data.
  - **Field notes** are the least standardized way of collecting observation data and do not include pre-set questions or responses. Field notes are open-ended narrative data that can be written or dictated onto a tape recorder (digital voice recorder).
- **Select the sites:** Select an adequate number of sites to help ensure they are representative of the larger population and will provide an understanding of the situation you are observing.
- **Select the observers:** You may choose to be the only observer or you may want to include others in conducting observations. Stakeholders, other professional

staff members, interns and graduate students, and volunteers are potential observers.

- **Train the observers:** It is critical that the observers are well trained in your data collection process to ensure high quality and consistent data. The level of training will vary based on the complexity of the data collection and the individual capabilities of the observers.
- **Time your observations appropriately:**Programs and processes typically follow a sequence of events. It is critical that you schedule your observations so you are observing the components of the activity that will answer your evaluation questions. This requires advance planning.

What are the advantages of observation?

The major advantage of observation studies over surveys, which obtain self-reported data from respondents, is that the data obtained by observation are not subject to distortions, inaccuracies, or other response biases due to memory error, social desirability and so on. The data are recorded when the actual behaviour takes place.

- Collect data where and when an event or activity is occurring.
- Does not rely on people's willingness or ability to provide information.
- Allows you to directly see what people do rather than relying on what people say they did.
- Systematic and rigorous
- Substantial amount of data can be collected in a relatively short time span.
- Provides pre-coded data and ready for analysis.
- Inter observer reliability is high.

What are the disadvantages of observation?

Although the observation method may be used to describe a wide variety of behaviours, cognitive phenomena; such as attitudes, motivations, expectations, intentions, and preferences, cannot be observed. Another limitation is that the observation period is generally of short duration. Observing behaviour patterns over a period of several days or several weeks generally is either too costly or too difficult.

- Susceptible to observer bias.
- Susceptible to the "Hawthorne effect," that is, people usually perform better when they know they are being observed, although indirect observation may decrease this problem.
- It is a slow and laborious process.
- Can be expensive and time-consuming compared to other data collection methods.
- Does not increase your understanding of why people behave as they do.
- Establishing validity is difficult.
- Subjectivity is also there.
- The data may be unmanageable.

14 Qualitative research

Qualitative analysts may have two different goals. Some view analysis of a text as a way to understand what participants "really" thought, felt, or did in some situation or at some point in time. The text becomes a way to get "behind the numbers" that are recorded in a quantitative analysis to see the richness of real social experience. Other qualitative researchers have adopted a hermeneutic perspective on texts—that is, a perspective that views a text as an interpretation that can never be judged true or false. The text is only one possible interpretation among many. The meaning of a text, then, is negotiated among a community of interpreters, and to the extent that some agreement is reached about meaning at a particular time and place, that meaning can only be based on con-sensual community validation. From a hermeneutic perspective, a researcher is constructing a "reality" with his or her interpretations of a text provided by the subjects of research; other researchers, with different backgrounds, could come to markedly different conclusions.

Definitions of Qualitative research:

According to the research purpose and focus:

Qualitative researchers are interested in understanding the meaning people have constructed, that is, how people make sense of their world and the experiences they have in the world.

According to the epistemological stance of research:

Qualitative research is research using methods such as participant observation or case studies which result in a narrative, descriptive account of a setting or practice.

According to the process and context of data collection:

Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that makes the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them. (Denzin& Lincoln, 1994).

Box 14.1: Emic & Etic focus

Emic focus: Representing a setting with the participants' terms and from their viewpoint.

Etic focus: Representing a setting with the researchers' terms and from their viewpoint.

Qualitative research involves any research that uses data that do not indicate ordinal values. Qualitative research involves collecting and/or working with text, images, or sounds.

Qualitative data analysis tends to be inductive—the analyst identifies important categories in the data, as well as patterns and relationships, through a process of discovery. There are often no predefined measures or hypotheses. Anthropologists term this an **emic focus**, which means representing the setting in terms of the participants and their view-point, rather than an **etic focus**, in which the setting and its participants are repre-sented in terms that the researcher brings to the study.

A common thread throughout almost all forms of qualitative research is an inductive and flexible in nature. Another defining attribute of qualitative research is the open-ended and inductive style of questioning and observation. The quintessential feature of both in-depth inter-views and focus groups is the use of open-ended (though not necessarily unscripted) questions, which are followed up with probes in response to participants' answers.

Techniques of Qualitative Data Analysis:

The different techniques that are shared by most approaches for qualitative data analysis:

1. Documentation of the data and the process of data collection
2. Organization/categorization of the data into concepts
3. Connection of the data to show how one concept may influence another
4. Corroboration/legitimization, by evaluating alternative explanations, disconfirming evidence, and searching for negative cases
5. Representing the account (reporting the findings)

The analysis of qualitative research notes begins in the field, at the time of observation, interviewing, or both, as the researcher identifies problems and concepts that appear likely to help in understanding the situa-tion. Simply reading the notes or transcripts is an important step in the analytic process. Researchers should make frequent notes in the margins to identify important statements and to propose ways of coding the data. An interim stage may consist of listing the concepts reflected in the notes and diagramming the relation-ships among concepts. The fieldwork team met weekly to talk about situations that were unclear and to troubleshoot any problems. We also made use of peer-debriefing techniques. Here, multiple colleagues, who were familiar with qualitative data analysis but not involved in our research, participated in preliminary analysis of our findings.

Documentation

The data for a qualitative study most often are *notes jotted down* in the field or during an interview—from which the original comments, observations, and feelings are

Table 14.1: Some Basic Research Design Considerations for Qualitative Research

Decision Point	Some Options (options are not mutually exclusive)	Some Considerations
Primary Purpose of Study	Understand a Real-World Problem. Research that is *primarily* guided by the need to understand or help to resolve problems in the real world; these research problems may be investigator driven or passed on to researchers by funders, clients, and other stakeholders.	Findings should lead to actionable and evidence-based recommendations.
	Build Knowledge/Theory. Research that is *primarily* guided by existing theories and literature.	Findings should inform existing theories and bodies of literature.
	Develop Intervention/Program. Research intended to inform the development of a program, product, or intervention.	Findings should directly inform the development and/or proof of concept of an intervention or program.
	Evaluate something. Research intended to evaluate a program, product, or intervention.	Study is highly focused. Study results comprise the evaluation.
	Inform a Larger Study. Research whose primary purpose is to provide information for the conduct of a larger study; the smaller component could be considered a formative study to, or an embedded component of, a larger study.	Study is highly focused. Findings should directly inform another study component or feed into the overall study findings.
Primary Audience of the Findings	Scholars, Researchers, Academicians, Funders, Clients, Community, Stakeholders, Dissertation, Committee	Appraisal criteria often vary by the audience/end user of study findings. Be sure to know what those criteria are before you begin collecting data.
What Is Already Known About Topic	• Nothing documented on topic • Some qualitative research has been done on the topic but not among study population • Some qualitative research has been done on the topic and among your study population • A good deal of qualitative and quantitative research has been carried out on your topic with the target population for your study	The less that is known about a topic, the more exploratory (and typically qualitative) research is generally required. Always start with existing secondary data (if available) and work forward from there. If a lot of good data (QL and QT) already exist for a topic and within the context of your study population, your study should be very precise and important in scope to warrant moving forward.

Contd.

Decision Point	Some Options (options are not mutually exclusive)	Some Considerations
Study's Focus	• Deep understanding of the topic • Somewhat deep—but also want an idea of range of perspectives • Broad—variation exhibited across study population	The deeper you wish to investigate into a topic, the fewer resources you will have to explore its breadth. You can have some sort of mix, but unless you have unlimited time and resources available, you will need to moderate one aspect for the other. Generally speaking, depth of topic is best served with qualitative methods and breadth of topic with quantitative.
Study Objective (s)	• Identify • Explore • Describe • Explain • Assess/Evaluate	Although there is considerable overlap among these objectives, subtle differences exist. Your interview/focus group questions and framing of observations will vary by objective. Choose other verbs that make the most sense for your study, but make sure that your objectives are appropriate for qualitative inquiry. If they include words and phrases such as "measure," "test," or "how many," you're headed in a quantitative direction (which is not a bad thing—it just means you have to change your objectives or your data collection methods).
Time Parameters	• Immediate need for data • Reasonable deadline • No deadline	Time available invariably determines the size and scope of a study. The faster data are needed, the smaller and more refined the research should be. Longitudinal studies, by their very nature, require more time.
Resources	• Solo effort	As with time, human resources play a big role in

Contd.

Decision Point	Some Options (options are not mutually exclusive)	Some Considerations
Available	• Small team • Large team • Infrastructure at Data Collection Site(s)	the scope of study that can be achieved. The more colleagues that are available to collect and analyse data, the faster you can get a research study done. However, working in teams requires additional procedures to enhance consistency of data collection and analysis activities. Roads, communication, electricity, and other types of infrastructure in some areas of the world are not always reliably available. Be sure to become familiar with infrastructural conditions on the ground prior to finalizing your research design. And always have a Plan B in your pocket.

Table 14.2: Research Approaches and Implications for Data Collection in qualitative research

Type of Approach	Defining Features	Data Collection Implications
Phenomenology	• Focuses on individual experiences, beliefs, and perceptions. • Text used as a proxy for human experience.	• Questions and observations are aimed at drawing out individual experiences and perceptions. • In focus groups, group experiences and normative perceptions are typically sought out. • In-depth interviews and focus groups are ideal methods for collecting phenomenological data.
Ethnography	• Oriented toward studying shared meanings and practices (i.e., culture). • Emphasizes the emic perspective. • Can have a contemporary or historical focus.	• Questions and observations are generally related to social and cultural processes and shared meanings within a given group of people. • Traditionally, it is associated with long-term fieldwork, but some aspects are employed in applied settings. • Participant observation is well suited to ethnographic inquiry.
Inductive Thematic Analysis (ITA)	• Draws on inductive analytic methods (this would be same for Grounded Theory below as well). • Involves identifying and coding emergent themes within data. • Most common analytic approach used in qualitative inquiry.	• ITA requires generation of free-flowing data. • In-depth interviews and focus groups are the most common data collection techniques associated with ITA. • Notes from participant observation activities can be analysed using ITA, but interview/focus group data are better.
Grounded Theory (GT)	• Inductive data collection and analytic methods. • Uses systematic and exhaustive comparison of text segments to build thematic structure and theory from a body of text. • Common analytic approach in qualitative studies.	• As above, in-depth interviews and focus groups are the most common data collection techniques associated with GT. • Sample sizes for grounded theory are more limited than for ITA because the analytic process is more intensive and time consuming.
Case Study	• Analysis of one to several cases those are unique with respect to the research topic. • Analysis primarily focused on exploring the unique quality.	• Cases are selected based on a unique (often rarely observed) quality. • Questions and observations should focus on, and investigate deeply into, the unique feature of interest.

Contd.

Type of Approach	Defining Features	Data Collection Implications
Discourse/ Conversation Analysis	• Study of "naturally occurring" discourse • Can range from conversation to public events to existing documents. • Text and structures within discourse used as objects of analysis.	• These linguistically focused methods often use existing documents as data. • Conversations between individuals that spontaneously emerge within group interviews or focus groups may be studied but are not preferred. • Participant observation is conducive to discourse analysis if narratives from public events can be recorded.
Narrative Analysis	• Narratives (storytelling) used as source of data. • Narratives from one or more sources (e.g., interviews, literature, letters, diaries).	• If generating narratives (through in-depth interviews), then questions/ tasks need to be aimed at eliciting stories and the importance those stories, hold for participants, as well as larger cultural meaning.
Mixed Methods	• Defined as integrating quantitative and qualitative research methods in one study. • Two most common designs are sequential and concurrent.	• Collection of qualitative data in a mixed methods study can be informed from a wide range of theoretical perspectives and analytic approaches. • Researchers must specify up front, and in detail, how, when, and why qualitative and quantitative datasets will be integrated.

reconstructed—or text transcribed from audiotapes. The basic data are these observations and conversations, the actual words of people repro-duced to the best of my ability from the field notes. Analysis is less daunting, however, if the researcher maintains a disciplined transcription schedule.

Documentation is critical to qualitative research for several reasons: It is essential for keeping track of what will be a rapidly growing volume of notes, tapes, and documents; it provides a way of developing and outlining the analytic process; and it encourages ongoing conceptualizing and strategizing about the text.

Conceptualization, Coding, and Categorizing

Identifying and refining important concepts is a key part of the iterative process of qualitative research. Analytic insights are tested against new observations, the initial statement of problems and concepts is refined, the researcher then collects more data, interacts with the data again, and the process continues.

Matrix A form on which can be recorded systematically particular features of multiple cases or instances that a qualitative data analyst needs to examine.

Examining Relationships and Displaying Data:

Examining relationships is the centrepiece of the analytic process, because it allows the researcher to move from simple description of the people and settings to explanations of why things happened as they did with those people in that setting. The process of examining relationships can be captured in a matrix that shows how different concepts are connected, or perhaps what causes are linked with what effects.

Table 14.3: Coding Form for examining relationships

	Favourable	Neutral or Unknown	Antagonistic
High			
Moderate			
Low			

(Construct illustrative case studies for each cell based on fieldwork)

A great deal of analysis must precede the construction of such a model, with careful attention to identification of important variables and the evidence that suggests connec-tions between them.

Authenticating Conclusions:

Individual items of information can be assessed in terms of at least three criteria:

1. How credible was the informant?
2. Were statements made in response to the researcher's questions, or were they spontaneous?
3. How does the presence or absence of the researcher or the researcher's informant influence the actions and statements of other group members?

Tacit knowledge: In field research, a credible sense of understanding of social processes that reflects the researcher's awareness of participants' actions as well as their words, and of what they fail to state, feel deeply, and take for granted.

A qualitative researcher's conclusions should also be assessed by his or her abil-ity to provide a credible explanation for some aspect of social life. That explanation should capture group members' **tacit knowledge** of the social processes that were observed, not just their verbal statements about these processes. Tacit knowledge—"the largely unarticulated, contextual understanding that is often manifested in nods, silences, humour, and naughty nuances"—is reflected in participants' actions as well as their words and in what they fail to state but nonetheless feel deeply and even take for granted.

Comparing conclusions from a qualitative research project to those other researchers obtained while con-ducting similar projects can also increase confidence in their authenticity.

Reflexivity: Confidence in the conclusions from a field research study is also strengthened by an honest and informative account about how the researcher interacted with subjects in the field, what problems he or she encountered, and how these problems were or were not resolved. Such a "natural history" of the development of the evi-dence enables others to evaluate the findings and reflects the interpretative philosophy that guides many qualitative researchers. Qualitative data analysts display real sensitivity to how a social situation or process is interpreted from a particular background and set of values and not simply based on the situation itself.

After all, researchers are only human and must rely on their own senses and process all information through their own minds. By reporting how and why they think, they did what they did, they can help others determine whether, or how, the researchers' perspectives influenced their conclusions. There should be clear 'tracks' indicating the attempt has been made.

Alternatives in Qualitative Data Analysis

- Ethnomethodology;
- Qualitative comparative analysis;
- Narrative analysis;
- Conversation analysis;
- Case-oriented understanding; and
- Grounded theory

Ethnography The study of a culture or cultures that some group of people shares, using participant observation over an extended period of time. As a method, it is usually meant to refer to the process of participant observation by a single investigator who immerses him or her in the group for a long period of time (often one or more years), gradually establishing trust and experiencing the social world as do the participants. Ethnographic research can also be called *naturalistic,* because it seeks to describe and understand the natural social world as it really is, in all its richness and detail. This goal is best achieved when an ethnographer is fluent in the local language and spends enough time in the setting to know how people live, what they say about themselves and what they actually do, and what they value. There are no particular methodological techniques associated with ethnography, other than just "*being there*." The analytic process relies on the thor-oughness and insight of the researcher to "tell us like it is" in the setting, as he or she experienced it.

Ethnomethodology: A qualitative research method focused on the way that participants in a social setting create and sustain a sense of reality. Ethnomethodology focuses on the way that participants construct the social world in which they live—how they "create reality"—rather than on describing the social world itself. In fact, ethno-methodologists do not necessarily believe that we can find an objec-tive reality; it is the way that participants come to create and sustain a sense of reality that is of interest. In ethnomethodology, as compared with the naturalistic orientation of ethnography, the focus shifts from the scenic features of everyday life onto the ways through which the world comes to be experienced as real, concrete, factual, and "out there." An interest in members' methods of con-stituting their world supersedes the naturalistic project of describing members' worlds as they know them. The ethno-methodologist views a code of conduct, the way that people in the setting create a sense of order and social structure. The ethno-methodologist focuses on how reality is con-structed, not on what it is.

Conversation analysis: Conversation analysis is a specific qualitative method for analysing the sequential organization and details of conversation. Like ethnomethodology, from which it developed, conversation analysis focuses on how reality is constructed, rather than on what it is. From this perspective, detailed analysis of conversational interaction is important because conversation is "a form of social organization through which the work of . . . institutions such as the economy, the polity, the family, socialization, etc." is accomplished. It is through conversation that we conduct the ordinary affairs of our lives. Our relationships with one another, and our sense of who we are to one another is generated, manifest, maintained, and managed in and through our conversations, whether face-to-face, on the telephone, or even by other electronic means. Conversation analysis focuses attention on moment-by-moment interchange. Three premises guide conversation analysis:

1. Interaction is sequentially organized, and talk can be analysed in terms of the process of social interaction rather than in terms of motives or social status.
2. Talk, as a process of social interaction, is contextually oriented—it is both shaped by interaction and creates the social context of that interaction.
3. These processes are involved in all social interaction, so no interactive details are irrelevant to understand it.

Conversation analysis can uncover meanings in interactions about which the participants are not fully aware.

Narrative analysis: A form of qualitative analysis in which the analyst focuses on how respondents impose order on the flow of experience in their lives and thus make sense of events and actions in which they have participated. Narrative methods use interviews and sometimes documents or observations. Narrative analysis seeks to put together the "big picture" about experiences or events as the participants under-stand them. Narrative analysisfocuses on "the story itself" and seeks to preserve the integrity of personal biographies or a series of events that cannot adequately be under-stood in terms of their discrete elements. Narrative analysis displays the goals and intentions of human actors; it makes individuals, cultures, societies, and historical epochs comprehensible as wholes. The coding for a narrative analysis is typi-cally of the narratives as a whole, rather than of the different elements within them. The coding strategy revolves around reading the stories and classifying them into general patterns.

Four different types of stories:

1. *Action tales,* in which the author represents himself or herself and others as acting within the parameters of taken-for-granted assumptions about what is expected for particular roles among peers.
2. *Expressive tales,* in which the author focuses on strong, negative emotional responses to someone who has wronged him or her.
3. *Moral tales,* in which the author recounts explicit norms that shaped his or her behaviour in the story and influenced the behaviour of others.
4. *Rational tales,* in which the author represents himself or herself as a rational decision maker navi-gating through the events of the story.

Four stylistic dimensions of story:

1. plot structure (e.g., whether the story unfolds sequentially)
2. dramatic tension (how the central conflict is represented)
3. dramatic resolution (how the central con-flict is resolved) and
4. predominant outcomes (how the story ends)

Coding reliability was checked through a discussion between the two primary coders, who found that their classifications agreed for a large percent-age of the stories.

We can begin to think of the building blocks of cultures as different narrative styles in which various aspects of reality are accentuated, constituted, or chal-lenged, just as others are deemphasized or silenced. Narrative analysis allowed an understanding of youth conflict to emerge from the youths' own stories while also informing our understanding of broader social theories and processes. Narrative analysis can also use documents and observations and focus more attention on how stories are constructed, rather than on the resulting narrative.

Grounded theory: Systematic theory developed inductively, based on observations that are summarized into conceptual categories, re-evaluated in the research setting, and gradually refined and linked to other conceptual categories.

Theory development occurs continually in qualitative data analysis. Many qualitative researchers use a method of developing theory during their analysis that is termed grounded theory, which involves building up inductively a systematic theory that is *grounded* in, or based on, the observations. The grounded theorist first summarizes observations into concep-tual categories, and tests the coherence of these categories directly in the research setting with more observations. Over time, as the researcher refines and links the conceptual categories, a theory evolves. As observation, interviewing, and reflection continue, grounded theory researchers refine their defini-tions of problems and concepts and select indicators. They can then check the frequency and distribution of phenomena: How many people made a particular type of comment? How often did social interaction lead to arguments? Social system models may then be developed, which specify the relationships among different phenomena. These models are modified as researchers gain experience in the setting. For the final analysis, the researchers check their models carefully against their notes and make a concerted attempt to discover negative evidence that might suggest that the model is incorrect.

Case-Oriented Understanding: Attempts to understand a phenomenon from the standpoint of the participants. The case-oriented understanding method reflects an interpretive research philosophy that is not geared to identifying causes but provides a different way to explain social phe-nomena.

Photo voices: Methods in which research participants take pictures of their everyday surroundings with cameras the researcher distributes, and then meet in a group with the researcher to discuss the pictures' meaning.

Computer-assisted qualitative data analysis: Uses special computer software to assist qualitative analyses through creating, applying, and refining categories; tracing linkages between concepts; and making comparisons between cases and events. The analysis process can be enhanced in various ways by using a computer. Programs designed for qualita-tive data can speed up the analysis process, make it easier for researchers to experiment with different codes, test different hypotheses about relationships, and facilitate diagrams of emerging theories and preparation of research reports. The steps involved in computer-assisted qualitative data analysis parallel those used traditionally to analyse text such as notes, documents, or inter-view transcripts: preparation, coding, analysis, and reporting.

Ethics in Qualitative Data Analysis:

- *Privacy, confidentiality, and anonymity*
- *Intervention and advocacy*
- *Research integrity and quality*
- *Ownership of data and conclusions*
- Use and misuse of results

Table 14.4: Difference between qualitative research and quantitative research

Criteria	Qualitative Research	Quantitative Research
Purpose	To understand & interpret social interactions.	To test hypotheses, look at cause & effect, & make predictions.
Group Studied	Smaller & not randomly selected.	Larger & randomly selected.
Variables	Study of the whole, not variables.	Specific variables studied
Type of Data Collected	Words, images, or objects.	Numbers and statistics.
Form of Data Collected	Qualitative data such as open- ended responses, interviews, participant observations, field notes, & reflections.	Quantitative data based on precise measurements using structured & validated data-collection instruments.
Type of Data Analysis	Identify patterns, features, themes.	Identify statistical relationships.
Objectivity and Subjectivity	Subjectivity is expected.	Objectivity is critical.
Role of Researcher	Researcher & their biases may be known to participants in the study, & participant characteristics may be known to the researcher.	Researcher & their biases are not known to participants in the study, & participant characteristics are deliberately hidden from the researcher (double blind studies).
Results	Particular or specialized findings that is less generalizable.	Generalizable findings that can be applied to other populations.
Scientific Method	Exploratory or bottom–up: the researcher generates a new hypothesis and theory from the data collected.	Confirmatory or top-down: the researcher tests the hypothesis and theory with the data.
View of Human Behaviour	Dynamic, situational, social, & personal.	Regular & predictable.
Most Common Research Objectives	Explore, discover, & construct.	Describe, explain, & predict.
Focus	Wide-angle lens; examines the breadth & depth of phenomena.	Narrow-angle lens; tests a specific hypothesis.
Nature of Observation	Study behaviour in a natural environment.	Study behaviour under controlled conditions; isolate causal effects.
Nature of Reality	Multiple realities; subjective.	Single reality; objective.
Final Report	Narrative report with contextual description & direct quotations from research participants.	Statistical report with correlations, comparisons of means, & statistical significance of findings.

Table 14.5: Different strategies of inquiry among quantitative, qualitative and mixed methods

Quantitative	Qualitative	Mixed Methods
• Experimental designs • Non-experimental designs, such as surveys	• Narrative research • Phenomenology • Ethnographies • Grounded theory studies • Case Study	• Sequential • Concurrent • Transformative

(*Source:* Creswell, 2009)

Table 14.6: Difference among Quantitative, Mixed, and Qualitative Methods

Quantitative Methods	Mixed Methods	Qualitative Methods
Pre-determined	Both pre-determined and emerging methods	Emerging methods
Instrument based questions	Both open- and close-ended questions	Open-ended questions
Performance data, attitude data, observational data, and census data	Multiple forms of data drawing on all possibilities	Interview data, observation data, document data, and audio-visual data
Statistical analysis	Statistical and text analysis	Text and image analysis
Statistical interpretation	Across databases interpretation	Themes, patterns interpretation

(*Source:* Creswell, 2009)

Table 14.7: Using Literature in a Qualitative Study

Use of the Literature	Criteria	Suitable Strategy Types
The literature is used to frame the problem in the introduction to the study.	There must be some literature available.	Typically, literature is used in all qualitative studies, regardless of type.
The literature is presented in a separate section as a review of the literature.	This approach is often acceptable to an audience most familiar with the traditional post-positivist approach to literature reviews.	This approach is used with those studies employing a strong theory and literature background at the beginning of a study, such as ethnographies and critical theory studies.
The literature is presented in the study at the end; it becomes a basis for comparing and contrasting findings of the qualitative study.	This approach is most suitable for the inductive process of qualitative research; the literature does not guide and direct the study but becomes an aid once patterns or categories have been identified.	This approach is used in all types of qualitative designs, but it is most popular with grounded theory, where one contrasts and compares a theory with other theories found in the literature.

15 Quantitative Research

Quantitative research is essentially about collecting numerical data to explain a particular phenomenon, particular questions seem immediately suited to being answered using quantitative methods. Quantitative researchis a study involving the use and analyses of numerical data using statistical techniques. They pose questions of who, what, when, where, how much, how many, and how.

Quantitative research methods are designed to produce statistically reliable data that tells us how many people do or think something. Quantitative data typically is in numerical form such as averages, ratios or ranges.

Quantitative research is especially useful when carrying out a large scale needs assessment or baseline survey. It is independent of the researcher and one should get similar results no matter who carries out the research. It can also be used to measure trends.

Quantitative research is the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect. It is used in a wide variety of natural and social sciences, including physics, biology, Anthropology, psychology, sociology and geology (Wikipedia Encyclopaedia, 2005).

According to Cohen (2002), quantitative research is defined as social research that employs empirical methods and empirical statements. He states that an empirical statement is defined as a descriptive statement about what "is" the case in the "real world" rather than what "ought" to be the case. Typically, empirical statements are expressed in numerical terms; another factor in quantitative research is that empirical evaluations are applied. Empirical evaluations are defined as a form that seeks to determine the degree to which a specific program or policy empirically fulfils or does not fulfil a particular standard or norm.

Moreover, Creswell (2009) has given a very concise definition of quantitative research as a type of research that is "explaining phenomena by collecting numerical data that are analysed using mathematically based methods (in particular statistics)."

There are four main types of research question that quantitative research is particularly suited to find an answer to:

1. The first is when we want a quantitative answer.
2. Numerical change can likewise only accurately be studied using quantitative methods.
3. As well as wanting to find out about the state of something, we often want to explain phenomena.
4. The final activity for which quantitative research is especially suited is the testing of hypotheses.

Quantitative research should be used under the following circumstances:

- When trying to measure a trend such as 'do youth talk to their parents about issues important to them?'
- When data can be obtained in numerical forms such as 'number of children under 15 who participate in activities'.
- When simple objective responses can be received such as yes and no questions.
- There is no uncertainty about the concepts being measured, and there is only one way to measure each concept.
- You are trying to collect data in ratios, percentages and averages.

Important Questions to ask before deciding on what type of research to use

1. What is the information that is required?
2. How will you use this information?
3. From which stakeholders will you get this information?
4. What are the most appropriate tools for collecting the information?
5. What are the specific questions?

Quantitative research can be conducted by using a variety of methods of numerical data collection. There are several types of quantitative research. For instance, it can be classified as 1) survey research, 2) correlational research, 3) Trend analysis, 4) Exploratory research, 5) Descriptive research, 6) experimental research and 7) causal-comparative research.

Advantages of Quantitative research:

- Can be used when large quantities of data need to be collected.
- The result is usually numerical (quantifiable) and hence considered more "objective".
- The data is considered quantifiable and usually generalizable to a larger population.
- It can allow seeing changes overtime and help develop quantitative indicators.
- It can provide a clear, quantitative measure to be used for grants and proposals.

Disadvantages of Quantitative research:

- Results need to be calculated using Excel, Access, or data analysis software (such as SPSS), which may not always be accessible.
- Time consuming, as the researcher needs to enter, clean and then analyse the data.
- The larger the sample, the more time it takes to analyse the data and analyse results.
- The larger the sample the more time it takes to collect data.
- The quantitative data ignores a very important human element.

Consent forms for quantitative research:

- All interviewees must give their agreement to participate.
- Interviewers should make sure that interviewees know they can refuse to respond to questions (that is why always include "no response" in the list of possible responses) or stop the interview at any time.
- Investigators must provide interviewees with information about the activity in a manner appropriate to their culture and education.
- Consent forms and informational tools should be developed with community members and field-tested.

Numeric data collected in a research project can be analysed quantitatively using statistical tools in two different ways. **Descriptive analysis** refers to statistically describing, aggregating, and presenting the constructs of interest or associations between these constructs. **Inferential analysis** refers to the statistical testing of hypotheses (theory testing).

Much of today's quantitative data analysis is conducted using software programs such as SPSS or SAS.

Data Preparation

In research projects, data may be collected from a variety of sources: mail-in surveys, interviews, pre-test or post-test experimental data, observational data, and so forth. This data must be converted into a machine-readable, numeric format, such as in a spreadsheet or a text file, so that they can be analysed by computer programs like SPSS or SAS. Data preparation usually follows the following steps.

Data coding: Coding is the process of converting data into numeric format. A codebook should be created to guide the coding process. A codebook is a comprehensive document containing detailed description of each variable in a research study, items or measures for that variable, the format of each item (numeric, text, etc.), the response scale for each item (i.e., whether it is measured on a nominal, ordinal, interval, or ratio scale; whether such scale is afive-point, seven-point, or some other type of scale), and how to code each value into a numeric format. For instance, if we have a measurement item on a seven-point Likert scale with anchors ranging from "strongly disagree" to "strongly agree", we may code that item as 1 for strongly disagree, 4 for neutral, and 7 for strongly agree, with the intermediate anchors in between. Nominal data such as industry type can be coded in numeric form using a coding scheme such as: 1 for manufacturing, 2 for retailing, 3 for financial, 4 for healthcare, and so forth (of course, nominal data cannot be analysed statistically). Ratio scale data such as age, income, or test scores can be coded as entered by the respondent. Sometimes, data may need to be aggregated into a different form than the format used for data collection. For instance, for measuring a construct such as "benefits of computers," if a survey provided respondents with a checklist of benefits that they could select from (i.e., they could choose as many of those benefits as they wanted), then the total number of checked items can be used as an aggregate measure of benefits. Note that many other forms of data, such as interview transcripts, cannot be converted into a numeric format for statistical analysis. Coding is especially important for large complex studies involving many variables and measurement items, where the coding process is conducted by different people, to help the coding team code data in a consistent manner, and also to help others understand and interpret the coded data.

Data entry: Coded data can be entered into a spreadsheet, database, text file, or directly into a statistical program like SPSS. Most statistical programs provide a data editor for entering data. However, these programs store data in their own native format (e.g., SPSS stores data as .sav files), which makes it difficult to share that data with other statistical programs. Hence, it is often better to enter data into a spreadsheet or database, where they can be reorganized as needed, shared across programs, and subsets of data can be extracted for analysis. Smaller data sets with less than 65,000 observations and 256 items can be stored in a spreadsheet such as Microsoft Excel, while larger dataset with millions of observations will require a database. Each observation can be entered as one row in the spreadsheet and each measurement item can be represented as one column. The entered data should be frequently checked for accuracy, via occasional spot checks on a set of items or observations, during and after entry. Furthermore, while entering data, the coder should watch out for obvious evidence of bad data, such as the respondent selecting the "strongly agree" response to all items irrespective of content, including reverse-coded items. If so, such data can be entered but should be excluded from subsequent analysis.

Missing values: Missing data is an inevitable part of any empirical data set. Respondents may not answer certain questions if they are ambiguously worded or too sensitive. Such problems should be detected earlier during pre-tests and corrected before the main data collection process begins. During data entry, some statistical programs automatically treat blank entries as missing values, while others require a specific numeric value such as -1 or 999 to be entered to denote a missing value. During data analysis, the default mode of handling missing values in most software programs is to simply drop the entire observation containing even a single missing value, in a technique called *list wise deletion*. Such deletion can significantly shrink the sample size and make it extremely difficult to detect small effects. Hence, some software programs allow the option of replacing missing values with an estimated value via a process called *imputation*. For instance, if the missing value is one item in a multi-item scale, the imputed value may be the average of the respondent's responses to remaining items on that scale. If the missing value belongs to a single-item scale, many researchers use the average of other respondent's responses to that item as the imputed value. Such imputation may be biased if the missing value is of a systematic nature rather than a random nature. Two methods that can produce relatively unbiased estimates for imputation are the maximum likelihood procedures and multiple imputation methods, both of which are supported in popular software programs such as SPSS and SAS.

Data transformation: Sometimes, it is necessary to transform data values before they can be meaningfully interpreted. For instance, reverse coded items, where items convey the opposite meaning of that of their underlying construct, should be reversed (e.g., in a 1-7 interval scale, 8 minus the observed value will reverse the value) before they can be compared or combined with items that are not reverse coded. Other kinds of transformations may include creating scale measures by adding individual scale items, creating a weighted index from a set of observed measures, and collapsing multiple values into fewer categories.

The details of statistical test required for quantitative data analysis is explained in chapter-23.

Table 15.1: Comparison between Qualitative, Quantitative, and Mixed Methods Approaches

Tend to	Qualitative Approaches	Quantitative Approaches	Mixed Methods Approaches
Use these philosophical assumptions	Constructivist / advocacy / participatory knowledge claims	Post-positive knowledge claims	Pragmatic knowledge claims
Employ these strategies of inquiry	Phenomenology, Ground theory, Ethnography, Case study, and narrative	Surveys and experiments	Sequential, concurrent, and transformative
Employ these methods	Open-ended questions, Emerging approaches, text or image data	Close-ended questions, predetermined approaches, numeric data	Both open- and close-ended questions, both emerging and predetermined approaches, and both quantitative and qualitative data and analysis
Use these practices of research as the researcher	• Positions him- or herself • Collects participant meanings • Focuses on a single concept or phenomenon • Brings personal values into the study • Studies the context or setting of participants • Validates the accuracy of findings • Makes interpretations of the data • Creates an agenda for change or reform • Collaborates with the participants	• Tests or verifies theories or explanations • Identifies variables to study • Relates variables in questions or hypotheses • Uses standards of validity and reliability • Observes and measures information numerically • Used unbiased approaches • Employs statistical procedures	• Collects both quantitative and qualitative data • Develops a rationale for mixing • Integrates the data at different stages of inquiry • Presents visual pictures of the procedures in the study • Employs the practices of both qualitative and quantitative research
(source: Creswell, 2009)			

16 Survey Research

The word 'survey' has been derived from the words 'sur' or 'sor' and 'veeir' or 'veior' which means 'over' and 'see' respectively. Survey research means collection of facts for practical use in society. It is clear that for every practical problem demanding action plan, we need some concrete data, without which we cannot achieve concrete results. The data collected by survey enhance our knowledge as well as used for solving a particular problem in a scientific way.Survey Research Designs follow Property-Disposition Research paradigm.Survey research is a research method involving the use of standardized questionnaires or interviews to collect data about people and their preferences, thoughts, and behaviours in a systematic manner. Although census surveys were conducted as early as Ancient Egypt, survey as a formal research method was pioneered in the 1930-40s by sociologist Paul Lazarsfeld to examine the effects of the radio on political opinion formation of the United States. This method has since become a very popular method for quantitative research in the social sciences.

Characteristics of the Survey Method

The following are the main characteristics of the survey method of research:

1. The survey method gathers data from a relatively large number of cases at a particular time.
2. It is essentially cross-sectional.
3. It is not concerned with the characteristics of individuals.
4. It involves clearly defined problem.
5. It requires experts imaginative planning.
6. It involves definite objectives.
7. It requires careful analysis and interpretation of the data gathered.
8. It requires logical and skilful reporting of the findings.
9. Surveys vary greatly in complexity.
10. It does not seek to develop an organised body of scientific principles.
11. It provides information 'useful to the solution of local problems.
12. It contributes to the advancement of knowledge because affords penetrating insight into the nature of what one is dealing with.

13. It suggests the course of future developments.
14. It determines the present trends and solves current problems.
15. It helps in fashioning many tools with which we do the research.

Surveys are considered as most appropriate method in case of measuring variables through answers of questions. A wide range of subjects are covered by survey method of research. Broadly, it can be categorised as under:

1. Attitudes / beliefs / opinions
2. Behaviour
3. Reactions / comments
4. Characteristics
5. Expectations / aspirations
6. Knowledge / awareness
7. Suggestions
8. Need assessment
9. Interpersonal relations

This list is not exhaustive; it is an exemplary one, which includes only broad areas that are very frequently studied by using survey research.

The survey method can be used for descriptive, exploratory, or explanatory research. Survey research has several inherent **strengths** compared to other research methods:

1. Surveys are an excellent vehicle for measuring a wide variety of unobservable data, such as people's preferences (e.g., political orientation), traits (e.g., self-esteem), attitudes (e.g., toward immigrants), beliefs (e.g., about a new law), behaviours (e.g., smoking or drinking behaviour), or factual information (e.g., income).
2. Survey research is also ideally suited for remotely collecting data about a population that is too large to observe directly.
3. Due to their unobtrusive nature and the ability to respond at one's convenience, questionnaire surveys are preferred by some respondents.
4. Interviews may be the only way of reaching certain population groups such as the homeless or illegal immigrants for which there is no sampling frame available.
5. Large sample surveys may allow detection of small effects even while analysing multiple variables, and depending on the survey design, may also allow comparative analysis of population subgroups (i.e., within-group and between-group analysis).
6. Survey research is economical in terms of researcher time, effort and cost than most other methods such as experimental research and case research.

At the same time, survey research also has some unique **disadvantages**. It is subject to a large number of biases such as non-response bias, sampling bias, social desirability bias, and recall bias.

The sources of data in survey research are 'people' and 'paper'. The responses of questions put to people constitute the major sources of data in social research. This source is labelled as primary source of data. A large amount of data is already available in the form of 'paper' sources. These include document, historical records, diaries, biographies, statistical records etc. The 'paper' sources are commonly known as 'secondary source of data' or 'available data source'. Based on the two sources of data the major survey research designs can be organised into two categories:

1. Correlational studies, and
2. Analysis of available data

Correlational Studies:

Social research seeks to establish measure, analyse and predict association between human relations as well as in natural phenomena, in all their variety and intensity. Data collected through survey method are analysed keeping this presumption in mind. This design of survey research is commonly known as correlational studies. Much of the social researches establish interrelationships among variables as its first step. Correlational studies are concerned with determining the extent of relationship existing between variables. By and large, correlational studies intend to answer the following questions:

1. Is there a relationship between two variables?
2. What is the direction of the relationship?
3. What is the magnitude of the relationship?

Analysis of available data:

Data collected by someone other than the researcher for purposes that differ from the researcher are referred to as available data or secondary data. A wide range of such data is available for analysis. For example, governmental as well as non-governmental organisations collect a large amount of statistical data. Another form of secondary data are documents in different form of communication in qualitative format. This form of data includes articles of journals, books, magazines, letters, memoranda, diaries, etc. Social work case records and fieldwork records are a rich source of secondary data for social science research.

Depending on how the data is collected, survey research can be divided into two broad categories: questionnaire surveys (which may be mail-in, group-administered, or online surveys), and interview surveys (which may be personal, telephone, or focus group interviews). Questionnaires are instruments that are completed in writing by respondents, while interviews are completed by the interviewer based on verbal responses provided by respondents.

Questionnaire Surveys:

Invented by Sir Francis Galton, a **questionnaire** is a research instrument consisting of a set of questions (items) intended to capture responses from respondents in a standardized manner. Questions may be unstructured or structured. Unstructured questions ask respondents to provide a response in their own words, while structured questions ask respondents to select an answer from a given set of choices. Subjects' responses to individual questions (items) on a structured questionnaire may be aggregated into a composite scale or index for statistical analysis. Questions should be designed such that respondents are able to read, understand, and respond to them in a meaningful way, and hence the survey method may not be appropriate or practical for certain demographic groups such as children or the illiterate. Most questionnaire surveys tend to be **self-administered mail surveys**, where the same questionnaire is mailed to a large number of people, and willing respondents can complete the survey at their convenience and return it in postage-prepaid envelopes. Mail surveys are advantageous in that they are unobtrusive, and they are inexpensive to administer, since bulk postage is cheap in most countries. However, response rates from mail surveys tend to be quite low since most people tend to ignore survey requests. There may also be long delays (several months) in respondents' completing and returning the survey (or they may simply lose it). Hence, the researcher must continuously monitor responses as they are being returned, track and send reminders to non-respondents repeated reminders (two or three reminders at intervals of one to 1.5 months is ideal). Questionnaire surveys are also not well suited for issues that require clarification on the part of the respondent or those that require detailed written responses. Longitudinal designs can be used to survey the same set of respondents at different times, but response rates tend to fall precipitously from one survey to the next.

