# PSY 384
# Research Methods in Psychology

# Ibadan Distance Learning Centre Series

# PSY 384
# Research Methods in Psychology

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# Vice-Chancellor's Message

I congratulate you on being part of the historic evolution of our Centre for External Studies into a Distance Learning Centre. The reinvigorated Centre, is building on a solid tradition of nearly twenty years of service to the Nigerian community in providing higher education to those who had hitherto been unable to benefit from it.

Distance Learning requires an environment in which learners themselves actively participate in constructing their own knowledge. They need to be able to access and interpret existing knowledge and in the process, become autonomous learners.

Consequently, our major goal is to provide full multi media mode of teaching/learning in which you will use not only print but also video, audio and electronic learning materials.

To this end, we have run two intensive workshops to produce a fresh batch of course materials in order to increase substantially the number of texts available to you. The authors made great efforts to include the latest information, knowledge and skills in the different disciplines and ensure that the materials are user-friendly. It is our hope that you will put them to the best use.

**Professor Olufemi A. Bamiro, FNSE**
*Vice-Chancellor*

# Foreword

The University of Ibadan Distance Learning Programme has a vision of providing lifelong education for Nigerian citizens who for a variety of reasons have opted for the Distance Learning mode. In this way, it aims at democratizing education by ensuring access and equity.

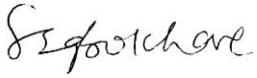
The U.I. experience in Distance Learning dates back to 1988 when the Centre for External Studies was established to cater mainly for upgrading the knowledge and skills of NCE teachers to a Bachelors degree in Education. Since then, it has gathered considerable experience in preparing and producing course materials for its programmes. The recent expansion of the programme to cover Agriculture and the need to review the existing materials have necessitated an accelerated process of course materials production. To this end, one major workshop was held in December 2006 which have resulted in a substantial increase in the number of course materials. The writing of the courses by a team of experts and rigorous peer review have ensured the maintenance of the University's high standards. The approach is not only to emphasize cognitive knowledge but also skills and humane values which are at the core of education, even in an ICT age.

The materials have had the input of experienced editors and illustrators who have ensured that they are accurate, current and learner friendly. They are specially written with distance learners in mind, since such people can often feel isolated from the community of learners. Adequate supplementary reading materials as well as other information sources are suggested in the course materials.

The Distance Learning Centre also envisages that regular students of tertiary institutions in Nigeria who are faced with a dearth of high quality textbooks will find these books very useful. We are therefore delighted to present these new titles to both our Distance Learning students and the University's regular students. We are confident that the books will be an invaluable resource to them.

We would like to thank all our authors, reviewers and production staff for the high quality of work.

Best wishes.



**Professor Francis O. Egbokhare**

*Director*

LECTURE ONE

# Research Methods

## Introduction

Whether you are about to undertake a Bachelor's project, Master's or a PhD thesis, you will need to prepare a carefully considered proposal for the work you plan to do –showing that you understand the literature in your area, have identified a gap which your research can fill, have a clear and unambiguous set of research questions to answer; and have a well thought-through plan for just how you will answer those questions – and thereby achieve your research goal.

## Objective

At the end of this lecture, you should be able to define research methods as used in the behavioural sciences.

## Pre-Test

What do you understand by research?

## CONTENT

What is research? Research is a purposeful, precise and systematic search for new knowledge, skills, attitudes and values, or for the re-interpretation of existing knowledge, skills, attitudes and values. Research is defined as human activity based on intellectual application in the investigation of matter. The term research can be used in two ways (i) it is the process of collecting data by observing behaviour; (ii) research also refers to theoretical or library research, that is the process of reviewing previous work on a topic in order to develop an empirical (practical) research

project, draw conclusions from a body of empirical research, or formulate a theory.

The research method you will follow in conducting your research is directly connected to two factors-(a) your problem statement, and (b) goal of your research. However, because of the possibility that your research goal and problem may vary, different methods of research can be utilized.

**Steps in the Research Method**

The process of conducting research can be divided into five steps in the following order:

1. develop an idea and refine it into a testable hypothesis;
2. choose a research strategy;
3. data collection;
4. data analysis and interpretation of the result; and
5. communicating the result of the research to other researchers.

Generally, research is a process covering three major features according to Fawole et al (2006):

1. clearly thought out research questions which your research intends to address;
2. identifying the context within which the research is situated; and
3. use of appropriate research methods to address the research questions.

LECTURE TWO

# Goals of Science and Value of Science

**Introduction**

Science is guided by goals and values. These goals and values help practitioners to maintain high standards in the conduct of their research as well as in the presentation of the findings. Values and goals also ensure that researchers conduct their work, mindful of the ethical issues that guide the methods researchers employ in their studies.

**Objective**

At the end of this lecture, you should be able to enumerate the goals and key values of science.

**Pre-Test**

What do you understand by the goals of science and the values of science?

**CONTENT**

**Goals of Science**

The behavioural sciences have four goals namely description, understanding, prediction and control of behavior.

1. Description – a scientific goal encompasses four aspects:
    a. Definition of phenomenon-science seeks to define the phenomenon to be studied and to differentiate among phenomena. This means that a concept must be defined by describing what the concept means. For example, if you were

interested in studying helping behaviour, you would need to first define what helping is.

b. Description is also used to differentiate among closely related phenomena. This ensures that the researcher is studying exactly what he wants to study. For example, differentiation is usually made between aggression and hostility.
c. Describe relationships among phenomena- for instance, it has been shown that frustration elicits many responses one of which is aggression. The discovery of relationship among phenomena helps us understand why certain events occur together.

2. Understanding – as a scientific goal, understanding is an attempt aimed at determining why a phenomenon occurs at all. If for instance a researcher has determined that eye witness account can be inconsistent, the researcher might be interested in (finding out) *understanding* why the inconsistencies exist and what causes them.
3. Prediction- this goal seeks to use our understanding of the causes of phenomena and the relationships among them to predict events.
4. Control-involves the use of knowledge of a phenomenon to influence it in some ways. Science practitioners use the principles of behavioural science to influence or control human behavior.

**Values of Science**

Science rests upon four key values in its attempt to generate knowledge that can be used to describe, understand, predict and control our world.

1. Empiricism- this principle holds that all decisions about what constitutes knowledge are based on objective evidence rather than ideology or abstract logic. When evidence and ideology are in conflict, evidence should prevail.
2. Skepticism- the principle of skepticism implies that researchers should always question the quality of the knowledge they have on any topic by asking 'how', 'why', 'what' and 'when' questions. The value of skepticism is that it helps to ensure that the theories that describe knowledge are as complete and correct as possible.
3. Tentativeness- knowledge is tentative and so can change as new evidence emerges. That is, a principle which may be valid today may become obsolete tomorrow as new evidence emerges. For instance, it was previously thought that there were sex differences

in conformity, but later findings by Eagly&Carli (1981) have debunked that no such differences in conformity existed.

4. Publicness- scientists do not only bring to the public domain their research findings, but they also make public how the research was conducted. There are three advantages of doing this:
   a. By bringing the research finding to the public domain, it gives people access to the result of the research.
   b. It allows scientists confirm the validity of other's research work by examining how the research was carried out (methodology, design etc.)
   c. It also allows for research findings to be replicated by other researchers to see if they will also get the same result.

**Summary**

In this lecture, we have examined the goals and values of science and how these goals and value help practitioners to maintain high standards in the conduct of their research and in the presentation of their findings.

**Post-Test**

What do you understand by the goals of science and the values of science?

LECTURE THREE

# Quantitative and Qualitative Approach to Research

**Introduction**

Data in behavioural science research can be classified as quantitative or qualitative. Quantitative data consists of numeric information such as frequency of occurrence of a particular behavior, or scores on a psychological construct (e.g. depression, aggression, IQ). For instance, we can say the rat made 10 desired responses that were reinforced within 30minutes or Tayo scored above the norm for her age-group on aggression scale.

Qualitative data however consists of non-numerical information, such as describing a behaviour or people's responses to questionnaires or interviews. This type of data may be generated by direct interactions with the participants through such means as focused group discussions (FGDs), in- depth interviews; key informant interviews (KIIs) and participatory or non-participatory observations.

**Objective**

At the end of the lecture, you should be able to explain the main approaches to research.

**Pre-Test**

Differentiate between quantitative and qualitative research

## CONTENT

Although any research method can yield either quantitative data and quality data or both, the perception however exists that some research methods can provide only one form of data (Rabinowitz and Weseen, 1987). The general belief is that only experiment-based researches are capable of providing quantitative data. While others such as case studies, observational studies and interviews are inherently qualitative. This distinction has resulted in a status hierarchy in the sense that research that yields itself to quantitative data are generally accorded more respect and accolades than research that produces qualitative data.