A second type of survey is group-administered questionnaire. A sample of respondents is brought together at a common place and time, and each respondent is asked to complete the survey questionnaire while in that room. Respondents enter their responses independently without interacting with each other. This format is convenient for the researcher, and high response rate is assured. If respondents do not understand any specific question, they can ask for clarification. In many organizations, it is relatively easy to assemble a group of employees in a conference room or lunch room, especially if the survey is approved by corporate executives.

A more recent type of questionnaire survey is an online or web survey. These surveys are administered over the Internet using interactive forms. Respondents may receive an electronic mail request for participation in the survey with a link to an online website where the survey may be completed. Alternatively, the survey may be embedded into an e-mail, and can be completed and returned via e-mail. These surveys are very inexpensive to administer, results are instantly recorded in an online database, and the survey can be easily modified if needed. However, if the survey website is not password-protected or designed to prevent multiple submissions, the responses can be easily compromised. Furthermore, sampling bias may be a significant issue since the survey cannot reach people that do not have computer or Internet access, such as many of the poor, senior, and minority groups, and the respondent sample is skewed toward an younger demographic who are online much of the time and have the time and ability to complete such surveys. Computing the response rate may be problematic, if the survey link is posted on bulletin boards instead of being e-mailed directly to targeted respondents. For these reasons, many researchers prefer dual-media surveys (e.g., mail survey and online survey), allowing respondents to select their preferred method of response.

Constructing a survey questionnaire is an art. Numerous decisions must be made about the content of questions, their wording, format, and sequencing, all of which can have important consequences for the survey responses.

Response formats. Survey questions may be structured or unstructured. The details of responses to structured questions are explained in chapter-9.

Every single question in a survey should be carefully scrutinized for the following issues:

- *Is the question clear and understandable:* Survey questions should be stated in a very simple language, preferably in active voice, and without complicated words or jargon that may not be understood by a typical respondent. All questions in the questionnaire should be worded in a similar manner to make it easy for respondents to read and understand them. The only exception is if your survey is targeted at a specialized group of respondents, such as doctors, lawyers and researchers, who use such jargonin their everyday environment.
- *Is the question worded in a negative manner:* Negatively worded questions, such as should your local government not raise taxes, tend to confuse many respondents and lead to inaccurate responses. Such questions should be avoided, and in all cases, avoid double-negatives.
- *Is the question ambiguous:* Survey questions should not words or expressions that may be interpreted differently by different respondents (e.g., words like "any" or "just"). For instance, if you ask a respondent, what is your annual income, it is unclear whether you referring to salary/wages, or also dividend, rental, and other income, whether you referring to personal income, family income (including spouse's wages), or personal and businessincome? Different interpretation by different respondents will lead to incomparable responses that cannot be interpreted correctly.
- *Does the question have biased or value-laden words:* Bias refers to any property of a question that encourages subjects to answer in a certain way. A biased language or tone tends to skew observed responses. It is often difficult to anticipate in advance the biasing wording, but to the greatest extent possible, survey questions should be carefully scrutinized to avoidbiased language.
- *Is the question double-barrelled:* Double-barrelled questions are those that can have multiple answers.

Q. Have you stopped beating your wife?

Q. Do you think urbanisation leads to the breaking up of the family <u>*and*</u> makes an individual extremely selfish?

It is always advisable to separate double-barrelled questions into separate questions.

- *Is the question too general:* Sometimes, questions that are too general may not accurately convey respondents' perceptions. If you asked someone how they liked a certain book and provide a response scale ranging from "not at all" to "extremely well", if that person selected "extremely well", what does he/she mean? Instead, ask more specific behavioural questions, such as will you recommend this book to others, or do you plan to read other books by the same author? Likewise, instead of asking how big is your firm (which may be interpreted differently by respondents), ask how many people work for your firm, and/or what is the annual revenues of your firm, which are both measures of firm size.
- *Is the question too detailed:* Avoid unnecessarily detailed questions that serve no specific research purpose. For instance, do you need the age of each child in a household or is just the number of children in the householdacceptable? However, if unsure, it is better to err on the side of details than generality.
- *Is the question presumptuous:* If you ask, what you see are the benefits of a tax

cut, you are presuming that the respondent sees the tax cut as beneficial. But many people may not view tax cuts as being beneficial, because tax cuts generally lead to lesser funding for public schools, larger class sizes, and fewer public services such as police, ambulance, and fire service. Avoid questions with built-in presumptions.

- *Is the question imaginary:* A popular question in many television game shows is "if you won a million dollars on this show, how will you plan to spend it?"
- *Do respondents have the information needed to correctly answer the question:* Often times, we assume that subjects have the necessary information to answer a question, when in reality, they do not. Even if a response is obtained, in such case, the responses tend to be inaccurate, given their lack of knowledge about the question being asked. For instance, we should not ask the CEO of a company about day-to-day operational details that they may not be aware of, or asking teachers about how much their students are learning, or asking high-schoolers "Do you think the Government acted appropriately?"

Interview Survey

Interviews are a more personalized form of data collection method than questionnaires, and are conducted by trained interviewers using the same research protocol as questionnaire surveys (i.e., a standardized set of questions). However, unlike a questionnaire, the interview script may contain special instructions for the interviewer that is not seen by respondents, and may include space for the interviewer to record personal observations and comments. In addition, unlike mail surveys, the interviewer has the opportunity to clarify any issues raised by the respondent or ask probing or follow-up questions. However, interviews are time-consuming and resource-intensive. Special interviewing skills are needed on part of the interviewer. The interviewer is also considered to be part of the measurement instrument, and must proactively strive not to artificially bias the observed responses. The most typical form of interview is personal or face-to-face interview, where the interviewer works directly with the respondent to ask questions and record their responses. Personal interviews may be conducted at the respondent's home or office location. This approach may even be favoured by some respondents, while others may feel uncomfortable in allowing a stranger in their homes. However, skilled interviewers can persuade respondents to cooperate, dramatically improving response rates. A variation of the personal interview is a group interview, also called focus group. The detail about focus group interview methodology is explained in chapter-21. A third type of interview survey is telephone interviews. In this technique, interviewers contact potential respondents over the phone, typically based on a random selection of people from a telephone directory, to ask a standard set of survey questions. A more recent and technologically advanced approach of computer-assisted telephone interviewing (CATI) is increasing being used by academic, government, and commercial survey researchers, where the interviewer is a telephone operator, who is guided through the interview process by a computer program displaying instructions and questions to be asked on a computer screen. The system also selects respondents randomly using a random digit dialling technique, and records responses using voice capture technology. Once respondents are on the phone, higher response rates can be obtained. This technique is not ideal for rural areas where telephone density is low, and also cannot be used for communicating non-audio information such as graphics or product demonstrations.

Role of interviewer: The interviewer has a complex and multi-faceted role in the interview process, which includes the following tasks:

- *Prepare for the interview:* Since the interviewer is in the forefront of the data collection effort, the quality of data collected depends heavily on how well the interviewer is trained to do the job. The interviewer must be trained in the interview process and the survey method, and also be familiar with the purpose of the study, how responses will be stored and used, and sources of interviewer bias. He/she should also rehearse and time the interview prior to the formal study.
- *Locate and enlist the cooperation of respondents:* Particularly in personal, in-home surveys, the interviewer must locate specific addresses, and work around respondents' schedule sometimes at undesirable times such as during weekends. They should also be like a salesperson, selling the idea of participating in the study.
- *Motivate respondents:* Respondents often feed off the motivation of the interviewer. If the interviewer is disinterested or inattentive, respondents won't be motivated to provide useful or informative responses either. The interviewer must demonstrate enthusiasm about the study, communicate the importance of the research to respondents, and be attentive to respondents' needs throughout the interview.
- *Clarify any confusion or concerns:* Interviewers must be able to think on their feet and address unanticipated concerns or objections raised by respondents to the respondents' satisfaction. Additionally, they should ask probing questions as necessary even if such questions are not in the script.
- *Observe quality of response:* The interviewer is in the best position to judge the quality of information collected, and may supplement responses obtained using personal observations of gestures or body language as appropriate.

Conducting the interview:

The interviewer should prepare a kit for the interview session. This kit may consist of a cover letter from the principal investigator or sponsor, adequate copies of the survey instrument, photo identification, and a telephone number for respondents to call to verify the interviewer's authenticity. The interviewer should also try to call respondents ahead of time to set up an appointment if possible. To start the interview, he/she should speak in an imperative and confident tone, such as "I'd like to take a few minutes of your time to interview you for a very important study," instead of "May I come in to do an interview?" He/she should introduce himself/herself, present personal credentials, explain the purpose of the study in 1-2 sentences, and assure confidentiality of respondents' comments and voluntariness of their participation, all in less than a minute. No big words or jargon should be used, and no details should be provided unless specifically requested. If the interviewer wishes to tape-record the interview, he/she should ask for respondent's explicit permission before doing so. Even if the interview is recorded, the interview must take notes on key issues, probes, or verbatim phrases. During the interview, the interviewer should follow the questionnaire script and ask questions exactly as written, and not change the words to make the question sound friendlier. They should also not change the order of questions or skip any question that may have been answered earlier. Any issues with the questions should be discussed during rehearsal prior to the actual interview sessions. The interviewer should not finish the respondent's sentences. If the respondent gives a brief cursory answer, the interviewer should probe the respondent to elicit a more thoughtful, thorough response. Some useful probing techniques are:

- *The silent probe:* Just pausing and waiting (without going into the next question) may suggest to respondents that the interviewer is waiting for more detailed response.
- *Overt encouragement:* Occasional "uh-huh" or "okay" may encourage the respondent to go into greater details. However, the interviewer must not express approval or disapproval of what was said by the respondent.
- *Ask for elaboration:* Such as "can you elaborate on that?" or "A minute ago, you were talking about an experience you had in high school. Can you tell me more about that?"
- *Reflection:* The interviewer can try the psychotherapist's trick of repeating what the respondent said. For instance, "What I'm hearing is that you found that experience very traumatic" and then pause and wait for the respondent to elaborate. After the interview is completed, the interviewer should thank respondents for their time, tell them when to expect the results, and not leave hastily. Immediately after leaving, they should write down any notes or key observations that may help interpret the respondent's comments better.

Biases in Survey Research:

Despite all of its strengths and advantages, survey research is often tainted with systematic biases that may invalidate some of the inferences derived from such surveys. Five such biases are the non-response bias, sampling bias, social desirability bias, recall bias, and common method bias.

Non-response bias: Survey research is generally notorious for its low response rates. A response rate of 15-20% is typical in a mail survey, even after two or three reminders. If the majority of the targeted respondents fail to respond to a survey, then a legitimate concern is whether non-respondents are not responding due to a systematic reason, which may raise questions about the validity of the study's results. For instance, dissatisfied customers tend to be more vocal about their experience than satisfied customers, and are therefore more likely to respond to questionnaire surveys or interview requests than satisfied customers. Hence, any respondent sample is likely to have a higher proportion of dissatisfied customers than the underlying population from which it is drawn. In this instance, not only will the results lack generalizability, but the observed outcomes may also be an artefact of the biased sample. Several strategies may be employed to improve response rates.

- *Advance notification:* A short letter sent in advance to the targeted respondents soliciting their participation in an upcoming survey can prepare them in advance and improve their propensity to respond. The letter should state the purpose and importance of the study, mode of data collection (e.g., via a phone call, a survey form in the mail, etc.), and appreciation for their cooperation. A variation of this technique may request the respondent to return a postage-paid postcard indicating whether or not they are willing to participate in the study.

- *Relevance of content:* If a survey examines issues of relevance or importance to respondents, then they are more likely to respond than to surveys that don't matter to them.
- *Respondent-friendly questionnaire:* Shorter survey questionnaires tend to elicit higher response rates than longer questionnaires. Furthermore, questions that are clear, non-offensive, and easy to respond tend to attract higher response rates.
- *Endorsement:* For organizational surveys, it helps to gain endorsement from a senior executive attesting to the importance of the study to the organization. Such endorsement can be in the form of a cover letter or a letter of introduction, which can improve the researcher's credibility in theeyes of the respondents.
- *Follow-up requests:* Multiple follow-up requests may coax some non-respondents to respond, even if their responses are late.
- *Interviewer training:* Response rates for interviews can be improved with skilled interviewers trained on how to request interviews, use computerized dialling techniques to identify potential respondents, and schedule call-backs for respondents who could not be reached.
- *Incentives*: Response rates, at least with certain populations, may increase with the use of incentives in the form of cash or gift cards, giveaways such as pens or stress balls, entry into a lottery, draw or contest, discount coupons, promise of contribution to charity, and so forth.
- *Non-monetary incentives:* Businesses, in particular, are more prone to respond to nonmonetary incentives than financial incentives. An example of such a non-monetary incentive is a benchmarking report comparing the business's individual response against the aggregate of all responses to a survey.
- *Confidentiality and privacy:* Finally, assurances that respondents' private data or responses will not fall into the hands of any third party, may help improve response rates.

Sampling bias: Telephone surveys conducted by calling a random sample of publicly available telephone numbers will systematically exclude people with unlisted telephone numbers, mobile phone numbers, and people who are unable to answer the phone (for instance, they are at work) when the survey is being conducted, and will include a disproportionate number of respondents who have land-line telephone service with listed phone numbers and people who stay home during much of the day, such as the unemployed, the disabled, and the elderly. Likewise, online surveys tend to include a disproportionate number of students and younger people who are constantly on the Internet, and systematically exclude people with limited or no access to computers or the Internet, such as the poor and the elderly. Similarly, questionnaire surveys tend to exclude children and the illiterate, who are unable to read, understand, or meaningfully respond to the questionnaire. A different kind of sampling bias relate to sampling the wrong population, such as asking teachers (or parents) about academic learning of their students (or children), or asking CEOs about operational details in their company. Such biases make the respondent sample unrepresentative of the intended population and hurt generalizability claims about inferences drawn from the biased sample.

Social desirability bias: Many respondents tend to avoid negative opinions or embarrassing comments about themselves, their employers, family, or friends. With negative questions such as do you think that your project team is dysfunctional, is there a lot of office politics in your workplace, or have you ever illegally downloaded music files from the Internet, the researcher may not get truthful responses. This tendency among respondents to "spin the truth" in order to portray themselves in a socially desirable manner is called the "social desirability bias", which hurts the validity of response obtained from survey research. There is practically no way of overcoming the social desirability bias in a questionnaire survey, but in an interview setting, an intelligent interviewer may be able to spot inconsistent answers and ask probing questions or use personal observations to supplement respondents' comments.

Recall bias: Responses to survey questions often depend on subjects' motivation, memory, and ability to respond. Particularly when dealing with events that happened in the distant past, respondents may not adequately remember their own motivations or behaviours or perhaps their memory of such events may have evolved with time and no longer retrievable. For instance, if a respondent to asked to describe his/her utilization of computer technology one year ago or even memorable childhood events like birthdays, their response may not be accurate due to difficulties with recall. One possible way of overcoming the recall bias is by anchoring respondent's memory in specific events as they happened, rather than asking them to recall their perceptions and motivations from memory.

Common method bias: Common method bias refers to the amount of spurious covariance shared between independent and dependent variables that are measured at the same point in time, such as in a cross-sectional survey, using the same instrument, such as a questionnaire. In such cases, the phenomenon under investigation may not be adequately separated from measurement artefacts. This bias can be potentially avoided if the independent and dependent variables are measured at different points in time, using a longitudinal survey design, of if these variables are measured using different methods, such as computerized recording of dependent variable versus questionnaire-based self-rating of independent variables.

17 Experimental Research

Experimental research, often considered to be the "gold standard" in research designs, is one of the most rigorous of all research designs. In this design, one or more independent variables are manipulated by the researcher (as treatments), subjects are randomly assigned to different treatment levels (random assignment), and the results of the treatments on outcomes (dependent variables) are observed. The unique strength of experimental research is its internal validity (causality) due to its ability to link cause and effect through treatment manipulation, while controlling for the spurious effect of extraneous variable.

There are many views about the experiment, given by different researchers. They are as follows:

> "An experiment usually consists in making an event occur under known conditions whereas many extraneous influences as far as possible are eliminated and close observation is possible so that relationship between phenomena can be revealed."
>
> – *William I.B. Beveridge*

> "An experiment is an observation under controlled conditions."
>
> – *F.S. Chapin*

> "An experiment is a question framed on the basis of what is known and addressed to nature to elicit further knowledge. It, thus transcends mere observations or collection of materials; it is consciously directed, purposeful observation."
>
> – *E.B. Wilson*

> "The essence of an experiment may be described as observing the effect on a dependent variable of the manipulation of an independent variable."
>
> – *Festinger*

Experimental research is best suited for explanatory research (rather than for descriptive or exploratory research), where the goal of the study is to examine cause-effect relationships. It also works well for research that involves a relatively limited and well-defined set of independent variables that can either be manipulated or controlled. Experimental research can be conducted in laboratory or field settings. A solid grounding in the **logic of experiments** is one of the keys to good research skills, no matter what kind of research you're doing.

The steps of the experimental research:

The steps of the experimental researches are essentially those of the scientific method. For the sake of clarification, they may be listed as follows:

1. *Selecting and delimiting the problem*: The problems amenable to experimentation generally can, and should, be converted into a hypothesis that can be verified of refuted by the experimental data. The variables to be investigated should be defined in operational terms for example, the scores on a test of acceptable validity.
2. Reviewing the literature.
3. *Preparing the experimental design*: While it should also include a clarification of such basic aspects of the design as the place and the duration of the experiment, this section should place primary emphasis on the questions of control, randomization, and replication. Because of the complexity of an experiment, it is generally advisable to conduct a pilot study in order to ensure the adequacy of the design.
4. *Defining the population*: It is necessary to define the population precisely so that there can be no question about the population to which the conclusions are to apply.
5. *Carrying out the experiment*: It is necessary here to insist on close adherence to plans, especially as they relate to the factors of control, randomization and replication. The duration of the experiment should be such that the variable under investigation is given sufficient time to promote changes that can be measured and to nullify the influence of such extraneous factors as novelty.
6. *Measuring the outcomes*: Careful consideration must be given to the selection of the criterion on the basis of which the results are to be measured.The fate of the experiment depends on the fairness of the criterion used through large measures.
7. *Analysing and interpreting the outcomes*: The investigator is concerned with the operation of the factor under study. She/he must be especially sensitive to the possibility that the results of her/his study arose through the operation of uncontrolled extraneous factors. She/he must further exclude, at a given probability level, the possibility that her/his experimental findings are simply the results of chance. In no other area of research is the need for competence in statistical procedures so clearly indicated as in the analysis of experimental data as the basis of their valid interpretation. Of course, statistics cannot correct fulfils in the design or overcome inadequacies in the basic data. The investigator must recognize that statistical tools do not relieve the scientist of his responsibility for planning the study for controlling extraneous factors and for obtaining valid and precise measurements. It can also be argued that there is limited justification for high-powered statistical refinement in the early exploration of a problem area or in instances where the data involved are essentially crude and imprecise.

8. *Drawing up the conclusions*: The conclusions of the study must be restricted to the population actually investigated and care must be taken not to over generalize the results. The results also pertain only to the conditions under which they were derived and since control may have distorted the natural situation care must be taken to restrict the conclusions to the conditions actually present in the experiment. The investigator must not forget that her/his conclusions are based on the concept of probability but especially she/he must not fail to recognize the limitations underlying her/his conclusions and/or the special conditions that restrict their applicability.
9. *Reporting the result*: The study must be reported in sufficient detail so that the reader can make a judgement as to its adequacy.

Laboratory experiments, conducted in laboratory (artificial) settings, tend to be high in internal validity, but this comes at the cost of low **external validity** (generalizability), because the artificial (laboratory) setting in which the study is conducted may not reflect the real world. Field experiments, conducted in field settings such as in a real organization, and high in both internal and external validity. But such experiments are relatively rare, because of the difficulties associated with manipulating treatments and controlling for extraneous effects in a field setting.

Experimental research can be grouped into two broad categories: true experimental designs and quasi-experimental designs. Both designs require treatment manipulation, but while true experiments require random assignment, quasi-experiments do not.

Treatment and control groups: In experimental research, some subjects are administered one or more experimental stimulus called a treatment (the treatment group) while other subjects are not given such a stimulus (the control group). The treatment may be considered successful if subjects in the treatment group rate more favourably on outcome variables than control group subjects. Multiple levels of experimental stimulus may be administered, in which case, there may be more than one treatment group.

Experimental Control:

The main important problem of an experiment is the experimental control. For an accurate conclusion it is essential that all variables except experimental variable should be controlled. It should only be in a functional situation.

Needs of control

1. For the internal validity of result.
2. To know the effect on situations by changing them.
3. To make scientific observation.
4. To make prediction.

The control means to hold over the situations in this way that a change at any time can be brought about and could control the effect. Researcher needs to study the effect of the independent variable. For this she/he has to control all the other relevant variables which effect the activation of experimental variable. Researcher has to design and conduct the experiment in such a way that the experimental group should not be exposed other than experimental variable or the treatment.

Treatment manipulation: Treatments are the unique feature of experimental research that sets this design apart from all other research methods. Treatment manipulation helps control for the "cause" in cause-effect relationships. Naturally, the validity of experimental research depends on how well the treatment was manipulated. Treatment manipulation must be checked using pre-tests and pilot tests prior to the experimental study. Any measurements conducted before the treatment is administered are called pre-test measures, while those conducted after the treatment are post-test measures.

Random selection and assignment: Random selection is the process of randomly drawing a sample from a population or a sampling frame. This approach is typically employed in survey research, and assures that each unit in the population has a positive chance of being selected into the sample. Random assignment is however a process of randomly assigning subjects to experimental or control groups. This is a standard practice in true experimental research to ensure that treatment groups are similar (equivalent) to each other and to the control group, prior to treatment administration. Random selection is related to sampling, and is therefore, more closely related to the external validity (generalizability) of findings. However, random assignment is related to design, and is therefore most related to internal validity. It is possible to have both random selection and random assignment in well-designed experimental research, but quasi-experimental research involves neither random selection nor random assignment. There are five steps in a classic experiment:

1. Formulate a hypothesis.
2. Randomly assign participants to the intervention group or to the control group.
3. Measure the dependent variable(s) in one or both groups. This is called *O*1 or "observation at time 1."
4. Introduce the treatment or intervention.
5. Measure the dependent variable(s) again. This is called *O*2 or "observation at time 2."

Threats to internal validity: Although experimental designs are considered more rigorous than other research methods in terms of the internal validity of their inferences (by virtue of their ability to control causes through treatment manipulation), they are not immune to internal validity threats. Some of these threats to internal validity are described below:

- *History threat* is the possibility that the observed effects (dependent variables) are caused by extraneous or historical events rather than by the experimental treatment. It refers to any independent variable, other than the treatment, that (1) occurs between the pre-test and the post-test in an experiment and (2) affects the experimental groups differently. Suppose you are doing a laboratory experiment, with two groups (experimental and control) and there is a power failure in the building. So long as the lights go out for both groups, there is no problem. But if the lights go out for one group and not the other, it's difficult to tell whether it was the treatment or the power failure that causes changes in the dependent variable. In a laboratory experiment, history is controlled by isolating participants as much as possible from outside influences. When we do experiments outside the laboratory, it is almost impossible to keep new independent variables from creeping in and confounding things.

- *Maturation threat* refers to the possibility that observed effects are caused by natural maturation of subjects (e.g., a general improvement in their intellectual ability to understand complex concepts) rather than the experimental treatment. It refers to the fact that people in any experiment grow older or get more experienced while you are trying to conduct an experiment. Consider the following experiment: Start with a group of teenagers and follow them for the next 60 years. Some of them will move to cities, some will go to small towns, and some will stay on the reservation. Periodically, test them on a variety of dependent variables (their political opinions, their wealth, their health, their family size, and so on). See how the experimental treatments (city vs. reservation vs. town living) affect these variables. Here is where the maturation threat enters the picture. The people you are studying get older. Older people in many societies become more politically conservative. They are usually wealthier than younger people. Eventually, they come to be more illness prone than younger people. Some of the changes you measure in your dependent variables will be the result of the various treatments—and some of them may just be the result of maturation. Maturation is not just about people getting older. People ''mature'' through practice with experimental conditions and they become fatigued. We see this all the time in new social programs where people start out being really enthusiastic about innovations in organizations and eventually get bored or disenchanted.
- *Testing threat* is a threat in pre-post designs where subjects' post-test responses are conditioned by their pre-test responses. It happens when people change their responses in reaction to being constantly examined. Asking people the same questions again and again in a longitudinal study, or even in an ethnographic study done over 6 months or more, can have this effect.
- *Instrumentation threat*, which also occurs in pre-post designs, refers to the possibility that the difference between pre-test and post-test scores is not due to the remedial program, but due to changes in the administered test, such as the post-test having a higher or lower degree of difficulty than the pre-test. It results from changing measurement instruments. Changing the wording of questions in a survey is essentially changing instruments. Which responses do you trust: the ones to the earlier wording or the ones to the later wording? If you do a set of observations in the field and later send in someone else to continue the observations you have changed instruments. Which observations do you trust as closer to the truth: yours or those of the substitute instrument (the new field researcher)? In multi-researcher projects, this problem is usually dealt with by training all investigators to see and record things in more or less the same way. This is called increasing interrater reliability.
- *Mortality threat* refers to the possibility that subjects may be dropping out of the study at differential rates between the treatment and control groups due to a systematic reason. It refers to the fact that people may not complete their participation in an experiment. Suppose we follow two sets of villagers—some who receive irrigation and some who do not—for 5 years. For example, during the 1st year of the experiment, we have 100 villagers in each group. By the 5th year, 70 remain in the treatment group, and only 20 remain in the control group.

One conclusion is that lack of irrigation caused those in the control group to leave their village at a faster rate than those in the treatment group.

- *Regression threat*, also called a regression to the mean, refers to the statistical tendency of a group's overall performance on a measure during a post-test to regress toward the mean of that measure rather than in the anticipated direction. For instance, if subjects scored high on a pre-test, they will have a tendency to score lower on the post-test (closer to the mean) because their high scores (away from the mean) during the pre-test was possibly a statistical aberration. This problem tends to be more prevalent in non-random samples and when the two measures are imperfectly correlated. It can occur when your study groups that has extreme scores on a dependent variable. For example, if men who are taller than 6'7"marry women who are taller than 6'3", then their children are likely to be (1) taller than average and (2) closer to average height than either of their parents are. There are two independent variables (the height of each of the parents) and one dependent variable (the height of the children). We expect the dependent variable to "regress toward the mean," since it really can't get more extreme than the height of the parents.
- *Selection of Participants threat* is a major threat. In true experiments, you assign participants at random, from a single population, to treatment groups and control groups. This distributes any differences among individuals in the population throughout the groups, making the groups equivalent. This reduces the possibility that differences among the groups will cause differences in outcomes on the dependent variables. Random assignment in true experiments, in other words, maximizes the chance for valid outcomes— outcomes that are not clobbered by hidden factors. In natural experiments, however, we have *no control* over assignment of individuals to groups.
- *Diffusion of Treatments threat* to validity occurs when a control group cannot be prevented from receiving the treatment in an experiment. This is particularly likely in quasi-experiments where the independent variable is an information program.

Classification of experiments or experimental procedures:

Experimental studies can be variously classified on different bases. The usual bases observed for classification of experiments are:

1. *Type of control*: Scientific or practical, formal or informal, actual or inferred.
2. *Means of approach*: Analytical, comparative, quantitative or qualitative.
3. *Place where conducted*: Laboratory, field or classroom.
4. *Grouping of subjects*: In groups or individually.
5. *Treatment of subjects*: In groups or individually.
6. *Function or purpose*: To study direct effects, indirect effects or causes.
7. *Time involved*: Long or short duration.
8. *Sponsorship or investigation agency*: Independently or cooperatively but an individual or an institution.

Although there are a number of combinations of the various experimental procedures, there are three basic procedures in the experimental method:

1. Single individual or single group experimentation.
2. Parallel or equated groups experimentation, and there are four ways for equating the groups.
   a. Randomization for equating groups.
   b. By comparing mean scores of the two groups.
   c. Matched pair's method for parallel groups.
   d. Co-twins method for equating groups.
3. Rotational procedure. It is of two types:
   a. Single group rotation, and
   b. Parallel or equated group rotation.

There are three basic types of errors which influence in an experiment in field. These are sampling error or S-error, Replication error or R-error and General error other than S and R or G error. For eliminating these three basic types of errors, experimental research designs as follows:

1. Simple Random Design.
2. Levels x Treatments Design,
3. Subjects x Treatments Design,
4. Random Replication Design,
5. Group within Treatment Design, and
6. Factorial Design.

A. Two-Group Pretest-Posttest Design

	Time 1		*Time 2*	
	Assignment	*Pre-test*	*Intervention*	*Post-test*
Group 1	R	O_1	X	O_2
Group 2	R	O_3		O_4

B. The Solomon Four-Group Design

	Time 1		*Time 2*	
	Assignment	*Pre-test*	*Intervention*	*Post-test*
Group 1	R	O_1	X	O_2
Group 2	R	O_3		O_4
Group 3	R		X	O_5
Group 4	R			O_6

C. Design Without Randomization

	Time 1	*Time 2*	
	Pre-test	*Intervention*	*Post-test*
Group 1	O_1	X	O_2
Group 2	O_3		O_4

D. The Campbell and Stanley Post-test Only Design

	Time 1	*Time 2*	
	Assignment	*Intervention*	*Post-test*
Group 1	R	X	O_1
Group 2	R		O_2

E. The One-Shot Case Study Design

Time 2	
Intervention	*Post-test*
X	O

F. The One-Group Pretest-Posttest Design

Time 1		*Time 2*	
Assignment		*Intervention*	*Post-test*
	O_1	X	O_2

G. Two-Group Post-test Only: Static Group Comparison Design

Intervention	*Post-test*
X	O_1
	O_2

H. The Interrupted Time Series Design

Pre-test	*Intervention*	*Post-test*
OOO	X	OOO

Fig. 17.1: Some experimental research designs

Two-Group Experimental Designs

The simplest true experimental designs are two group designs involving one treatment group and one control group, and are ideally suited for testing the effects of a single independent variable that can be manipulated as a treatment. The two basic two-group designs are the pretest-posttest control group design and the post-test-only control group design, while variations may include covariance designs. These designs are often depicted using a standardized design notation, where R represents random assignment of subjects to groups, X represents the treatment administered to the treatment group, and O represents pre-test or post-test observations of the dependent variable.

Pretest – posttest control group design. In this design, subjects are randomly assigned to treatment and control groups, subjected to an initial (pre-test) measurement of the dependent variables of interest, the treatment group is administered a treatment (representing the independent variable of interest), and the dependent variables measured again (post-test).

R	O_1	X	O_2	Treatment group
R	O3		O_4	Control group

Fig. 17.2: Pretest-posttest control group Experimental Design

The effect *E* of the experimental treatment in the pre-test post-test design is measured as the difference in the post-test and pre-test scores between the treatment and control groups:

$E = (O2 - O1) - (O4 - O3)$

Statistical analysis of this design involves a simple analysis of variance (ANOVA) between the treatment and control groups. The pretest-posttest design handles several threats to internal validity, such as maturation, testing, and regression, since these threats can be expected to influence both treatment and control groups in a similar (random) manner. The selection threat is controlled via random assignment. However, additional threats to internal validity may exist. For instance, mortality can be a problem if there are differential dropout rates between the two groups, and the pre-test measurement may bias the post-test measurement.

	Time 1	*Time 2*	
	Assignment	*Intervention*	*Post-test*
Group 1	R	X	O_1
Group 2	R		O_2

Fig. 17.3: The Campbell and Stanley Post-test Only Experimental Design

Posttest-only control group design. This design is a simpler version of the pretest-posttest design where pre-test measurements are omitted.

The treatment effect is measured simply as the difference in the post-test scores between the two groups:

$E = (O_1 - O_2)$

The appropriate statistical analysis of this design is also a two-group analysis of variance (ANOVA). The simplicity of this design makes it more attractive than the pretest-posttest design in terms of internal validity. This design controls for maturation, testing, regression, selection, and pretest-posttest interaction, though the mortality threat may continue to exist.

Covariance designs. Sometimes, measures of dependent variables may be influenced by extraneous variables called *covariates*. Covariates are those variables that are not of central interest to an experimental study, but should nevertheless be controlled in an experimental design in order to eliminate their potential effect on the dependent variable and therefore allow for a more accurate detection of the effects of the independent variables of interest. The experimental designs discussed earlier did not control for such covariates. A covariance design (also called a concomitant variable design) is a special type of pre-test post-test control group design where the pre-test measure is essentially a measurement of the covariates of interest rather than that of the dependent variables. The design notation is shown in Figure 17.4, where C represents the covariates:

R	C	X	O_1	Treatment group
R	C		O_2	Control group

Fig. 17.4: Covariance Experimental Design

Because the pre-test measure is not a measurement of the dependent variable, but rather a covariate, the treatment effect is measured as the difference in the post-testscores between the treatment and control groups as:

$E = (O_1 - O_2)$

Due to the presence of covariates, the right statistical analysis of this design is a two group analysis of covariance (ANCOVA). This design has all the advantages of post-test only design, but with internal validity due to the controlling of covariates. Covariance designs can also be extended to pretest-posttest control group design.

Factorial Designs

Two-group designs are inadequate if your research requires manipulation of two or more independent variables (treatments). In such cases, you would need four or higher-group designs. Such designs, quite popular in experimental research, are commonly called factorial designs. Each independent variable in this design is called a *factor*, and each sub-division of a factor is called a *level*. Factorial designs enable the researcher to examine not only the individual effect of each treatment on the dependent variables (called main effects), but also their joint effect (called interaction effects).

The most basic factorial design is a 2 x 2 factorial design, which consists of two treatments, each with two levels (such as high/low or present/absent). For instance, let's say that you want to compare the learning outcomes of two different types of instructional techniques (in-class and online instruction), and you also want to examine whether these effects vary with the time of instruction (1.5 or 3 hours per week). In this case, you have two factors: instructional type and instructional time; each with two levels (in-class and online for instructional type, and 1.5 and 3 hours/week for instructional time), as shown in Figure 17.5. If you wish to add a third level of instructional time (say 6 hours/week), then the second factor will consist of three levels and you will have a 2 x 3 factorial design. On the other hand, if you wish to add a third factor such as group work (present versus absent), you will have a 2 x 2 x 2 factorial design. In this notation, each number represents a factor, and the value of each factor represents the number of levels in that factor.

Instructional Time

Factors (independent variables)

Instructional Type	1.5 hours/week	3 hours /week
	(Levels of factors)	
Online	**Group – 1**	**Group – 2**
In-classes	**Group – 3**	**Group – 4**

R	X_{11}	O
R	X_{12}	O
R	X_{21}	O
R	X_{22}	O

(Design Notation)

Figure 17.5: 2 x 2 Factorial Experimental Design

Factorial designs can also be depicted using a design notation, such as that shown on the down panel of Figure 17.5. R represents random assignment of subjects to treatment groups, X represents the treatment groups themselves (the subscripts of X represents the level of each factor), and O represent observations of the dependent variable. Notice that the 2 x 2 factorial designs will have four treatment groups, corresponding to the four combinations of the two levels of each factor. Correspondingly, the 2 x 3 design will have six treatment groups, and the 2 x 2 x 2 design will have eight treatment groups. As a rule of thumb, each cell in a factorial design should have a minimum sample size of 20 (this estimate is derived from Cohen's power calculations based on medium effect sizes). So a 2 x 2 x 2 factorial design requires a minimum total sample size of 160 subjects, with at least 20 subjects in each cell. As you can see the cost of data collection can increase substantially with more levels or factors in your factorial design. Sometimes, due to resource constraints, some cells in such factorial designs may not receive any treatment at all, which are called *incomplete factorial designs*. Such incomplete designs hurt our ability to draw inferences about the incomplete factors.

In a factorial design, a main effect is said to exist if the dependent variable shows a significant difference between multiple levels of one factor, at *all levels* of other factors. No change in the dependent variable across factor levels is the null case (baseline), from which main effects are evaluated. In the above example, you may see a main effect of instructional type, instructional time, or both on learning outcomes. An interaction effect exists when the effect of differences in one factor depends upon the level of a second factor. In our example, if the effect of instructional type on learning outcomes is greater for 3 hours/week of instructional time than for 1.5 hours/week, then we can say that there is an interaction effect between instructional type and instructional time on learning outcomes. Note that the presence of interaction effects dominate and make main effects irrelevant and it is not meaningful to interpret main effects if interaction effects are significant.

Hybrid Experimental Designs:

Hybrid designs are those that are formed by combining features of more established designs. Three such hybrid designs are randomized blocks design, Solomon four-group design, and switched replications design.

Randomized block design. This is a variation of the post-test-only or pretest-posttest control group design where the subject population can be grouped into relatively homogeneous subgroups (called *blocks*) within which the experiment is replicated. For instance, if you want to replicate the same post-test-only design among university students and full-time working professionals (two homogeneous blocks), subjects in both blocks are randomly split between treatment group (receiving the same treatment) or control group (see Figure 17.6). The purpose of this design is to reduce the "noise" or variance in data that may be attributable to differences between the blocks so that the actual effect of interest can be detected more accurately.

University students	R	X	O	Homogeneous groups
	R		O	
Full-time workers	R	X	O	
	R		O	

Figure 17.6: Randomized Blocks Experimental Design

Solomon four-group design: In this design, the sample is divided into two treatment groups and two control groups. One treatment group and one control group receive the pre-test, and the other two groups do not. This design represents a combination of post-test-only and pretest-posttest control group design, and is intended to test for the potential biasing effect of pre-test measurement on post-test measures that tends to occur in pretest-posttest designs but not in post-test only designs. The design notation is shown in Figure 17.7.

R	O	X	O
R	O		O
R		X	O
R			O

Fig. 17.7: Solomon Four-group Experimental Design

Switched replication design: This is a two-group design implemented in two phases with three waves of measurement. The treatment group in the first phase serves as the control group in the second phase, and the control group in the first phase becomes the treatment group in the second phase, as illustrated in Figure 17.8. In other words, the original design is repeated or replicated temporally with treatment/control roles switched between the two groups. By the end of the study, all participants will have received the treatment either during the first or the second phase. This design is most feasible in organizational contexts where organizational programs (e.g., employee training) are implemented in a phased manner or are repeated at regular intervals.

R	O	X	O		O
R	O		O	X	O

Fig. 17.8: Switched Replication Experimental Design

Quasi-Experimental Designs

Quasi-experimental designs are almost identical to true experimental designs, but lacking one key ingredient: random assignment. For instance, one entire class section or one organization is used as the treatment group, while another section of the same class or a different organization in the same industry is used as the control group. This lack of random assignment potentially results in groups that are non-equivalent, such as one group possessing greater mastery of a certain content than the other group, say by virtue of having a better teacher in a previous semester, which introduces the possibility of *selection bias*. Quasi-experimental designs are therefore inferior to true experimental designs in interval validity due to the presence of a variety of selection related threats such as selection-maturation threat (the treatment and control groups maturing at different rates), selection-history threat (the treatment and control groups being differentially impact by extraneous or historical events), selection-regression threat (the treatment and control groups regressing toward the mean between pre-test and post-test at different rates), selection-instrumentation threat (the treatment and control groups responding differently to the measurement), selection-testing (the treatment and control groups responding differently to the pre-test), and selection mortality (the treatment and control groups demonstrating differential dropout rates). Given these selection threats, it is generally preferable to avoid quasi-experimental designs to the greatest extent possible. Many true experimental designs can be converted to quasi-experimental designs by omitting random assignment. For instance, the quasi-equivalent version of pretest-posttest control group design is called **non-equivalent groups design** (NEGD), as shown in Figure 17.9, with random assignment *R* replaced by non-equivalent (non-random) assignment *N*. Likewise, the quasi-experimental version of switched replication design is called **non-equivalent switched replication design** (see Figure 17.10).

N	O	X	O
N	O		O

Fig. 17.9: NEGD Experimental Design

N	O	X	O		O
N	O		O	X	O

Fig. 17.10: Non-equivalent Switched Replication Experimental Design

In addition, there are quite a few unique non-equivalent designs without corresponding true experimental design cousins. Some of the more useful of these designs are discussed below.

Regression-discontinuity (RD) design: This is a non-equivalent pretest-posttest design where subjects are assigned to treatment or control group based on a cut-off score on a pre-program measure. For instance, patients who are severely ill may be assigned to a treatment group to test the efficacy of a new drug or treatment protocol and those who are mildly ill are assigned to the control group. In another example, students who are lagging behind on standardized test scores may be selected for a remedial curriculum program intended to improve their performance, while those who score high on such tests are not selected from the remedial program. The design notation can be represented as follows, where *C* represents the cut-off score:

C	O	X	O
C	O		O

Fig. 17.11: Regression-discontinuityExperimental Design

Because of the use of a cut-off score, it is possible that the observed results may be a function of the cut-off score rather than the treatment, which introduces a new threat to internal validity. However, using the cut-off score also ensures that limited or costly resources are distributed to people who need them the most rather than randomly across a population, while simultaneously allowing a quasi-experimental treatment. The control group scores in the RD design does not serve as a benchmark for comparing treatment group scores, given the systematic non-equivalence between the two groups. Rather, if there is no discontinuity between pre-test and post-test scores in the control group, but such a discontinuity persists in the treatment group, then this discontinuity is viewed as evidence of the treatment effect.