But recent advances in research have shown that the quantitative-qualitative distinction is more a matter of philosophy rather than one of method and thus uncalled for because both approaches are suited to different types of research in order to yield reliable data. A critical analysis of the different underlying philosophies shows that advocates of the quantitative and qualitative approaches are guided by the logical positivist and humanistic view of science respectively. Both philosophical leanings represent different attempts at understanding human behaviour using different routes to achieving that understanding.

The following are some of the distinctions between quantitative and qualitative approaches to research (Banister et al, 1994; Marecek and Kidder, 1997; Stake, 1995).

### Quantitative Research

1. Focuses on identifying cause-effect relationships among variables.
2. The variables to be studied and methods to be used are defined in advance by theories and hypotheses derived from theories and remain unchanged through out the study.
3. To promote objectivity, the researcher keeps a psychological and emotional distance from the research.
4. Frequently studies behaviour divorced from its natural context (e.g laboratory studies).
5. Frequently studies behaviours by manipulating it.
6. Data are numerical (frequencies, means, mode, etc)
7. Tries to maximize internal validity.

**Qualitative Research**

1. Focuses on understanding how people experience and interpret events in their lives.
2. The variables to be studied and methods to be used emerge from the researcher's experiences in the research context and are modified as the research situation changes.
3. The researcher is an inseparable part of the research process, that is both the researcher's experience and those of the research participants constitute valuable research data.
4. Studies behaviour in its natural context and studies the interrelationship of behaviour and context.
5. Studies behaviour as it naturally occurs.
6. Data are open-ended- includes descriptions of behavior and narrative responses to interview questions.
7. Attempts to maximize ecological validity.
8. Focuses on both the similarities and differences in individual experiences and on both the similarities and differences in the ways in which people interpret their experiences.

**Summary**

In this lecture, we have examined the differences between quantitative and qualitative research as well as their approach to research.

**Post-Test**

Differentiate between quantitative and qualitative research

LECTURE FOUR

# Scales of Measurement

## Introduction

In conducting research in the behavioural sciences, there is need for the variables of interest to be measured. Fagbohungbe (1996) describes measurement as the process of assigning numbers to indicants or variables in order to clarify the concepts of research problems.

## Objectives

At end of this lecture, you should be able to:

1. explain the different scales of measurement used in behavioral sciences; and
2. describe the use of the scales of measurement.

## Pre-Test

Mention the scales of measurement used in behavioural sciences

## CONTENT

### Types of Scales of Measurement

There are four types of scales of measurement that are commonly used in behavioural science research. These are nominal scale, ordinal scale, interval scale and ratio scales. Each of these scales of measurement differs from the other in some specific ways.

## Nominal Scales

Nominal scales have been described as the lowest or weakest form of measurement out of all the scales of measurement. They are distinguished from others by the absence of numerical or quantitative property. Use of nominal scale requires that variables/observations be classified into groups or categories with labels (names or numbers) for identification purpose only. As observed by Fagbohungbe (1996), nominal scale is a type of measurement that consists of assigning objects or variables to mutually exclusive categories such as high/medium/low, male/female, etc. Therefore, in assigning variables to different categories or groups, the researcher must ensure that there are no overlaps making sure that those variables with identical properties all fall within the same group or category. This means that no variable must belong to more than one group/category as doing otherwise would confuse the outcome of the study. The names (male/female for sex variables) or numerals (0, 1, 2, 3, etc) used in identifying categories in nominal scale have no meanings attached to them besides as a means of discriminating among categories.

In the Faculty of the Social Sciences, University of Ibadan, for instance, we can categorize course of study as psychology (1), economics (2), geography (3), political science (4) and sociology (5). The fact that sociology is represented by '5' and psychology represented with '1'does not materially, imply that sociology is superior to psychology. Other examples of variables in the nominal scaling form are political parties, religion, race, name of people, name of countries, different arms in a class in a secondary school, etc.

## Ordinal Scales

Ordinal scales are slightly more advanced than nominal scales in some respects. This scale of measurement allows for ordering of categories or observations to be studied. That is, instead of having just categories that are simply different, as in a nominal scale, the categories can be ordered from first to the last. Hence, ordinal scale allows for discussion of 'greater than or less than', without necessarily indicating the extent of differences observed.