Proxy pre-test design: This design, shown in Figure 17.12, looks very similar to the standard NEGD (pretest-posttest) design, with one critical difference: the pre-test score is collected after the treatment is administered. A typical application of this design is when a researcher is brought in to test the efficacy of a program (e.g., an educational program) after the program has already started and pre-test data is not available. Under such circumstances, the best option for the researcher is often to use a different pre-recorded measure, such as students' grade point average before the start of the program, as a proxy for pre-test data. A variation of the proxy pre-test design is to use subjects' post-test recollection of pre-test data, which may be subject to recall bias, but nevertheless may provide a measure of *perceived* gain or change in the dependent variable.

N	O_1	X	O_2
N	O_1		O_2

Fig. 17.12: Proxy pre-test Experimental Design

Separate pretest-posttest samples design: This design is useful if it is not possible to collect pre-test and post-test data from the same subjects for some reason. As shown in Figure 17.13, there are four groups in this design, but two groups come from a single non-equivalent group, while the other two groups come from a different non-equivalent group. For instance, you want to test customer satisfaction with a new online service that is implemented in one city but not in another. In this case, customers in the first city serve as the treatment group and those in the second city constitute the control group. If it is not possible to obtain pre-test and post-test measures from the same customers, you can measure customer satisfaction at one point in time, implement the new service program, and measure customer satisfaction (with a different set of customers) after the program is implemented. Customer satisfaction is also measured in the control group at the same times as in the treatment group, but without the new program implementation. The design is not particularly strong, because you cannot examine the changes in any specific customer's satisfaction score before and after the implementation, but you can only examine *average* customer satisfaction scores. Despite the lower internal validity, this design may still be a useful way of collecting quasi-experimental data when pre-test and post-test data are not available from the same subjects.

N_1	O		
N_1		X	O
N_2	O		
N_2			O

Fig. 17.13: Separate Pretest-Posttestsamples Experimental Design

Non-equivalent dependent variable (NEDV) design: This is a single-group pre-post quasi-experimental design with two outcome measures, where one measure is theoretically expected to be influenced by the treatment and the other measure is not. For instance, if you are designing a new calculus curriculum for high school students, this curriculum is likely to influence students' post-test calculus scores but not algebra scores. However, the post-test algebra scores may still vary due to extraneous factors such as history or maturation. Hence, the pre-post algebra scores can be used as a control measure, while that of pre-post calculus can be treated as the treatment measure. The design notation, shown in Figure 17.14, indicates the single group by a single *N*, followed by pre-test $O_1$and post-test $O_2$for calculus and algebra for the same group of students. This design is weak in internal validity, but its advantage lies in not having to use a separate control group. An interesting variation of the NEDV design is a *pattern matching NEDV design*, which employs multiple outcome variables and a theory that explains how much each variable will be affected by the treatment. The researcher can then examine if the theoretical prediction is matched in actual observations. This *pattern-matching* technique, based on the degree of correspondence between theoretical and observed patterns is a powerful way of alleviating internal validity concerns in the original NEDV design.

N	O_1	X	O_1
	O_2		O_2

Fig. 17.14: Non-equivalent Dependent Variable ExperimentalDesign

Perils of Experimental Research:

Experimental research is one of the most difficult of research designs, and should not be taken lightly. This type of research is often best with a multitude of methodological problems. First, though experimental research requires theories for framing hypotheses for testing, much of current experimental research is non-theoretical. Without theories, the hypotheses being tested tend to be ad hoc, possibly illogical, and meaningless. Second, many of the measurement instruments used in experimental research are not tested for reliability and validity, and are incomparable across studies. Consequently, results generated using such instruments are also incomparable. Third, many experimental research use inappropriate research designs, such as irrelevant dependent variables, no interaction effects, no experimental controls, and non-equivalent stimulus across treatment groups. Findings from such studies tend to lack internal validity and are highly suspect. Fourth, the treatments (tasks) used in experimental research may be diverse, incomparable, and inconsistent across studies and sometimes inappropriate for the subject population. For instance, undergraduate student subjects are often asked to pretend that they are marketing managers and asked to perform a complex budget allocation task in which they have no experience or expertise. The use of such inappropriate tasks, introduces new threats to internal validity (i.e., subject's performance may be an artefact of the content or difficulty of the task setting), generates findings that are non-interpretable and meaningless, and makes integration of findings across studies impossible. To design an adequate and appropriate task, researchers should use pre-validated tasks if available, conduct treatment manipulation checks to check for the adequacy of such tasks (by debriefing subjects after performing the assigned task), conduct pilot tests (repeatedly, if necessary), and if doubt, using tasks that are simpler and familiar for the respondent sample than tasks that are complex or unfamiliar. In summary, this chapter introduced key concepts in the experimental design research method and introduced a variety of true experimental and quasi-experimental designs. Although these designs vary widely in internal validity, designs with less internal validity should not be overlooked and may sometimes be useful under specific circumstances and empirical contingencies.

18 Intensive Fieldwork

Fieldwork is the moment when the researcher climbs down to everyday reality and finds out that the rules of academia are not necessarily the same as those of everyday life. Everyday life will never adjust to your research plan; the only way forward is to adapt your plan and ways of going about things to the rules of everyday reality. Fieldwork is a theorised mode of action, something in which researchers still follow certain procedures and have to follow them; something in which a particular set of actions need to be performed; and something that needs to result in a body of knowledge that can be resubmitted to rigorous, disciplined academic tactics.

The theories applied in the study of foreign societies are clarified through an account of the methods used by the early social anthropologists B. Malinowski and A. Radcliffe-Brown, with the purpose of discovering the role played by fieldwork in determining the scientific value of ethnographic research. This is followed by a discussion of more recent developments within anthropology and the methods used, as well as considerations of the ethical issues that arise in research situations, and an evaluation of the merit of the methods developed by early anthropologists.

The hypothesis is that the methodology of anthropological fieldwork is a vital aspect in determining the scientific value of research in this field. When we discuss methodology we refer to the concept as being a system of methods developed on the basis of certain theories. Defining what constitutes science in general would be a daunting task. The objectives of science are widespread and therefore the epistemological standards for disciplines within the natural, social and humanistic sciences are incommensurable. The discipline of anthropology is a science often considered to be on the border between the two latter categories. This discussion has its roots in the distinction between quantitative and qualitative research, and the stance that the latter lacks intrinsic worth as the basis for science.

In 1898 a group of men, educated in different fields of science and led by A.C. Haddon set out on an expedition to collect data in New Guinea. Haddon was originally a zoologist, but became on this expedition more concerned with studying the natives of the area. Haddon, like most other anthropologists of his generation, viewed the native way of life he observed as being on its way to extinction because of European influence. His opinion, therefore, was that as much data and as many artefacts as possible should be collected, and ultimately gathered together in museums, so that information on these 'disappearing' cultures would be available to future generations as well. Haddon was influenced by the ideas of cultural evolutionism, which was the first theoretical perspective applied in anthropology, and which appeared in the middle of the 19th century. He and his peers translated these ideas of evolution in order to apply them to the study of culture. They would look for indications in native life and customs to use as evidence of earlier developments of human culture. Haddon was also interested in discovering how cultures adapted to their environment, a purpose quite in line with the idea of evolutionism.

One of Haddon's colleagues on the aforementioned expedition to New Guinea was W.H.R. Rivers, an experimental psychologist. While studying the natives on this trip, he discovered that a useful way of collecting data was by recording the genealogies or relationship ties between the people being studied. He saw this method as useful for collecting a large amount of information in a relatively short period of time, and as a way to structure the collection of data, as many social aspects could be described in connection with the study of ties between individuals.

Both Haddon and Rivers conducted survey research, but later they began to encourage intensive fieldwork. In fact, Rivers went on an expedition to India that was scheduled to last for six months, where he employed research methods similar to those later used by ethnographers, and encountered some of the same problems that they would later experience.

Though many contributions to the discipline have their origins in the American tradition, brought forth by Franz Boas (1858-1942), the emergence of ethnographic fieldwork is usually accredited to British scholars. An obvious choice of focus will be to concentrate on the figure who has gained wide fame as being the founding father of ethnographic fieldwork, Bronislaw Malinowski (1884-1942) and his contemporary A. Radcliffe-Brown (1881-1955). They both adhered to forms of functionalism, a specific philosophy used to explain and understand social phenomena by identifying their purpose for society.

Malinowski's Fieldwork Methods:

Malinowski's first work "Natives of Mailu", published in 1915, was created based on the methods of "Notes and Queries". The data was collected while sailing the coasts of the region, and consisted of a wide variety of cultural aspects arranged according to the format of "Notes and Queries". He later described this work as a failure, because he didn't feel that it was detailed enough to give a broad sense of the experience of a foreign culture. Despite this however, the expedition provided him with experiences that were to help shape his methods in his later work. For example, he began to go on outings with the natives and to spend nights at a time with them. Malinowski found, provided a much deeper insight into their way of thinking than direct questioning. Malinowski was thirty when he began his intensive fieldwork in southern New Guinea. In the introduction of *The Argonauts of the Western Pacific*, Malinowski wrote:

"Soon after I had established myself in Trobriand Islands, I began to take part in the village life, to look forward to the important or festive events, to take personal interest in the gossip and the developments of the small village occurrences, to wake up every morning presenting the day to myself as the natives do."

He wanted to create an ethnography that was able to appeal to the broader public, but also be an academically valid work. To do this, he found it was necessary to combine a description of ethnographic "facts" with theory, an idea that was in opposition to the previous notions that "facts" could be explained later and by someone else, namely the "armchair anthropologists".

It was this idea that brought him to explain in his introduction to *Argonauts of the Western Pacific* that he considered the importance of studying three different aspects of ethnographic material with three different methods: statistic documentation of concrete evidence (genealogies, maps, synoptic tables or charts), ethnographic diary and recording data in the native language.

Malinowski stated that data pertaining to "the organization of customs and social life, the framework of a society's rules" should be collected, for example through studies of genealogy, but that this was not, in itself, enough to provide a picture of the society in question. Secondly, to create this fuller picture, he claimed that social life should be observed in order to verify and give evidence to the "factual" value of what was observed. This would provide an understanding of what was considered to be norms and good manners, which he argued was "part of the real substance of the social fabric". The investigation of native's everyday life, small occurrences in the village and native's emotional interactions, friendships or hostilities could not be done by a method of question and answer, but by keeping an ethnographic diary and systematically noting peculiarities of actual life during a long period of fieldwork. Despite the fact that Malinowski is usually credited with being the source for this consideration, it had also been discussed previously in a new edition of "Notes and Queries" from 1912, where researchers were encouraged to confirm the validity of their observations with witnesses, and also to observe social events or ceremonies if the opportunity should arise. Thirdly, he was of the opinion that native views and opinions should be studied through collection of "text and linguistic statements taken in the vernacular". This opinion was in fact also mentioned in the "Notes and Queries" from 1912, where Rivers discussed the importance of correct understanding between researcher and informant. Malinowski first used pidgin-English in the Trobriands, but as he was already familiar with the structure of Melanesian languages and had acquired some knowledge of them. After his second visit to the Trobriands, he could easily follow conversations among the natives and could take notes rapidly in dialect. "*Argonauts of the Western Pacific*"is a typical example of Malinowski's method. Firstly, the landscape is recreated and physical characteristics of the natives and the main features of their social and economic organization are indicated. An outline of Trobriand economy, kinship system, beliefs, ceremonies and political institutions is given in order to understand the tradition of valuables exchange (*kula*). Then, the essentials of the *kula*system are given. Malinowski uses the description as a basis for the enunciation and clarification of sociological concepts. Not to leave "*imponderabilia of an actual life*" behind, he purveys information about native values and attitudes, tensions and conflicts which underlie the operation of structural principles.

Radcliffe-Brown's Fieldwork Methods:

The most famous of Radcliffe-Brown's ethnographic studies is that of the societies of the Andaman Islands. However, the fieldwork was carried out at such an early stage in his career that the methods he applied in gathering information cannot be considered a clear example of his later methodological beliefs. Instead he was more in line with the theories of his mentors Rivers and Haddon, and viewed the fieldwork as an apprenticeship. It was not until 1922 that he eventually published his book *The Andaman Islanders*, and by this time the Durkheimian influence had sufficiently changed his view on ethnography, resulting in a focus on the society as it existed as opposed to a historical recreation of society. In interpreting the meanings and functions of the material he had a different theoretical departure than at the time he collected it in 1906-08. Radcliffe-Brown viewed his fieldwork as an opportunity for testing methods and the collection of ethnographic facts, both artefacts and measurements of the people he studied. In Radcliffe-Brown's opinion, the fieldworker *observed* these individual actions, but described in his work and notes the underlying patterns of the social interactions between the individuals. In other words, at any given time, one can only observe separate components of the system, but one is discovering the structure. The method of ethnography defined by Radcliffe-Brown is to firstly produce an accurate description of specific elements of a given society. In this stage he recorded and labelled observations systematically by categorizing phenomena. On the basis of the descriptions, the phenomenon's meaning is interpreted. This entails awareness of the risk of misinterpretation, as Radcliffe-Brown has stated in the 1932 preface of *The Andaman Islanders*: "There is a danger that the ethnologist may interpret the beliefs of a native people not by a reference to *their* mental life but by reference to his own." A more sufficient understanding can only be achieved if one has devoted time to developing an understanding of the pattern of thought displayed by the society to be studied. In relating a series of phenomena to each other, patterns of social function are discovered. These patterns are seen as the underlying structures which constitute social relationships and the implications of these on the function of the society as a whole. The ultimate goal is then to identify similarities between different societies in order to define general "social laws". This can then result in the formulation of a "hypothesis as to the nature and function of ritual or of myth" to be tested and potentially proven to be applicable to other societies. This frame of method is also reflected in the structure of *The Andaman Islanders*, which consists of a description of mental and daily lives of the people followed by more theoretical chapters. Radcliffe-Brown's intention with these theoretical chapters is to discover the meaning of their customs etc. "We have to explain why the Andamanese think and act in certain ways." This is his aim and he intends to achieve this by studying one custom in relation to others and thereby understanding the underlying ideas and thoughts.

The basic concept of the "field" has changed little since Malinowski and Radcliffe-Brown worked within it. The idea of the field as being one that is, in fact, somewhere else, preferably very distant, different and exotic, is still close at hand.

The realization that otherness also exists within the researcher's own society, opens up the concept of the "field". Rather than being defined by geographical remoteness, location is more likely to be bounded by social phenomena such as sub-cultures or lifestyles.

Anthropology has depended on the idea that culture has, until now, provided the distinct boundaries, fixed locations and structures that were the "field". As globalization has eroded these clear boundaries and the concept of clear boundaries itself, anthropologists have had to reconsider their reliance on the very well-defined locality.

Decentring the field also changes the perception of the field as being among a specific group of people. The field becomes more a method of study, one which is concerned with many interconnected locations and people. The aim of ethnography is no longer to create "holistic knowledge" of a foreign culture, but to create a deeper understanding of complex workings within a group of people.

Very few cultures can be contained within a specific isolated location. With worldwide communication and migration now being a given, a holistic portrayal of a single culture as site is not realistic.

As the "field" becomes more difficult to identify, anthropologists are looking for new ways to define their area of work. Today, anthropologists tend to be increasingly focused on the political allegiances and the problems that arise in an increasingly globalized world. This has long been the purpose of applied anthropology, which focuses on a specific political project. The opinion is that science does not exist apart from its social context, and that the ultimate goal should be discovering and providing solutions for problems that arise in life. However, active participation in such projects entails new considerations of the nature of anthropology as science. The goal becomes to eventually facilitate change in the "field" of study, as opposed to simply documenting it as it is and leaving it up to others to act. However, if anthropologists focus exclusively on researching problem areas, there is the risk of excluding research which could potentially provide important knowledge.

Because of the dominance of Malinowski's ideas, the "field" has long been restricted to a far distant location. As anthropologists in a changed world seek new paths, the methods applied are changing, and the strict methodology of participant observation is being complemented by other research techniques.

In recent years, there have been a number of stimulating volumes that have reflected on the changing nature of fieldwork practices challenged by contemporary conditions, informing the concepts and ambitions of anthropological research.

Fieldwork-based research has three sequential stages:

1. prior to fieldwork,
2. during fieldwork, and
3. after fieldwork.

Roughly, these stages correspond to

1. preparation and documentation;
2. fieldwork procedures and
3. post-fieldwork analysis and writing.

Prior to fieldwork, several activities are required, and they can be captured under preparation and documentation. Preparation, of course, starts as soon as one begins research, develops an interest in a particular topic or field, and starts working on a proposal and a work plan. You read considerable volumes of theoretically and methodologically informative works, which is invaluable because it directs your gaze to particular aspects of social reality and sharpens your eyes and ears for particular phenomena and events. That is general preparation, and we need not dwell on it here. But there will be a decision at a given moment that your research will include fieldwork. And this decision has far-reaching consequences, because it places your work on a track which has its own requirements and peculiarities: you now have to subscribe to the general epistemological and methodological principles. The result of your research will now *not* be a body of findings which can claim representativeness for a (segment of the) population, it will not be replicable under *identical* circumstances, it will not claim objectivity on grounds of an outsider's position for the researcher, it will not claim to produce 'uncontaminated' evidence, and so on. It will be interpretive research in a situated, real environment, based on interaction between the researcher and the subject(s), hence, fundamentally *subjective* in nature, aimed at demonstrating complexity, and yielding hypotheses that can be replicated and tested in *similar*, not identical, circumstances. Ethnography produces theoretical statements, not 'facts' nor 'laws'. That does *not* mean that your research will be a game without rules. The rules of ethnographic analysis are as strict and rigorous as those of statistics, and there are more things one can do wrong in ethnographic work than perhaps in any other branch of science.

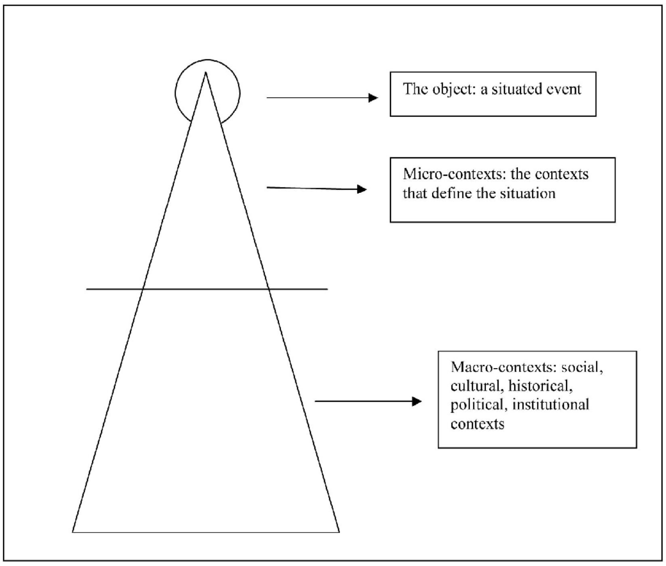

Fig. 18.1: Schematic representation of contextualisation of intensive fieldwork

Your object is a needle point in time and space, and it can only gain relevance when it is adequately contextualised in micro- and macro-contexts. This contextualisation explains why your object has the features it has and why it lacks others; it also allows you to see, in microscopic events, effects of macroscopic structures, phenomena and processes.

The main task during your fieldwork preparation is, thus, *to understand and study the possible contexts in which your object will occur,* micro as well as macro. This will expand the range of recognisable things – not everything will be totally strange and unexpected – and lower the risk of asking the wrong questions and behaving totally out of order. It *lowers* these risks, but does not *eliminate* them, of course. If you intend to do fieldwork in a primary school in a country it is good to know

(i) that there arein effect such schools
(ii) some basic and general things about how such schools operate
(iii) whether there are regional divisions, or urban-rural divisions, that could be important foci of research
(iv) some general things about the legal provisions for such schools, and about their institutional structure
(v) general information about its history, social structure, politics, major languages, media etc.
(vi) the tradition of scholarship on education, the major centres for research, and the major researchers, policy makers and authority figures in the field.

A lot of this documentary research needs to be done prior to departing for the field. Some parts of it, however, may only be possible over there. You might need access to specific archives, and asking people there. As said, it is important, because it leads to, and helps you in, more practical aspects of preparation. For instance, and very importantly, it can help you decide whether the topic you had in mind is

(i) *Worth researching*: is it big enough as a topic, is it promising in terms of findings, are there specific documentary/empirical and theoretical issues that may be addressed through fieldwork there?
(ii) *Researchable*: This is very important. Many topics are very much worth researching, but practically, legally or otherwise un-researchable. There may be ethical restrictions, legal and political ones (authorities not releasing crucial information, or not granting research permits for particular forms and topics of research), material ones (fieldwork would be too expensive or would require a massive research infrastructure) or others. Research in a war zone, for instance, is as good as impossible, even if the situation in that region cries for thorough and sustained research and even if people there would be genuinely helped by your work. The same goes for many 'slum' environments around the world: they are extraordinarily fascinating places and we absolutely need a clear and detailed understanding of life in such environments, but the conditions for research are such that researchers could expose themselves to serious danger even entering the area. There are also people who might put you in grave danger when you decide to do research with and on them – think of gangs or rebel movements. Researchability is a major decision you need to make during the preparation phase, and thorough preparatory research is essential in making it.

In addition, preparatory research of course helps you in deciding issues such as the general target(s) of your research, the patterns of work you will develop – observations, interviews, single-site or multiple-site research, etc. – the number and kinds of informants you would probably need in order to get your findings, the amount of administrative procedure you need to follow (visa requirements, research permits, ethical clearance, local reporting, and so on). It helps you select the schools you will work in, establish first contacts with local people in schools and communities, find out a bit about what goes on there prior to your arrival, and establish interaction with local researchers or institutes. Good preparation helps you to be *realistic* in all of this.

Part of this realism, and unfortunately often overlooked, is *to have a Plan B*. Be aware of the fact that every aspect of fieldwork can go completely wrong, even if it is based on the most meticulously prepared and detailed plan. You are working in a real social environment and with real people. The informants you had contacted prior to your fieldwork may no longer be there, may now bluntly refuse cooperation or demand huge sums of money in return. The people you wanted to interview refuse to be interviewed or keep postponing the appointments to do the interviews. The archive material you absolutely need is not there or not accessible. Or, you may fall out with your collaborators in the field; people may start turning their backs on you. Or, your video recorder refuses duty from day one, and there is no way in which you can get a new one – while a crucial part of your research ought to be based on video data. Or, you get involved in a nasty traffic accident and get a bad neck injury requiring weeks of hospitalisation and rehab. It is thus very wise to think of, and develop, a research plan that can still be carried through even if all goes wrong. If your research is dependent on one major type of data – say video recordings of classroom practices – or on particular formats of work such as interviewing, close work with informants, etc. you must think of something that can be researched from other types of data and through other means (a policy study, an analysis of teaching materials or of pupils' notebooks, an inquiry into adjacent fields such as e.g. the labour market or teacher training programmes). This will require different topics, aims, procedures. That is not an easy job, but it is best to put it in your bag because work in the field can be very unpredictable.

In the field:

Fieldwork itself is humanly demanding, as a fieldworker will need to give proof of all the good qualities in life: patience, endurance, stamina, perseverance, flexibility, adaptability, empathy, tolerance, the willingness to lose a battle in order to win a war, creativity, humour and wit, diplomacy, and being happy about very small achievements.

Chaos: Since most of us are only human, fieldwork is often a period of deep frustration, disappointment and confusion, sometimes even of bitter tears. The main frustration is due to the widespread perception and experience that fieldwork is *chaotic*. It can contain long periods in which nothing seems to happen and then suddenly all sorts of things co-occur rapidly and seemingly without structure or patterns, certainly not with the clear structure and patterns one had picked up from the literature. (At these moments of acceleration, you discover that you forgot your tape recorder of course). People contradict each other, and just when you think you found the key to the whole thing, the whole thing changes again. The plan has to be revised over and over again, as certain administrative procedures take forever and some of your key informants are on leave or have better things to do. Above all, the topic you had so nicely sketched in your research proposal turns out to be either very different than what you expected, or to be more than one topic and a cluster of things that need to be investigated step by step in ways you had not anticipated. *Chaos is the normal state of things*. It is nothing to worry about. Remember what we set out to do: to describe and analyse *complexity*, not to simplify a complex social event into neat tables and lines. So we should not be surprised if the social events we observe are not linear, not perfectly logical, not clearly sequential, not dominated by rational decisions and so on: life is not like that. Try to describe *everything* you do when you perform a single activity such as crossing a busy street – every sensory and bodily movement, and every thought and decision –human behaviour is stunningly complex. But there is an interesting twist: the perception of chaos is gradually replaced by one of order, and this has to do with the learning process of fieldwork. *The more we get to understand the contexts of events, the less we experience such events as chaotic*. If we return to the example of crossing a street: for most people this would be a single action – I simply cross the street – and the reason is that we've done it thousands of times and have developed routinized procedures for it, procedures we no longer perceive as part of the activity, but just as a canvas, a neutral background to the activity itself. *Of course* we look carefully left and right before we decide to cross, *of course* we adjust our walking speed to that of approaching vehicles, and *of course* we will step back when a car is approaching too fast or is already too close to us. *How else could we cross the street*? So what is essentially a tremendously complicated bundle of activities is now seen as one logically structured, almost automatic activity of extreme simplicity. And if crossing a street is already a complex thing, one can imagine what degree of complexity a social network must have; yet all of us move through various such networks on a daily basis and seem not to encounter major problems doing so. Chaos becomes order because we got used to the chaos. Fieldwork has to start from the assumption that what is observed will be chaotic. Also, we need to understand that *a priori*, we never know the boundaries of events. We never know exactly in advance what we will need to include in our observations and what not. We can set out to investigate literacy practices and quickly discover that we first need to investigate oral proficiency levels among pupils, for instance. This will determine a lot of what follows, as we shall see.

The learning process: Fieldwork is traditionally seen as 'data collection'. This is true to some extent: of course you should return from the field loaded with bags full of 'data': raw and half-processed materials that reflect and document the realities in the field. But fieldwork should not just be reduced to data collection, because essentially it is *a learning process*. The researcher almost by definition arrives as an outsider: someone who is not part of the social environment in which s/he will do research, has limited knowledge of the people, the normal patterns of everyday conduct, the climate and culture of the place. The preparation has ideally provided some knowledge, but as we know, social environments drive on a lot of tacit understanding, on unspoken routines and conventions, on shared experiences and outlooks – and none of that belongs to the researcher's background. The fieldworker gradually learns these tacit codes, and gradually moves from the margins of the social environment to a more central position.

The fact that you are familiar with the rules of a place does not necessarily work for your benefit: as a researcher you almost necessarily *transgress* these rules – you ask silly questions, you pry on people's activities, you stand where you are not supposed to stand, you disturb normal routines – and such transgressions can be held against you precisely because the others know that you are familiar with the rules. The outsider has the advantage of innocence (provided this is granted to him/her). Early in your fieldwork, you can find that people are very tolerant towards your deviant behaviour; the longer you stick around, however, the more they may expect you to adjust to expected behaviour. Your initial ignorance can be a useful fieldwork instrument, but it rarely lasts.

Being an outsider, to be sure, does not mean that you are non-existent and of no consequence to what goes on. As a fieldworker, you never belong 'naturally' or 'normally' to the field you investigate; you are always a foreign body which causes ripples on the surface of smooth routinised processes. *There is always an observer's effect*, and it is essential to realise that: you are never observing an event as if you were not there. You are there, and that makes it a different event.

The learning process is thus mutual: the others learn about you, get used to your presence and start understanding what you are after; you start to get accustomed to the normal ways of organising the activities and the patterns such activities take.

This mutual learning process becomes the 'common ground' between researchers and hosts, the thing that enables particular forms of interaction to take place and particular kinds of knowledge to travel between the two parties. *The things we call 'data' gain profile and relevance in relation to this more general learning process*. And to these data, there are three clusters of activities:

1. observation and field-notes;
2. interviewing and what we shall for the sake of convenience call
3. the collection of rubbish.

Observation and field-notes:

You observe all the time. Whenever your eyes and ears are open and you are in a clear state of mind, you register things that strike you. In everyday life we don't have a word for this (we just do it); in fieldwork we call this 'observation'. And the rule is: you start by observing *everything* and gradually start focusing on *specific targets*. The main instruments for that are your eyes, your ears, your mouth and your notebook, and you can use visual and other recording devices in support of that.

Saying that you observe 'everything' is not very helpful of course. You can only watch if you know where to look, and that depends on understanding, where you are and what you're doing there – here is the issue of preparation again. But the point is that the beginning phase of fieldwork is a phase of finding your way around a particular place, registering faces and voices, discovering itineraries to get from one place to another. You have a particular topic in mind and your attention will quickly go in that direction. But pending full focus on these bits, *you observe indiscriminately in an attempt to get an overall image*. Make sure you have this general image before you actually move in to your focal site. Knowing such things creates *patterns of expectation*.

Small things start becoming meaningful in relation to bigger things, and you begin to see how these bigger things have their grounding in small things. You start seeing how the events you observe form part of a *system*. Finding out such things demands *observation at various levels, different times and places.*

And it also (even more importantly) demands *making connections* between bits of information gathered at these different levels, times and places – this is the work of *contextualisation*: things you find here need to be connected to things found elsewhere in attempts to establish contextual connections ("this is an effect of that", "this belongs to the same category as that", "this can only be understood in relation to that"…). It's like making a big jigsaw puzzle, and you will find yourself developing numerous hypotheses about such connections and making numerous attempts before the puzzle fits.

Part of the observation process consists of **making recordings**: audio, video and/or visual recordings; we should add 'collecting' as well: collecting copies of pupils' notebooks or coursework, or of tests you developed and administered; collecting samples and so on.

The finality of recordings is dual. On the one hand, these recordings provide you with the 'raw data' that will eventually substantiate your analysis as 'evidence' and 'examples'. They will be the bits of first-hand information that will be crucial in making your account of events stick academically. So your recordings have an important function *after the fieldwork.* On the other hand, recordings also have important functions *during fieldwork*. They provide you with *an archive of your own research*. Recordings made in the beginning of fieldwork will be different from recordings made at a more advanced stage of your work, the reason being that your gaze has shifted towards more specific topics and events. The collection of recordings documents your own progression through the learning process, it testifies to the way in which you yourself have become familiar with what goes on there.

This is very important; because one of the features of the learning process is that you tend to forget where you came from. Things that strike you as strange and remarkable in the beginning cease to do that soon after, and after some time all kinds of initially remarkable things are taken for granted because they have become part of your own outlook on things. Yet, your initial ignorance and amazement are crucial: they provide the beginning stages of *ethnographic understanding*, and the accumulation of knowledge during fieldwork is exactly the process you need to document and establish. The archive of your fieldwork ideally contains *everything you need to reconstruct your itinerary from being an outsider to being a knowing member of a community*, someone who now can analyse confidently what went on. You therefore need a careful record of that trajectory –the field-notes.

Photographs can be an important help in the creation of your own archive. There too, you will find yourself making different pictures in the beginning and towards the end of your fieldwork. In the beginning, you will try to capture documentary things, things that assist you in finding your way around. Gradually, the photographs will become 'data'– things you perhaps think can be useful as illustrations in your dissertation and/or in publications or presentations afterwards. And afterwards, all of these images will be tremendously helpful in reminding you of what places, moments and people were like. Looking at a picture will trigger a vivid memory of the moment when you took it; it will trigger the recollection of an anecdote that might exactly be the thing you need in a particular place in your analytical argument.

Let's now return to the issue of recordings. Usually, making recordings is considered to be an intrusive measure. In fact, it is, of course, because what you do is to capture something which normally remains 'on the spot', and 'export' it, so to speak, to other times and places. Words spoken by someone without further thoughts can become crucial building blocks in someone else's academic argument; they can find their way into published papers, and they may be accompanied by critical remarks about the words and the one who uttered them. Innocent utterances may become politically sensitive ones due to interventions from the researcher. Recordings are always sensitive materials, things that people may experience as threatening. Normally, therefore, people will impose *conditions on recording*. They will insist that you obtain official permission for making recordings; they may insist that you leave a copy of the recordings with them or that your recordings will be destroyed after the completion of your research, and so on. They might also request that you do not record certain things, or that you restrict your recording to specific times and occasions.

You submit to these conditions of course, but you should make sure that people understand, and agree to, two things very clearly:

1. That your recordings will be used exclusively for academic purposes, but that they are essential for your academic purposes. In other words: it is no use if they allow you to make recordings but insist on the destruction of your recordings immediately after the completion of research. These data should be granted a life since they are *scientific* materials that will only be treated scientifically. Your own integrity is at play here: you will have to convince people of your good intentions. You can commit this to paper in a protocol, you can refer to existing ethical guidelines to which you subscribe and against which your conduct can be measured, and you can invoke higher authorities by producing written assurances from ethical committee.
2. That the scientific use of these recordings will involve a process of modification of these data, such that the personal interests of the recorded individuals are protected: all names will be changed, faces may be made unrecognisable, people will be consulted in cases of doubt. This too can be committed to paper in a protocol. Sometimes the effects of this are cumbersome.

Since recording is considered sensitive and intrusive, don'tstart recording anything and all the time; make arrangements and appointments, prepare your recording sessions well, and record things you believe will be maximally salient and informative. Better return with a limited collection of high-quality recordings than with a pile of recordings of which only a small fraction will deserve further attention. Make sure your recording devices are in good working order – try them and double check! – and put them in such spots that they capture adequate quality data without disturbing the normal order of the setting too much. But remember: a recording is *never* comprehensive; there will always be 'blind spots' – a problem which is more outspoken with video than with audio recordings. Therefore, if you are physically present during the recording session, *make notes* of what you see and hear; that creates a secondary, back-up record of the session, and it can fill in important blanks when you start analysing the recorded materials.

Remove your equipment immediately after the session and check the quality of the recording. If the circumstances allow that, *listen to the whole recording as soon as possible after the recording session, and make notes while you listen*. Do not postpone this: your memory of faces, voices and particular events will fade quickly, and whereas you will still be able to recognise a voice a few hours after the recording, you won't be able to do that a few weeks later. You of course keep a detailed *catalogue* of your recordings. You can do this in your field-notes or in a separate document. In that catalogue, you give every recording an 'identity tag': a number or a code, along with the date, time, place of recording, the participants, and either a brief description of the contents or a number of key words that distinguish that particular recording. This will be of immense help afterwards when you want to dig out particular parts of your corpus for purposes of transcription and analysis. What you collect during fieldwork are building blocks for an archive that documents your work and your own gradual process of learning and understanding. You construct this archive *for yourself.*

Field-notes are a variant of a very old genre: the diary. In anthropology, their value is controversial, because field-notes often contradict the end result of ethnography – books or articles. The publication of Bronislaw Malinowski's fieldwork diaries called into question a lot of what he had written in his classic ethnographic works. Here was a man who expressed extreme confusion, boredom, anger, racial superiority even about the people whose culture he afterwards described in flattering and affectionate terms. The confusion and emotional orientations in the field-notes eventually make way for the aesthetics and genre requirements of academic prose, and contradictions or paradoxes there become coherent and linear features, obscure pieces become symbolic, and what looked like a half-finished jigsaw puzzle now becomes a fine painting.

Field-notes are crucial in building the archive of your research. They will be, and will remain, your material memory of fieldwork, of the things you learned and how you learned them. Hence, you must be meticulous about them: make a habit – a *disciplined* habit, which not evens a night out with friends, can break – of writing entries in them, and make your entries comprehensive and detailed. Do not attempt to be Cartesian in your field-notes: you can afford yourself to be subjective and impressionistic, emotional or poetic. Use the most appropriate way of expressing what you want to express, do not write for an audience, and do not feel constrained by any external pressure: your field-notes are private documents, and you will be the only one to decide what you will release from them. You can use them for anything apart from their 'diary' function: for cataloguing the materials you have collected, for preliminary transcripts and analyses, for notes made during recording sessions, for anecdotes or accounts of things you saw on TV – their use is unrestricted as long as you make it a repository of knowledge gathered in a learning process. If you keep that final function well in mind, your notes will be rich and useful, way beyond the immediate purpose they serve.

Plan to spend 2–3 hours every working day of a participant observation study writing up field notes, working on your diary, and coding interviews and notes. Ralph Bolton (1984) asked 34 anthropologists about their field note practices; they reported spending anywhere from 1.5 hours to 7 hours a day on write-up.

Create many small notes rather than one long, running commentary. Write your notes on a computer and make many separate files—one for each day is fine—rather than adding to the same humongous file day after day. The advantage is that you can name your notes by their date of creation. That way, the computer will present the notes to you in chronological order so you can always find a particular day's (or week's) notes. Many small files are also easier to handle when we get to text management and retrieval programs.

Finally, there are two radically different styles when it comes to writing field notes. Some people like to immerse themselves completely in the local culture and concentrate on the experience. They write up field notes when and as they find the time. Most ethnographers advocate writing up field notes every day, while you are still capable of retrieving detail about the day's events and interactions.

Two things can be said about the method of writing field notes. (1) It works; and (2) It is not the only way to do things. If you do field research, you will develop your own style of writing notes and you will add your own little tricks as you go along.

There are *four types of field notes*: jottings, a diary, a log, and field notes proper.

Fieldjottings (*scratch notes*) are what get you through the day. Keep a note pad with you at all times and make field jottings on the spot. This applies to both formal and informal interviews in homes and on the street. It also applies to things that just strike you as you are walking along. Jottings will provide you with the trigger you need to recall a lot of details that you don't have time to write down while you're observing events or listening to an informant. Even a few key words will jog your memory later. Remember: If you don't write it down, it's gone.While fieldnotes are based on observations that will form the basis of your publications, *a diary*, on the other hand, is personal. It is a place where you can run and hide when things get tough. You absolutely need a diary in an ethnography project. It will help you deal with loneliness, fear, and other emotions that make fieldwork difficult. A diary chronicles how you feel and how you perceive your relations with others around you. If you are really angry at someone, you should write about it—in your diary. Jot down emotional highs and lows while they're happening, if you can, and write them up in your diary at the end of the day. Try to spend at least half an hour each day pouring out your soul to a diary. Later on, during data analysis, your diary will become an important professional document. It will give you information that will help you interpret your field notes and will make you aware of your personal biases.

The Log: A log is a running account of how you plan to spend your time, how you actually spend your time, and how much money you spent. A good log is the key to doing systematic fieldwork and to collecting both qualitative and quantitative data on a systematic basis.

Each day of fieldwork, whether you're out for a year or a week, should be represented by a double page of the log. The pages on the left should list what you *plan* to do on any given day. The facing pages will recount what you *actually* do each day. Begin your log on pages 2 and 3. Put the date on the top of the even-numbered page to the left. Then, go through the entire notebook and put the successive dates on the even-numbered pages. By doing this in advance, even the days on which you "do nothing," or are away from your field site, you will have double log pages devoted to them. The first day or two that you make a log you will use only the right-hand pages where you keep track of where you go, who you see, and what you spend. Some people like to carry their logs around with them. Others prefer to jot down the names of the people they run into or interview, and enter the information into their logs when they write up their notes in the evening. Keep an alphabetized file of 25-word profiles on as many people you meet as you can. This can be on index cards or on a computer database. The file will make it much easier to remember who you're dealing with. Before you go into any second or third interview, look up the key biographical information you have about the person.

Remember, good field notes do not depend on the punctuality of informants or your ability to do all the things you want to do. They depend on your systematic work over a period of time. If some informants do not show up for appointments (and often they won't), you can evaluate whether or not you really need the data you thought you were going to get from them. If you do need the data, then put a note on the left-hand page for that same day, or for the next day, to contact the informant and reschedule the appointment. If you still have no luck, you may have to decide whether it's worth more of your time to track down a particular person or a particular piece of information. Your log will tell you how much time you have spent on it already and will make the decision easier. There's plenty of time for everything when you think you have got months stretching ahead of you. But you only have a finite amount of time in any fieldwork project to get useful data, and the time goes very quickly.

Field Notes: After a hard day trekking all over [town] [the village] [the jungle] [the desert] interviewing people, hanging out, and recording behaviour, it's hard to sit down and write up field notes. The faster you write up your observations, the more detail you can get down. There are three kinds of field notes: methodological notes, descriptive notes, and analytic notes.