While numbers may be used in ordinal scales, the numbers are only meaningful to the extent that they enable us to order the categories. Thus the numbers in ordinal scale do have some quantitative meanings since

they show the degree of importance or superiority of categories. An example where ordinal scaling is commonly used is in students' performance in terms of cumulative grade points. According to their overall individual scores, students could be ranked into first class, second class upper, second class lower and so on. With ordinal scale, we know that the student with a first class performed better than one with a second class upper, and second class upper is better than second class lower and so on. However, we cannot conclude that first class grade is two times better than second class lower and so on. Another example of ordinal scale is the nomenclature used to identify university lecturers starting from Assistant Lecturer, Lecturer 11, Lecturer 1, Senior Lecturer, Reader, Professor, which may be designated (6), (5), (4), (3), (2), and (1) respectively**.** The numbers have no meanings in themselves besides helping us rank lecturers into positions of superiority.

**Interval Scale**

This is the most widely used scale of measurement in the behavioural sciences. In an interval scale, the difference between the numbers on the scale is meaningful. This scale is more sophisticated than nominal and ordinal scales because it combines the qualities of both. The intervals between the numbers in an interval scale are equal in size. That is, the difference between 10 and 12 is exactly the same difference between 14 and 16. This means that numerically equal distances on interval scales represent equal distances in the property being measured.

The household thermometer for example, measures temperature on an interval scale. The difference in temperature between 20 degrees and 40 degrees is equal to the difference between 50 degrees and 70 degrees. However, there is no absolute zero on the scale that would indicate the absence of temperature. Thus, without an absolute zero point on interval scales, it is not possible to form ratios of the numbers. Hence, one cannot infer that 40 degrees temperature is twice as cold as 20 degrees temperature. Also, we cannot say that a person with IQ score of 100 is twice as intelligent as another individual with score of 50. Generally, personality traits such as intelligence quotient (IQ), depression, self-esteem, extraversion etc. are measured on the interval scale.

**Ratio Scale**

This is the most sophisticated of all measurement scales because it combines all the properties of the other scales such as the nominal, ordinal and interval scales. This is in addition to having a true zero point. The possession of a true zero point confers the powers of multiplication and addition on the ratio scale. Thus, it is possible to have ratios and fractions when a variable is measured on the ratio scale. Therefore a person who weighs 80kg weighs twice as much as the person who weighs 40kg (2:1); a 30 year old person is twice as young as a 60 year old person (1:2). This implies that two individuals can be compared on a specific physical variable (weight, height, age, duration of response, response time) on this scale.

Ratio scales are more popular in the physical sciences than in the behavioural sciences since there are rarely constructs in the behavioural sciences with absolute zero (that is, complete absence). It should be noted however that the statistical tests for interval and ratio scales are the same.

**Summary**

In this lecture, we have examined the different scales of measurement used in behavioural sciences and the use of the scales of measurement.

**Post-Test**

Mention the scales of measurement used in behavioural sciences

LECTURE FIVE

# Variables in Research and Hypothesis

**Introduction**

This lesson introduces the students to the concept of variables and their importance in research. The students will also learn about the different types of variables used in the behavioral science. In addition, in this lesson, the students will be introduced to hypotheses-what they are and the various types in use.

**Objectives**

At the end of this lecture, you should be able to:

1. explain the concept of variables and the types of variables in behavioral science research; and
2. describe what hypothesis is and the types of hypotheses commonly used in behavioural science.

**Pre-Test**

1. What is a variable?
2. What is a hypothesis?

**CONTENT**

A variable is any event, situation, behavior or individual characteristic that varies or changes such as gender, intelligence, reaction time, speaker credibility, age, cognitive task performance, etc. Each of these variables represents a general class within which specific instances vary. These specific instances are called the levels or values of the variables. A

variable must have two or more levels or values. For example, gender has two levels (male and female), age (young and old). Furthermore, some variables have values that have true numeric or quantitative property (cognitive task performance on a class test can range from zero correct to, say100 correct responses), while other values simply indicate different categories (gender, for example is categorized as male /female but there are no quantitative differences implied).

**Classification of Variables**

Variables can be classified into four general categories:

1. Situational Variables
   This type describes characteristics of a situation or environment such, as speaker credibility, number of people standing at the scene of an emergency, etc.
2. Response Variables
   This describes the responses or behaviours of individuals. Examples are cognitive task performance, reaction time, helping behaviour etc.
3. Participant/ Subject Variables

   Participant or subject variables refer to individual characteristics that could be use to describe a person. Personality traits, gender and intelligence are examples of participant variables.
4. Mediating Variables
   These types of variables describe psychological processes that mediate the effects of a situational variable on a particular response. An example of a mediating variable is known as diffusion of responsibility (a term used to describe the situation where personal responsibility to offer help is reduced in the presence of bystanders).