Methodological notes deal with technique in collecting data. If you work out a better way to keep a log than don't just *use* your new technique; write it up in your field notes and publish a paper about your technique so others can benefit from your experience. Write up notes about your discoveries. Mark all these notes with a big "M" at the top—M for "method." Methodological notes are also about your own growth as an instrument of data collection. Collecting data is always awkward when you begin a field project, but it gets easier as you become more comfortable in a new culture. During this critical period of adjustment, you should intellectualize what you are learning about doing fieldwork by taking methodological notes. Methodological notes, then, have to do with the conduct of field inquiry itself. You will want to make methodological notes especially when you do something silly that breaks a cultural norm.

Descriptive notes are the key ingredients of fieldwork. Most notes are descriptive and are from two sources: watching and listening. Interviews with informants produce acres of notes, especially if you use a recorder and later write down large chunks of what people say. Observations of processes, like feeding children, building a house, making food, and so on, also produce a lot of notes. Descriptive field notes may contain birth records that you have copied out of a local anganwardi centre's registry; or they may consist of summary descriptions of a village plaza, or an urban shopping mall, or any environmental features that you think are important. The best way to learn to write descriptive field notes is to practice doing it with others who are also trying to learn. Get together with one or more partners and observe a process that's unfamiliar to all of you. Whatever you observe, try to capture in field notes about the details of the behaviour and the environment.

Analytic notes can be about relatively minor things. Analytic notes are the product of a lot of time and effort and may go on for several pages. They are often the basis for published papers, or for chapters in dissertations and books. They will be the product of your understanding and that will come about through your organizing and working with descriptive and methodological notes over a period of time. Don't expect to write a great many analytic notes, but write them all your life, even (especially) after you are out of the field.

Make a habit of re-reading your notes. Gradually, you will start reading them as a source of 'data' which you can group, catalogue and convert into preliminary analyses. You will also notice that the entries gradually become shorter and more focused. The entries of the first days in fieldwork might be very short as well – you feel that there is very little to report on as yet – but the opening stages of fieldwork usually result in long entries, because *everything is still new*. You find yourself in a strange environment in which you need to find your bearings; every aspect of that experience is new, strange, puzzling. The more you get used to your environment (and your environment gets used to you), the more you 'normalise' the conduct, social relations and encounters you experience. You don't see them as marked and deviant anymore, and you don't feel that they are in need of description and explanation any more: they have become *your* social and cultural codes, no longer just *theirs*. Thus, the longer you dwell in the field, the less you will report on 'strange' events and encounters and the more you will start focusing on the business at hand: talks you have with informants, bits of material you transcribed and annotated, reports of visits to libraries, documentation centres, archives, addresses and phone numbers of new contacts, *aide-memories* to send material to certain people upon your return, and so forth. Your field-notes, like the other records you keep, thus testify to the shift in your own gaze and attention as you start learning and become familiar with the environment in which you work and live.

Less things will *amaze* or *surprise* you, and these feeling of surprise and amazement are what Agar (1996) calls *'rich points'* in ethnography: moments at which you think "hey, that's strange" or "what the hell is this?". This feeling is important: it indicates that *you bumped into the boundary of what is readily understandable for you* – the boundaries of your cultural and social conventions – and that the event that caused the surprise fell outside your established, familiar categories of understanding. The length of your field-notes in the initial stages of fieldwork suggests that the days were littered with 'rich points', and that you bumped into the boundaries of your own sociocultural codes on every street corner. The fact that they decrease in length and density later on shows that there are less and less 'rich points', and that you have started adopting a lot of the local codes, customs and patterns of conduct. Your field-notes provide an archive of that immensely important process, and it is of crucial importance that you recognise them as such: as a repository of rich points that emerge, get explained, and disappear because they are *known*. Do not think that you need an exotic environment to experience rich points.

The whole world is one big rich point. But that is just a matter of degree, not of substance. Even while doing research in an environment of which you think that it is familiar, you will be surprised and amazed – you will come across rich points. Research in one's own immediate neighbourhood usually results in an awareness of how little one actually knew about it prior to the inquiries.

There are two main reasons for that. First, we tend to have a unified, homogeneous image of our own life world. Everything looks simple and straightforward; the people all look the same and speak the same language. A few days of research will teach you that this erstwhile familiar environment now appears to contain at least three or four subcultures, microcosms where things are very different from what you expected and populated by people who are rather sharply different from what you thought they were. You discover that people in your neighbourhood have widely divergent interests, do their shopping in very different places, watch very different TV channels, and talk with accents you never picked up before. Societies are a patchwork of micro-units, they only *look* homogeneous. Second, as a fieldworker, you tend to start asking questions that no one normally asks; you tend to establish connections between the here-and-now and other contexts, connections that no one ever established; you tend to problematize things that nobody ever calls into question. In other words, you have a very different orientation towards social reality, one that takes nothing for granted and which treats everything which is considered 'normal' as suspect, intriguing and worthy of some investigation.

After fieldwork

The learning process has not stopped after your return. You have started forgetting certain things, while others have assumed a clear form now. It is time for analysis and write-up. For the rest of your life, you will be referring to your 'fieldwork data'. The word 'data' captures the success and achievement of fieldwork: you came back with something – something that could then be converted into scientific products, and that could be used as examples, illustrations, support for arguments, in scientific discourse. Your data are *a complex of widely divergent scientific objects*. Together they offer *a subjective representation of facts and events 'out there', and the analysis of such data is an interpretive analysis that necessarily draws on an interdisciplinary set of methods*. Since the analysis of such data is interpretive, the boundary between 'during' and 'after' fieldwork is blurred: a lot of interpretation has already been done in the field, on an everyday basis, while you were trying to make sense of the data. Your field-notes, thus, will already contain many pieces of analysis that will prove to be hard to improve afterwards. Let us begin with the different objects that together form your 'data'. You will have difficulties describing *everything* you have collected. Some things are clear: texts, material artefacts, photographs, recordings, transcripts of interviews. Most people would instantly and intuitively recognise these objects as scientific evidence for which particular procedures directed the process of collection. But your field-notes, for instance, are quite a bit harder to describe as scientific evidence. They contain items that are deeply personal, show no trace of 'hard facts' or of rigorous scientific procedures – they are very much a diary, and you will feel the same reticence in having other people read them as the one you had when you kept your teenage diaries. It's a very private document, yet it contains lots of invaluable information, crucial for achieving your scientific goals. And then there are things that can only be described as 'thoughts' or 'insights': immaterial things, things you just *know* because you have done your fieldwork. Features of people's character, for instance, can be essential in interpreting particular events and incidents; but of course the image you formed of people is a dialogical thing, informed by your own attitudes and preferences. Still, all of these are 'data'. So: the fieldwork process was messy and chaotic, and this is reflected in your data. Your data reflect the different viewpoints from which social events can be (and are) viewed: they reflect positions in relation to topics, events, phenomena. It is one big jigsaw puzzle in which the different bits and types of data have to be put together so as to yield a comprehensive picture.

Ethnographic fieldwork is grounded in an epistemological and methodological framework that sets it apart from most other approaches in the social sciences. It is not just a *technique*, but it is part of a *theoretical complex*, a paradigm, of considerable sophistication. It is the theoretical background that makes fieldwork a scientifically valid enterprise – if it is done well. Doing fieldwork well revolves around understanding what are you doing. You are, in fieldwork, constructing an archive of your own learning process; that means: you are gathering a 'subjective', interpretive collection of evidence that reflexively tells a story about social roles, social positions, and social events. Everything in this collection of evidence is situated, contextualised, and your work is aimed at understanding the contextualised nature of events. You will try to understand the totality of contexts, not just a selection of them. You are trying to describe and understand complexity – not simplification. In doing so, you deploy a wide variety of research activities, resulting in 'data' of very different kinds – from very 'objective' things to very 'subjective' ones. Solving the puzzle is the work of analysis, and it is an attempt at constructing a *replica* of what you witnessed and experienced. Ethnography is the science that explicitly attempts to be *iconic* in relation to its object: an ethnographic analysis will attempt to 'mirror' the events and processes it describes.

19 Ethnography

Ethnography is a written report summarizing the behaviours, and the beliefs, understandings, attitudes, and values they imply, of a group of interacting people. Ethnography is a description of the way of life, or culture of a society.

Sciences advocating strict rules of measurement usually operate in a linear fashion to show causal relationships between select phenomena; but have been long known to be weak in providing insight on the relationships between the contexts and processes of human social life, and the ºmeaningº that humans attach to social and physical phenomena.

While the predominant methods paradigm of ethnography is qualitative, ethnography is more than simply a qualitative research method.

Strengths or attributes of ethnography:

1. Ethnography includes both qualitative and quantitative methods, and both classical and non classical ethnographic approaches.
2. Ethnography is more than simply methods, but has ontological and epistemological properties.
3. Ethnography is a holistic approach to the study of cultural systems.
4. Ethnography is the study of the socio cultural contexts, processes, and meanings within cultural systems.
5. Ethnography is the study of cultural systems from both emic and etic perspectives.
6. Ethnography is greatly dependent on fieldwork.
7. Ethnography is a process of discovery, making inferences, and continuing inquiries in an attempt to achieve emic validity.
8. Ethnography is an iterative process of learning episodes.
9. Ethnography is an open ended emergent learning process, and not a rigid investigator controlled experiment.
10. Ethnography is a highly flexible and creative process.
11. Ethnography is an interpretive, reflexive, and constructivist process.
12. Ethnography requires the daily and continuous recording of field notes.
13. Ethnography may be carried out by individual investigators, or by teams of investigators.

14. Ethnography presents the world of its host population in human contexts of thickly described case studies.

Ethnography includes both qualitative and quantitative methods, and also both classical and non-classical ethnographic methods. The ethnographer should employ any and all means necessary and prudent to create the most holistic understanding of the cultural system or group being studied, including qualitative, quantitative, classical, and non-classical ethnographic methods. Holistic or contextual analysis requires a multi-method approach, whether such methods are quantitative or qualitative.

Classical ethnographic methods are those that ethnographers have traditionally used, such as carrying out fieldwork and living in the living communities of their hosts, observing activities of interest, recording field notes and observations, participating in activities during observations (participant observation), and carrying out various forms of ethnographic interviewing. Other methods that anthropologists have traditionally used include the physical mapping of the study setting, conducting household censuses and genealogies, assessing network ties, and using photography and other audio/ visual methods. Ethnographers have also added many non-classical methods to their tool kits. The study of ethno-semantics is a good example of a non-classical method. Another non classical method that some ethnographers have added to their research tool kits include such computer assisted technologies as Geographic Information Systems (GIS) to facilitate traditional ethnographic approaches of mapping their host communities. Other non-classical approaches that have been adopted by many applied ethnographers are Focus Group Interviews and Rapid Ethnographic Assessments or Appraisals. Ethnographers are open to the use of all methods of understanding the human conditions.

Ethnography is more than simply methods, but has ontological and epistemological properties. Ethnographers are open to a variety of methods, including methods that are more quantitative or positivist in their epistemologies. According to Guba and Lincoln (1994) are also ontological and epistemological orientations. They suggest that scholars with different research orientations may also differ not only in terms of methods, but also in terms of perspectives on the nature of what is being studied (ontology), and how to best understand this object of study (epistemology). Researchers may differ in their ontological orientations in terms of whether they adopt the idea that what is being studied exists as some exact phenomenon (i.e., the idea of an exact objectivity), the more positivist orientation, or the nature of the phenomenon will vary based on a range of factors, including social, economic, political, situational, or experiential/personal. Researchers may also differ epistemologically in their beliefs that the best way to accurately understand human settings is through the positivist investigative approach that emphasizes a separation between investigator and subject, or an acceptance that what is understood of that setting is the product of an intersubjective process between investigator and subject.

Ethnography is a “holistic” approach to the study of cultural systems and introduction to the cultural systems paradigm (CSP). Ethnographers are fond of saying that ethnography is always defined by theories of culture. Gaining a clearer conception of culture provided a degree of standardization to the fundamental theoretical concept that underlies the ethnographic inquiries carried out by anthropologists.

Cultural Systems Paradigm (CSP) can be grouped into 9 descriptive categories:

1. *The individual human organism*and its biological status, psychological makeup, personality and idiosyncratic tendencies (including agency), "intelligence," skill levels, etc.
2. *The social systems*or units of social relationships which individuals interact within, are influenced by, and have an influence on (residential units, extra residential networks and dyads, and community or societal organizations and agencies).
3. Individual and shared (with others in select social systems) *behavioural patterns***.**
4. The significant *"idea" systems*(knowledge, attitudes, beliefs, values, and symbolisms or "units of meaning") held by individuals and social systems.
5. *Expressive Culture*as represented in such forms as language, music, art, etc.
6. Technologies and human made material objects, or *material culture*.
7. The *physical environments*in which humans interact.
8. *Needs*that humans must meet in order to achieve the level of physical functioning necessary to the survival of the individual and group.
9. T77he human group's *shared history*of significant events and processes.

The first ethnographic principle of the CSP is referring to *The Principle of Universal Human Cultural Categories.* This principle holds that there are certain categories of phenomena which are universally relevant to human communities, though these communities differ in terms of how these phenomena are expressed *(culture*). The job of ethnographer is to decipher the specific cultural and individual expressions.

The second ethnographic principle of the CSP is the Principle of Paradigmatic Flexibility because of the differences in behavioural and ideational expressions across human groups and individuals, conceptual frameworks that inform the study of cultural systems must be flexible.

The third ethnographic principle of the CSP is the Principle of the Interrelationship between Sociocultural Contexts, Processes, and Meaning Systems. This principle holds that in order to understand why certain behaviours emerge and persist, including health risk and resiliency behaviours, we must understand the socio-cultural contexts in which these behaviours occur, the socio-cultural processes of behavioural contexts, and the socio-cultural meanings that these contexts and processes have for those who practice them.

The use of the CSP in analysing the various social units as cultural systems is made possible when these systems have the following:

1. preferred social relationships or structures;
2. preferred (or normative) idea systems and behaviour patterns;
3. valued and other objects that have been produced by the group;
4. exist within certain physical and social environments;
5. shared sense of needs that the group attempts to meet; and
6. shared historical events and processes that group members either explicitly know, or are tacitly influenced by.

Ethnography is the study of the socio-cultural contexts, processes, and meanings in cultural systems. The ethnographer is interested in the socio-cultural contexts and processes in which people live their lives, as well as the meaning systems which motivate them. Within an ethnographic paradigm, the actors and their corresponding actions, behaviours, and beliefs are examined within the cultural and societal context in which they take place.

As discussed by Clifford and Marcus (1986): "Ethnography is actually situated between powerful systems of meaning. It poses its questions at the boundaries of civilizations, cultures, classes, races and genders. Ethnography decodes and recodes, tilling the grounds of collective order and diversity, inclusion and exclusion. It describes processes of innovation and structuration and is itself part of these processes."

Boyle (1994) has suggested that a "central tenet of ethnography is that people's behaviour can only be understood in context."

Ethnography then approaches the interrelationships between socio-cultural contexts, processes and meaning systems as they contribute to the complexities of human realities. Most often this is accomplished in ways that cannot be adequately addressed by positivist approaches alone.

Ethnography is the study of cultural systems from both "*emic*" and "*etic*" perspectives. The primary aim of ethnography is to understand the socio-cultural contexts, processes, and meanings of a cultural system from the perspective of the members of that system. To achieve this understanding, the ethnographer should maintain both an "emic" and an "etic" approach to studying any given cultural system. An emic approach attempts to understand components of a cultural system from the perspective of the group being studied. The etic approach, on the other hand, analyses a cultural system with research paradigms brought by the researcher from outside of that system (Pelto and Pelto 1978).

The emic perspective is critical to the ethnographer's primary goal of learning the world of his or her host community from the perspectives of its members. As Malinowski pointed out more than 80 years ago, the goal of ethnography is *"to grasp the native's point of view...to realize his vision of the world"*.

Complementing the emic with an etic viewpoint is important for understanding all aspects of a human group, because the attributes of culture include dichotomies such as the ideal versus the real and the tacit versus the explicit, the ethnographer must maintain some sense of an external, "objective" framework. This provides 'emic validity'—understanding from the perspectives of ethnographic hosts through rigorous and iterative observations, interviewing, and other modes of ethnographic inquiry. In the end, the ethnographer must keep in mind that the product of ethnographic work is a descriptive reconstruction of the hosts' own construction of their worlds. This reconstruction can be best achieved by balancing the emic understanding with what is learned through an etic perspective.

Ethnography is greatly dependent on fieldwork. Spradley (1980) stated that *"ethnographic fieldwork is the hallmark of cultural anthropology."* Agar (1996) has argued that the very name for "*doing ethnography*" is fieldwork. Fieldwork allows the researcher to observe and examine all aspects of a cultural system, especially those that could not be addressed through laboratory or survey research alone. Spending long periods of time in the field is considered the crucial aspect of the classical ethnographer's ability to comprehensively describe components of a cultural system as accurately and with as little bias as possible. Epistemologically, the classical ethnographer believes that the only way to gain a native's view of his or her own world is to spend time in that world, according to Spradley (1980), *"participating in activities, asking questions, eating strange foods, learning a new language, watching ceremonies, taking field-notes, washing clothes, writing toletters home, tracing out genealogies, observing play, interviewing informants, and hundreds of other things."*

Ethnography is a process of discovery and continuing inquiries in an attempt to achieve emic validity. Among the ontological orientations in which ethnography is grounded is the view that humans, as the primary object of study, construct *multiple realities* that are complex, multifaceted, differently expressed in specific situations, and continually undergoing change. Epistemologically, to grasp an understanding of such realities, the classic ethnographic enterprise does not begin with predetermined hypotheses to be proved or disproved as objective social fact, but begins with open ended exploratory attempts to learn as much as possible about those realities. In the end, this process enables the ethnographer to describe these realities and the connections between them with as much emic validity as possible.

Ethnography is an iterative process of learning episodes. The ethnographer enters a research setting with an orientation towards discovering new knowledge through multiple learning (ethnographic data collection) episodes. Each subsequent learning episode builds on questions that emerged during preceding episodes. As such, each subsequent data collection method or instrument is designed and implemented in order to complement and enhance the data already collected. That is this iterative approach allows an ethnographer's ongoing experience in the field to inform decisions on subsequent methods and approaches.

Ethnography is an open ended emergent learning process, and not a rigid investigator controlled experiment. Spradley(1980) has commented that ethnography is not so much about studying people as learning from them. Ethnography is the process of learning about ethnographic hosts' worlds or cultural systems, as their socialization into or experience with these systems has rendered them as experts on various aspects of their worlds. Thus to be effective at his or her craft, the ethnographer learns to become comfortable with appearing unknowledgeable or ignorant of the world about which he or she is learning. This learning process is an ongoing one throughout the fieldwork enterprise, until the ethnographer feels that he or she has an understanding of that world from the perspectives of his or her hosts. The ethnographer must not allow existing knowledge (including scientific, theoretical, and methodological orientations) from preventing the absorption of new knowledge gained during the fieldwork process; or as Geertz (1973) puts it the ethnographer must allow components of the cultural system to be revealed through the fieldwork process.

Ethnography is a highly flexible and creative process. The ethnographer works in a situation in which his or her host population has greater immediate control of the research setting than the ethnographer. Thus the success of the ethnographer's research enterprise is more dependent on the goodwill and cooperation of his or her host than is usually the case for those who persist in following a more positivist research paradigm. In some instances, it is not only the research process upon which the ethnographer is dependent on his host population, but he or she may find early in the ethnographic process, that his or her mental and physical functioning or comfort is dependent on his or her host. Because of such circumstances, the ethnographer often finds him or herself having to “go with the flow” of the socio-cultural contexts and processes of these research settings. Thus ethnographers have to be highly flexible in their approach to understand the human condition.

Ethnography is an interpretive, reflexive, and constructivist process. Altheide and Johnson (1996) expressed the emic validity aspect of ethnography as “interpretive validity.” Their terminology is based on the perspective that all research findings are interpretations made by the researcher of what he or she has observed in the research setting. As such it is long been accepted among positivist researchers that biased interpretations are possible, and thus they have long attempted to overcome such biases through statistical and methodological treatments. Since positivist approaches have dominated the social science research scene, the findings from ethnographers and qualitative researchers have long been dismissed as not having validity because they don’t religiously follow such rigid methodological regimens. As such, as Altheide and Johnson (1996) point out, reflexivity is the best prescription for enhancing interpretive validity. They define reflexivity as the recognition “that the scientific observe is part and parcel of the research setting, context and culture he or she is trying to understand and represent”.Another definition of ethnographic reflexivity is that it’s not only an ongoing process of not only what is being observed or studied, but also a continuing examination and re-examination of the basis for one’s interpretations, and the potential biases in representation. Another attribute of contemporary ethnography is the understanding that a portion of the “realities” that are represented in an ethnographer’s findings are constructions created not only by the observations of the ethnographer but also because of input from the host. A constructivist viewpoint implies that for the ethnographer, reality does not exist as a neutral objective phenomenon that can be accurately revealed, let alone accurately measured. Rather, “realities” are jointly constructed at given points in time by the ethnographer in conjunction with the people being studied.

Ethnography requires the daily and continuous recording of field-notes. Ethnographers are continuously recording as field-notes, what they are observing and learned in the field setting. The open-ended, emergent, discovery-oriented iterative and reflexive attributes of the ethnographic enterprise make the collection of daily field-notes necessary simply as a means of recording what is being observed and experienced by the ethnographer.

Ethnography may be carried out by individual investigators, or by teams of investigators. Undoubtedly, an individual researcher who has spent a long period of time in the field is capable of providing careful and well thought out analyses in the course of ethnographic analysis and writing.At the same time, in applied research, the holistic perspective that an anthropologist can bring applied efforts is crucial because without such holistic perspectives interventions informed by such research can be misdirected because of its lack of emic validity. At the same time, if research based on a holistic perspective is going to be recommended, it should have the research skills involved to achieve that perspective. Often times the single ethnographer does not have the range of research skills necessary to adequately address the complexities inherent in a holistic approach to the study of a cultural system. Beyond methods, a team approach also allows the ethnography to capitalize on the strengths and compensate for the weaknesses of any individual team member.

Ethnography presents the world of their hosts within a human context of "thickly" described case studies. The richness or thickness of ethnographic data comes from placing individuals within their various socio-cultural contexts, and exploring how socio-cultural processes and meaning systems are expressed within these contexts. In good ethnography, hosts are not reduced to simple numerical values, but are depicted through the gamut of human experience, including rich contextual, process, and ideational constructions. While ethnographers rarely use the real names of their hosts for reasons of confidentiality and protection, they often provide pseudonyms. This naming process tends to "humanize" individual hosts for the reader of ethnographic texts, and organizing that individuals contextual data around him or her continues this process.

20 Participant Observation

Participant observation is a qualitative method with roots in traditional ethnographic research, whose objective is to help researchers learn the perspectives held by study populations. Participant observation always takes place in community settings, in locations believed to have some relevance to the research questions. The method is distinctive because the researcher approaches participants in their own environment rather than having the participants come to the researcher. Generally speaking, the researcher engaged in participant observation tries to learn what life is like for an "insider" while remaining, inevitably, an "outsider."

Data obtained through participant observation serve as a check against participants' subjective reporting of what they believe and do. Participant observation is also useful for gaining an understanding of the physical, social, cultural, and economic contexts in which study participants live; the relationships among and between people, contexts, ideas, norms, and events; and people's behaviours and activities – what they do, how frequently, and with whom.

Observing and participating are integral to understanding the breadth and complexities of the human experience – an overarching research endeavour for any public health or development project.

Through participant observation, researchers can also uncover factors important for a thorough understanding of the research problem but that were unknown when the study was designed.

What we learn from participant observation can help us not only to understand data collected through other methods (such as interviews, focus groups, and quantitative research methods), but also to design questions for those methods that will give us the best understanding of the phenomenon being studied.

Table 20.1: Strengths and weaknesses of participant observation

Strengths	Weaknesses
Allows for insight into contexts, relationships, behaviour	Time-consuming
Can provide information previously unknown toresearchers that is crucial for project design, datacollection, and interpretation of other data	Documentation relies on memory, personaldiscipline, and diligence of researcher. Requires conscious effort at objectivity becausemethod is inherently subjective

Participant observation data consist of the detailed field notes that the researcher records in a field notebook. Although typically textual, such data may also include maps and other diagrams, such as kinship or organizational charts. Participant observation may involve quantification of something and, as a result, produce numerical data.

In applied research, as in traditional ethnography, participant observation is almost always used with other qualitative methods, such as interviews and focus groups. It is an integral part of the iterative research process – that is, the back-and-forth revising and refining – in several ways:

At the beginning stages of a research project, participant observation is used to facilitate and develop positive relationships among researchers and key informants, stakeholders, and gatekeepers, whose assistance and approval are needed for the study to become a reality. These relationships are essential to the logistics of setting up the study, including gaining permission from appropriate officials, and identifying and gaining access to potential study participants.

Researchers also use data collected through participant observation to improve the design of other methods, such as interviews and focus groups. For instance, they help to ensure the cultural relevance and appropriateness of interview and focus group questions.

Participant observation data are invaluable in determining whom to recruit for the study and how best to recruit them.

When acting as interviewers or focus group facilitators, researchers are guided by the cultural understanding gained through participant observation, allowing them to discern subtleties within participant responses. Knowing what these culturally specific cues mean allows the researcher to ask more appropriate follow-up questions and probes.

Participant observation may be done prior to other data collection, as well as simultaneously with other methods and during data analysis.

Ethical Guidelines of participant observation:

How much should I disclose about who I am and what I am doing?

When conducting participant observation, you should be discreet enough about who you are and what you are doing that you do not disrupt normal activity, yet open enough that the people you observe and interact with do not feel that your presence compromises their privacy. In many situations, there is no reason to announce your arrival at the scene; in many others, however, it is essential that you openly state your identity and purpose. You should always alert relevant gatekeepers (community members in positions of official or unofficial authority) as to your presence and purpose. You should never be secretive or deliberately misleading about the research project or your role in it. If someone asks directly what you are doing, always provide a truthful response, using your judgment to gauge how exactly to handle a given situation. Be open, polite, and cognizant of your position as a guest or outsider.Also, do not neglect to inform the person or persons of their right to refuse further discussion and of your commitment to confidentiality if they decide to continue talking with you.

How do I maintain confidentiality during participant observation?

As with all qualitative methods, researchers involved in participant observation must make a personal commitment to protect the identities of the people they observe or with whom they interact, even if informally. Maintaining confidentiality means ensuring that particular individuals can never be linked to the data they provide. This means that you must not record identifying information such as names and addresses of people you meet during participant observation. These names and locations may be documented in field notes and shared with other research staff, but they should be coded and eliminated upon entry of the field notes into the computer, with the code list kept in a separate, secure computer file with limited access.Sometimes, you may develop informal personal relationships with key informants. If that happens, be sure that no personal information they give you is ever included in the actual participant observation data. If you are unsure whether information they provide is appropriate for your official field notes, ask their permission.

Participant confidentiality must also be respected during eventual presentation of the data in public dissemination events, as well as in printed publications.

How should informed consent be handled for participant observation?

It is not necessary to obtain formal informed consent for participant observation. However, when talking to people informally about the research and your role in it, it is important to emphasize that they are not required to talk to you and that there will be no repercussions if they do not. If your involvement with an individual appears to be progressing beyond participant observation to a formal interview, it is necessary to obtain informed consent before beginning an in-depth interview.

What are my responsibilities as a participant observer?

Researchers conducting participant observation need to be prepared and willing to adapt to a variety of uncontrolled situations and settings. Researchers' specific responsibilities include:

- observing people as they engage in activities that would probably occur in much the same way if you were not present
- engaging to some extent in the activities taking place, either in order to better understand the local perspective or so as not to call attention to yourself
- interacting with people socially outside of a controlled research environment,

Table 20.2: What to observe during participant observation

Category	Includes	Researchers should note
Appearance	Clothing, age, gender,physical appearance	Anything that might indicate membership ingroups or in sub-populations of interest to thestudy, such as profession, social status,socioeconomic class, religion, or ethnicity
Verbal behaviour andinteractions	Who speaks to whom andfor how long; who initiatesinteraction; languages ordialects spoken; tone ofvoice	Gender, age, ethnicity, and profession of speakers;dynamics of interaction
Physical behaviour andgestures	What people do, who doeswhat, who interacts withwhom, who is notinteracting	How people use their bodies and voices tocommunicate different emotions; what individuals'behaviours indicate about their feelings toward oneanother, their social rank, or their profession
Personal space	How close people stand toone another	What individuals' preferences concerning personalspace suggest about their relationships
Human traffic	People who enter, leave, andspend time at theobservation site	Where people enter and exit; how long they stay;who they are (ethnicity, age, gender); whetherthey are alone or accompanied; number of people
People who stand out	Identification of people whoreceive a lot of attentionfrom others	The characteristics of these individuals; whatdifferentiates them from others; whether peopleconsult them or they approach other people;whether they seem to be strangers or well knownby others present

such as at public meeting place, bus depot, religious gathering, or market – if casual conversation gives way to more substantive discussion of the research topic, you would need to disclose your identity, affiliation, and purpose

- identifying and developing relationships with key informants, stakeholders, and gatekeepers

Is participant observation done individually or as a team?

Participant observation may be done individually, in pairs, and in teams – whichever arrangement is most appropriate for covering the locations and topics at issue. The objective should be to gather data in the least obtrusive and most efficient manner possible, in light of the specific population and context.

Where should I do participant observation?

Where you should go to do participant observation depends on the research goals. Generally, you should try to go where people in the study population often go in their daily lives, and if appropriate, engage in the activity of interest. A key informant could tell you where those places are.

When should I do participant observation?

Participant observation is often done at the beginning of the data collection phase, but the method is also sometimes revisited later to address questions suggested by data collected using other methods. The best time to schedule participant observation sessions depends on what, whom, and where you need to observe. You may need to set up specific times based on when the particular activity takes place. It may also be important to observe the same population in several different locations and at different times.Less structured, unscheduled participant observation may occur any time you are moving about the community and interacting with people. You may wish to carry your notebook and a pen so that you can take advantage of spontaneous opportunities without relying completely on memory.

How long does participant observation take?

The specific duration of participant observation depends on the setting, activity, and population of interest.

What is the difference between observing and participating?

The basic difference between these two roles should be self-evident. In the first, you remain an “outsider” and simply observe and document the event or behaviour being studied. In the second, you take part in the activity while also documenting your observations.

How do key informants figure into participant observation?

Another important aspect of participant observation is identifying key informants – local individuals who can directly provide important information about the community and thus help the researcher more quickly understand the study population and cultural environment. Key informants can facilitate your access to particular resources, populations, organizations, gatekeepers, etc., and can help you make connections between phenomena that might not be obvious to an outsider. Key informants with personal connections to the study population can be invaluable. They may not be appropriate study participants themselves but may be willing to serve as liaisons to the community. Researchers often find such individuals at a field site by chance. You might identify as a key informant someone toward whom other people seem to migrate, for example. You could even be approached by someone whose personality or social position makes him or her naturally inclined to interpret and communicate key aspects of the culture to outsiders. If you eventually want to interview a key informant formally, rather than converse informally in a participant observation context, you need to follow procedures for conducting in-depth interviews, including obtaining informed consent.

How do I document what I learn during participant observation?

Documentation of participant observation data consists of field notes recorded in field notebooks. These data are records of what you experienced, what you learned through interaction with other people, and what you observed. Field notes should include an account of events, how people behaved and reacted, what was said in conversation, where people were positioned in relationship to one another, their comings and goings, physical gestures, your subjective responses to what you observed, and all other details and observations necessary to make the story of the participant observation experience complete. Field notes may be written either discreetly during participant observation or following the activity, depending on where you go and how much you participate. Whatever the case, notes should be expanded as soon as possible before your memory of the details fades. You might also sketch a map of your observation site. You could indicate important establishments and locations mark where certain activities were taking place and places where follow-up observation is needed. Audio and video recordings of participant observation are generally not permissible in applied public health or international development research activities because of ethical requirements for obtaining informed consent.

What should I do with my field notes?

As soon as possible after collecting participant observation data, you should expand whatever notes you were able to make into a descriptive narrative. If you plan to do participant observation late in the evening, make sure that you will have time the next morning to expand your notes.

Include as many details as possible. You will not have been able to write down everything that transpired and that you observed, and maybe not anything at all, if you were participating quite actively.

Once you have expanded your notes, either you or a typist hired for the project will need to type your field notes into a computer file. The notebook and hard copy of the typed data should then be stored in a secure location (along with maps and any other products of participant observation).

When should I share my data with the research team?

Frequent sharing of data from participant observation among researchers helps the study team to become familiar with the context and study population, to identify unanticipated but potential problems and issues related to carrying out the project successfully, and to adjust procedures as necessary.

How to Be an Effective Participant Observer

Participant observation data are only as good as researchers' observations, descriptions, and notes. Getting these data requires that participant observers be prepared, know how to gauge their behaviour, be objective, take good notes, and use the data throughout data collection activities, including those associated with other methods.

How do I prepare for participant observation?

First, know what the research is about. A thorough understanding of the study will help you stay focused during participant observation. Once you have a clear idea of what the research is about, you can determine specific objectives for the participant observation activity. It may be useful to create a list of things to pay attention to, and either write it in your field notebook or keep it in your pocket for quick reference. Note, however, that it is most important to keep your eyes open for scenarios you had not expected to encounter, which may suggest new directions for the research. In preparing for the participant observation activity, it is useful to find out as much as you can about the site where you will be participating or observing and about any activities in which you might participate. If necessary, visit the scene and make initial observations before you set up your official data collection time. Also, take some time to rehearse how you will describe or explain yourself and your purpose, if necessary. Similarly, establish in advance your own personal shorthand conventions – that is, how you will indicate and abbreviate the words and concepts you are likely to use in your note taking. Know how you will separate your objective observations from your interpretations; how you will indicate men, women, and children, and their ages; and so forth.

How should I behave during participant observation?

The most important behavioural principle in participant observation is to be discreet. Try not to stand out or to affect the natural flow of activity. It also helps to be aware of local meanings for particular body language (positions and gestures, for example) and tones of voice, as well as what types of physical and eye contact are locally appropriate in different situations.

What should I document?

It is important to document what is actually taking place rather than what you were expecting to see and to not let your expectations affect your observations. The purpose of participant observation is partly to confirm what you already know but is mostly to discover unanticipated truths. It is an exercise of discovery. Also, avoid reporting your interpretation rather than an objective account of what you observe. To interpret is to impose your own judgment on what you see.

How do I take field notes?

Handwritten notes, later converted into computer files, are often the only way to document certain participant observation activities, such as informal or spontaneous interviews, observation, and generally moving about in the field. Notes from participant observation – like those from interviews and focus groups – are called "field notes," and they are written directly into field notebooks.

How do I expand my notes?

Following each participant observation event, data collectors need to expand their notes into rich descriptions of what they have observed. This involves transforming your raw notes into a narrative and elaborating on your initial observations, a task most conveniently done using a computer. If no computer is available within a day or so, you should expand your notes by hand. Eventually, all expanded notes should be typed into computer.

Expanding your notes involves the following:

1. *Scheduling time to expand your notes,* preferably within 24 hours from the time field notes are made.
2. Expanding your shorthand into sentences
3. Composing a descriptive narrative from your shorthand and key words
4. Identifying questions for follow-up
5. *Reviewing your expanded notes and adding any final comments*

21 Focus Group Interview

Focus group methodology is one of several tools that researchers can use to generate valid information important to the advancement of programs, communities, and organizations. Focus groups were developed afterthe rise of statistical survey methods. Survey methodology shares with focus group method a commitment to rigorous collection of high quality data and honest reporting. Focus groups require special training. Focus group methodology is different from quantitative survey methodology in its purposes, procedures, and results.

A focus group is a group interview of approximately six to twelve people who share similar characteristics or common interests. A facilitator guides the group based on a predetermined set of topics. The facilitator creates an environment that encourages participants to share their perceptions and points of view. Focus groups are a qualitative data collection method, meaning that the data is descriptive and cannot be measured numerically.

A focus group interview has several important features:

- It enables in-depth discussions and involves a relatively small number of people.
- It is focused on a specific area of interest that allows participants to discuss the topic in greater detail.
- Interaction is a unique feature of the focus group interview. Indeed, this characteristic distinguishes the method from the individual in-depth interview. It is based on the idea that group processes assist people to explore and clarify their points of view. Such processes tend to be less accessible in an individual interview. This group interaction has been termed 'the group effect'.
- A moderator, who is often also the researcher, introduces the topic and assists the participants to discuss it, encouraging interaction and guiding the conversation. The moderator plays a major role in obtaining good and accurate information from the focus groups. There can be more than one moderator facilitating and moderating in one focus group.
- The participants usually have shared social and cultural experiences (such as age, social class, gender, ethnicity, religion and educational background) or shared particular areas of concern (such as divorce, marriage, motherhood,

childbirth, infant feeding, childhood immunisation, diarrhoea, nutrition, mental health, contraception, Sexually Transmitted Diseases (STDs), or living with HIV/ AIDS).

Table 21.1: Elements of focus groups

Element	Focus Groups
Format	Group session
Size	8-12 per session; invite twice as many
Length	1.5 to 2 hours
Number of sessions	Varies; should be more than 1
Participants	1. Selected; by invitation only 2. Similar characteristics
Forms of data	1. Conversation, including tone of voice 2. Silences (words and issues)3. Body language
Data collection	1. Audiotape 2. Transcribe
Moderator	1. Flexible yet focused 2. Uses interview guide; modify based on early sessions
Formats for reporting	1. Selected quotations 2. Analysis of repeated themes
Committee on Human Subjects	Submit as for other social research

When should you use focus groups for evaluation?

- To get more in-depth information on perceptions, insights, attitudes, experiences, or beliefs.
- To gather additional information as an adjunct to quantitative data collection methods.
- As part of a mixed method evaluation approach.

Information gathered through focus groups is used for a wide variety of purposes. A few of these include…

- determining program needs,
- program design,
- pilot testing curricula and products,
- program improvement,
- customer satisfaction,
- organizational development,
- policy making and testing, and
- outcome evaluation.

Again, it is important to keep in mind that the purpose of a focus group is to gather information, not to make a decision or complete a task. Focus groups are used to gather the information needed for decision-making or guiding action. Occasionally, people avoid using focus groups because they are afraid that the people they invite won't show up. However, by following the steps below, consistently high attendance rates can be achieved.

- Using what is known about the individuals that are to be invited, set an appropriate date, time, and location for the meeting.

- Make personal contacts with potential participants. This is often done through a telephone call or personal visit.
- For those who agree to attend, send a personal letter that confirms their participation and communicates the relevant details of the event.
- Make a reminder phone contact the day before the event.

Characteristics of effective moderators:

- Shows interest in the participants and the environment in which they live.
- Interacts informally with participants before and after the focus group.
- Looks at participants when they are talking.
- Demonstrates active listening techniques.
- Uses non-verbal communication techniques.
- Demonstrates empathy and positive regard for participants.
- Has working knowledge on the topic.
- Restrains from expressing personal views.

"Building rapport" refers to establishing a connection with participants that facilitates comfortable and open communication. Rapport is important to the facilitation process, because it can dramatically influence the willingness of participants to answer questions, and how openly and honestly they answer the questions they are asked. The purpose of focus groups is to gain information about the topic(s) of interest from the perspective of participants. Rapport helps achieve this.

- Participants as Experts: Individuals are being invited to participate in focus groups because they are viewed as possessing important knowledge about particular experiences, needs, or perspectives that we hope to learn more about as a result of the needs assessment.
- Familiarity with the Community and Sensitive Topics: First and foremost, become familiar with some of the critical issues affecting the community represented by participants. It is true that, as the facilitator, you are there to learn from participants. However, it is necessary to have a basic awareness of sensitive issues so that you do not offend or insult participants unknowingly or unintentionally.
- Your Role as the Facilitator: It is important to present yourself as a researcher rather than a friend. You will need to let participants know that you are part of a team that is conducting research for a community needs assessment. This formality communicates to participants that their participation is important and contributes to the community.
- Balancing Rapport and Professionalism: Part of your role is to achieve a balance between building rapport with participants and conveying an appropriate level of professionalism.
- Recognizing and Appreciating Participants for their Time and Contributions: This is one of the most important things you can do to help create rapport. Remember to thank participants for their time and participation. Let them know that the information they have shared is valuable for this project.

Good listening is a key to conducting focus groups that will result in the collection of useful information. Being a good listener means being an "interested" listener. This is done by demonstrating that you are paying attention to what participants are sharing, staying neutral or impartial, and practicing appropriate silence.

- Listen Carefully to Participants: Active listening allows you to probe effectively and at appropriate points during the focus group. Active listening involves not only hearing what someone is saying, but also noticing body posture and facial gestures (i.e., any changes in nonverbal behaviour) that might provide clues as to the appropriate or necessary ways to engage participants.
- Show Participants You Are Listening: Show participants that you are listening to what they are saying. Signs that you are paying attention may include leaning forward slightly, looking directly at participants while they are speaking, or nodding at appropriate times. Looking away, yawning, or frequently checking your watch will most likely make participants feel that you are not listening. If participants suspect that you are not listening to them with great care, they may take their role of sharing expert knowledge less seriously and, therefore, may not elaborate or provide much detail with their answers.
- Gathering Honest Information: You want to gather information during focus groups that is as honest as possible. If participants sense that you have an opinion, they may want to change their responses so that they will seem more socially desirable, rather than reflect what they truly believe or feel about a topic.
- Silence Encourages Elaboration: Allowing silence at times encourages elaboration by participants because it gives them a chance to think about what they want to say. More often than not, participants will fill the silence with more information. However, it is important to strike a balance between keeping the conversation moving and allowing participants adequate time to share and process what has been shared.