**Types of Variables**

When researchers study the relationship between variables, the variables are usually conceptualized as having cause-effect connection. That is, one variable is considered to be the ‘cause’ and the other variable the ‘effect’. Researchers therefore commonly use the terms dependent and independent variables to refer to the variables under investigation. The independent is seen as the ‘cause’ (that is the one that brings about changes), while the

dependent variable is regarded as the effect (the one that is changed). Kerlinger (1964) described an independent variable as the presumed cause of the observed change in the dependent variable. The dependent variable is the variable that is manipulated to find its influence on the dependent variable. The independent variable is also known as the predictor variable while the dependent variable is sometimes known as the criterion variable. Consider the following example, the influence of noise level and illumination on assimilation. Noise level and illumination are the independent or predictor variables, while illumination is the dependent or criterion variable.

**Hypothesis**

Behavioural science researches are attempts to test a hypothesis formulated by the researcher. A hypothesis is a type of idea or question which makes a statement about something that may be true. According to Osuala (1987), a hypothesis is a conjectural statement of the expected relationship between two or more variables in a research. A good hypothesis must compliment the problem of study the researcher is investigating. That is, it must bear direct relevance to the problem statement of the research.

**Types of Hypotheses**

Behavioural scientists make use of two types of hypotheses, namely the null hypothesis and the alternative hypothesis.

The null hypothesis is statement that there is no effect of the independent variable on the dependent variable. In other words, the null hypothesis makes no prediction of the effect of treatment on the dependent variable. It is also represented by the symbol, Ho. An example of a null hypothesis is –there is no effect of noise and illumination on assimilation.

Alternative hypothesis makes statement that there is an effect of the independent variable on the dependent variable. This type of hypothesis may also tell the direction of effect or treatment and the degree of effect on the dependent variable. The type that indicates direction of effect is known as directional hypothesis (examples of directional hypothesis are: female students will score higher on a test of recall than male students; lecturers who attend lectures regularly will be rated higher by students than lecturers who do not attend lectures regularly). A non-directional

hypothesis says there will be difference but does not indicate the direction of the difference. Examples are, there will be difference in students' rating of lecturers who attend lectures regularly and those who do not; there will be effect of different teaching techniques on learning outcome.

**Summary**

In this lecture, we examined the concept of variables and types of variables in behavioural science research. The lecture also explained what hypothesis is and the types of hypotheses commonly used in behavioural science.

**Post-Test**

1. What is a variable?
2. What is a hypothesis?

LECTURE SIX

# Research Designs

## Introduction

A research design is a structure or plan which will guide a researcher during the process of data collection and analysis and ensures that the eventual outcome of the study is reliable. Festinger (1964) believes that research designs enable the researcher to answer research questions as validly, objectively, accurately and economically as possible. In any study, the research design is likened to a master plan which specifies the methods and procedures for collecting and analyzing the needed information (Zikmund, 1994).

## Objectives

At the end of this lecture, you should be able to:

1. explain the different types of research designs used in behavioural science research; and
2. describe the characteristics of each design.

## Pre-Test

Mention and describe the different types of research design used in behavioural science research.

## CONTENT

### One –Group Design

In the one group research design, the main focus of the researcher is to observe what happens to the dependent variable (DV) when the

independent variable (IV) is manipulated. For example, a researcher might want to know the influence of public enlightenment slogan on HIV on sexual practice among youths. If after a period, a group of respondents who were exposed to the slogan say they now practice safe sex, we cannot say for sure whether it is the slogan that brought about this change in them or not. This is because other variables (known as extraneous variables) were not controlled and they could be responsible for the change observed in the respondents. Thus, one drawback with this type of design lies in its lack of control over extraneous variables. The implication is that the researcher cannot conclude that the observed changes are due solely to the treatment administered.

**Before and after One–Group Design**

With this type of research design, the researcher will observe and note the value of the dependent variable(s) before the experimental treatment is given, and again after the treatment has been administered on the participants.