Probes and clarifying questions are an important part of interviewing and have two main purposes: to help clarify what an interview respondent has said and to help get more detailed information on topics of interest. Probes allow the interview respondent to provide more than just a one-sentence answer to the questions you ask.

- Keeping Them Talking
- Probing in Not Finishing Their Thoughts
- Seeing Things From Their Perspective
- Avoid Making Assumptions
- The Interview Respondent Is The Expert
- Good Probing is Not Leading
- Avoid Asking Leading Questions

Developing Questions for Focus Groups

An important step in preparing for the focus group interview is the development of a set of questions which encourage participants to respond and solicit the information needed from the group. Good questions sound conversational and natural. They are usually short, open-ended, and one-dimensional (they ask only one question at a time). There are five general types of questions used in focus group interviews. They are typically arranged in the same order as presented below.

- *Opening questions* are used to get people talking and feeling comfortable. They should be easy to answer, but should not emphasize differences among group members. *Example: Tell us your name and how long you have been participating in the program.*
- *Introductory questions* are used to get the group to start thinking about the topic at hand. They help focus the conversation. *Example: How was it that you first learned about the program?*
- *Transition questions* provide a link between the introductory questions and the key questions. They typically ask participants to go into more depth than introductory questions. *Example: Think back to when you first became involved with the program. What were your first impressions?*
- *Key questions* focus on the major areas of concern. The majority of the time is devoted to discussions of these questions. *Example: In what way is your life different because of your participation in the program?*
- *Ending questions* bring the session to closure. *Example: Is there anything we should have talked about, but didn't?*

Time management is perhaps one of the most challenging aspects of conducting interviews. It is important that the interviewer and the interview have agreed upon the amount of time they will spend in the interview, and that this time is managed appropriately so that all the topics can be covered.

- Managing time during the interview:Individuals love to talk about their experiences and may have a tendency to go on and on about them. Here is where your skills as an interviewer are put to the test. As the interviewer, your job is to structure the interview in such a way that you elicit a complete response to questions, probing insightfully so that you get the level of detail you need in order to the issues adequately.
- Keep the interviews moving: It is also your job to politely move the interview forward when what the respondent is sharing is less useful given your research questions. Sometimes, it is possible to do this by listening for a sequence – something that the respondent talks about that is relevant to another question or set of questions. Other times, you may want to acknowledge that your time together is waning and there are some other aspects of their work and experience that you want to be sure you have time to learn about and explore, and, for this reason, you are going to move on.
- Check with the respondent: At least once during the interview, ask the respondent how they are doing with time. Use your perceptive abilities to sense if there is a feeling of strain on the part of the respondent to participate in the interview. If he or she has had another commitment come up since you scheduled the interview with him or her, there may be a feeling of being rushed. It is polite to check in, and it also allows you to move to the most critical questions in case that you must end the interview early.
- Efficient Use of the Interview Guide: A well-developed interview guide will have built-in prompts that remind you, as the interviewer, to do a time check periodically to make sure that the interview is progressing appropriately. Another strategy is to listen for relevant information to questions that you have not yet asked so

that you can skip these later. If you do run out of time before you have covered all the questions in the interview guide, be sure to use your remaining time asking and exploring only the most important questions remaining. The more familiar you are with the interview guide, the easier it will be for you to prioritize particular questions and to recognize when the respondent has already provided relevant information (indeed, adequately answered) questions you have not yet asked. This will ensure that your questions do not feel redundant to the respondent and that the interview, overall, flows smoothly and efficiently.

- Not Rushing the Interview Respondent: Overall, you want to achieve a balance between collecting necessary information and gathering important data that have not been anticipated. Sometimes it can be difficult to tell the difference until you ask clarifying questions or probes. Again, you want to make sure that you interrupt the interview respondent as little as possible and not rush them with their answers while keeping them on course with the interviewing guide.

Focus group methodology

- Insight not rules
- Social not individual
- Homogeneous not diverse
- Flexible not standardized
- Warm not hot
- Words not numbers

Insight not rules- Focus groups arguably provide researchers with more surprises than other types of research.

Individuals who participate in focus group sessions aren't restricted by the "A, B, C" choices provided by the typical survey researcher. Participants generally are allowed to say anything they'd like in focus groups sessions. Focus groups therefore are considered to be naturalistic.

The researcher listens not only for the content of focus group discussions, but for emotions, ironies, contradictions, and tensions. This enables the researcher to learn or confirm not just the facts (as in survey method), but the meaning behind the facts. This is simplistic, but conveys a major advantage of focus group method: the production of insight. Focus groups can provide trustworthy naturalistic data that also lead to important insights about human behaviour, but they aren't set up to generalize in the same way as survey research.

Social not individual- The focus group is a type of *group interview***.** If there's no group, there is no focus group. The *social, semi-public*nature of the methodology shapes the data and the purposes that it serves. In a focus group session, conversation among participants results in data that are "talk." In this way, focus groups elicit information that paints a portrait of *combined local perspectives***.** The researcher can see how it "all fits together". However, focus group methodology is not a reliable technique for determining an individual's authentic point of view. Social norms get in the way.

Homogenous not diverse- It makes good sense, when developing programs, to elicit as many points of view as possible. Focus groups do this well. However, one might assume that focus groups accomplish this by inviting a highly diverse group of people to participate in the same session. Regrettably, this doesn't work very well. Instead, focus group researchers select and invite 20-25 people with similar characteristics to a single session. The goal is to fill the room with a minimum of 10-12 participantsthat are similar. Composing a group with highly different characteristics will decrease the quality of the data. To get a cross section of views from a diverse population using focus group method, it is necessary to conduct *multiple sessions***.** To understand the perspectives of a different group of people, compose multiple focus groups on the same topic. The key to deciding which features are important to keep the same or vary depends on the type of *community*and the *topic*of the focus group.

*Flexible not standardized***-** Focus group method strives to produce *good conversation*on a given topic. Good conversation ebbs and flows. Individuals laugh, tell personal stories, revisit an earlier question, disagree, contradict themselves, and interrupt. However, the researcher must balance the needs of participants to 'have their say' against the need to stay *focused*. A focus group moderator wants both natural features of conversation as well as focused discussion in the course of a two-hour session. The moderator accomplishes this balancing act by using an *interview guide***.** A well-designed guide assists group members to *relax, open up, think deeply, and consider alternatives***.**

A good design also allows for synergy to occur, which produces greater insight due to the fact that participants work together during the session. Questions in an interview guide flow from *general to specific*. They *invite openness*and *avoid bias.*

Warm not hot- Focus groups produce conversations that border on intimacy. One might assume that focus groups therefore can be used to investigate private topics or subjects that people feel deeply about. The rule of thumb is that the topic can be *warm but not hot***.** Consider that conversation in many cultures *avoids conflict***.** Consider also that individuals are adept at changing the subject away from overtly private matters, like sex and salaries. In general, people strive to be polite. Therefore, focus groups do not produce reliable data on topics that produce extremely strong feelings.

Words not Numbers- Focus groups rely upon *words*spoken by participants. The focus on language earns focus group methodology the label, qualitative. A report based on focus groups will feature *patterns*formed by words, called *themes or perspectives***.** Researchers must use specific methods to analyse patterns in spoken language.

Steps in Planning Focus Groups

- *Select the Team***-** Conducting focus groups requires a small team, comprised of:
  a. Facilitator to guide the discussion, and
  a. Note taker who will make hand-written notes and observations during the discussion, which serves as a "back-up" in case something happens with the recording equipment or participants wish not to have their discussion recorded.
- *Select the participants*- Focus groups will be held for several different types of groups. One part of planning a focus group is to identify the most suitable individuals to participate in each group. When recruiting for focus groups, be

sure that participants fit the criteria established for inclusion in a particular focus group. For example, if you want to learn about how immigrants in a certain community navigate important systems, such as the health care system, participants should be limited to immigrants in that community. It is also important to ensure that focus group participants represent the diversity of the larger group about whom you want to learn. To go back to the previous example, in order to learn about both the facilitators and barriers of getting basic needs for services met, it will be important to learn from those who have successfully navigated such systems, as well as those who have struggled to do so, although probably not in the same focus group as there may be issues of shame associated with being relatively less successful in navigating systems of care. As this example illustrates, it is very important to be sensitive to tendencies toward social comparisons when composing focus groups. Depending on the issues being explored, it may also not be appropriate to invite men and women to participate in the same focus group.

- *Decide on the time and location*-Focus groups normally last about an hour and a half, though they may be longer in some cases. Plan a time of day that is convenient for the participants and responsive to their life circumstances. Groups should be conducted in locations that are also convenient and comfortable for participants, are quiet, and have some degree of privacy. Depending on the community, it may be necessary (and reflect a greater degree of cultural sensitivity) if the group met in a public space, such as a community centre. It is up to you to judge the situation and decide on the best, most appropriate location. Set a date, reserve a space, and arrange for food and drink.
- *Invite the participants*- Before the date of the focus group; invite appropriate participants to take part in a particular focus group, using established selection criteria as your guide. It is often helpful to contact confirmed participants the day before the group to remind them of the time and location of the focus group and to confirm, once again, their participation.
- *Prepare the focus group guide*-The discussion guide is an outline, prepared in advance for a specific set of respondents that covers the topics and issues to be explored. The guide is designed with the overall research questions in mind and is constructed to ensure that topics covered in the focus groups relate to these research objectives.

Tips for Conducting Focus Groups

- *Obtain verbal consent*
- *Establish rapport*
- *Follow the Focus Group Guide*
- *Revising Focus Group Questions*
- *Other Tips for Guiding the Discussion*

In focus groups, it is not uncommon for a few individuals to dominate the discussion.

Sometimes in mixed gender groups, one gender may tend to speak more than the other. To balance participation, and ensure that every participant has an opportunity to contribute to the discussion, you might consider the following strategies:

- Address questions to individuals who are reluctant to talk
- Give nonverbal cues (look in another direction or stop taking notes when an individual talks for an extended period)
- Intervene, politely summarize the point, and then refocus the discussion

•*Minimize Pressure to Conform to a Dominant View Point*

When an idea is being adopted without any general discussion or disagreement, more than likely group pressure to conform to a dominant viewpoint has occurred. To minimize this group dynamic, the facilitator should probe for alternative views. For example, the facilitator can raise another issue, or say, "We have had an interesting discussion, but let's explore other ideas or points of view. Has anyone had a different experience that they wish to share?"

•*Record the discussion*

Data Analysis

Data analysis consists of examining, categorizing, tabulating or otherwise recombining the "evidence" collected during the focus group to address the initial propositions of the study. The purpose of the study drives the analysis. There are typically three sources of information that are used in the analysis. First are the assistant moderator's or moderator's notes. The second is memory. The third source is the audio tape-recording of the session, if one was made.

Analysis of focus group data involves three steps: indexing, management, and interpretation.

- ***Indexing*** - Involves reading a transcript or notes and assigning codes or "labels" to each piece of relevant information. Often codes are written in margins. The codes or labels link together pieces of text which represent a common viewpoint or perspective related to one of the key questions or central purposes of the study.
- ***Management*** - Collecting together all of the extracts of text which have been allocated the same code or label. Three management methods are typically used. One method is to cut apart individual responses and use piles to cluster similar extracts. Another method is to use a word processor to "cut" and "paste" extracts. There is also the option of using software specifically designed for analysis of qualitative data.
- ***Interpretation*** – One technique is analytic induction. This technique involves development of a summary statement which is true of each extract or piece of text in the pile or group. These statements often become key themes which are communicated in reports of the "study."

After the analysis is completed, a written report of the study is often prepared and discussed with key stakeholders. The report often includes the purpose of the study, description of the procedure used, summary of the findings, and the implications of those findings often presented as recommendations. In the summary of the findings, data is frequently organized around the initial questions which were too answered by the focus group study. It is typical to discuss several key themes which emerged for each question.

What are the advantages focus groups?

- Quick and relatively easy to set up.
- The group dynamic can provide useful information that individual data collection does not provide.
- Is useful in gaining insight into a topic that may be more difficult to gather through other data collection methods.

What are the disadvantages of focus groups?

- Susceptible to facilitator bias.
- The discussion can be dominated or side-tracked by a few individuals.
- Data analysis is time consuming and needs to be well planned in advance.
- Does not provide valid information at the individual level.
- The information is not representative of other groups.

Principles of research ethics for focus group interview:

A. Voluntary Participation

- Individuals must agree to participate in the research of their own free will. Written consent is preferred, but verbal consent that is recorded may be done instead.
- It is essential that participants understand that their participation is voluntary and that there are no consequences for refusing to take part in the study or to answer specific questions.
- Researchers must explain the nature of the study openly and honestly and in a way that is understandable to the participant. It is the responsibility of the researcher to ensure that the participant understands the nature of the research, the purposes of the research, the potential risks and benefits to the participant of participation, and the fact that they may withdraw from participation at any time.
- It is helpful to make sure that there is adequate time to answer any questions that an individual may have before and during the focus group.
- Should individuals look confused or withdrawn, it is a good idea to ask them if they have any questions before proceeding. If an individual does not want to talk further about a topic, the researcher must respect this.
- Communicate how information obtained during the focus group/community discussion will be used.

B. Confidentiality

- Researchers must agree to keep personal information that is revealed to them confidential. This means that you cannot share the specific contents with anyone except another researcher on the project. This also means that you cannot share any information that would allow another researcher or outsider to know who participated in the study.
- Researchers must explain how confidentiality will be protected. Only you will know their name and only other researchers will have access to their information. No information will be publicly reported that would identify them as a participant in the study.

- When these conditions of confidentiality cannot be met, researchers must explain this to the individual.

C. Professional Competence

- Researchers must not misrepresent or misuse their expertise as researchers. You should undertake only those tasks for which you have been trained. You should not act in any capacity other than as a researcher while conducting research.
- Researchers are expected to fulfil the highest standards in their work. You should ask for help when needed to ensure quality interactions with individuals and quality information is collected.

D. Respect for People's Rights, Dignity, and Diversity

- Researchers and their work must respect the rights, dignity and worth of all people.
- In their work, researchers must be respectful of the rights of others to hold values, attitudes, and opinions that differ from their own.
- Researchers must strive to advance and protect the public good through their work.

22 Rapid Rural Appraisal and Participatory Rural Appraisal

Participatory methodologies, including rapid rural appraisal (RRA) and rapid assessment procedures (RAP), have emerged in response to this -need for more people-oriented approaches to research, focusing on problems identified by the community.

In health and nutrition, as in other fields of development, the perceptions and opinions of "target populations" must be taken into account. There is a divergence of views; however, regarding ways in which such perceptions should be translated into decisions and change.

Participation as a concept in development theory and practice has now gained wide acceptance. Nevertheless, an understanding of the mechanisms by which it is put into operation in the field and in institutions, and the stresses as well as the advantages that accumulate from participatory practices, is still evolving. This is particularly true in the realm of scientific enquiry. Researchers areattempting to establish dynamic linkages between their own perceptions and those of people who lack training and experience in research but upon whom innovation, change and development ultimately depend. This means that participatory research may not exclusively involve the poor themselves.

In this context, the most useful research would seek to change attitudes among elite groups in a direction that will enable poor people to think and act more independently.

Rapid Rural Appraisal (RRA)

Rapid Rural Appraisal consists of a series of techniques for "quick and dirty" research that are claimed to generate results of less apparent precision, but greater evidential value, than classic quantitative survey techniques. The method does not need to be exclusively rural nor rapid, but it is economical of the researcher's time. It is essentially extractive as a process: the agenda is still that of the outside researcher. RRA emerged in the 1970s as a more efficient and cost-effective way of learning by outsiders, particularly about agricultural systems, than was possible by large-scale social surveys or brief rural visits by urban professionals. It drew on many of the insights of field social anthropology emphasized the importance and relevance of situational local knowledge, and the importance of getting the big things broadly right rather than achieving spurious statistical accuracy. It developed a style of listening research, and a creative combination of iterative methods and verification, including "triangulation" of data from different sources - using two different methods to view the same information. It was usually conducted by a multi-disciplinary team, and its chief techniques included:

- Review of secondary sources, including aerial photos, even brief aerial observation
- Direct observation, foot transects, familiarization, participation in activities
- Interviews with key informants, group interviews, workshops
- Mapping, diagramming
- Biographies, local histories, case studies
- Ranking and scoring
- Time lines
- Short simple questionnaires, towards end of process
- Rapid report writing in the field.

Clearly, the management of RRA is as crucial to its success as is the quality of the research undertaken. Participation is not normally spontaneous; it has to be organized and sustained. This implies that researchers who pursue RRA and other participatory approaches to community development require skills in communication and management which are not regarded as essential for performing conventional research. Such considerations have implications for the design of training programmes.

Principles of RRA

Most practitioners of RRA would include the following among its basic principles:

1. Learning rapidly and progressively, with flexible use of methods, opportunism, improvisation, and iteration, not following a blueprinted programme but adapting in a learning process;
2. Offsetting the biases (spatial, project, person, seasonal, professional, diplomatic...) of rural development tourism, and not rushing but relaxing;
3. Learning from and with rural people, directly face-to-face;
4. Triangulating, meaning using more than one, and often three, methods or sources to cross check;
5. Optimizing, relating costs of learning to the useful truth of information, with trade-offs between quantity, relevance, accuracy and timeliness. The principles apply here of optimal ignorance - not trying to find out more than is needed, and of appropriate imprecision - not trying to measure what does not need to be measured, or not measuring more accurately than is necessary for practical purposes; and
6. Critical self-awareness, reflecting on what is being seen and not seen, who is being met and not met, what is being said and not said, and sources of error.

A menu of RRA methods

A summary listing can indicate some of the types of methods known:

- secondary data review
- direct observation, including wandering around
- DIY (doing-it-yourself), taking part in activities
- key informants
- semi-structured interviews
- group interviews
- chains (sequences) of interviews
- key indicators
- key probes
- workshops and brainstorming
- transects and group walks
- mapping
- aerial photographs
- diagrams
- ranking and scoring
- quick quantification
- ethno-histories and time lines (chronologies of events)
- stories, portraits and case studies
- team management and interactions
- short, simple questionnaires, late in the RRA process
- rapid report writing in the field

Diagramming and ranking have provided some of the less obvious methods. Diagramming has come to include many topics, aspects and techniques, such as transects, seasonality, spatial and social relations, institutions, trends and ecological history.

Rapid rural appraisal is a way of organizing people and time for collecting and analysing information in a cost-effective manner. Important advantages of this methodology are community participation and flexibility in the information generating process. The fundamental principles of RRA are

1. Triangulation,
2. Optimal ignorance,
3. Appropriate imprecision,
4. Rapid and progressive learning, and
5. Learning from, and along with, rural people.

Dangers and drawbacks of RRA:

The range of techniques can be effective, but it remains fundamentally an extractive, externally-driven process. Many researchers who use standard RRA methods claim that they are using PRA, when the "participation" is restricted to provision of information to the researcher by the community. The simple test is what is the value added and who owns the product. If the community draws a map because you ask them to, it's RRA. If they realize that the map belongs to them, and want to keep it for their own use, then it's PRA.

Participatory Rural Appraisal (PRA)

Participatory Rural Appraisal (PRA) is a further development of RRA.

PRA can be defined as a semi-structured process of learning from, with and by rural people about rural conditions.

More an eclectic situational style (the humble, learning outsider) than a method, the Participatory Rural Appraisal is distinguished at its best by the use of local graphic representations created by the community that legitimize local knowledge and promote empowerment. Emerging in the 1980s, PRA "proper" builds on RRA but goes much further. Its five central additional concepts are:

- **Empowerment**. Knowledge is power. Knowledge arises from the process and results of the research that, through participation, come to be shared with and owned by local people. Thus the professional monopoly of information, used for planning and management decisions, is broken. New local confidence is generated, or reinforced, regarding the validity of their knowledge. "External" knowledge can be locally assimilated.
- **Respect**. The PRA process transforms the researchers into learners and listeners, respecting local intellectual and analytical capabilities. Researchers have to learn a new "style". Researchers must avoid at all costs an attitude of patronizing surprise that local people are so clever they can make their own bar charts etc. The "ooh-aah" school of PRA works against its own principles of empowerment and indicates shallow naivete on the part of the researcher. A good rule of thumb is that when you can really understand the local jokes, poetry and songs, then you may feel you are starting to understand the people's culture.
- **Localization**. The extensive and creative use of local materials and representations encourages visual sharing and avoids imposing external representational conventions.
- **Enjoyment**. PRA should be well done with fun. The emphasis is no longer on "rapid" but on the process.
- **Inclusiveness**. Enhanced sensitivity, through attention to process; include marginal and vulnerable groups, women, children, aged, and destitute.

Overview of PRA techniques

·Group dynamics, e.g. learning contracts, role reversals, feedback sessions

·Sampling, e.g. transect walks, wealth ranking, social mapping

·Interviewing, e.g. focus group discussions, semi-structured interviews, triangulation

·Visualization e.g. Venn diagrams, matrix scoring, timelines

Strengths of RRA

1. *Visual sharing*. Diagrams, maps or quantification are presented physically by rural people in a manner they readily understand, since they have created it, and that can be cross checked and amended. Successive approximation is thus built into the process.
2. *Ranking and scoring, rather than measuring*. Of course, measurements and estimates can be and are sought. But especially for sensitive information like income or wealth, people are often willing to present relative values when they would conceal or distort absolute values. In seasonal analysis, for example,

people readily use seeds or other counters to show relative amounts of income and expenditure by month. Similarly, with changes and trends over time, relative values can be given. Ranking items by people's own criteria, and scoring different items out of ten, five or three, have also proved feasible and popular.

3. *Combinations and sequences of methods* have proved powerful and practical. Participatory mapping and modelling, where villagers make their own map or model on the ground or on paper, leads easily and naturally to other activities, such as discussing routes for walking transects in which they are guides, and to household listings and wealth ranking, to identifying numbers and types of people in a community, and to marking in other details.
4. The approach and methods are popular and empowering. Questionnaires are often a bore for all concerned. PRA methods are often enjoyed. We have had to learn not to interview and not to interrupt when people are being creative with a map or model, when they are thinking, when they are reflecting on estimates. People are no longer "respondents." They are players, performers, presenters, and own their play, performance and presentation. And the word "fun" comes into the development vocabulary.

Dangers and drawbacks of PRA

Because of the diversity of research questions which can possibly be posed in this project, there are few prescriptions other than that PRA, well done, is a promising way in. The term PRA itself can cause difficulties: PRA need not be rural, and sometimes is not even participatory, and is frequently used as a trendy label for standard RRA techniques. Despite its limitations, the concentrated power of formalization of community knowledge through participatory techniques can generate an impressive amount of information in a relatively short space of time, leaving time for more selective structured formal surveys.If PRA becomes part of the global development agenda, there are risks of:

- **"Hijacking"**. When this occurs, the PRA agenda is externally driven, and used to create legitimacy for projects, agencies and NGOs.
- **Formalism**. The "PRA hit team" arrives in a local community to "do a PRA". This abrupt and exploitative approach is all too common in project-based PRAs where there is a deadline to meet, or in scheduled training courses.
- **Disappointment**. Local expectations can easily be raised. If nothing tangible emerges, local communities may come to see the process as a transient external development phenomenon. The empowerment implications of PRA, and the power of its social analysis, can create threats to local vested interests, although less so than with PAR.

In the very early phases of project planning where basic information is being gathered to inform the project approach and to identify the types of concerns that need to be addressed, RRA will probably be more appropriate. At this point the project will probably not yet have decided exactly where it plans to work and will want to avoid raising the expectations of the local populations where the studies are carried out.

Once the project gets underway, some combination of RRA and PRA will most likely be appropriate. RRAs might be used, for example, to monitor and evaluate progress

Table 22.1: A Comparison of RRA and PRA

	RRA	PRA
Purpose	Inform project design, gather baseline information, monitor and evaluate	Capacity building for improved decision making at community level, situational analysis, planning and monitoring by community
Team	Multi-disciplinary team	Team composed of villagers, sometimes facilitated research personals
Sites	Limited number of representative sites	Communities where project activities will take place
Time Period	Discrete studies, usually lasting 5-7 days	Ongoing throughout the life of project. Usually begins with training and initial situational analysis (appx 10 days) leading to Community Action Plan
Tools and Techniques	Semi-Structured Interviewing, Participatory Mapping, Transect Walk, Venn Diagram, Calendars, Wealth Ranking, Historical Profile, Matrices, Tools Specifically Useful in Planning, The Community Action Plan	Semi-StructuredInterviewing, Participatory Mapping, Transect Walk, Venn Diagram, Calendars, Wealth Ranking, Historical Profile, Matrices, Tools Specifically Useful in Planning, The Community Action Plan
Documentation	Comprehensive, well written report that captures the depth and complexity of information obtained in the study	Village Log Book with notes of principal findings, activities, and Community Action Plan

in a select number of communities. Several discrete monitoring studies would be carried out over time in order to assess the impact of the project, any significant implementation problems, etc. PRAs, on the other hand, might be carried out in each site where the project intervenes. This would be a way to involve the population much more integrally in the project process. They could use the PRAs to customize project activities in light of their own analysis of the situation. The idea of such PRAs is both to make the project more effective in each site, but also to ensure that there are benefits that outlive the actual presence of the project in the community. This is more likely to happen if villagers have been involved in all stages of project planning and implementation and view themselves as active participants rather than passive beneficiaries.

Effective use of these methods is very much related to the scale on which they will be used. PRAs involve long and reasonably complex processes in each village in which they are carried out.

PRA approach complements and supports projects where capacity building, subsidiarity, social justice, and fundamental issues of community development are the principal objectives. Without community commitment, participation, and engagement, these projects have less chance of achieving their goals. The PRA approach is the most logical in such cases but it may require both a scaling down and a slowing down of the pace of project implementation in order to accommodate the challenges of participatory development.

In RRA and PRA, the principal strategy to reduce bias and enhance the quality of information collected in the study is called **triangulation**. Triangulation refers to the diversification of perspectives in order to offset the biases that may result from looking at an issue from a limited viewpoint. The process of identifying and offsetting biases is both explicit and systematic in RRA and PRA. The team is responsible for monitoring the way the study is designed and implemented so as to reduce bias as much as possible.

In RRA, a team of specialists is put together to carry out the study and to document the information in a well-written report. Triangulation of such a research team takes numerous factors into consideration. There are three particular importancesuch as:*discipline, gender,* and whether the person is an *insider or an "outsider"* to the situation are being studied.

To the extent that PRA is an ongoing process that is used by communities to set priorities, make decisions, and plan, it is critically important that diverse interests in the community are represented on the "team."

A danger that is always lurking behind the participatory process is that a minority group within the population will co-opt the process and purposefully and systematically bias the results to favour their own interests. The team for a PRA is really everyone in the community who takes an active role in the PRA process. Realistically, however, everyone cannot be involved at the same level without the process become extremely unwieldy. A "steering committee" is established for the PRA activities. A steering committee might be composed of, for example, twelve members, four from each of three quarters in a community. The four people might be comprised of an older woman and older man and a younger woman and younger man. Within the group of twelve, then, it would be important to ensure that the different ethnic and religious groups present in the village be represented, as well as families who are richer, poorer, and about average.

This steering committee should, ideally, be selected in a village plenary meeting where the various criteria are discussed and decided upon as a group.This committee (which essentially becomes the core PRA team) then mobilizes the population as needed for various activities and planning sessions.

Whether in RRA or PRA, attention must be paid to triangulation at the respondent level.Since different people and groups within the community have different perceptions and points of view, it is important that the full range of perspectives be considered as information is being gathered. Thus, it is important to gather information from:

- men and women,
- people who are older and younger,
- those who are poorer as well as those who are richer,
- and people from different ethnic groups, castes, or professions.

In an RRA, where the team is composed of outsiders who will not necessarily know the composition of the community before they go to the village, use of tools such as wealth ranking and social mapping that explore differences in the community will be useful in identifying different groups that can then be sampled to ensure a good mix of respondents.

RRA and PRA tools include diagraming, quantification techniques, various modes of interviewing, participant observations, etc.

Triangulation may be the nuts and bolts of carrying out good RRA or PRA but the whole process depends on the appropriate behaviour and attitudes of the research team and each member of that team. Among the critical elements needed to successfully carry out these methods are the following:

- willingness to work together in a group
- respect for local people and practices
- ability to listen
- willingness to be self-critical
- interest in others and curiosity to learn more

One of the worst sins committed by RRA/PRA practitioners is to come into a community with the results of the study already in mind and then to use the so called "participatory experience" merely to confirm or justify these views. This practice is abusive of not only the methods, but also of the populations who contribute their time to an empty exercise. Dealing with these types of problems occurs at several points in the study:

1. Personality issues should be carefully considered ***as the team is being selected.*** People who are not interested in participatory approaches, who are not willing to be self- critical, or do not have a genuine respect for the knowledge of local people are best excluded from the outset.
2. ***Once the team has been selected but before it leaves for the field*** it will be important to have an orientation that deals with these issues. Role plays are one way to anticipate tricky situations and work through appropriate responses. Team contracts are another way to ensure that all members agree to certain basic principles and will accept criticisms in a spirit of team self-improvement.
3. ***During the field work,*** part of the team interaction each day should be devoted to assessing behavioural issues and thinking about strategies and behaviours that might enhance mutually respectful relationships with the community.

Setting Study Objectives

One of the first steps in preparing an RRA or a PRA is setting the study objectives. The general focus of the study (sometimes called the "theme") will have to be clear even before the team is selected since this will determine what kinds of people should be on the team. A study to evaluate a nutrition oriented intervention would have to have a nutritionist on the team, for example, whereas a study looking in depth at production and storage losses would require that an agronomist be part of the team. Other team members would have social or economic expertise. This team will be selected according to the subjects that will be studied.

Once the team is in place, its first task is usually to refine the study objectives. Objectives are, quite simply, what the team wants to learn during the study.The more that team members are clear on what they are trying to find out, the more they can focus their inquiry on relevant issues, and the more likely that the information gained will be coherent and useful.Setting good objectives may be one of the most difficult parts of an RRA or a PRA. In an RRA, the whole team should participate.In the case of a PRA, the local community will be actively involved in setting the objectives. Objective setting will take place as a first step of the field work to ensure that the whole community has a chance to participate.

In setting objectives, a common ground must be found so that the team will work comfortably together in the field.One way to organize your objectives is as follows:

1. **A Profile Objective -**Often it is useful to make the first objective a "profile" objective since every study needs a certain amount of background information to set the context for the rest of the information to be gathered.
2. **One or more descriptive objectives -** The next objectives may be largely descriptive, reporting on people's practices in a given arena.
3. **One or more analytic objectives -** The analytic objectives will go beyond the descriptive to focus on the reasons why a given situation exists. Often by this time you will be thinking along the lines of constraints, interrelationships between various factors, etc.
4. **The synthesis objective(s) -** In most cases the final objective should be a synthesis objective that pulls together the findings in the form of conclusions or recommendations.

RRA Site Selection Site selection is of critical importance because of the small number of sites that, realistically, can be visited given the time and labor intensity of these methods. In selecting the number of RRA sites, the team will need to consider what type of information is needed, how it will be used, the diversity of the region, and logistical matters.The site selection procedure should be carefully thought out in advance and then followed systematically to ensure that unwanted bias does not creep into the selection process.

1. Choosing How Many Sites Will be Studied **(**The number of sites that, realistically, can be studied will depend on the availability of competent team members and the amount of time that they can spend in the field.)
2. Selecting the Sites **(**In most cases this is best accomplished by using a combination of **purposive** and **random sampling.)**

Matching Research Objectives and Tools:

A useful step at this point is to prepare a matrix that outlines the types of information that are needed and the tools that may be appropriate for getting that information.

The first step in putting together this matrix is to brainstorm the issues that will be addressed in the study. To do this, it is useful to post the objectives where everyone can see them. Then, read off each objective and ask people to think about what they would need to know to satisfy the information requested by that objective. List all the ideas before proceeding to the next objective. Once all the ideas have been gathered, organize them in a coherent list and place this along the vertical axis of the matrix. Along the horizontal axis of the matrix, list the various tools that can be used to gather information. Then, for each tool, go down the list and note down what information will be gathered using that tool.

It may be useful to use Xs to show which tools will gather a lot of information on a particular subject, or O's for those that will gather some information, but less.

If, after completing this exercise, you find that there are some subjects that will not be covered using the tools on the list, then brainstorm some other ways that you might be able to get this information. You may have to adapt a tool, or create a new one. Similarly, if there are tools on the list that appear to have limited utility in terms of the information you are trying to get, then you will quickly see that it may not be worth the time to use this particular tool for this particular study. One advantage of doing a matrix like this is that it will be the starting point for creating the checklist for each tool.

Flow of Activities in the Field during an RRA Study (Time Frame = 5-8 days)

Opening Protocol (2-3 hours)

↓

Information Gathering Activities (3-5 days; moving from more general activities to more specific)

↓

Preliminary Analysis (1/2 day)

↓

Information Gathering Activities (2-3 days; usually very focused activities)

↓

Final Protocol/Village Feedback (1/2 day)

Managing the Time in the Field:

RRA studies are typically (though not necessarily) carried out during a discrete period of field work typically lasting from four to seven days. The studies will be longer when the information to be collected is more complicated or more sensitive, when the outsiders have less background information on the community or the issue being studied, when the community social structure is more complex, or when people are for some reason discreet to share information with outsiders and more time is needed to build rapport.

Table 22.2: Example of Use of RRA Tools to Collect Types of Information Needed in Baseline

	Map	Social Map	Transect	Venn Diagram	FS Calendar	FS Time Trend	Historical Profile	Historical Matrix	Consumption Unit	Production Unit
History						O	X	X		
Geographic Context	X		X							
Social Context	X	X		X			X	X		
Economic Context	X	X	X			X		X		
Food Acquisition Strategies	X		X		X	X	X	X	X	X
Food Consumption Pattern		X			X	X	X	X	X	
Price Variation of Foods					X	X		X	X	
Food Sharing		X			X			X	X	
Food Availability Constraints	O	X	X		X	X		X		
Household/individual strategies		O			O				X	

Maintaining a Participatory Process:

PRA studies are much more difficult to describe in any prescriptive way because in a good PRA the process evolves out of the community's participation. The outsider has only limited input into what happens during the time in the field. In RRA, quality information is the principal objective; in PRA, the process which leads to that information is important. Among the principle objectives is strengthening the community's capacity to generate and analyse information and, ultimately, to use it for their own purposes.

The key, then, to carrying out as successful PRA is to set up the study in such a way as to maximize the likelihood that the community and community members will participate as fully as possible and will develop a sense of ownership over the process. There is very little in a PRA that does not happen in the community since the objective is to include the community in the process.

1. Role of the Facilitator:

The facilitator plays a key but very delicate role in PRA. On one hand, she or he is likely to be the principal inspiration for the process and the person who is central to mobilizing the community's interest at the outset. His or her enthusiasm, encouragement, and concern are critical to getting things off the ground. On the other hand, the facilitator also poses the greatest dangers to the process since the very exuberance that acts as inspiration to get things underway may smother the villagers' own sense of initiative once the process begins.

It is essential, then, that the facilitator's role changes over the course of the PRA process.

In the early stages, the facilitator's role will include some or all of the following tasks:

- explaining the whys and hows of PRAs
- facilitating village visits to sites where PRAs are already ongoing
- discussing the problem of bias and the principle of triangulation
- helping the village to identify steering committee members for the study

As things get underway, the facilitator may turn his/her energies more to:

- training community members in the tools and techniques
- asking key questions to keep the methodology on track
- gently orienting the process toward greater inclusiveness
- mentoring the community members who will become the on-site facilitators of the process

As the process advances, the facilitator will need to think about:

- pulling back from the process to leave room for community initiative
- doing less within the village and perhaps more to link the villagers to external resources
- responding to community demands for help rather than initiating
- encouraging villagers to make progressively more decisions
- spending less time on site

2. Scheduling of Activities:

The key to scheduling activities during a PRA is to make the process as accessible as possible to as many people as possible. Scheduling can be a factor that either encourages or discourages participation and may introduce significant biases if it ends up, either by accident or design, excluding certain segments of the community. Scheduling refers to both the time of year that the activity takes place and the time of day.

3. Maintaining Community Interest

One of the challenges in participatory research is maintaining the community's interest. These activities take time and people need to see that this investment is having — or is likely to have — some tangible benefit. Transparency and consistency in working with communities and not unduly raising expectations are key. There should be a direct relationship between our level of effort in doing a PRA/RRA and the extent of the community's efforts. The likelihood of resources being invested there should be considered even before the community invests much time and resources into the PRA.

4. Communities supporting communities:

It makes sense for communities beginning the PRA process to work in conjunction with other communities who have either already begun or are ready to undertake PRA work.

Analysis and Report Writing:

Collecting information takes patience and persistence. But the real challenge often comes in analysing the information. Analysis is a multistep process. It requires **organizing** the information so that it is coherent and makes sense. It requires **sifting** the information to separate that which is important from that which is less so. And it requires **thinking hard** in order to figure out why some of the information is so important and what it means for local planning, project activities, policy recommendations, etc.

In RRA the principal analysis is carried out by the RRA team, which in most cases is composed primarily of outsiders. The analysis usually takes place after the team leaves the village.

In PRA, the analysis is carried out locally by team members who are, primarily, local residents. Indeed, if the community is carrying out the PRA, it is the community who will analyse the information.

It is important that the results of the study be captured in a way that makes information available to those who could use it to improve a situation. In the case of RRA, this will necessarily involve writing a report since, along with the feedback session in the village, the report is the main vehicle for recording and sharing the information from the study. It is important that such a report be well written and that it records the richness and complexity of the information obtained in the study. Otherwise the results will be of no use to anyone and the study will have done little but waste the time that the team and the villagers spent on the study. Oral presentations to policy makers and project staff should also be organized if these will increase the chances that the information will be used.

Whether a report is an important part of the PRA process will depend on the purpose of the study. If the results of the study are to be used by the villagers alone and written communication is not particularly useful to them, then there may not be a need for a formal report. Instead, the results may be captured by other means, whether oral or using other visual forms of communication such as diagrams or drawings. At a minimum, the results should be recorded in at least a summary fashion in a **Village Log Book.** If the PRA needs to inform others where written communication is more effective, then it will probably be worth the trouble to write a full report so that information will not be lost or distorted.

23 Basic Statistics and Statistical Analysis for Anthropological Research

A **population** is defined as the set of all individuals, items, or data of interest. This is the group about which scientists will generalize. A characteristic (usually numeric) that describes a population is referred to as a population parameter. Population statisticsare usually represented with Greek letters. The true value of population statistics cannot be observed and is unknown. It is however possible to estimatethe true value with some degree of certainty. This involves randomly sampling from the whole population of interest.

A **sample** is defined as a set of selected individuals, items, or data taken from a population of interest. Characteristic Quantities(usually numeric) derived from an observed sampleare called sample statistics, and are usually denoted using Roman letters. Two random samples of equal size will usually not yield the same value of the sample statistic. The possible differences between the estimates from all possible samples (conceptual), or between each possible estimate and the true value are referred to as sampling variation.

Statistics is a branch of mathematics used to summarize, analyse, and interpret a group of numbers or observations.Statistical tests are able to infer values of a population by using observations of one or more samples.Statistics helps in testing hypotheses to determine whether observed differences between groups or variables are real or occur simply by chance. Statistical tests produces new information by making predictions and generalizations based on samples.

In the early 1940s, Harvard psy-chologist S. S. Stevens coined the terms *nominal, ordinal, interval,* and *ratio* to classify the scales of measurement (Stevens, 1946). Scales of measurement are rules that describe the properties of numbers. These rules imply that a number is not just a number in science. Instead, the extent to which a number is informative depends on how it was used or measured. Scales of measurement are characterized by three properties: order, differences, and ratios. Each property can be described by answering the fol-lowing questions:

1. *Order:* Does a larger number indicate a greater value than a smaller number?
2. *Differences:* Does subtracting two numbers represent some meaningful value?
3. *Ratio:* Does dividing (or taking the ratio of) two numbers represent some meaningful value?

Different scales of measurement and the information they provide concerning the order, difference, and ratio of numbers.

Table 23.1: Scales of measurement

		Scale of Measurement			
Property		Nominal	Ordinal	Interval	Ratio
	Order	NO	YES	YES	YES
	Difference	NO	NO	YES	YES
	Ratio	NO	NO	NO	YES

Nominal values represent something or someone. They often reflect coded data in behavioural science.

Coding refers to the procedure of converting a nominal value to a numeric value.

Ordinal scales are measurements where values convey order or rank alone.

Interval scales are measurements where the values have no true zero and the distance between each value is equidistant.

Equidistant scales are those values whose intervals are distributed in equal units.