This research design has two types- the first type has what is known as a comparison group or a control group (the control group does not receive any treatment) whose purpose is to enable the researcher determine the influence of the treatment on the experimental group. Suppose we want to study the influence of TV generosity on generosity behavior among teenagers. Two groups of teenagers are formed with one group serving as the comparison group (because it will not be exposed to TV generosity), while the other group which receives treatment is the experimental group (exposed to TV generosity). Consequently, scores on generosity are taken twice, that is, before and after the treatment has been administered on the experimental group. The difference in scores of generosity observed (if any) is attributed to the influence of TV generosity.

The other type is the situation where treatment is given to the same group but at different times (we can call this repeated measure). For instance, the same group of teenagers is exposed to TV generosity but at different times. Any difference in observed generosity scores at the two different periods may not be solely linked to the influence of the treatment since there are other plausible explanations for the observed changes in generosity behaviour.

One advantage of this type of design is that it enables the researcher to confirm the presence or absence of changes in the dependent variable as a result of manipulation of the independent variable.

**Two-Group Design**

The two-group research design involves two independent groups of participants with one group (A) exposed to the treatment, while the other group (B) receives no treatment. Thereafter, the researcher compares both groups on the measure of interest for the influence of the treatment. For instance, two groups of children may be compared on aggression but only one group will be exposed to TV aggression while the other group will not receive any such exposure (treatment).

It is important to note that all of these research designs treated so far share one thing in common, and that is lack of control of extraneous variables. This constitutes a major limitation when using these designs and negatively affects the validity and reliability of findings of studies in which these designs are used. However, it is noteworthy that there are certain studies for which these designs are best suited for.

**Correlational Design**

This design is used when the interest of the researcher is to establish that a relationship exists between two or more variables. It is a non experimental design because there is no manipulation of variables involved. If a researcher suspects that there is a relationship between parent's level of formal education and child's academic performance, the researcher will take scores on parent's education and scores on children's academic performance and compare the two scores. The coefficient we get will indicate the degree and direction of the relationship between both variables whether it is positive or negative correlation. The typical approach then when using the correlational method is to measure two or more characteristics of each member of a group of people, and then to determine the relationship between the scores on one variable and the scores on other variables.

**Factorial Designs**

Factorial designs are designs with multiple independent variables. Each independent variable is a factor in a factorial design. By convention, a factorial design is described in terms of the number of conditions or levels of each independent variable. A 2×2 design, for example has two independent variables at two levels or treatment conditions. A 2×3 design has two independent variables with one at two levels and the other at three levels. In the same vein, a 3×2×2 design has three independent variables with the first having three conditions, while the others have two levels or conditions respectively.

Factorial designs provide two types of information about the effects of the independent variables. A main effect is the effect that one independent variable has in isolation of the effect of other independent variables. That is, a main effect represent what would have happened supposing the experiment was conducted using that single variable and ignoring the effects of the other independent variables. An interaction effect on the other hand, occurs when two or more independent variables combine to produce an effect over and above their main effects. Interactions can be observed only when the effects of two or more independent variables are considered simultaneously. For this reason, interaction effects can be found only when a factorial design is used.

Let us consider examples where we have main effect and interaction effects in a study. In a study to examine the effect of sex differences and age on hostility, the main effects are the independent effects of age and sex on hostility, while the interaction effects are the joint or combined effects of age and sex taken together on hostility.

The number of possible outcomes in a factorial design is a function of the number of independent variables and the levels or treatment conditions involved. For instance, in a 2x2 design (of sex differences and age on hostility), there are eight possible outcomes; there may or may not be an effect for each of the two independent variables, and the independent variables may not interact.

Sex

| | | Male | Female |
|---|---|---|---|
| Age | old | MO | FO |
| | young | MY | FY |

Where,

MO = male, old

FO = female, old

MY = male, young

FY = female, young

In the diagram above, besides the main effects of age and sex on hostility (a total possible outcomes of four: male/hostility, female/hostility, young/hostility, old/hostility), the interaction effect will give us the picture above.

**Uses of Factorial Design**

1. factorial designs can be used to test hypotheses about moderator variables;
2. to detect order effects in counterbalanced within-subjects designs; and
3. to control for extraneous variance through blocking.

**Summary**

In this lecture, we examined the different types of research designs used in behavioural science research and the characteristics of each design.

**Post-Test**

Mention and describe the different types of research design used in behavioural science research.