Interval values have equidistant scales but no true zero.

A true zero describes values where the value 0 truly indicates nothing.

Ratio values have equidistant scales and a true zero. This scale of measurement does not limit the conclusions researchers can state.

A random variable assigns a value to each subject of a population, such as weight, hair colour, etc. By random, it is implied that the true value of the variable cannot be known until it is observed. A variable is either quantitative or qualitative.

A quantitative variable is one that can be measured and can take a range of values, for example, waist circumference, size, age, or the number of children in a household. Quantitative variables include discrete and continuous variables. A discrete variable is one that can take only a limited range of values, or similarly, the possible values are distinct and separated, such as the number of children in a household. On the other hand, a continuous variable can take an infinite range of values, or similarly, can assume a continuous uninterrupted range of values, such as height or age.

A qualitative or categorical variable is one that cannot be numerically measured, such as the presence or absence of a disease, gender, or the colour of hair. A dichotomous or binary variable is one that can take one of two values, such as the presence or absence of a trait or state, or whether or not one is overweight.

A continuous variable is measured along a continuum at any place beyond the decimal point. Continuous variables can be measured in whole units or fractional units.

A discrete variable is measured in whole units or categories that are not distributed along a continuum.

A quantitative variable varies by amount. This variable is measured numerically and is often collected by measuring or counting.

A qualitative variable varies by class. This variable is often represented as a label and describes nonnumeric aspects of phenomena.

Table 23.2: Examples of some variables showing how they fit into the three categories

Variables	Continuous vs. Discrete	Qualitative vs. Quantitative	Scale of Measurement
Gender (male, female)	Discrete	Qualitative	Nominal
Seasons (spring, summer, fall, winter)	Discrete	Qualitative	Nominal
Number of dreams recalled	Discrete	Quantitative	Ratio
Number of errors	Discrete	Quantitative	Ratio
Duration of drug abuse (in years)	Continuous	Quantitative	Ratio
Ranking of favorite foods	Discrete	Quantitative	Ordinal
Ratings of satisfaction (1 to 7)	Discrete	Quantitative	Interval
Body type (slim, average, heavy)	Discrete	Qualitative	Nominal
Score (from 0 to 100%) on an exam	Continuous	Quantitative	Ratio
Number of students in your class	Discrete	Quantitative	Ratio
Temperature (degrees Fahrenheit)	Continuous	Quantitative	Interval
Time (in seconds) to memorize a list	Continuous	Quantitative	Ratio
The size of a reward (in grams)	Continuous	Quantitative	Ratio
Position standing in line	Discrete	Quantitative	Ordinal
Political Affiliation (Republican, Democrat)	Discrete	Qualitative	Nominal
Type of distraction (auditory, visual)	Discrete	Qualitative	Nominal
A letter grade (A, B, C, D, F)	Discrete	Qualitative	Ordinal
Weight (in pounds) of an infant	Continuous	Quantitative	Ratio
A college students' SAT score	Discrete	Quantitative	Interval
Number of lever presses per minute	Discrete	Quantitative	Ratio

To create an experiment, we must satisfy the three requirements for demonstrating cause and effect: randomization, manipulation, and comparison. To satisfy each requirement, the researcher can

1. Randomly assign participants to experience one of the conditions.
2. Create the two conditions.
3. Include a comparison group.

There are two general types of statistics:

- Descriptive statistics: statistics that summarize observations.
- Inferential statistics: statistics used to interpret the meaning of descriptive statistics.

Descriptive statistics are procedures used to summarize, organize, and make sense of a set of scores or observations. Descriptive statistics are typically presented graphically, in tabular form (in tables), or as summary statistics (single values). Descriptive statistics is the term given to the analysis of data that helps describe, show or summarize data in a meaningful way such that, for example, patterns might emerge from the data. Descriptive statistics do not, however, allow us to make conclusions beyond the data we have analysed or reach conclusions regarding any hypotheses we might have made. They are simply a way to describe our data.Descriptive statistics are very important because if we simply presented our raw data it would be hard to visualize what the data was showing, especially if there was a lot of it. Descriptive statistics therefore enables us to present the data in a more meaningful way, which allows simpler interpretation of the data.When we use descriptive statistics it is useful to summarize our group of data using a combination of tabulated description (i.e., tables), graphical description (i.e., graphs and charts) and statistical commentary (i.e., a discussion of the results).Descriptive statistics are useful on their own, but are also important as basis for making inferences from a sample of observations to characteristics of the population from which the sample came. Mean of a sample can be used to suggest the likely value of the mean of the population.Standard deviation of a sample can be used to suggest the likely value of the standard deviation of the population.

Inferential statistics are procedures used that allow researchers to infer or generalize observations made with samples to the larger population from which they were selected.

Inferential statistics are used to help the researcher infer how well statistics in a sample reflect parameters in a population.

Inferential statistics are techniques that allow us to use samples to make generalizations about the populations from which the samples were drawn. It is, therefore, important that the sample accurately represents the population. The process of achieving this is called sampling. Inferential statistics arise out of the fact that sampling naturally incurs sampling error and thus a sample is not expected to perfectly represent the population. The methods of inferential statistics are (1) the estimation of parameter(s) and (2) testing of statistical hypotheses.Inferential statistics is used to make predictions or comparisons about larger group (a population) using information gathered about a small part of that population. Thus, inferential statistics involves generalizing beyond the data, something that descriptive statistics does not do.

Statistical inference is the use of statistics and random sampling to make inferences concerning the true parameters of a population. By choosing a representative sample, inference based on the observed prevalence leads to an estimation of the true parameter. But how many subjects should be sampled to obtain an accurate estimate of the prevalence? Similarly, how many subjects should we sample to show that this parameter is different from some fixed value?

By selecting a representative sample, inference based on the observedprevalence leads to an estimation of the trueparameter.Sample size estimation is a fundamental step when designing clinical trials and epidemiological studies for which the primary objective is the estimation or the comparison of parameters.

Sample size estimation can be either precision-based or power-based. In the first scenario, one is interested in estimating a parameter, such as a proportion, or a difference between two means, with a specific level of precision. On the other hand, one might only be interested in testing whether two parameters differ. The sample size will be estimated as a function of the size of the difference one wishes to detect as well as the degree of certainty one wishes to obtain.

- Before estimating a sample size, the nature and the distribution of the variable of interest must be defined. The parameter of interest (mean, proportion, reference limit) can then be identified.
- Before estimating a sample size, the type of sample has to be identified: one single sample? Two samples?
- Sample size estimation can be either precision-based or power-based.
- When performing precision-based sample size estimation, the anticipated value

of the parameter as well as the level of significance and the precision (absolute or relative) must be defined a priori.

- When performing power-based sample size estimation, the anticipated value of the parameter as well as the level of significance and the power must be defined a priori.

Determination of sample size is a difficult task. Particularly in anthropological research, where we consider a set of variables, it becomes really difficult to ascertain the size of sample. However, it is possible to determine the size of sample by using a representative sampling procedure.

Krejcie and Morgan (1970) have given a table in which no calculations are needed to determine the size of the sample. It is being reproduced by following **table.**

Table 23.3: Krejcie and Morgan's sample size estimation table

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	76	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384

(*Note:* N is population size, S is sample size) (Source: Lal Das, 2005)

Data

Data are obtained by making observations of the world about us. Data are obtained from experiments or from studying population. Data contain information about the system or individuals under study, but in order to make judgements it is usually necessary to process the data to extract relevant information.

Types of data:

Non-parametric data: nominalor categorical data (e.g. names, colours etc. without any preferences), ordinaldata (rankings, 1st 2nd 3rd etc.)

Parametric data: numerical/quantitative measurements may be on an interval scale(e.g. height, weight) or they may be discretevalues on a discontinuous scale(e.g. number of offspring)

Data Processing:

Data processing refers to certain operations such as editing, coding, computing of scores, preparation of master charts, etc. After collection of filled-in questionnaires, editing of entries therein is not only necessary but also useful in making subsequent steps simpler. Many a times, researcher or the assistants either miss entries in the questionnaires or enter responses, which are not legible. This sort of discrepancies can be resolved by editing the schedule meticulously. Another problem comes up at the time of tabulation of data when the researcher asks for tabulation of responses from consecutive questions. In cases where data are not cleaned, there has to be inconsistency in the tabulations. In the process of editing, the researcher has to be very careful about consecutive questions having 'not applicable' as a response.

Coding of Data:

Coding of data involves assigning of symbols (numerical) to each response of the question. The purpose of giving numerical symbols is to translate raw data into numerical data, which may be counted and tabulated. The task of researcher is to give numbers to response carefully. As it is already discussed about various types of questions (such as open-end, close end, matrix, factual, opinion, etc.), the coding scheme will very accordingly. A close-end question may be already coded and hence it has to be just included in the code book, whereas coding of open-end questions involves operations such as classification of major responses and developing a response category of 'others' for responses which were not given frequently. The classification of responses is primarily based on similarities or differences among the responses. Usually, in the case of open-end questions, to classify responses, the researcher looks for major characteristics of the responses and put it accordingly. In case of attitude scales, the researcher has to keep in mind the direction or weightage of responses. For example, a response 'strongly agree' is coded as '5' the subsequent codes would be in order. Therefore, if there are responses like 'agree', 'undecided', 'disagree' and 'strongly disagree', they have to be coded as 4, 3, 2, 1. The matrix questions have to be coded taking into consideration each cell as one variable. For example, if the column of matrix represents employment status, namely 'permanent' and 'temporary' and the row represents employers or type of employer, namely, government and private, the first cell would represent a variable 'government-permanent', the second cell would represent 'government-temporary' and so on.

Preparing a Master Chart

After a code book is prepared, the data can be transferred either to a master chart or directly to computer through a statistical package. Going through master chart to computer is much more advantageous than entering data directly to computer because one can check the wrong entries in the computer by comparing 'data listing' as a computer output and master chart.

IBM SPSS- (Statistical Package for Social Sciences)

- provides a powerful statistical analysis and data management system
- Most of the tasks can be accomplished simply by pointing and clicking the mouse

- Most user's friendly Statistical Package
- A to Z of data processing and statistical analysis

Meaning of data analysis:

- Translation: Expressing numbers in words.
- Analysis: Examination, study, scrutiny, breakdown.
- Interpretation: Explanation, elaboration, elucidation, understanding.

Starting IBM SPSS → **DOUBLE CLICK ON THE ICON**

When you start a SPSS session, the Data Editor opens automatically

Data processing using SPSS:

- Step I: *Define your data*. Once you prepare your Code Book, you need to include it in the programme for further action to be taken. The process of including the code book is known as "Define Variable"
- Step II: *Get your data entered into SPSS Data Editor*. The Data Editor provides a spreadsheet for entering and editing data and creating data files.
- Step III: Select the variables for the analysis.
- Step IV: Select a procedure from the menus to calculate Statistics.
- Step V: Run the procedure and look at the results.

Steps in data interpretation:

- Introduction of the data (variables)
- Table with statistical results
- Explanation of the data
- Elaboration of the data
- Elucidation / clarification
- Inference / Understanding

Data, especially biological data, tend to be scattered. This form of variability may be an inherent property of the quantity measured or it may be due to the limited accuracy of measurement. It is more difficult to draw conclusions from data that are very scattered.

Data may be described by calculating quantities that measure:

1. Central tendency: mean, median or mode;
2. spread or scatter or dispersion: range, variance, standard deviation, coefficient of variation

Univariate Data Analysis → Analysis of One Variable → Description

To get Frequency Tables (one way Tables) in SPSS:

- From Menu, choose:
  - Analyze → Descriptive Statistics → Frequencies
- Click on Frequencies.
- Select one or more variables (actuals) in the Frequency Dialogue Box.
- Click Statistics for descriptive statistics for (actuals) quantitative variables.
- Now click the boxes for statistics you wish to apply for your data like, mean, standard deviation, etc.
- You may click chart for bar chart, pie-charts and histogram.
- Then click the 'Continue' button.
- Then click 'OK'

Recoding (numeric variable):

Generally, we recode a numeric variable using Quartiles Values (first =Q1 and third= Q3).

- Select variable you need to recode and transfer it to the Right Box.
- Name it and Click on
- Label it and Click on
- You will get a Dialogue Box
- Recode into Different variable: Old and New Values
- In the 'Old Value 'Select 'Range Lowest through 'and enter (Q1 value) in the box.
- Now enter 1 in the New Value. Click on button
- Select 'First Range' and enter consecutive value of Q1 i.e. (Q1+1) in the first box and (Q3 value) in the next box.
- Now enter 2 in the New Value. Click on button
- Finally, select 'Range through highest 'and enter consecutive value of Q3 i.e. (Q3+1) in the box.
- Now enter 3 in the New Value. Click on button

The **range** is the difference between the largest and smallest values of a set.

The **inter-quartile range**, or IQR, which is the range of the set with the smallest and largest quarters removed. If Q1 and Q3 are the medians of the lower and upper halves of a data set, then the IQR is simply Q3 " Q1.

Mode

The **mode** is the most frequent value in a set. A set can have more than one mode; if it has two, it is said to be bimodal.

- the most commonly occurring value

ex: 6 people with ages 21, 22, 21, 23, 19, 21 - mode = 21

Median

The **median** is the middle number of a set of numbers arranged in numerical order. If the number of values in a set is even, then the median is the sum of the two middle values, divided by 2.

- the centre value
- the formula is (N+1)/2

ex: 6 people with ages 21, 22, 24, 23, 19, 21 line them up in order form lowest to highest 19, 21, 21, 22, 23, 24 and take the center value - mode =21.5

Mean

The **mean** is the sum of all the values in a set, divided by the number of values. The mean of a whole population is usually denoted by ì, while the mean of a sample is usually denoted by m.

- the mathematical average

ex: mean age = age of person one + age of person two + age of person three, etc./ number of people

The **variance** is a measure of how items are dispersed about their mean.

- a measure of how spread out a distribution is
- it is computed as the average squared deviation of each number from its mean

The variance σ^2 of a whole population is given by the equation

$\sigma^2 = [\Sigma (x - \mu)^2] / n$

The variance s^2 of a sample is calculated differently:

$s^2 = [\Sigma (x - m)^2] / (n-1)$

The **standard deviation** ó (or s for a sample) is the square root of the variance. (Thus, for a population, the standard deviation is the square root of the average of the squared deviations from the mean. For a sample, the standard deviation is the square root of the sum of the squared deviations from the mean, divided by the number of samples minus 1.

- how much scores deviate from the mean
- it is the square root of the variance
- it is the most commonly used measure of spread

The **relative variability** of a set is its standard deviation divided by its mean. The relative variability is useful for comparing several variances.

A **linear transformation** of a data set is one where each element is increased by or multiplied by a constant. This affects the mean, the standard deviation, the IQR, and other important numbers in different ways.

Position

There are several ways of measuring the relative position of a specific member of a set. Three are defined below:

- Simple ranking: As the name suggests, the simplest form of ranking, where objects are arranged in some order and the rank of an object is its position in the order.
- Percentile ranking: The percentile ranking of a specific value is the percent of scores/values that are below it.

z-score: The z-score of a specific value is the number of standard deviations it is from the mean. Thus, the z-score of a value x is given by the equation

$z = (x-\mu)/\sigma$

Where ì is the mean and σ is the standard deviation

To get z score in SPSS:

- From Menu, choose:
- Analyze $\rightarrow$ Descriptive Statistics $\rightarrow$ Descriptives $\rightarrow$ Choose variables in ratio form $\rightarrow$ tick the save standardized values $\rightarrow$ OK

Percentiles and *Z* -scores are often used to assess anthropometric measures to help evaluate children's growth and nutritional status. Compared to percentiles, *Z* -scores have a number of advantages: first, they are calculated based on the distribution of the reference population (mean and standard deviation), and thus reflect the reference distribution; second, as standardized quantities, they are comparable across ages, sexes, and anthropometric measures; third, *Z* -scores can be analysed as a continuous variable in studies. In addition, they can quantify extreme growth status at both ends of the distribution.

Table 23.4: Comparison between percentiles and z-scores

	Percentiles	Z -scores
Definition	The percentage of observations(or population) falls below the valueof a variable	The number of standard deviation (SD) awayfrom the mean, when the distribution isnormal
Scale	Rank scale	Continuous scale (from $-\infty$ to ∞)
Strengths	(a) Intuitively more understandable (b) Indicating the expected prevalence	(a) Allowing comparisons across ages and sexes (b) Able to quantify the extreme values (c) Good for assessing the longitudinal changes in growth status
Limitations	(a) Not comparable across different Anthropometries (b) Extreme values are lumped to the highest/lowest percentile (c) Not suitable for assessing longitudinalgrowth status	Difficult to perceive than percentiles, especially for the public
percentile-Z -score conversion values	Under normal distribution, a percentile must correspond to a fixed Z -score.Following is a list of usually used percentile- Z -score conversion values.	
	0.2^{nd}	–3
	2.3^{rd}	–2
	2.5^{th}	–1.96
	5^{th}	–1.64
	15^{th}	–1.04
	16^{th}	–1
	50th (median)	0
	84^{th}	+1
	85^{th}	+1.04
	95^{th}	+1.64
	97.5^{th}	+1.96
	97.7^{th}	+2
	99.8^{th}	+3

The use of Z -scores is recommended for several reasons. First, Z -scores are calculated based on the distribution of the reference population (both the mean and the standard deviation [SD]); thus, they reflect the reference distribution. Second, as standardized measures, Z -scores are comparable across age, sex and measure (as a measure of "dimensionless quantity"). Third, a group of Z -scores can be subject to summary statistics such as mean and SD and can be studied as a continuous variable. In addition, Z -score values can quantify the growth status of children outside of the percentile ranges (WHO 1995). However, the major limitation of Z -scores is that they are not straightforward to explain to the public and may be of limited use in clinical settings.

In statistical terms, Z -scores are a special application of transformation rules. The Z -score for a measure (e.g., height or BMI), indicates how far and in what direction (positive vs. negative) a measured value deviates from the population mean, expressed in units of the population SD. It is a dimensionless quantity derived from dividing the difference between individual value (x) and the population mean (i) by the population SD (σ). The transformed Z -scores' distribution will have a mean of zero and a SD of one (i.e., mean = 0, SD = 1). This conversion process is called standardizing or normalizing.

Z -scores are sometimes called "standard scores". The Z -score transformation is especially useful when seeking to compare the relative standings of different measures (e.g., height vs. BMI, or the measures of boys' vs. girls') from distributions with different means and/or different SDs. Z–scores are especially informative when the distribution to which they refer is normal. In every normal distribution, the area under the curve between the mean and a given Z -score value corresponds to a fixed proportion of the total area. Based on this characteristic, statisticians have created tables indicating the value of these proportions for various Z -scores.

The Use of Percentiles

A percentile is the value of a variable below which a certain percentage of observations (or population) falls, i.e., the percentile refers to the position of an individual on a given reference distribution. Percentiles are easier to understand and use in practice, both by health professionals and the public. In addition, a percentile dictates the expected percentage of a population should be above (or below) it. Often age-sex-specific percentiles are recommended to assess children's growth and nutritional status based on anthropometric measures as well as other health conditions such as blood pressure. During recent years, there is a growing consensus on using sex- and age-specific BMI percentiles as cut-offs instead of weight-for-height Z -scores (WHZ) for assessing overweight and obesity as well as thinness/underweight in children over 2 years old (Kuczmarski et al. 2002; Wang et al. 2006; WHO 2006). The widely used percentiles include the 3rd, 5th, 50th (median), 85th, 95th, 97th, 99th. In statistics, the term percentile and the related term percentile rank are often used in descriptive statistics as well as in the reporting of scores from norm-referenced tests. Percentiles are often represented graphically, using a normal curve. A normal curve is always represented with some key features. The peak or the center of the bell-shaped curve stands the point of the mean of the distribution. The mean (z = 0) halves the normal distribution into two equal and symmetric areas. On both the right and left sides each, the graph can be shown as divided into three parts, according to Z-scores of 1, 2, and 3 SD to the right and -1, -2, -3 SD to the left, respectively. At each point of these SDs, the corresponding percentile (or cumulative probability) is fixed. In other words, as long as the distribution is normal, every SD unit on the x-axis has a specific percentile which is always paired with them. Therefore, on a normal curve, 34.13% of the data lies between 0 and -1 (or +1), 13.59% between -1 and -2 (or between +1 and +2), and 2.14% between -2 and -3 (or between +2 and +3). The remaining 0.14% of the data lies below -3 (or above +3).

A limitation of using percentiles is that the same interval of percentile values corresponds to different ranges in absolute values for different measurements. Even within the distribution of one measurement, same increments at different percentile levels could correspond to different changes in both Z-scores and absolute measures. In addition, it does not allow for quantifying the change in percentile values near the extremes of the reference distribution (e.g., people in the uppermost 1st percentile can have very different absolute values). For these reasons, we suggest that percentiles should not be used to assess change in status over time, while change in Z-scores is a better measure. Z-scores are more useful in research while percentiles are easier for use in clinical settings and by the public. Z-scores and percentiles can be converted to each other, but the commonly used cut points of each are not at exactly comparable levels. For example, Z-scores of 2 and -2 correspond to the 97.7th and 2.3rd percentiles, while the 85th and 5th percentiles correspond to Z-scores of 1.04 and -1.65, respectively.

The quantity (n – 1) is called the number of degrees of freedom(d.f.). Statisticians will tell you that each time you calculate a statistic from sample data the number of degrees of freedom is reduced by 1.

Presenting data graphically

Graphic methods allow the visual assessment of data. For nominal data this can take the form of a bar-chart or a pie-diagram.

Histograms

Parametric data i.e. numerical data may be plotted as a histogram. The quantity measured is divided into intervals or classes of appropriate size and the number of observations within each class is plotted. We are, therefore, classifying the data. The total area under the histogram is proportional to the total number of observations.

Rather than plotting the number of observations in each class on the vertical axis, it is common to plot the frequency. This is number of observations in each class divided by the total number of observations. The sum of all the frequencies will be 1. Instead of plotting each class as a block, a frequency polygon outlining the profile can be drawn. Such a graph is called the frequency distribution.

Standard error of the mean

If many samples are selected from a population, each has its own mean value, $\bar{X}$. The distribution of these means is called a sampling distribution and it is centred on the population mean m. The width of the sampling distribution depends on the number of items in each sample. Larger samples give narrower sampling distributions. This means that if you take a sample of 20 items, the mean value will be closer to m than if you take a sample of, say, 5 items.

The SD of the sampling distribution is called the standard error of the mean (SE or SEM). The smaller it is, the closer a sample mean is likely to be to m.

The standard error of the mean is a measure of the closeness of the sample mean to the population mean.

It is given by

$$SE = \frac{s}{\sqrt{n}}$$

The Normal Distribution

The Normal distribution is one of the most common frequency distributions that occur. It is bell-shaped and symmetrical about the central value.

The Normal curve for a large population is the frequency polygon, centered at the population mean m and with a half-width of ó (the SD) at 61% of the maximum height. Any Normal curve is completely defined in terms of shape by the parameters ì and ó, which determine its centre and width. Its area is equal to the number of items/observations.

A simplified form is provided by the Standard Normal Distribution (SND), where ì is set to zero and the units of measure on the horizontal axis are SD's; (i.e. x has become $z = (x - \mu)/\sigma$). The area under the whole curve is 1. The area may be divided into parts by drawing vertical lines.

We can use this property of a Normal curve to provide an additional way of describing the spread of data in a sample. It applies to large ($n > 60$) samples taken from a normally distributed population and it is called the 95% confidence interval:

$$95\%\text{CI} = \bar{X} \pm (1.96 \times \text{SE})$$

This doesn't apply to small samples ($n < 60$) since although the population may be normally distributed; the samples tend to be distributed according to the so-called *t* distribution (a little broader than a Normal curve). An additional complication is that, unlike the Normal distribution, the shape of the *t* distribution depends on the number of degrees of freedom. Thus

$$95\%\text{CI} = \bar{X} \pm (t \times \text{SE})$$

where the value of *t* is given by the *t* tables at d.f. = n - 1 and p = 0.05.

Tests of significance

Significance tests are used to determine the likelihood that two (or more) samples come from the same population. For example, does a particular form of treatment make the patient better or could it have happened by chance? The general procedure is as follows.

1. Formulate a **null hypothesis** (called $\mathbf{H_0}$ for short). This takes the pessimistic view that difference between sample means is due entirely to chance, i.e. both samples are derived from the same population.
2. Calculate the significance level of H_0. This is the probability that the null hypothesis is true.

3. If the significance level is (by convention) below 5% ($p < 0.05$) we reject H_0.

Decisions about significance depend on the area under the appropriate distribution. Test can be two-tailed or they can be single tailed (for differences in one direction only).

Bi- and Multivariate Inferential Statistical Tests

Bivariate data analysis (application of inferential statistics)

Bivariate data analysis $\rightarrow$ analysis of two Variables at a Time $\rightarrow$ Inference

Percentage in bivariate tables:

- Row Percentage - Row Total (100) is base for calculating row percentage.
- Column Percentage - Column Total (100) is base for calculating column percentage.
- Determine in which direction the percentages have been computed
- Comparisons are always made in a direction opposite to the one in which the percentages have been computed. If the percentages have been computed across the rows, then we compare percentages down the column.

Limitations of interpretation by percentage difference:

- It does not tell us if the inference drawn will hold good to the population from which the sample is drawn.
- That means the inference may be just a chance.
- Therefore, to know that the inference is not by chance we need to compute some inferential statistical tests.

Errors in significance testing

Rejection of H_0 is sometimes termed a "positive" finding while acceptance is "negative". For example, when a patient is tested for a particular disease and the result is significantly different from controls, the individual is termed positive for that test. If the test was faulty it might give false positive or false negative results. These are classified as:

Type I errors or **false positives** incorrect rejection of H_0

Type II errors or **false negatives** incorrect acceptance of H_0

Statistical power

By definition, the probability of a Type I error is equal to the chosen significance level (usually 5%). We can reduce the probability of a Type I error by setting a lower significance level, say to 1%. The probability of a Type II error is a little more complicated. If H_0 is false then the distribution of sample means will be centred on a population mean that is different from ì. Let us call it ì'. We reject H_0 when our sample mean lies in the tails of the sampling distribution centred on ì. However, there is a chance that our sample could have a mean in the overlap region, i.e. there is a b% chance that we would incorrectly accept the null hypothesis. The power of a statistical test is given by the probability of not doing this, i.e. 100-b%.

Decreasing the significance level will reduce the power. Increasing sample size will increase the power.

Measures of Difference: t-tests

- There are two types of t –tests;
  - T –test for independent samples,
  - T-test for paired sample.

Both the tests are used to assess significance of difference.

T-test for independent samples (Unpaired data):

- T-test for independent samples is used for the scores of two groups and is independent of each other.
- That means there are no logical relationships between the scores that have been obtained for one group when compared with other group.
- The t – test for two independent samples examines the difference between their means to see how close or apart they are.
- An unpaired, or two samples, *t* test is used to compare samples that have no correspondence, for example a set of patients and a set of healthy controls. The number in each sample does not have to be the same. If the SE for each sample is similar then it is necessary to calculate a pooled SE sp. (If the SE's are rather different than other methods may be used).

$$s_p = \sqrt{\frac{(\mathrm{n}_1 - 1)\mathrm{s}_1^2 + (\mathrm{n}_2 - 1)\mathrm{s}_2^2}{\mathrm{n}_1 + \mathrm{n}_2 - 2}}$$

This is then used to compute *t* as

$$t = \frac{\overline{X}_1 - \overline{X}_2}{s_p\sqrt{(n_1 + n_2)}}$$

$$\text{d.f.} = \mathrm{n}_1 + \mathrm{n}_2 - 2$$

For large samples use the Normal table (SND) and compute z from

$$z = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

To get the T-test for independent samples from SPSS:

- From the menu bar select Analyze
- Select Compare Means
- Select Independent Samples T-test.
  You will get Independent Samples T-test Dialogue Box.
- Select variable and Transfer it to Test Variable box.
- Select another variable and Transfer it to Grouping Variable box.
- Define Gr 1=1 and Gr 2=2
- Click 'Continue'
- Click OK.

You will get the value of T-test in output SPSS viewer.

T-test for Paired sample:

- A *t*-test for paired sample is used to determine if two sets of data (e.g. pre and post intervention scores) significantly different from each other.

Paired data, small samples

For two samples of paired data, i.e. data that are matched or that correspond in a one-to-one relation e.g. measurements on the same individual "before" and "after" treatment, and where n < 60 and the data are from a Normal distribution, we use a paired *t* test. (*t*is the number of SE's between the means). This test is best performed by calculating the differences between the measurements on each individual and then determining if the mean difference is significantly different from zero; H_0 states that it is not.

$$t = \frac{mean\,diff}{\left(s/\sqrt{n}\right)}$$

d.f. = n – 1

Paired data, large samples

When n > 60 the *t* distribution and the Normal distribution are very similar, so we calculate not *t* but z, the Standard Normal Deviate. Remember z = (difference in means)/ SE; it does not depend on d.f.

To get the T-test for paired samples from SPSS:

- From the menu bar select Analyze
- Select Compare Means
- Select paired Samples T-test.

You will get Paired Samples T-test Dialogue Box.

- Select a pair of variable and Transfer it to Test Variable box.
- Click OK.

You will get the value of T-test in output SPSS viewer.

Non-parametric tests of significance

When data are not normally distributed we can often still use the parametric tests described above if we can transform the data in a way that makes them normal. This can be achieved in a variety of ways, sometimes simply by taking the logarithm. If this cannot be done or if the data are ordinal rather than parametric, then we must resort to a nonparametric test. For these tests the data are converted from an interval scale into ranked data. The subsequent tests then only consider the relative magnitudes of the data, not the actual values, so some information is lost. There are many different non-parametric tests, all with specific applications. However, there is a correspondence between the parametric and non-parametric methods.

Procedure:

1. Rank the differences, excluding any that = 0; (ignore the signs).
2. Sum the ranks with positive and with negative differences

Comparing observed and expected data. The c^2 test

A way of comparing data that can be grouped into categories is to place the results in a contingency table that contains both the observed and expected data. One of the ways of testing that the difference between observed and expected values is significant is the c^2 test. (Note c or chi, pronounced as in sky, is a Greek letter).

The restrictions on the use of this test are

1. $n > 20$
2. There must be at least 5 items in any "expected" box
3. The boxes must contain actual data not proportions

On the other hand, c^2 tests are not restricted to normally distributed data.

The c^2 test can be used to detect an association between two (or more) variables measured for each individual. These variables need not be continuous. They can be **discrete** or **nominal**. For two variables we use a 2 x 2 contingency table.

$\chi^2 = \Sigma(O\text{-}E)^2/E$

O = observed frequency

E = expected frequency

The number of degrees of freedom is (no rows-1)(no columns-1)

To Obtain Chi-square by using SPSS:

- From Menu, choose :
  - Analyze → Descriptive Statistics → Crosstab
- Click Crosstab.
- You get Crosstab Dialogue Box
- Highlight the independent variable and transfer it to the ROW Box.
- Highlight dependent variable and transfer it to the COLUMN Box.
- Click on 'Statistics' Button
- You will get Statistics Dialogue Box
- Select Statistics, say, Chi-square and Coefficient of Contingency.
- Click Continue.
- Click OK.

SPSS output provides exact significance:

- The decision rule: "If the exact significance level is less than 0.05 we reject the null hypothesis and accept the research hypothesis".
- If the association is statistically significant, now we can say that the inference drawn will hold good to the population from which the sample is drawn.
- Finally, we may infer that the association is due to some reasons and certainly it is not by chance.
- While the chi-square measures indicate that there is an association between two variables, they do not indicate the strength of the association.
- As such, if you are interested in explaining the strength of association you have to find out Coefficient of Contingency (C).\
- Coefficient of Contingency measure indicates the strength of the association between the row and column variables in a crosstable.

Coefficient of Correlation:
This is given by

$$r = \frac{\left(X - \bar{X}\right)\left(Y - \bar{Y}\right)}{\sqrt{\left(X - \bar{X}\right)2\left(Y - \bar{Y}\right)2}}$$

It would be inappropriate to calculate the correlation coefficient of data that is non-linear, (i.e. does not follow a straight line relationship) e.g.
Notice:

1. r has no units.
2. The closer r is to ± 1, the better the correlation.
3. Correlation doesn't necessarily indicate direct causality.

Remember: The data must also be normally distributed, (otherwise use a non-parametric test such as Spearman's rank correlation test).

- We often wish to know the relation between different variables.
- The most frequently used measure of correlation among variables is the coefficient of correlation (r).
- The correlation coefficient (r) is often referred to as product – moment correlation.
- The correlational method involves measuring the relationship between pairs of scores.
- Coefficient of correlation is calculated to identify the extent or degree of correlation between two variables.
- Level of measurement: Interval or Ratio data
- Coefficient of correlation is calculated to identify the extent or degree of correlation between two variables.
- In other words, correlation in two sets of data need not always be the result of mutual inter-dependence.
- Changes in one set of data may be the cause of changes in the other set (of data) and there may be a cause and effect relationship between these two sets.
- But it is also equally possible that the changes in the two sets of data are the effects of some third factors, which affects both these sets of data.
- When one variable increases (or decreases) and the other changes is the same direction, the relation of the two series is positive; but if the changes in the two variables are in opposite directions, the correlation between the two series is negative.
- The coefficient of correlation (r) changes in value from positive one (+ 1.0) down through zero (0.0) to negative one or unity (- 1.0).
- Statistical convention decrees that the coefficient of correlation ranging from 1 to 0.7 (±) be taken as an indication of 'high' correlation, that ranging from 0.7 to 0.4 (±) as substantial, 0.4 to 0.2 (±) as low and that below 0.2 as negligible.

To get the Coefficient of Correlation from SPSS:

- From the menu bar select Analyze Select Correlate Select Bivariate.
- You will get Bivariate Correlation Dialogue Box.
- Select pair of variables and Transfer it to the variable box.
- Click OK.

You will get the value of Coefficient of Correlation in output SPSS viewer.

Trivariate Data Analysis:

Trivariate data analysis → analysis of three variables at a time → Causal Inferences

The Purpose of Trivariate data analysis:

- To substantiate the findings of bivariate analysis
- To draw causal inference

Causal Inference (Cause-Effect Relationship):

- The Logic of Causal Inference
- Correlation: Two variables changes together.
- Causality: Variable X causes the effect Y (Cause-Effect Relationship)

Conditions of causality:

Two variables are said to be causally related: If

1. There is an empirical correlation between them,
2. The relationship is not found to be the result of the effects of some third variable on each of the two initially observed, and
3. The cause precedes the effect in time

Trivariate data analysis using SPSS (Controlling the Effect of Third Variable):

- From Menu, choose :
  - Analyze → Descriptive Statistics → Crosstab
- Click Crosstab.
- You get Crosstab Dialogue Box
- Highlight the independent variable and transfer it to the ROW Box.
- Highlight dependent variable and transfer it to the COLUMN Box.
- Highlight the third variable (or controlling variable) and transfer it to the Layer 1 of 1 Box.
- Click on 'Statistics' Button
- You will get Statistics Dialogue Box
- Select Statistics, say, Chi-square and Coefficient of Contingency.
- Click Continue.
- Click OK.

Possible outcomes from Trivariate analysis**:**

- The original bivariate association is not affected by the third variable (Non-spurious association)
- The original bivariate association is effected by the third variable (the original bivariate association is disappeared) (Spurious association)
- The original bivariate association is effected partially by the third variable (the original bivariate association is disappeared) (Partially Spurious association)

Comparing more than two samples

Suppose you were asked to compare blood pressure readings from three communities and were asked if they were different from one-another. The *t* test is not appropriate for such a study. The 'equivalent' of a t test for more than two samples is called **analysis of variance** (**ANOVA**).

The analysis of variance (sometimes obtained as ANOVA or F – Test) determines whether there is a statistically significant difference between more than two groups on the basis of their means. This procedure, which can only be applied to normally distributed data, enables you to determine if the variation between sample means can be accounted for by the variation that occurs within the data as a whole, (this is the null hypothesis), or whether the variation between the means is due to significant differences between them. For a factor of analysis (such as community) one way ANOVA is performed, for two factors of analysis (for instance community and sex) two-way ANOVA is used, and so on. Variances are calculated from "sums of squares" $\sum(X-\bar{X})^2$let us call it SS for short). These may be partitioned in the following way

$$SS_{\text{(total)}} = SS_{\text{(between groups)}} + SS_{\text{(within groups)}}$$

The procedure is as follows:

1. Calculate the total SS, i.e. over all the data.
2. Calculate the SS between the means of each group or sample.
3. Calculate the residual SS which is the SS within the groups.

Now calculate the ratio F of the between-group variance to the within-group variance and deduce the p value from the F table. (Note that for only two groups the result is identical to the *t* test.)

To obtain One-Way Analysis of Variance in SPSS:

- From the Menu choose:
- Analyze
- Compare Means
- One-Way ANOVA
- Select one or more dependent variables.
- Select a single independent factor variable
- Click OK in the main dialogue box to run the procedure

ANOVA (Analysis of variance)

- tests the significance of group differences between two or more groups
- the IV has two or more categories
- only determines that there is a difference between groups, but doesn't tell which is different

ANCOVA (Analysis of covariance)

- same as ANOVA, but adds control of one or more covariates that may influence the Dependant Variable (DV)

Multivariate Data Analysis:

Multivariate Data Analysis → analysis of effects of set variables on one variable

Multiple Statistical Outcomes such as: Description, Correlation, Cause–effect Relationship, Simultaneous Effect and Prediction

MANOVA (Multivariate Analysis of Variance)

- same as ANOVA, but you can study two or more related DVs while controlling for the correlation between the DV
- if the DVs are not correlated, then separate ANOVAs are appropriate

MANCOVA (Multivariate analysis of covariance)

- same as MANOVA, but adds control of one or more covariates that may influence the DV

Regression analysis is a statistical procedure commonly used in multivariate analysis of quantitative data.

- Regression analysis is a statistical process for estimating the relationships among variables.
- It includes many techniques for modeling and analysing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables.
- Data on Interval / Ratio Scale, a set of Independent Variables and a Dependent Variable
- A statistical technique for characterising the pattern of a relationship between quantitative variables in terms of a linear equation and for summarising the strength of this relationship in terms of its deviation from that linear pattern.
- Regression Equation: **Y= C + bX**

Y= Dependent Variable.
C= Constant
b= Regression Coefficient
X= Independent Variable

Linear regression is an alternative way of assessing dependence, but it also provides the equation of the straight line that best fits the data, by specifying its slope and intercept. This line is called the regression line.

If we want to measure the degree of association between two variables that we suspect may be dependent on one another we can calculate the correlation coefficient or perform linear regression. These methods test only for a linear association, i.e. that the data are related by an expression of the type $y = a + bx$. (Recall that this is the equation of a straight line with a slope b and an intercept on the y axis at $y = a$):

An alternative approach and an important preliminary test are to draw a scatter plot of the data. For example compare IQ and height for a sample of individuals. In another example compare probability of heart disease with daily fat intake.

The horizontal axis (sometimes called the abscissa) is usually the independent variable, the one whose values you select or are determined already. The vertical axis (or ordinate) is usually reserved for the dependent variable, the one that is determined by nature.

This is achieved by minimising the distances between the data points and the fitted line:

Usually x is the independent variable (i.e. determined by the investigation) and the vertical (y) distances are minimised. (For example we wish to know how plasma volume is determined by body weight not the converse).

The line we obtain is then termed the regression of y upon x. Its equation is given by

$$Y = a + bx$$

$$b = \frac{\left(X - \overline{X}\right)\left(Y - \overline{Y}\right)}{\left(X - \overline{X}\right)2}$$

$$\text{and } a = \left(\overline{Y} - b\,\overline{X}\right)$$

In our example b = 0.0436
a = 0.0857

so that Y = 0.0857+ 0.0436 X and we can construct the line by calculating x and y values.

The derived equation can be used to calculate values of y for a given x. alternatively; y values may be read directly from the straight line graph. Both of these operations should be restricted to the region encompassed by the original data. This is called interpolation. The estimations of y values beyond the data region are called extrapolation. Often there is no reason to assume that the regression line will apply beyond the data limits, so extrapolation can be misleading.

To obtain a Regression analysis in SPSS:

- From the Menu choose: Analyze
- Regression
- Linear
- Select dependent variable
- Select independent variable
- Click OK in the main dialog box to run the procedure

Interpretation of Regression Analysis Results:

- A low p-value (< 0.05) indicates that an independent variable (predictor) is likely to have contribution in explaining the dependent variable (model).
- Regression coefficients represent the mean change in the dependent variable for one unit of change in the independent (predictor) variable while holding other predictors in the model constant.
- Regression equation is extremely useful if we want to make predictions from the available data.

When trying to decide what test to use, ask yourself the following...

Am I interested in...?:

- *description* (association) - correlations, factor analysis, path analysis
- *explanation* (prediction) - regression, logistic regression, discriminant analysis
- *intervention* (group differences) - *t*-test, ANOVA, MANOVA, chi square

Do I need longitudinal data or is cross-sectional data sufficient for my purpose?

- Do my hypotheses involve the investigation of change, growth, or the timing of an event?
- If longitudinal data is necessary, how many data points are needed?

Is my dependent variable nominal, ordinal, interval, or ratio?

·*nominal* - chi square, logistic regression

- *dichotomous* - logistic regression
- *ordinal* - chi square

Table 23.5: Different statistical tests with reference to Independent variables and Dependent variables

StatisticalAnalyses	Independent Variables		Dependent Variables		Control Variables	Question Answered by the Statistic
	No. of IVs	Data Type	No. ofDVs	Data Type		
Chi square	1	categorical	1	categorical	0	Do differences exist between groups?
t-Test	1	dichotomous	1	continuous	0	Do differences exist between 2 groups on one DV?
ANOVA	1 +	categorical	1	continuous	0	Do differences exist between 2 or more groups on one DV?
ANCOVA	1 +	categorical	1	continuous	1 +	Do differences exist between 2 or more groups after controlling for CVs on one DV?
MANOVA	1 +	categorical	2 +	continuous	0	Do differences exist between 2 or more groups on multiple DVs?
MANCOVA	1 +	categorical	2 +	continuous	1 +	Do differences exist between 2 or more groups after controlling for CVs on multiple DVs?
Correlation	1	dichotomous or continuous	1	continuous	0	How strongly and in what direction (i.e., +, -) are the IV and DV related?
Multiple regression	2 +	dichotomous or continuous	1	continuous	0	How much variance in the DV is accounted for by linear combination of the IVs? Also, how strongly related to the DV is the beta coefficient for each IV?
Path analysis	2 +	continuous	1 +	continuous	0	What are the direct and indirect effects of predictor variables on the DV?
Logistic Regression	1 +	categorical or continuous	1	dichotomous	0	What is the odds probability of the DV occurring as the values of the IVs change?

Table 23.6: Statistics Decision Tree

Research Question	Number andtype of DV	Number andtype of IV	Covariates	Test	Goal of Analysis
Groupdifferences	nominal orhigher	1 nominal orhigher		chi square	determine ifdifferencebetween groups
	continuous	1 dichotomous		*t*-test	determinesignificance ofmean groupdifferences
		1 categorical		one-way ANOVA	
			1+	one-way ANCOVA	
		2+ categorical		factorial ANOVA	
			1+	factorial ANCOVA	
	2+ continuous	1 categorical		one-way MANOVA	create linearcombo of DVsto maximizemean groupdifferences
			1+	one-way MANCOVA	
		2+ categorical		Factorial MANOVA	
			1+	Factorial MANCOVA	
Degree ofrelationship	continuous	1 continuous		bivariatecorrelation	determinerelationship/prediction
		2+ continuous		multipleregression	linearcombination topredict the DV
	1+ continuous	2+ continuous		path analysis	estimate causalrelations amongvariables
Prediction ofgroupmembership		dichotomous2+ nominal orhigher			logisticregression create linearcombo of IVs ofthe log odds ofbeing in onegroup

- *interval/ratio* - correlation, multiple regression, path analysis, *t*-test, ANOVA, MANOVA, discriminant analysis

Do I have moderating or mediating variables?

A *moderating* relationship can be thought of as an *interaction*. It occurs when the relationship between variables A and B depends on the level of C. A *mediating* relationship can be thought of as an *intervening* relationship. It is one in which the path relating A to C is mediated by a third variable (B).

24 Writing Research Proposal

A good research proposal is the key to successful research. Any research must begin with a clearly focused research proposal. In recent times there has been a proliferation of researches indicating an exponential growth of scientific activity, which has made the business of research competitive. A good research proposal has become a necessity not only for ensuring a high quality of research but also for the practical reason of landing a research grant. In order to attract a research grant, a research proposal must be precise and convincing. The readers have to be convinced that you have something there, and that you can do it. The proposed research must be within the capabilities of the researcher to do that kind of research. A good research proposal must be systematic, coherent and, above all, capable for research. An effective proposal should be crisp and be composed of segments that can be read independently of one another. Each segment must tell its own story in a straightforward fashion. A research proposal must tell the readers clearly, at least two things: what you want to do and how you want to do it.

Elements of a Research Proposal:

- Title
- Abstract
- Study Problem
- Rationale/Relevance of the Project
- Literature Review
- Specific Study Objectives
- Research Methods

  I. Study design

  II. Subjects

Inclusion/exclusion criteria

Sampling

Recruitment plans

Method of assignment to study groups

III. Data collection

Variables: outcomes, predictors, confounders
Measures/instruments
Procedures

IV. Intervention

V. Statistical considerations

Sample size
Data analysis

- Ethical Considerations

Consent form
Privacy of information

- Work Plan
- Budget
- Research team
- Dissemination Plan

Selection of a Research Topic:

Step-I: There are three factors which a researcher needs to consider in choosing a research topic:

1. *Interest* of the researcher
2. Researcher's *competence*
3. The *relevance* or usefulness of the topic

Interest: Chose a topic that you find interesting. Don't worry if you have not done much reading on that subject. If your interest is genuine and you have confidence in your ability, you do not need to have a great deal of prior knowledge on that subject. With a modest knowledge you can start a project, provided you have a consuming interest in that subject. Remember, many anthropologists did monumental work about societies and cultures they knew little or nothing about prior to their field trip. Read books, articles, reviews, reports, etc.—as much as possible on that topic. The reading will make up for any deficiency that you may have. Do not select a topic just because it is fashionable. Do not commit yourself to a project unless you have a solid interest in it, otherwise the experience can be as painful as an unhappy marriage.

Competence: Make a careful self-evaluation. Choose a topic in which you think you are competent. Competence in this case does not mean that you have to be well informed about the subject; it is more a mixture of your interest and some prior knowledge. Interest alone is, however, not always adequate. As a student of anthropology you may also have a more than casual interest. Strict as it may sound, you don't know what you are doing. So just forget it. Choose a topic within the range of your competence. Give some thought at this stage to the methodological demands of the research and see if your methodological training matches with them. If you are not comfortable with multiple regression or factor analysis, don't get involved in a project that demands high-level quantitative skills.

Usefulness: Make sure that your research is useful on the following counts:

1. It is topical (that is, everyone is talking about it and it may be relevant to public policy).
2. It can help you land a research grant and/or a job (assuming you are working on a dissertation).

3. It promises to contribute to your discipline, or more ambitiously, to humanity and knowledge per se.

Step-II: *Narrow down your topic*.

It is very important to demarcate your interest. If your topic is too broad it will take you forever to do the research and even after that, you may find that your study is still incomplete. But if the topic is too narrow, sometimes it can be too small or difficult to research. So you have to be careful in striking a balance. It is recommended that to start thinking with a broader topic then go on to narrow it down. In moving from a general to a particular topic, it is useful if you can discover a knowledge gap and are in need of knowing. In narrowing down your research topic, state clearly what you are not going to do.

Once you have selected a research topic that can be done with your resources i.e., time, money, knowledge, competence, etc., write down how you will go about doing it.

Proposal Writing:

Overall Quality of the Study*:*

- Good research question
- Appropriate research design
- Rigorous and feasible methods
- Qualified research team
- Research questions matches data collection/data analysis

Quality of the Proposal

- Informative title
- Self-sufficient and convincing abstract
- Clear research questions
- Scholarly and pertinent background and rationale
- Relevant previous work
- Appropriate population and sample
- Appropriate measurement and intervention methods
- Quality control
- Adequate sample size
- Sound analysis plan
- Ethical issues well addressed
- Tight budget
- Realistic timetable
- Identify strengths and limitations

Quality of the Presentation

- Clear, concise, well-organized
- Helpful table of contents and subheadings
- Good schematic diagrams and tables
- Neat and free of errors

Following eight steps may be followed for writing an effective research proposal:

Step-I: *Introduction:*

Say in the first paragraph what your research project is. In the first few sentences write what your project is about. It is a good idea to start a research proposal like this: "In the proposed study we seek to examine …"

Step-II: *Review of the literature:*

Any research is a social activity. Don't go alone, be a part of the group. Don't forget that knowledge, at least in the social sciences, is cumulative. There are people who must have already thought, studied, and written about your pet project. So do read their books, be familiar with their works and in this section, review the existing literature on your proposed topic.

A critical summary of research on a topic of interest, generally prepared to put a research problem in context or to identify gaps and weaknesses in prior studies so as to justify a new investigation.

Research tends to be a cyclical process – research findings lead to theory development, theory leads to further research. As a researcher, you can jump into this cycle at many places. In the literature review, you should show that you are jumping in at the appropriate place. If little is known in an area, then very basic descriptive studies designed to give a preliminary understanding about a phenomenon are appropriate. However, if the area is well advanced, that type of study will be inappropriate. When reading the literature review section, a reviewer will be looking to see whether you are sufficiently knowledgeable about the area and whether your proposed work is appropriate for the level of knowledge currently existing in that area.

Keys to Success

- Thorough, complete and up to date, but not a recitation of every study ever conducted
- Logical
- Original research
- Primary sources

Focus on original research and systematic reviews

- Well organized/synthesized
- Critical appraisal
- Build a case for a new study

Describe any controversial areas objectively

Include evidence for and against your position

Identify any gaps in existing knowledge

Step-III: *Identification of the knowledge gap:*

Hopefully you will find that there are gaps in the existing literature which need to be filled. In this section, you state what we do not know from reading the existing fund of knowledge and need to know. This is a justification for taking up of the project.

Step-IV: *Statement of the problem:*

Now you state clearly and precisely what your specific research problem is. Don't get confused with the word 'problem'. It does not have to be a real-life problem. Research problem actually means research topic. And the topic may sometimes concern a real-life problem.

Step-V: *Objectives and limitations:*

State what you hope to accomplish by doing the research and mention the areas you are not going to deal with. Drawing boundaries is an important part of research. Stating what you are not going to do is often just as important as stating what you are going to do. Research objective is a clear statement of the specific purposes of the study, which identifies the key study variables and their possible interrelationships and the nature of the population of interest.

Research objectives have the specific purpose stated in the form of a question (descriptive/exploratory research). Identifying the research problem and developing a question to be answered are the first steps in the research process. The research question will guide the remainder of the design process.

Step-VI: *Hypotheses* (plural of the word 'hypothesis'):

State what kind of relationships you expect to find between variables or factors. The specific purpose stated in terms of a tentative prediction or explanation of the relationship between two or more variables. In thinking of a research proposal, it is always useful to think in terms of a cause-effect relationship between the variables (factors). In the jargon of research methodology these are called independent variables (causes) and dependent variables (effects) respectively. There can also be intervening and incidental variables. 'Hypothesis' is your intelligent guess about the possible relationship between two variables. Remember this is only a guess; you are not putting your prestige in the line. Don't be hard pressed to prove that your guess is right. It is more common to disprove the hypothesis (or hypotheses) than prove it on the basis of the research findings.

Keys for Success

- Only one or two primary research questions or hypotheses: focus on the important question.
- Clear and consistent.
- Key concepts/constructs identified.
- Includes the independent and dependent variables (if applicable).
- Measurable.
- Hypotheses clearly predict a relationship between variables.
- Relevant or novel.

Step-VII

a) Method:

State what method you will follow in doing the proposed research. Your method may often be dictated by the nature of your research.

Keys to Success

- Clearly identify and label study design using standard terminology.
  - Quantitative/qualitative
  - Intervention/descriptive
  - Cross-sectional/longitudinal
  - Prospective/retrospective

    - True Experiment/Quasi-Experiment
- Must specify the major elements of the design
    - Variables, instruments
    - Subjects: sampling frame, sample size, selection procedures
    - Timing of testing/intervention
- Use a diagram if needed
- Must be consistent with objectives/hypotheses
- Must justify choice of design:
    - appropriate choice to answer question
    - lack of bias/validity
    - precision / power
    - feasible
    - ethical

b) Source of data:

1. Who will be studied?
2. How will they be recruited?
3. How will they be allocated to study groups? (if appropriate)

Tell us about your data sources. Tell us whether you are collecting your own data or using an existing data set. In the latter case, mention who collected the data, when, and how. What sort of documents, or books, or newspapers etc. are you planning to consult? Don't feel shy. There are many who may not be aware of some of the sources that you know of. In case you are collecting your own data by interviews, tell us who are you going to interview, how many, and how. You need to attach a sample questionnaire with your proposal. If you are going to do fieldwork using ethnographic techniques such as participation-observation, tell us about your subjects, the duration of your fieldwork and other plans related to it. In writing about your data sources, show some sensitivity to ethical considerations.

Step-VIII: *Importance and contribution of the study:*

Make a concluding statement on the importance of your work and tell us in what area and in what way your work is going to contribute to our knowledge and to our understanding of certain issues. It is a good idea to exercise some modesty in this paragraph.

A well-written proposal will ease the process of obtaining institutional and ethical approval and will increase your chances of obtaining funding for your project.

Keys to Effective Writing

- Simplicity
- Clarity
- Parsimony

Important Rules

- Avoid jargon.
- Avoid trendy words
- Avoid abbreviations

- Avoid colloquialisms
- Do not try to sound "intellectual"
- Avoid redundant phrases
- Avoid overused phrases

25 Research Report Writing

The research and its adequacy are examined on the basis of research proposal, research summary, research abstract and the research report. The contribution of the study is judged on the basis of research report. Thus the research report is the key aspect of the research and hence the researcher has to present the report. Further it is necessary that the report stands to the expectations of the researchers and the readers. Here your aim is to write clearly and concisely about your research topic so that the reader can easily understand the purpose and results of your research. A report is typically made up of three main divisions: (1) preliminary material, (2) body and (3) supplementary material. Each of the sections contains a different kind of content. Refer to the tables below:

Table 25.1: Divisions and sections of a report

Broad Divisions	Individual Sections
1 Preliminary material	Title of Report Table of Contents (not always required) Abstract/Synopsis
2 Body of report	Introduction Literature Review (sometimes included in the Introduction) Methodology Results Discussion Conclusion Recommendations (sometimes included in the Conclusion)
3 Supplementary material	References or Bibliography Appendices

Table 25.2: Content of individual sections

Individual Sections	Content of Each Section
Title of Report	Concise heading indicating what the report is about
Table of Contents(not always required)	List of major sections and headings with page numbers
Abstract/Synopsis	• Concise summary of main findings • Outlines - purpose, research method, findings, main conclusions and recommendations Mainly written in past tense
Introduction	• Outlines context, background and purpose • Defines terms and sets limits of the research • What you researched and why • The reader/audience can easily identify what, how, why (Mainly uses past tense and can be written later although presented first)
Literature Review (sometimes included in the Introduction)	Other relevant research in this area
Methodology	Explains how research was done and outlines how the data was collected
Results	• What you found • Presents findings of the research • Facts only - no interpretation • Uses graphic form (e.g. tables & graphs)
Discussion	• Presents an interpretation and evaluation of the results. • Analyses results - draws together different aspects of the findings, findings of other studies and refers to literature • Relevance of your results, how it fits with other research in the area
Conclusion	• Brief statement of what was found • Summary of results/findings
Recommendations (sometimes included in the Conclusion)	What needs to be done as a result of your findings (Suggest suitable changes/solutions)
References or Bibliography	All references used in your report or referred to for background information
Appendices	Any additional material which will add to your report

Order of contents

The structure of the research report, dissertation or thesis is based on a standard format which contains the following sections:

- Preface
- Text
- Supplementary

Title Page

The title page is the first page after the front cover and should include the research title.

Abstract

Generally the abstract is written after the completion of the text of the research report/dissertation/thesis. It summarizes the structure of the whole text and the major facts it contains. It should be written in the language of the research report/dissertation/thesis and translated to English and contain no more than 500 words. The abstract should be placed on the page immediately after the title page.

Acknowledgements

Most research reports, dissertations or theses have their subsection to convey appreciation to those who have been involved in the study.

Table of Contents

The Table of Contents lists the chapters, topics and sub-topics together with their page numbers. Sub-topics and topics should be labelled according to the chapter, for e.g., the first topic in Chapter 1 should be marked 1.1 and the first sub-topic, 1.1.1. The use of letters in parenthesis for e.g., (a), (b), (c) is appropriate as a means of differentiating sub-topics of the same topic. This numbering system provides a clear picture of the relationship between chapters and topics and shows how they are connected.

List of Figures

This list contains the titles of figures, together with their page numbers, which are listed in the text. For e.g., figures in Chapter 3 are numbered sequentially: Figure 3.1, Figure 3.2.

List of Tables

This list contains the titles of tables, together with their page numbers, which are listed in the text. The numbering system is according to chapter, for e.g.: tables in Chapter 3 are numbered sequentially: Table 3.1, Table 3.2.

List of Symbols and Abbreviations

The symbols and abbreviations must be in accordance to international convention.

List of Appendices

This list is optional and contains the titles of appendices placed in the supplementary section.

Text

Researcher should ensure that the text follows the agreed conventions of the individual Faculty. Normally, the text consists of the following chapters:

Introduction

This chapter contains the introduction to the issues in which the research is concerned, the aims and objectives of the study, and the outline of the research approach.

Literature Review

This chapter surveys previous literature and studies relevant to the field of study. The literature review should be comprehensive and include recent publications.

Methodology

This chapter describes and explains the research methodology used in the study. The sub-topics for this chapter include the key research questions, the research design, and the research procedures adopted. It may also, where appropriate, indicate sampling methods, research instruments and statistical methods employed. The purpose of this is to inform the reader on the methods used to collect the data and generate the findings reported.

Results

Results are commonly presented in the form of text, figures and tables, complete with data analysis.

Discussion

This chapter contains the interpretation of the results. The findings of the research should be compared and contrasted with those of previous studies presented in the literature review. The purpose of this chapter is to discuss the findings of the research.

Conclusion

In this section, the findings are summarized and their implications discussed. This section may include suggestions for future work.

Supplementary

Specific items which were not included in the main body of the text should be put in this Supplementary Section. Typically, this section includes the following:

Instrumentation

Research instruments such as questionnaires, maps or computer programmes.

Appendix

Appendices consist of additional illustration of data sources, raw data and quoted citations which are too long to be placed in the text. The appendix supports the written text of the research report/dissertation/thesis. Appendices can be divided into Appendix A, B, C.

Bibliography

All works or studies referred to in the research, report/dissertation/ thesis in the form of quotations or citations must be included in the bibliography. The references should be written consistently in the American Psychological Association (APA) format or in another format approved by the subject experts. Each reference should be written in single spacing format and a double space should be left between references. This list of references should not be numbered.

Following steps should follow for preparing research report perfectly:

STEP 1

Analyse the Task

You may find the following questions useful when analysing the task:

- What is the purpose of the report?

(It could be analysing, persuading or reporting on an investigation.)

- Who is the audience for the report?
- What is the word limit?

(Many times the word limit only includes the body of the report.)

- What is the topic of the report?

(The topic may be specified by the supervisor, but other times you will have a choice.)

- What is the expected format of the report?

STEP 2

Develop a Rough Plan

Use the section headings (outlined above) to assist with your rough plan. Write a thesis statement that clarifies the overall purpose of your report. Jot down anything you already know about the topic in the relevant sections.

STEP 3

Do the Research

Steps 1 and 2 will guide your research for this report. You may need to report on other research on a particular topic or do some research of your own. Keep referring to your analysis and rough plan while you are doing your research to ensure that you remain on track. Give yourself plenty of time for this step, as the research phase of your work will usually take the most time of any step in producing your report. Also, ensure you keep correct bibliographic details for all of the material you may later use in your report.

STEP 4

Draft the Body of Your Report

Introduction - The purpose of your report. The thesis statement will be useful here. Background information may include a brief review of the literature already available on the topic so that you are able to ‘place’ your research in the field. Some brief details of your methods and an outline of the structure of the report.

Literature Review - If asked to do a separate literature review, you must carefully structure your findings. It may be useful to do a chronological format where you discuss from the earliest to the latest research, placing your research appropriately in the chronology. Alternately, you could write in a thematic way, outlining the various themes that you discovered in the research regarding the topic. Again, you will need to state where your research fits.

Methodology - Here you clearly outline what methodology you used in your research i.e. what you did and how you did it. It must be clearly written so that it would be easy for another researcher to duplicate your research if they wished to.

- It is usually written in a 'passive' voice (e.g. the participants were asked to fill in the questionnaire attached in Appendix 1) rather than an 'active' voice (e.g. I asked the participants to fill in the questionnaire attached in Appendix 1).
- Clearly reference any material you have used from other sources. Clearly label and number any diagrams, charts, and graphs. Ensure that they are relevant to the research and add substance to the text rather than just duplicating what you have said. You do not include or discuss the results here.

Results - This is where you indicate what you found in your research. You give the results of your research, but do not interpret them.

Discussion - This is where you discuss the relevance of your results and how your findings fit with other research in the area. It will relate back to your literature review and your introductory thesis statement.

Conclusion - This is a summary of the most significant results/findings. You should not include any new material in this section. Sometimes you could indicate some areas where your research has limits or where further research would be useful.

Recommendations - This includes suggestions for what needs to be done as a result of your findings. Recommendations are usually listed in order of priority.

STEP 5

Draft the Supplementary Material

- **References or Bibliography** - This includes all references used in your report or referred to for background information. This must be done using the referencing convention specified by your supervisor.
- **Appendices** - These should add extra information to the report. If you include appendices they must be referred to in the body of the report and must have a clear purpose for being included. Each appendix must be named and numbered.

STEP 6

Draft the Preliminary Material

- **Title of Report** - Make sure this is clear and indicates exactly what you are researching.
- **Table of Contents** - List all sections, sub headings tables/graphs appendices and give page numbers for each.
- **Abstract/Synopsis** - This gives a very brief overview of the report in a condensed form.

STEP 7

Polish Your Report

The final step is checking your report to ensure you have followed all of the guidelines of editing.

Report Printing and Binding Format

Length

The maximum length (excluding footnotes, appendices, tables and prefaces) for a submission for examination:

- Research Report: 20,000 words
- Dissertation: 30,000 words
- Thesis : 100,000 words

Paper and Duplicating

Manuscripts should be printed on high quality A4 paper (201 X 297 mm; 80 gsm). The final manuscript, in hardbound copies, must be typed and duplicated by printing or good quality photocopying. All copies must be clean and neat in order to ensure easy reading.

Printing

- **Printing Quality:** Sections must be typed using Times New Roman, font size 12. For mathematical texts, the use of Equation Editor or Latex is advisable. Script fonts are not permitted. A high quality laser or ink-jet printer should be used for the printing.
- **Line Spacing:** The body of the text should be typed with double spacing. Single-spacing is only permitted in tables, long quotations, footnotes, citation and in the bibliography.
- **Margins:** The text should have the following margins:

Top: 2.0 cm
Right: 2.0 cm
Left: 4.0 cm
Bottom: 2.0 cm

Additional guidelines need to be followed:

- Do not type more than one sentence after the bottom margin. If it is necessary to do so, it should only be for a footnote or the completion of the last sentence of the chapter, topic or sub-topic or information in a figure.
- All tables and figures must be placed within the specified margins.
- The last paragraph of the page should contain at least two sentences. If it does not, the paragraph should begin on the next page.
  - **Page Numbering:** All page numbers should be printed 1.0 cm from the bottom margin and placed at the right hand side without any punctuation.
- Font size 8 recommended for numbers.
- Roman numerals (i, ii, iii etc) should be used in the Preface section. Although the Title Page is the first page of the Preface, no number is printed on it. Numbering begins on the second page with (ii).
- Arabic numerals (1, 2, 3) are used on the pages of the text (starting with the introduction page) and supplementary sections.
  - **Footnotes:** There are differences in the use of footnotes in various disciplines. For example, footnotes are commonly used in the Humanities and Social Sciences but rarely in Science and Technology. Footnotes should use a smaller font than the text (font size 8).

- **Tables:** Tables are printed within the body of the text at the centre of the frame and labelled according to the chapter in which they appear. Thus, for example, tables in Chapter 3 are numbered sequentially: Table 3.1,

Table 3.2.

The label should be placed abovethe table itself and has the following format:
Table 3.1 : Short Title

If the table occupies more than one page, the continued table on the following page should indicate that it is a continuation: for example: 'Table 3.7, continued'. If the table contains a citation, the source of the reference should be placed below the table.

- **Figures:** Figures, like tables are printed within the body of the text at the centre of the frame and labelled according to the chapter in which they appear. Thus, for example, figures in Chapter 3 are numbered sequentially:

Figure 3.1, Figure 3.2.

Figures, unlike text or tables, contain graphs, illustrations or photographs and their labels are placed at the bottomof the figure rather than at the top (using the same format used for tables). If the figure occupies more than one page, the continued figure on the following page should indicate that it is a continuation: for example: 'Figure 3.7, continued'. If the figure contains a citation, the source of the reference should be placed at the bottom, after the label.

Binding

The five (5) preliminary copies of the manuscript to be examined should be soft-bound and the three (3) final copies to be deposited in the University should be hardbound. The title, author, name of the university and year of submission must be printed on the front cover. The spine of the manuscripts should show the title, author, year of submission and type of degree.

The cover for both soft and hard bound copies should be made from rexine and the colour should be navy blue for research report and dark red or maroon for dissertation/ thesis. The letters for the Front Cover should be printed in gold of font size 15, font type Times New Roman and in uppercase letters.

26 Style of Referencing

When writing an assignment your own thoughts and ideas build on those of other writers and researchers. It is essential that you acknowledge those sources of information by:

Acknowledging the source within the text by citing the author's last name and year of publication in parentheses, e.g. (Nayak, 2011)

Giving full details of each item in an **alphabetical reference list** at the end of your assignment.

When you find a source that you wish to use in your assignment, write down all the information you need. If you do not do this, you will need to find the source again in future, as you will be penalised if you submit incomplete references in your assignment.

The main reasons for making reference are:

1. To enable other researchers to follow up the references and find the book or journal article in a library.
2. To demonstrate that you have read widely a range of opinions.
3. To enable to check the accuracy of the information you have given.
4. Good referencing will assist in avoiding accusations of plagiarism.
5. You will lose credibility if you do not acknowledge sources.

What Needs To Be Cited?

Whenever you report something that you have read, you have an ethical and a practical responsibility to cite where you read it. Ethically, you need to give credit to other authors for their words and ideas. Practically, citations identify your sources to the interested reader. Citing sources is essential in research papers, which rely heavily on empirical evidence.

You **must** document, by giving a citation, each and every case where you use someone else's ideas or information, except where it is reasonable to assume that the information or ideas are "common knowledge" in the field in which you are writing.

A citation is a bibliographic reference to a specific source—a book, an article, or other source of information. In-text citation simply means placing citations in the text of the paper, instead of in footnotes. In-text citation documents the use of sources of data and ideas, just as reference (bibliographic) footnotes do, but in-text citations are used instead of such footnotes in anthropology. You do not use reference footnotes or endnotes when you write a paper using the in-text citation format.

The important thing to understand is that *in-text citation replaces reference footnotes*. Here's what in-text citation looks like:

The evidence for this hypothesis is suspect (Burns 1969).

Tonkinson (1978) notes that the Aborigines of the Western Desert...

As you can see, the in-text citation supplies, in parentheses, the name of the author, the year of publicationin which the material cited can be found.

The citation format used in anthropology is less work than the footnote format because you only have to type out the complete bibliographic information for a source once—in the reference list. In a paper using reference footnotes, you have to type that information twice—once in the footnote itself, and then again in the reference list.

Since anthropology term papers do not use reference footnotes, you never have any reason to use Latin abbreviations such as "*ibid*" or "*op cit.*" In the footnote format, you use these expressions when you refer more than once to a single source. But when you use in-text citation, you give the same information every time that you refer to a source: the author's last name, year of publication of the work cited from which the idea or data you use appears.

What is an anthropology term paper? It is a library research paper, written from an anthropological perspective, on a topic approved by your instructor.Mastering this skill early in your academic career can greatly increase your enjoyment of university life.

Rules for Writing Term Papers:

1. A paper should be organized around a clear problem. The problem is formulated in the course of exploratory reading in the anthropological literature.
2. After you have selected a problem and become acquainted with some of the literature on it, make a well thought out and fairly detailed *outline*.
3. A term paper should be conceived of as a whole. It should have thematic unity and an integrated structure.
4. Write with your readers in mind. Be clear and explicit so that they can follow your argument. Be concise and yet complete.
5. The paper should reflect the theme of the course.
6. Revise, Rewrite and Proofread.
7. If you use a computer, save your files often and make multiple backup copies.
8. Make a rule to fit in this space.

What is a referencing "style"?

There are several standard referencing styles, likewise APA (American Psychological Association) style, MLA (Modern Language Association) style, CBE (Council of Biological Editors) style, Harvard system of referencing style,etc.

Anthropologists document the use of other people's work—the sources of ideas or data used in a paper—by placing citations in the text of the paper.

Plagiarism*:*

Plagiarism is bad news. It is morally wrong. Plagiarism is the use of someone's work without acknowledgment, as if it were your own. Plagiarism is cheating. To avoid plagiarism, you have to know how to document your use of other people's work. Documentation is more than a good thing to know—it is your responsibility to know how to document your use of sources, and to make sure that you do so in every paper that you write, whether you use in-text citation for an anthropology paper, or reference footnotes for a literature paper.

How do present referenced material?

There are two ways to refer to the works of other authors:

Paraphrasing allows you to summaries another author's ideas in your own words, whilst still acknowledging the original source. Quotation marks are not needed. A concise well-paraphrased account demonstrates your understanding of what you have read. When paraphrasing or referring to an idea contained in another work, you are encouraged to provide a page or paragraph number, especially when it would help an interested reader locate the relevant passage in a long or complex text.

Direct quotes can be used. However, an assignment cannot be a 'cut and paste' exercise. Quotations should be used sparingly, as the person reading the assignment wants to see your views and analysis of what you have read. When you use a direct quote always give double quotation marks around the quotation.

Example of Paraphrasing

Text from the original article: Little is known about whether and how early childhood living arrangements affect adult children's propensity to take aging parents into their homes. Past research on care giving has focused on the characteristics of current family structure such as sibling composition, the marital status of parent or child, or competing roles (Szinovacz, 1997).

Bad paraphrasing: Not much is known about how living arrangements in childhood affect adult children's willingness to take elderly parents into their homes. Past research on looking after elderly parents has focused on the characteristics of current family structure such as brothers and sisters, the marital status of parent or child, or competing roles (Szinovacz, 1997). = only a few words have been changed, not reflecting any understanding or interpretation of the original.

Good paraphrasing: Research has tended to focus on the effect of current family structure on adult children's willingness to look after their elderly parents – in consequence, little is known about the effects of childhood living arrangements (Szinovacz, 1997). = the content has been rephrased.

Examples of Direct Quotes

You can include direct quotes in the following ways, depending on your sentence structure:

For short quotations-

Discussing data collection, Matthews and Ross (2010) note that "it is a practical activity, one that has to be carried out with time, spatial and resource constraints", and therefore needs careful consideration.

For quotations over 40 words-

If the quotation is 40 words or more (not something that you should expect to do) then do not use quotation marks, but indent the quotation by half an inch on the left margin (in the same position as a new paragraph) and double space the entire quotation. The citation should be included using one of the methods described below (In-Text Citations) with the page number, paragraph number or the full citation as the final element in the block of text, after the final punctuation mark.

For example-

Careful consideration of method is needed with data collection as it ... is a practical activity, one that has to be carried out with time, spatial and resource constraints. It is therefore important to consider how valid social research data can be collected effectively and efficiently within those constraints. The history of social research has included the development of a range of research 'tools' to help social researchers to organise and manage the task of data collection. (Matthews & Ross, 2010)

What is the difference between a reference list and a bibliography?

A reference list is composed of all the sources that you have referred to in the text of your assignment. A bibliography is composed of all those sources you read, but did not refer to in your assignment. Both reference list and bibliography are arranged in alphabetical order of author's last name. A bibliography is not always necessary and will never duplicate anything in the reference list.

A reference list—sometimes known as a reference bibliography, or even just a bibliography—provides the information needed to find any source used in a paper. You must give this bibliographic information for every source you cite in your paper. But you should not include sources that you did not cite in the text of the paper.

A reference list is not a real "bibliography" in the sense of seeking either to cover a subject comprehensively, or to identify sources which share certain special qualities (as in a select bibliography). A reference list is less ambitious; it is an inventory of sources actually used rather than of all sources or selected sources. (Some people refer to reference lists as bibliographies, and others don't. Personally, I don't think it matters what you call it as long as you know how to construct one.)

A reference list gives the necessary bibliographic information in a particular format. The bibliographic format presented here is derived, for the most part, from the journal *American Anthropologist* and from the *International Encyclopedia of the Social Sciences*. The format may be somewhat different in other journals, and still more different in other disciplines.

The reference list follows the text of the paper. It can be headed at the top of the page "References Cited" or "Works Cited."

The entries in the list are organized alphabetically by the last names of the authors. Here is what an entry for a book looks like:

Nayak J. K. 2012. Constructive Community Drinking: A Genome based Socio-Cultural Study on Bondo Highlanders.Germany: Lambert Academic Publishing.

Geertz, Clifford. 1973. The Interpretation of Cultures. New York: Basic Books.

and for a journal article:

Nayak J K and Das P K. 2014.A case study on factors influencing protective health ecology for alcoholism among the hill Bonda tribal group of Odisha.*Man in India;* 94(4): 555-571.

Keesing, Roger .1979. Linguistic Knowledge and Cultural Knowledge: Some Doubts and Speculations. *American Anthropologist* 81:14- 36.

The above examples give the general form for entering sources in a reference list. You should use the same layout and punctuation. Start typing from the regular margin.

Notice what bibliographic information is required:

1. Last name of author, then first name (and middle initial).

[In the natural sciences (that goes for BioAnthro), first names are **not** generally used, just initials. There are about a gazillion nuances and styles; in general, use the style that is used by most of the sources you are citing—i.e., pay attention to your sources and do like they do.]

2. Date of publication.
3. Title.
4. Information about the publisher or periodical, or other information about the source of the publication.
   a) If a book, then the city of publication and name of the publisher.
   b) If an article, then the name of the periodical, volume number, and pages on which the article appears. (Note: if the journal or periodical does not number pages consecutively for the entire year, you also need to give the issue number. See point 7 below.)

The above form will work for most entries. But there are a variety of little details and special problems that you will encounter from time to time. Let's consider these one by one.

1. Book, single author.

Include complete subtitles.

Tonkinson, Robert. 1978 The Mardujara Aborigines: Living the Dream in Australia's Desert. New York: Holt, Rinehart, and Winston.

2. Book or article, more than one author.

Only the name of the first author is reversed

Berger, Peter, and Thomas Luckmann. 1966 The Social Construction of Reality. New York: Doubleday.

Harrison, G.A., J.S.Weiner, J.M.Tanner and N.A. Barnicot. 1977 Human Biology: An Introduction to Human Evolution, Variation, Growth, and Ecology. 2nd ed. Oxford: Oxford University Press.

Remember that it is (usually) acceptable, in a reference such as the one above, to use the principal author's name followed by et al in your in-text citation, but that you must give all of the authors' names in the reference list entry.

3. More than one publication by same author.

In this case, you list the works chronologically (by date of publication). The earliest work is cited first.

Bailey, F.G. 1963 Politics and Social Change. Berkeley: University of California Press.

1969 Stratagems and Spoils: A Social Anthropology of Politics. Oxford: Blackwell.

If more than one work was published in the same year, list them alphabetically and use lower case letters to distinguish them, as in the in-text citation (1963a, 1963b).

4. City and State of Publication.

If a book was published in some little known city or town—Tuba City, Arizona, or Weed, California, for example—then you should note the state, as well as the city, of publication.

Rosenberg, G. and D. Anspach 1973 Working Class Kinship. Lexington, Massachusetts: Lexington Books.

Place of publication is not required for periodicals, except to avoid confusion, as when journals with the same of similar names are published in different places.

5. Editor or compiler.

Use "ed." or "comp."

Hunt, Robert, ed. 1967 Personalities and Cultures: Readings in Psychological Anthropology. Austin: University of Texas Press.

6. Chapter or article in book.

Williams, T.R. 1972 The Socialization Process: A Theoretical Perspective. *In* Primate Socialization. Frank E. Poirer, ed. Pp. 207-260. New York: Random House.

Notice that "in" is underlined (or italicized in print). This is to make sure that no one thinks it is part of the title of the book. Also, note that the name of an editor, when not in the author position, is not inverted.

7. Journal Articles.

If the periodical has continuous pagination, you omit the issue numbers.

Singer, M. 1980 Signs of the Self: An Exploration in Semiotic Anthropology. *American Anthropologist* 82: 485-507.

Nowadays, most scholarly journals do not start off each issue with new pagination; rather, pagination is continuous throughout a volume, so providing an issue number would be superfluous. However, some periodicals start each issue with page one, in which case you must give the issue number in your entry. Whenever you are not sure whether pagination is continuous, provide the issue number, in parentheses, after the volume number.

Washburn, Sherwood L. 1978 The Evolution of Man. *Scientific American* 239(3):194-211.

8. Translator.

If you read Helen Sebba's translation of a book by Roger Bastide, the complete entry would be as follows:

Bastide, Roger 1978 The African Religions of Brazil: Toward a Sociology of the Interpenetration of Civilizations. Helen Sebba, trans. Baltimore: Johns Hopkins University Press. (Original: Les Religions Afro-Brasiliennes: Contributions a uneSociologie des Interpenetrations de Civilisations, Paris, 1960).

All of the above information is not always available, in which case you have to make do with what is available. There are also variations in what is done. For example, sometimes the language of the original is given: “Translated from the Nahuatl by...”.

9. Corporate Author.

Laboratory of Comparative Human Cognition 1978 Cognition as a Residual Category in Anthropology. *Annual Review of Anthropology* 7:51-69.

10. Reprints of Older Works.

You should give the original publication date in brackets, if available, as well as the date of the reprint.

Smith, Arthur H. 1971 [1899] Village Life in China. Boston: Little, Brown.

You probably should cite this in the text by both dates, at least on its first use, so the reader will be aware of the historical context of the source. Your page citation should be to the edition you used.

A Sample Bibliography

Works Cited

Blom, Frans and Oliver LaFarge 1926 Tribes and Temples. New Orleans: Tulane University Press.

Collier, Jane F. 1973 Law and Social Change in Zinacantan. Stanford: Stanford University Press.

1974 Women in Politics.In Women, Culture and Society. M. Rosaldo and L. Lamphere, eds. Pp. 89-96. Stanford: Stanford University Press.

1977 Political Leadership and Legal Change in Zincantan. *Law and Society Review* 11:131-163.

Emerson, Richard 1962 Power-dependence Relations. *American Sociological Review* 27(1):31-40.

Levi-Strauss, Claude 1975 La Voie Des Masgues. 2 vol. Geneva: Editions Albert Skira.

Strickmann, Michel 1974 Taoism, history of. The New Encyclopaedia Britannica. 15th ed. Chicago: Encyclopaedia Britanica. Vol. 17.Pp. 1044- 1050.

APA (American Psychological Association) reference style:

Notes:

- Please “copy” the title of a book/an article/whatever (as far as the spelling of words such as “behavior”/”behavioral” are concerned (and this also goes for direct quotations) exactly as in the original.
- When referring to any work that is NOT a journal, such as a book, article, or Web page, capitalize only the first letter of the first word of a title and subtitle, the first word after a colon or a dash in the title, and proper nouns. Do not capitalize the first letter of the second word in a hyphenated compound word.
- Capitalize all major words in journal titles.
- If within the same paragraph, reference is made to the same author(s) for a second and further time(s), the year of publication is omitted in the second and further references - as long as it does not lead to confusion.

Table 26.1: Examples of APA reference style

Basic in-text referencing	
In-text reference where the author of the source is known	…the result of this is a 'technical super identity' (Erikson, 1967, p. 20). Azar and Martin (1999) found that… (As part of the sentence) …thus Cox (1966, p. 52) refers to the modern urbanite as…(Simply use whatever you used as author in the reference, as well as the year of publication. Only insert the page number when using a direct quote. Do not include suffixes such as *Jr*.)
In-text reference to more than one source	More recent studies (Bartlett, 1992; James, 1998) show that… The researchers (Bartlett, 1992, p. 54; Brown, 1876, p. 45; James, 1998, p. 45) refer to… (In-text reference to more than one author should be ordered alphabetically.)
General forms for reference lists	
Non-periodical	Author, A.A. (1994). *Title of work*. Location: Publisher. (Non-periodicals include items published separately: books, reports, brochures, certain monographs, manuals, and audiovisual media)
Part of a Non-periodical	Author, A.A., & Author, B.B. (1994). Title of chapter. In A. Editor, B. Editor, & C. Editor (Eds.), *Title of book* (pp. xxx-xxxx). Location: Publisher.
Periodical	Author, A.A., Author, B.B., & Author, C.C. (1994). Title of article. *Title of Periodical, xx*, xxx-xxxx. (Periodicals include items published on a regular basis: journals, magazines, scholarly newsletters, etc)
Online periodical	Author, A.A., Author, B.B., & Author, C.C. (2000). Title of article. *Title of Periodical, xx*, xxx-xxxx. Retrieved Month day, year, from web address
Online document	Author, A.A. (2000). *Title of work*. Retrieved Month day, year, from web address
Referencing other sources	
A book with only one author	Rose, L. (1977). *Crime and punishment.* London: Batsford.
A book by two authors	Gordon, E.W., &Rourke, A. (1966*). Compensatory education for the disadvantaged*. New York: College Entrance Examination Board. In order to avoid possible communication problems all procedures should be explained to the patient (Gardner & Sheldon, 1967, p. 40)… Gardner and Sheldon (1967, p. 40) (When quoting a book with two authors in the text, use the word 'and' between the names; if the reference is in parentheses, use '&' examine the problem…)
A book by three or more authors	Meyer, B.S., Anderson, D.P., Bohning, R.H., &Fratanna, D.G., Jr. (1973). *Introduction to plant physiology.* New York: Van Nostrand. In referring to a work by three, four or five authors all the relevant nameshave to be furnished in the first reference to the work, e.g.: …the traditionalist personality (Riesman, Denney & Glazer, 1968, p. 40) restrains him from doing… In later references to this work only the first author's name is stated, and the abbreviation '*et al.*' is used: …due to

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	his "other-directness" modern Western man in a sense is at home everywhere and yet nowhere (Riesman *et al*., 1968, p. 40)… In referring to a work by six or more authors, cite only the surname of the first author followed by *et al.* (italicized and with a full stop after "al"), and the year for the first and subsequent citations. In the reference list, provide the initials and surnames of the first six authors, and shorten any remaining authors to *et al*.
Reference to more than one publication of the same author in the same year	Johnson (1994a, p. 48) discussed the subject… In his later works (Johnson, 1994b, p. 56) he argued… Johnson, P.D. (1994a). *Pedagogy*. London: Routledge.Johnson, P.D. (1994b). *Advanced Pedagogy*. London: Routledge.
Different authors with the same surname	According to B. Smith (1989) and F. Smith (1997), … (When you refer to publications by different authors with the same surname, use their initials in the reference.)
A book with an institution, organisation or association as author	You can also use the name of the body as part of the sentence. …it had long been evident that the intellectual potential of the Afrikaners on the Witwatersrand was underutilised (Rand Afrikaans University, 1976, p. 48)… …thus the Rand Afrikaans University (1963, p. 30) concluded that… Rand Afrikaans University (1970). *The new university: A practical guideline*. Johannesburg, Gauteng: Rand Afrikaans University.(Where reference is made to the work by a body (institution, organisation, association, etc.) where no specific author is responsible for the work, the official name of the body is used as author. When the author and publisher are identical, use the word Author as the name of the publisher.)
A book with (an) editor(s)	Driver, E., &Broisen, A. (Eds.). (1989). *Child sexual abuse*. Basingstoke, UK: Macmillan Education Ltd. Strunk, W. (Ed.). (1976). *Adult learning*. New York: Macmillan.
A chapter in a book (not edited)	Capra, F. (1983). The systems view of life. In *The turning point: science, society and the rising culture* (pp. 376-399). London: Fontana Press
Part/chapter of an edited book	Hartley, J.T., Harker, J.O., & Walsh, D.A. (1980). Contemporary issues and new directions in adult development of learning and memory. In L.W. Poon (Ed.), *Aging in the 1980's: Psychological issues*, (pp. 239-252). Washington: American Psychological Association. Shirom, A. (1989). Burnout in work organizations. In C.L. Cooper & I.T. Robertson (Eds.), *International review of Industrial and Organizational Psychology,* Vol. IV (pp. 25-49). New York: Wiley.
Anonymous work	When a work's author is designated as "Anonymous", cite in text the word 'Anonymous'*:* A recent article (Anonymous, 1993) stated that… In the case of articles in newspapers or magazines where no author is named, the title is used instead of the author. A recent article (War over, 1991) stated that… Anonymous. (1993, 17 February). Best practices. *The Star*, p. 10. War over. (1991, 7 January). *The Star*, p. 1.

Contd.

A work with a foreign title	Spyridakis, A. (1987). *E historia tis Helladas*[A history of Greece]. Athens: Theriosita Iona.
Translated works	Luria, A.R. (1968). *The mind of a mnemonist: A little book about a vast memory*. (L. Solotaroff, Trans.). New York: Basic Books. (Original work published 1967) In text, cite the original publication date and the date of the translation: A recent study (Luria, 1967/1968)
Second, further or revised editions	Dyson, G.G.H. (1977). *The mechanics of athletics*. (7th edn.). New York: Homes and Meier. Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (Rev. edn.). New York: Academic Press.
Date of publication unknown	Wolverton, H.(n.d.). *The geological structure of the Black Hills*. Wilmington: Prairie Press.
Dictionaries	*The concise Macquarie dictionary*. (1982). New South Wales: Lane Cove. Nguyen, D.H. (1966). *Vietnamese-English dictionary.* Rutland Vermont: Charles Tuttle Company. Sadie, S. (Ed.). (1980). *The new Grove dictionary of music and musicians* (6th edn, Vols. 1-20). London: MacMillan.
Encyclopaedia	Bergmann, P. G. (1993). Relativity. In *The new Encyclopaedia Brittanica*(Vol. 26, pp. 501-508). Chicago: Encyclopaedia Brittanica. If an entry has no byline, place the title in the author position.
Personal communication	Personal communications may be letters, memos, some electronic communication (e.g., e-mail or messages from non-archived discussion groups or electronic bulletin boards), personal interviews, telephone conversations, and the like. Because they do not provide recoverable data, personal communications are not included in the reference list. Cite personal communications in text only. Give the initials as well as the surname of the communicator, and provide as exact a date as possible: According to T.K. Lutes (personal communication, April 18, 2001)…
Unpublished manuscript submitted for publication	Jordan, B. (1989). *Psychology of adolescent parents*. Manuscript submitted for publication.
Unpublished manuscript not submitted for publication	Ryder, M. (1987). *Wonder woman: An Amazon legacy*. Unpublished manuscript.
Newspaper article	Lamb, J. (1970, 20 October). The perfect plants for lazy gardeners. *Weekend Australian*, p. 3.
Periodical article	If a journal or newsletter does not use volume numbers, include the month, season, or other designation with the year, for example (1994, April) Phillips, E. (1985). The Australian scene. *Australian Journal of Ecology*, *3*(2), 25-29. Only indicate the issue number after the volume number if each issue begins on page 1.
Journal article in press	Phillips, E. (in press). The Australian scene. *Australian Journal of Ecology.* In text: Phillips (in press) or (Phillips, in press)
Abstract	Phillips, E. (1985). The Australian scene [Abstract]. *Australian Journal ofEcology*, *3*(2), 25-29.

Contd.

Non-English journal article	Give the original title, as well as an English translation in brackets. Ising, M. (2000). Intensitätsabhängigkeitevozierter Potenzialim EEG: Sind impulsive Personen Augmenter oder Reducer? [Intensity dependence in eventrelated EEG potentials: Are impulsive individuals augmenters or reducers?]. *ZeitschriftfürDifferentielle und DiagnostischePsychologie, 21,* 208-217.
Published dissertation or thesis	Bevins, G.D. (1987). *Theory and practice at an Australian university*. Doctoral dissertation. Montreal: McGill University.
Unpublished dissertation or thesis	Little, P. (1965). *Helplessness, depression and mood in end stage renal disease*. Unpublished master's thesis, Wits University, Johannesburg, South Africa. Or: Unpublished doctoral dissertation…
Dissertation abstract	Ross. D.F. (1990). Unconscious transference and mistaken identity: When a witness misidentifies a familiar but innocent person from a lineup (Doctoral dissertation, Cornell University, 1990). *Dissertation Abstracts International, 51*, 417.
Government publications	When referring to a government publication, the date is sufficient for in text referencing, e.g.: According to The Bill of Rights (1996)… Education is in the process of transformation (Department of Education, 1995)… Provide all numbers, sections, chapters or volume numbers that is available, in brackets. The Bill of Rights of the Constitution of the Republic of South African. (1996). *Government Gazette*. (No. 17678). Department of Education. (1995). White Paper on Education. G*overnment Gazette*. (Vol. 375, No. 45621). Commission on Civil Rights. (1967). *Racial isolation in the public schools*. Washington: United States Government Printing Office. Republic of South Africa. (1997). Basic Conditions of Employment Act, No. 75 of 1997. Pretoria: Government Printers.
Unpublished raw data, untitled	Use brackets to indicate that the material is a description of the content, not a title. Bordi, F., &LeDoux, J.E. (1993). [Auditory response latencies in rat auditory cortex]. Unpublished raw data.
Booklet, pamphlet or leaflet	South African College of Advanced Education. (1976). *Referencing: the footnote and Harvard system* [Brochure]. Johannesburg: Wits Technikon. Research and Training Center in Independent Living. (1993*). Guidelines for reporting and writing about people with disabilities* (4th edn.). [Brochure]. Lawrence, K.S.: Author.
Study guide	Speedy, C. (1999). *Study Guide: Electrical Engineering 1*. America: South American College of Engineering.
Conference proceedings, no author or title	International Microcomputer Conference. (1984). *Conference proceedings held at the Western Australian Institute of Technology, Perth, 22 – 24 May 1984*. Perth: Western Australian Institute of technology.

Contd.

Conference proceedings, with author	Field, G. (2001). Rethinking reference rethought. In *Revelling in Reference: Reference and Information Services Section Symposium, 12-14 October 2001* (pp. 59-64). Melbourne, Victoria, Australia: Australian Library and Information Association
Unpublished paper presented at a meeting	Lanktree, C., &Briere, J. (1991, January). *Early data on the Trauma Symptom Checklist for Children (TSC-C).* Paper presented at the meeting of the American Professional Society on the Abuse of Children, San Diego, CA.
Publication of limited circulation	For a publication of limited circulation, given in parentheses immediately after the title a name and address from which the publication can be obtained: Klombers, N. (Ed.). (1993, Spring). *ADAA Reporter*. (Available from the Anxiety Disorders Association of America, 6000 Executive Boulevard, Suite 513, Rockville, MD20852)
Review	Schatz, B.R. (2000). Learning by text or context? [Review of the book *The social life of information*]. *Science, 290*, 1304. Kraus, S.J. (1992). Visions of psychology: A videotext of classic studies [Review of the motion picture *Discovering Psychology*]. *Contemporary Psychology*, *37*, 1146-1147.
Electronic sources	
In-text reference where the author of the electronic source is known	Simply use whatever you used as author in the reference, as well as the year of publication: The project website was created using *Aldus Pagemaker version 3* (1987-1988)… Several films (e.g., Bertolucci, 1988) have used this technique… Azar and Martin (1999) found that…
In-text reference to a web site	To cite an entire Web site (but not a specific document on the site), simply give the site's URL in the text: Rainbow MOO is a virtual space designed especially for teachers and their elementary-school students (http://it.uwp.edu/rainbow). When a specific part of an electronic source has to be quoted and no page number can be found, use the paragraph number if available, preceded by the ¶ symbol or the abbreviation para. If these are absent, cite the heading and the number of the paragraph following it: Jones, 2000: ¶5,Jones, 2000: Conclusion, para.7)
Internet site with author	Holmes, A. (1998). *Greenpeace wins media war.* Retrieved November 25, 1998, from http://www.independent.co.uk/international/green25.htm
Internet document without author	GVU's 8th WWW user survey. (n.d.). Retrieved August 8, 2000, from http://www.cc.gatech.edu/gvu/user_surveys/survey-1997-10/
Article From an Online Periodical with	DOI Assigned Author, A.A., & Author, B.B. (Date of publication). Title of article. *Title of Journal, volume number*(issue number*).* doi:0000000/000000000000
Personal electronic communication (e-mail)	Because personal e-mail do not provide recoverable data, they (like other personal communications) are not included in the reference list. Cite personal communications in text only. Give the initials as well as the surname of the

Contd.

	communicator, and provide as exact a date as possible: According to T. K. Lutes (personal communication, April 18, 2001)…
Article in an Internet-only journal	Fredrickson, B.L. (2000, March 7). Cultivating positive emotions to optimize health and well-being. Prevention & Treatment, 3, Article 0001a. Retrieved November 20, 2000, from http://journals.apa.org/prevention/volume3/pre0030001a.html
Electronic copy of a journal article retrieved from database	Borman, W.C. (1993). Role of early supervisory experience in supervisor performance. *Journal of Applied Psychology, 78*, 443-449. Retrieved October 23, 2000, from Psyc ARTICLES database.
Internet articles based on a print source	VandenBos, G., Knapp, S., & Doe, J. (2001). Role of reference elements in the selection of resources by psychology undergraduates [Electronic version]. *Journal of Bibliographic Research, 5*, 117-123. If you have reason to believe that the article might be subject to change, you should add the date you retrieved the document, and the URL
Newsgroups, online forums, electronic mailing lists	**FORMAT**: Author. (Year, Day Month). Subject of message. Message posted to Name mailing list, archived at URL Brack, Ernie (1995, 2 May). Re: Computing short courses. Message posted to LisLink mailing list, archived at http://archive.lislink.com Jensen, L.R. (1995, 12 December). Recommendation of student radio/tv in English. Message posted to IASTAR mailing list, archived at http://nrg.dtu.dk Brett, P. (1999, June 6). Experiments proving the collective unconscious [Msg 1]. Message posted to news://alt.psychology.jung If you cannot determine the author's name or screen name, then use theauthor's email address as the main entry. When deciding where in your Reference List to insert such a source, treat the first letter of the email address as though it were capitalized. lrm583@aol.com (1996, May 26). Thinking of adoption. Message posted to news://alt.adoption If the message is not retrievable from an archive, it should not be included in the reference list. It can be cited as a personal communication.
Paper presented at a virtual conference	Tan, G., &Lewandowsky, S. (1996). *A comparison of operator trust in humans versus machines*. Paper presented at the CybErg 96 virtual conference. Retrieved May 16, 2000, from http://www.curtin.edu.au/conference/cyberg/centre/outline.cgi/frame?dir=tan
Abstract	Isaac. J.D., Sansone, C., & Smith, J.L. (1999, May). Other people as a source of interest in an activity. *Journal of Experimental Social Psychology, 35,* 239-265. Abstract retrieved June 7, 1999, from IDEAL database: http://www.europe.idealibrary.com

Contd.

Article in an electronic magazine	Adler, J. (1999, May 17). Ghost of Everest. *Newsweek.* Retrieved May 19, 1999.
Newspaper article	Azar, B., & Martin, S. (1999, October). APA's Council of Representatives endorses new standards for testing, highschool psychology. *APA Monitor.* Retrieved October 7, 1999, from http://www.apa.org/monitor/oct99/in1.html
Review	Parfit, M. (1997, December 7). Breathless [Review of the book *The climb: Tragic ambitions on Everest]. New York Times on the Web.* Retrieved October 7, 1999, from http://search.nytimes.com/books/97/12/07/reviews/971207.07parfitt.
Letter to the editor	Gray, J. (1999, May 7). Pesticides linger in land and air—and in our bodies [Letter to the editor]. *Lexington Herald-Leader.* Retrieved October 7, 1999, from http://www.kentuckyconnect.com/heraldleader/news/050799/lettersdocs/507letters.htm
Government publication	Bush, G. (1989, April 12). Principles of ethical conduct for government officers and employees Exec. Order No. 12674. Pt. 1. Retrieved November 18, 1997, from http://www.usoge.gov/exorders/eo12674.html
CD-ROM	Hawking, S. (1994). *A brief history of time: An interactive adventure* [CD]. Sacramento: Crunch Pod Media.
Sound recording	Williamson, C. (1985). Prairie fire. On *Arkansas traveler*[CD]. Oakland, California: Olivia Records. *Rock 'n roll classics*. (1986). [Cassette] San Diego, California: Uptown Sound.
Motion picture/film	*Transactional analysis* [Motion picture]. (1974). Los Angeles: Research Films. Bertolucci, B. (Producer). (1988). *The last emperor* [Motion picture]. Los Angeles: Columbia Pictures.
Television broadcast	Crystal, L. (Executive Producer). (1993, October 11). *The MacNeil/Lehrer news hour* [Television broadcast]. New York and Washington, DC: Public Broadcasting Service.
Video recording	*Babakuieria*. (1986). [Video recording]. Sydney: ABC Drama Department. Sutton, P. (Producer). (1986). *Kay Cottee: First Lady* [Video Recording]. New South Wales: Direct Video Pty Ltd. Cochrane, C., (Executive Producer) & Graham S., (Director). (1988). *The Superkids' fitness video* [Video Recording]. Perth: Dynami Australia.
Microfiche	Illinois State Office of the Superintendent of Public Instruction (1971). *Toys for early development of the young blind child: a guide for parents*. (ERIC Document Reproduction Service No. ED 065 201)
Computer program	*Aldus Pagemaker version 3.0* [Computer software] (1987-1988). Seattle,Washington: Aldus Corporation. Schwarzer, R. (1989). Statistics software for meta-analysis [Computer software and manual]. Retrieved from http://www.yorku.ca/faculty/academic/schwarze/meta_e.htm

Commonly used abbreviations

Appendix - app.	Chapter - ch.
Column - col.	Volume - vol.
Columns - cols.	Volumes - vols.
Editor - ed.	Written - writ.
Editors - eds.	**Rule:** a capital letter for the abbreviation for editor or editors
Edition – edn.	i.e. Ed. or Eds. Use lower case for edition i.e. 2nd edn.
Editions - edns.	
Number - no.	**Latin abbreviations**
Numbers - nos.	And others - *et al.* (etalii)
No date - n.d.	Used where there are too many authors to list
No publisher, no page - n.p.	In the same work - *ibid.* (ibidem)
Page - p.	Signifies the same work as the one cited immediately before, but a different page
Pages - pp.	The same - *id.*(idem)
Paragraph - para.	The item cited is by the author of the item cited immediately before
Revised - rev.	In the work cited - *op. cit.* (opere citato)
Reprinted - rpt.	Refers the reader back to the author's previously cited work,
Supplement - Suppl.	but to a different page
Technical Report - Tech. Rep.	Without place - *s.l.* (sine loco)
Translated, translator - trans.	

MLA (Modern Language Association) referencing style:

Table 26.2: Examples of MLA reference style

Print Resources	Works Cited List
book by a single author	Castle, Gregory. *Modernism and the Celtic Revival*. New York: Cambridge UP, 2001. Print.Note: "Print" indicates the medium of publications consulted
book by two or more authors	Kelley, Robert E., and O. M. Brack. *Samuel Johnson's Early Biographers*. Iowa City: U of Iowa P, 1971. Print.Note: Give the names in the same order as on the title page, not necessarily in alphabetical order.For more than three authors, you may name the first author and add "et al." or give all names in full.
work in an anthology	Allende, Isabel. "Toad's Mouth." Trans. Margaret Sayers Peden. *A Hammock beneath the Mangoes: Stories from Latin America*. Ed.Thomas Colchie. New York: Plume, 1992. 83-88. Print.Note: This example also shows how to indicate the translator of a work.
article in a scholarly journal	Vickeroy, Laurie. "The Politics of Abuse: The Traumatized Child in Toni Morrison and Marguerite Duras." *Masaic*29.2 (1996): 91-109. Print.
article in a monthly magazine	Giovannini, Joseph. "Fred and Ginger Dance in Prague." *Architecture* Feb. 1997: 52-62. Print.
article in a newspaper	Alaton, Salem. "So, Did They Live Happily Ever After?" *Globe and Mail* [Toronto] 27 Dec. 1993: D1+. Print.

Contd.

Print Resources	Works Cited List
article in a reference	work Le Patourel, John. "Normans and Normandy." *Dictionary of the Middle Ages*. Ed. Joseph R. Strayer. 13 vols. New York: Scribner's, 1987. Print.
anonymous article or book	*Encyclopedia of Virginia*. New York: Somerset, 1993. Print."The Decade of the Spy." Newsweek 7 Mar. 1994: 26-27. Print.Note: When a work is anonymous, alphabetize the entry by title (ignoring any initial A, An, or The).
Electronic Resources	Works Cited List
website	"Royal Shakespeare Company." *Encyclopedia Britannica Online*. Encyclopedia Britannica, 2009. Web. 21 July 2009.Note: No URL is required here, although it is necessary to indicate the electronic medium ("Web.")
journal article from library database	Collett, Anne. "Reading Kate Llewellyn's Garden." *Australian Literary Studies* 22.4 (2006): 482-504. *Expanded Academic ASAP.* Web.16 Mar. 2007.
journal article from web, with print publication data	Reynolds, Robert. "The Demise of Sadness: Melancholia, Depression and Narcissism in Late Modernity." *Australian HumanitiesReview* 41 (2007): n.pag. *Australian Humanities Review*. Web. 15 Mar. 2009.Note: "n.pag." indicates that page numbers are inapplicable or unavailable.
e-book	Nesbit, Edith. *Ballads and Lyrics of Socialism.* London: The Fabian Society, 1908. *Victorian Women Writers Project*. Ed. Perry Willett.Indiana U, May 2000. Web. U. 24 July 2009Norman, Richard. *The Moral Philosophers*. New York: Oxford UP, 1998. *NetLibrary*. Web 23 July 2009.
scholarly project	Willett, Perry, ed. *Victorian Women Writers Project*. Indiana U. Apr. 2003. Web. 14 July 2009.
poem	Nesbit, Edith. "Marching Song." *Ballads and Lyrics of Socialism,* London: The Fabian Society, 1908. *Victorian Women Writers Project*. Ed. Perry Willett. Indiana U, May 2000. Web. 14 July 2009.

Citing a Web Source with No Page Numbers

If you have the option of viewing a PDF version of an article or book chapter, do it—these have the same pagination as the print version and you can cite it exactly like an article in print format.

Web documents generally do not have fixed page numbers or any kind of section numbering. If your source lacks numbering, you cannot cite page numbers or use numbers associated with your printout.

If your source includes fixed page numbers or section numbering (such as numbering of paragraphs), cite the relevant numbers. For example—paragraph numbers: Moulthrop, pars. 19-20. (Pars. is the abbreviation for paragraphs.)

27 Research Ethics

Most research involving human beings is directed towards advancing human welfare, knowledge and understanding, and/or towards the study of social or cultural dynamics. Such work is undertaken for many reasons, for example: to alleviate human suffering, to validate social or scientific theories, to dispel ignorance, to analyse or evaluate policy, and to understand human behaviour and the evolving human condition.

Researchers working in academia enjoy a number of important freedoms and privileges – the principle of academic freedom (UNESCO, 1997) - which are essential to maintain the independence of the higher education research community. These freedoms include freedom of inquiry and the right to disseminate their findings, freedom to challenge conventional thought and the opportunity to conduct research on human participants with public assessments, trust and support.

However, researchers and institutions must also recognise that such freedom carries with it significant responsibilities, including the need to ensure that research involving human participants meets high scientific and ethical standards. It also implies duties of honesty, integrity, objectivity, accountability and openness alongside thoughtful inquiry, rigorous analysis, and the application of professional standards.

Researchers have a clear responsibility to ensure that they recognise and protect the rights and general well-being of their participants, regardless of the nature of their research. Codes of practice in research provide guidelines that reinforce the basic principles of both human rights and ethics; many aspects are legally enforceable.

Research ethics provides guidelines for the responsible conduct of research. In addition, research ethics educates and monitors scientists conducting research to ensure a high ethical standard.

The birth of modern research ethics began with a desire to protect human subjects involved in research projects. The first attempt to craft regulations began during the Doctors Trial of 1946-1947. The Doctors Trial was a segment of the Nuremberg Trials for Nazi war criminals. In the Doctors Trial, 23 German Nazi physicians were accused of conducting abhorrent and torturous "experiments" with concentration camp inmates. The accused physicians tortured brutalized, crippled, and murdered thousands of victims in the name of research. Some of their experiments involved gathering scientific information about the limits of the human body by exposing victims to extreme temperatures and altitudes.

To prosecute the accused Nazi doctors for the atrocities they committed, a list of ethical guidelines for the conduct of research – the *Nuremberg Code*– were developed.

The Nuremberg Code consisted of ten basic ethical principles that the accused violated.

The 10 guidelines were as follows:

1. Research participants must voluntarily consent to research participation
2. Research aims should contribute to the good of society
3. Research must be based on sound theory and prior animal testing
4. Research must avoid unnecessary physical and mental suffering
5. No research projects can go forward where serious injury and/or death are potential outcomes
6. The degree of risk taken with research participants cannot exceed anticipated benefits of results
7. Proper environment and protection for participants is necessary
8. Experiments can be conducted only by scientifically qualified persons
9. Human subjects must be allowed to discontinue their participation at any time
10. Scientists must be prepared to terminate the experiment if there is cause to believe that continuation will be harmful or result in injury or death

The Nuremberg Guidelines paved the way for the next major initiative designed to promote responsible research with human subjects, the *Helsinki Declaration*. The Helsinki Declaration was developed by the World Medical Association and has been revised and updated periodically since 1964, with the last update occurring in 2000. The document lays out basic ethical principles for conducting biomedical research and specifies guidelines for research conducted either by a physician, in conjunction with medical care, or within a clinical setting.

The unique principles developed within the Helsinki Declaration include:

1. The necessity of using an independent investigator to review potential research projects
2. Employing a medically qualified person to supervise the research and assume responsibility for the health and welfare of human subjects
3. The importance of preserving the accuracy of research results
4. Suggestions on how to obtain informed consent from research participants
5. Rules concerning research with children and mentally incompetent persons
6. Evaluating and using experimental treatments on patients
7. The importance of determining which medical situations and conditions are appropriate and safe for research

Following the Helsinki Declaration, the next set of research ethics guidelines came out in the *Belmont Report*of 1979 from the National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research. The report outlines:

1. The ethical principles for research with human subjects
2. Boundaries between medical practice and research
3. The concepts of respect for persons, beneficence, and justice
4. Applications of these principles in informed consent (respect for persons), assessing risks and benefits (beneficence), and subject selection (justice)

Why study research ethics?

Knowing what constitutes ethical research is important for all people who conduct research projects or use and apply the results from research findings. All researchers should be familiar with the basic ethical principles and have up-to-date knowledge about policies and procedures designed to ensure the safety of research subjects and to prevent sloppy or irresponsible research, because ignorance of policies designed to protect research subjects is not considered a viable excuse for ethically questionable projects. Therefore, the duty lies with the researcher to seek out and fully understand the policies and theories designed to guarantee upstanding research practices. Research is a public trust that must be ethically conducted, trustworthy, and socially responsible if the results are to be valuable. All parts of a research project – from the project design to submission of the results for peer review – have to be upstanding in order to be considered ethical. When even one part of a research project is questionable or conducted unethically, the integrity of the entire project is called into question.

Any researcher might want to ask the following questions:

- Is it ethical to go undercover to study this organization?
- What does the researcher do when he or she confronts information or situations where individuals are observed engaging in major violations of the law?
- Is the researcher ethically obligated to report such activity?
- What about the risks the researcher is taking in terms of his or her own life in doing so?

The centrality of ethics in the research process:

Ethical discussions usually remain detached or marginalized from discussions of research projects. In fact, some researchers consider this aspect of research an afterthought. Yet, the *moral integrity* of the researcher is a critically important aspect of insuring that the research process and a researcher's findings are "trustworthy" and valid. The term *ethics* derives from the Greek word *ethos* which means *character*. To engage with the ethical dimension of your research requires asking yourself several important questions:

- What moral principles guide your research?
- How do ethical issues enter into your selection of a research problem?
- How do ethical issues affect how you conduct your research—the design of your study, your sampling procedure, etc.?
- What responsibility do you have toward your research subjects? For example, do you have their informed consent to participate in your project? What ethical issues/dilemmas might come into play in deciding what research findings you publish? Will your research directly benefit those who participated in the study?

Why does research with human participants require ethical approval?

Ethical approval for research with human participants is needed for the following reasons:

- To protect the rights and welfare of participants and minimise the risk of physical and mental discomfort, harm and/or danger from research procedures

- To protect the rights of the researcher to carry out any legitimate investigation as well as the reputation of the institution for research conducted and/or sponsored by it
- To minimise the likelihood of claims of negligence against individual researchers, the institution and any collaborating persons or organisations
- Because Research Funding bodies and refereed journals increasingly require a statement of ethical practices in applications for research funds and/or as a condition for publication

Social policy research has four features:

1. it tends to address both academic and policy/practice questions;
2. it engages with users of welfare services;
3. it works with a range of disciplines and research methodologies;
4. it has a responsibility to disseminate results to a range of audiences, both academic and policy/practice.

These Guidelines follow the Social Research Association's ethical guidelines in identifying four distinct but overlapping constituencies towards whom social policy researchers have ethical responsibilities:

1. society in general;
2. research participants;
3. research sponsors and funders;
4. colleagues and the profession.

Code of conduct and ethical guidelines developed by UNESCO for social science research:

Researchers should be fully aware of the ethical issues involved in their work and adhere to the following basic principles:

1. Responsibility for all procedures and ethical issues related to the project rests with the principal investigators.
2. Research should be conducted in such a way that the integrity of the research enterprise is maintained, and negative after-effects which might diminish the potential for future research should be avoided.
3. The choice of research issues should be based on the best scientific judgement and on an assessment of the potential benefit to the participants and society in relation to the risk to be borne by the participants. Studies should relate to an important intellectual issue.
4. The researcher should consider the effects of his/her work, including the consequences or misuse, both for the individuals and groups, among whom they do their fieldwork, and for their colleagues and for the wider society.
5. The researcher should be aware of any potential harmful effects; in such circumstances, the chosen method should be used only if no alternative methods can be found after consultation with colleagues and other experts. Full justification for the method chosen should be given.
6. The research should be conducted in a competent fashion, as an objective scientific project and without bias. All research personnel should be qualified to use all of the procedures employed by them.

7. The research should be carried out in full compliance with, and awareness of, local customs, standards, laws and regulations.
8. All researchers should be familiar with, and respect, the host culture. Researchers undertaking research on cultures, countries and ethnic groups other than their own should make their research objectives particularly clear and remain aware of the concerns and welfare of the individuals or communities to be studied.
9. The principal investigators' own ethical principles should be made clear to all those involved in the research to allow informed collaboration with other researchers. Potential conflicts should be resolved before the research begins.
10. The research should avoid undue intrusion into the lives of the individuals or communities they study. The welfare of the informants should have the highest priority; their dignity, privacy and interests should be protected at all times.
11. Freely given informed consent should be obtained from all human subjects. Potential participants should be informed, in a manner and in language they can understand, of the context, purpose, nature, methods, procedures, and sponsors of the research. Research teams should be identified and contactable during and after the research activity.
12. There should be no coercion. Participants should be fully informed of their right to refuse, and to withdraw at any time during the research.
13. Potential participants should be protected against any and all potentially harmful effects and should be informed of any potential consequences of their participation.
14. Full confidentiality of all information and the anonymity of participants should be maintained. Participants should be informed of any potential limitations to the confidentiality of any information supplied. Procedures should be put in place to protect the confidentiality of information and the anonymity of the participants in all research materials.
15. Participants should be offered access to research results, presented in a manner and language they can understand.
16. All research should be reported widely, with objectivity and integrity.
17. Researchers should provide adequate information in all publications and to colleagues to permit their methods and findings to be properly assessed. Limits of reliability and applicability should be made clear.
18. Researchers are responsible for properly acknowledging the unpublished as well as published work of other scholars.
19. All research materials should be preserved in a manner that respects the agreements made with participants.

(Guchteneire, Paul de. Code of conduct social science research UNESCO)

Anthropologists carry out their professional research in many places around the world; some where they are 'at home' and others where they are in some way 'foreign'. Anthropologists as professionals and as citizens, they need to consider the effects of their involvement with, and consequences of their work for; the individuals and groups among whom they do their fieldwork (their research participants); their colleagues and the discipline, and collaborating researchers; sponsors, funders, employers and gatekeepers; their own and host governments; and other interest groups and the wider

Table 27.1: Some Potential Ethical Decision-Making Issues and Dilemmas Confronting Student Researchers

Ethical Issues Student Researchers Confront	Student Strategy for Empowering Ethical Decision Making	Ethical Issues Faculty Supervisors Confront	Faculty Strategy for Empowering Ethical Student Decision Making
Students begin a research project as a means of exploring or solving topics they are personally concerned about or involved in; use of research as a "therapeutic action" could influence the outcome of the research, as well as the involvement of the students and research participants.	Students might first attempt a small pilot study to judge how they will react to a larger research project.	Faculty advisers need to gauge the students' level of engagement or attachment to the topics and locate possible problem issues.	Faculty advisers should have an extended conversation with students prior to the beginning of the research project and check up with them throughout the project's duration. Faculty advisers shouldbe able to advisestudents if the projectdoes not appear to be working.
Students approach sample collection and interviewing without a good background of safety precautions in research.	Students must remain aware of personal safety in research (i.e., be careful about what research subjects they choose and where they are interviewed).	Faculty advisers need to provide students with an overview of safety practices.	Faculty advisers and students should discuss safety in supervisory meetings. Faculty advisers should encourage students to check in before and after they go out on an interview assignment.
Students seek to use family and friends for research purposes and run into issues of confidentiality.	Students should consider whether they will be able to honour ethical rules governing confidentiality. Students should gauge their own level of ability to conduct private research.	Faculty advisers need to inform students of confidentiality and privacy guidelines.	Faculty advisers and students need to have a meeting about ethical guidelines. Faculty advisers should advise students if they think the students will be unable to follow through with these ethical guidelines.

society in the countries in which they work. Anthropologists, like other social researchers, are faced increasingly with competing duties, obligations and conflicts of interest, with the need to make implicit or explicit choices between values and between the interests of different individuals and groups. Ethical and legal dilemmas occur at all stages of research - in the selection of topic, area or population, choice of sponsor and source of funding, in negotiating access, making 'research bargains' and during the research itself conducting fieldwork, in the interpretation and analysis of results and in the publication of findings and the disposal of data. Anthropologists have a responsibility to anticipate problems and insofar as is possible to resolve them without harming the research participants or the scholarly community. They should do their utmost to ensure that they leave a research field in a state which permits future access by other researchers. As members of a discipline committed to the pursuit of knowledge and the public disclosure of findings, they should strive to maintain integrity in the conduct of anthropological research.

The following set of ethical guidelines to which individual anthropologists should subscribe:

1. *Relations With and Responsibilities Towards Research Participants*

The close and often lengthy association of anthropologists with the people among whom they carry out research entails personal and moral relationships, trust and reciprocity between the researcher and research participants; it also entails recognition of power differentials between them.

i. **Protecting research participants and honouring trust:** Anthropologists should endeavour to protect the physical, social and psychological well-being of those whom they study and to respect their rights, interests, sensitivities and privacy.

ii. **Anticipating harms:** Anthropologists should be sensitive to the possible consequences of their work and should endeavour to guard against predictably harmful effects. Consent from subjects does not absolve anthropologists from their obligation to protect research participants as far as possible against the potentially harmful effects of research.

iii. **Avoiding undue intrusion:** Anthropologists should be aware of the intrusive potential of some of their enquiries and methods.

iv. **Negotiating informed consent:** Following the precedent set by the Nuremberg Trials and the constitutional laws of many countries, inquiries involving human subjects should be based on the freely given informed consent of subjects. The principle of informed consent expresses the belief in the need for truthful and respectful exchanges between social researchers and the people whom they study.

v. **Rights to confidentiality and anonymity:** informants and other research participants should have the right to remain anonymous and to have their rights to privacy and confidentiality respected.

vi. **Fair return for assistance:** There should be no economic exploitation of individual informants, translators and research participants; fair return should be made for their help and services.

vii. **Participants' intellectual property rights:** It should be recognised that research participants have contractual and/or legal, interests and rights in data, recordings and publications, although rights will vary according to agreements and legal jurisdiction.

viii. **Participants' involvement in research:** As far as is possible anthropologists should try and involve the people being studied in the planning and execution of research projects, and they should recognise that their obligations to the participants or the host community may not end with the completion of their fieldwork or research project.

2. *Relations With and Responsibilities towards Sponsors, Funders and Employers*

Anthropologists should attempt to ensure that sponsors, funders and employers appreciate the obligations that they have not only to them, but also to research participants, and to professional colleagues.

i. **Clarifying roles, rights and obligations:** Anthropologists should clarify in advance the respective roles, rights and obligations of sponsor, funder, employer and researcher. They should be careful not to promise or imply acceptance of conditions which would be contrary to professional ethics or competing commitments. Where conflicts seem likely, they should refer sponsors or other interested parties to the relevant portions of the professional guidelines. Anthropologists who work in non-academic settings should be particularly aware of likely constraints on research and publication and of the potentiality for conflict between the aims of the employer, funder or sponsor and the interests of the people studied.

ii. **Obligations to sponsors, funders and employers:** Anthropologists should recognise their general and specific obligations to sponsors, funders and employers whether these are contractually defined or are only the subject of informal, and often unwritten, agreements.

iii. **Negotiating 'research space':** Anthropologists should be careful to clarify, preferably in advance of signing contracts or starting their research, matters relating to their professional domain and to control over the research project and its products.

3. *Relations With, and Responsibilities Towards, Colleagues and the Discipline*

Anthropologists derive their status and certain privileges of access to research participants and to data not only by virtue of their personal standing but also by virtue of their professional citizenship. In acknowledging membership of a wider anthropological community anthropologists owe various obligations to that community and can expect consideration from it.

i. **Individual responsibility:** Anthropologists bear responsibility or the good reputation of the discipline and its practitioners.

ii. **Conflicts of interest and consideration for colleagues:** That there may be conflicts of interest (professional and political) between the anthropologists, particularly between visiting the local researchers and especially when cross-national research is involved, should be recognised.

iii. **Sharing research materials:** Anthropologists should give consideration to ways in which research data and findings can be shared with colleagues and with research participants.

iv. **Collaborative and team research:** In some cases anthropologists will need to collaborate with researchers in other disciplines, as well as with research and field assistants, clerical staff, students etc. In such cases they should make clear their own ethical and professional obligations and similarly take account of the ethical principles of their collaborators.

v. **Responsibilities towards research students and field assistants:** Academic supervisors and project directors should ensure that students and assistants are aware of the ethical guidelines and should discuss with them potential (as well as actual) problems which may arise during fieldwork or writing-up.

4. *Responsibilities to the Wider Society*

Anthropologists also have responsibilities towards other members of the public and wider society. They depend upon the confidence of the public and they should in their work attempt to promote and preserve such confidence without exaggerating the accuracy or explanatory power of their findings.

i. **Widening the scope of social research:** Anthropologists should use the possibilities open to them to extend the scope of social inquiry, and to communicate their findings, for the benefit of the widest possible community.

ii. **Considering conflicting interests:** Social inquiry is predicated on the belief that greater access to well-founded information will serve rather than threaten the interests of society.

iii. **Maintaining professional and scholarly integrity:** Research can never be entirely objective - the selection of topics may reflect a bias in favour of certain cultural or personal values; the employment base of the researcher, the source of funding a various other factors may impose certain priorities, obligations and prohibitions – but anthropologists should strive for objectivity and be open about known barriers to its achievement.

Conclusion

Integrating ethics into the research process, starting with the selection of the research problem, to carrying out research goals, to the interpretation and reporting of research findings, is critical to ensuring that the research process is guided by ethical principles beyond informed consent. An important step beyond securing informed consent lies in the researcher engaging in self-reflexivity, by asking:

- What is my “ethical standpoint” on the research process?
- You may find the following checklist of questions useful in uncovering your own ethical perspective on the research process:
- What type of ethical principles guide your work and life beyond the professional code of ethics you are bound by through a given discipline or professional association?
- Where do your ethical obligations to the researched start and end?

Knowing your own ethical standpoint as a researcher is an important internal guide as to how to proceed in your research. Michael Patton (2002) provides an “ethics checklist” to take into account as you proceed with your research project.

Patton’s checklist of questions for conducting an ethical research project:

- How will you explain the purpose of the inquiry and methods to be used in ways that are accurate and understandable to those you are researching?
- Why should the researched participate in your project?
- In what ways, if any, will conduct this research put people at risk (psychological, legal, political, becoming disliked by others)?
- What are reasonable promises of confidentiality that can be fully honoured?
- What kind of informed consent, if any, is necessary for mutual protection?
- Who will have access to the data? For what purposes?
- How will you and your respondent(s) likely be affected by conducting this research?

- Who will be the researcher's confidant and counsellor on matters of ethics during a study?
- How hard will you push for data?
- What ethical framework and philosophy informs your work and ensures respect and sensitivity for those you study, beyond whatever may be required by law? (Adapted from Patton, 2002)

Patton (2002) notes that respondents are now challenging the right to "tell their stories" while at the same time not hiding their identities, especially when they see the project as an opportunity to gain empowerment through telling their stories and perhaps becoming a catalyst for social change. Patton suggests a number of important ethical dilemmas that flow from this new viewpoint on confidentiality:

- Should the researcher "impose confidentiality against the wishes of those involved"?
- Are human subjects committees "patronizing and disempowering" if they turn down those respondents who wish to reveal their identities?
- Do research subjects make the choice independent of others in their social context? What about the privacy of significant others in their lives, such as children, spouse, and extended family members?

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