LECTURE SEVEN

# Sampling and Sampling Techniques

## Introduction

Research in the behavioural sciences involves the process of *sampling* participants from a population of interest. Sampling is the systematic process employed by the researcher for the purpose of selecting participants for the study. Because it is not feasible to study all the members of a population of interest in a study, researchers use only a proportion which is representative of the population. For the sample to be truly representative, it must share all characteristics in common (matching) with the population. For instance, a representative sample of a population of adolescents must be matched in terms of age, education, sex, etc. A sample is representative of the population to the extent that it exhibits the same distribution of characteristics as the population.

## Objective

At the end of this lecture, you should be able to explain the types of sampling techniques in use in research.

## Pre-Test

Mention the types of sampling techniques and two methods under each technique.

## CONTENT

### Population

In a study, the *population* is composed of all individuals of interest to the researcher. One population of interest in a large public opinion poll, for

example, might include all eligible voters in Nigeria. By implication, the population of interest excludes such groups as people under 18years, visitors to the country, convicted felon, and every other person not eligible to vote. Also, the entire students of University of Ibadan could constitute the population in a survey.

**Sampling Frame**

The sampling frame is the actual population of individuals from which a random sample will be drawn. In a survey to evaluate the attitudes of students toward library services in the University of Ibadan, the sampling frame might be a list obtained from the office of the registrar of all currently registered students. This list obtained from the registrar's office thus forms the sampling frame for the study.

**Sampling Techniques**

There are two basic techniques for sampling individuals from a population– these are probability sampling and non-probability sampling.

**Probability Sampling**

In probability sampling, each member of the population has an equal chance of being included in the sample. This type of sampling technique is important because it allows researchers to estimate how likely it is that their sample findings differ from the findings they would have obtained by studying the whole population. For example, suppose a researcher wants to study use of library facilities among students of the University of Ibadan, the researcher is more likely to get a truly representative sample of students if she uses the list of registered students from the registrar's office than if she included in the sample the first 30 students to arrive at the library as it is being opened.

**Types of Probabilistic Sampling**

***Simple Random Sampling***

A basic characteristic of this sampling technique is that it ensures that every member of a particular population of interest has an equal chance (probability) of being selected in the sample. For instance, if the population of interest has 100 members, each one has one chance out of

100 of being selected. Balloting and random tables are frequently used to select members under simple random sampling.

**Stratified Sampling**

With this method, participants are selected on the basis of how they are distributed in the population by subgroups or strata. The strata chosen should bear direct relevance to the problem of study. For instance, a survey on sexual attitudes might stratify the population of interest on the basis of relevant demographic variables such as age, sex, education, etc. There are two methods of selecting participants using stratified sampling. The first method is selecting participants by proportion or proportional representation. That is, participants are selected according to their proportion in the population. Suppose we have a population divided into three strata of 40%, 40% and 20%. A stratified sample of 200 drawn from this population would give 80, 80 in the first two strata and 40 in the third stratum. The other method of selecting participants using this technique is by drawing equal-sized samples from each stratum.

**Systematic Sampling**

In this procedure, a list of all members of the population is created, then only individuals who fall under a predetermined nth position will be selected. For example, suppose a sample size of 5 is chosen, with a sample frame of 40. In this case, the nth position is 8 (i.e. 40/5). Thus, only those who fall in the $8^{th}$ position will be included in the sample for the study. That gives us persons $16^{th}$, $24^{th}$ and so on.

**Cluster Sampling**

Sometimes because it could be impossible to get a comprehensive list of a population of interest, cluster sampling is used. With cluster sampling, the researcher first identifies groups of people who satisfy the characteristics of the study population. This is known as a cluster. The researcher then takes a random sample of the clusters and uses all members of the sampled clusters as research participants.

Probabilistic sampling is used infrequently in behavioral science research partly because it is expensive and also because of the limitations

it places on experimental manipulation and the types of measures that can be used.

**Non Probabilistic Sampling**

Generally, non-probabilistic sampling refers to sampling techniques in which the researcher finds it convenient to use participants who are available and willing to collect data for the study.

***Types of Non-Probabilistic Sampling***

**Accidental Sampling:**

This involves selecting respondents primarily on the basis of their availability and willingness to participate in the study. For example, a researcher who is interested in studying students' attitude about the recent hike in school fees by the authority of the University of Ibadan would survey as many students that are willing and available to participate in the study.

**Convenience Sampling**:

In this case, the participants are made up of individuals whom the researcher finds it convenient to collect data from. Suppose a researcher wants to study aggression. The researcher could set a cutoff point for aggression and administer the questionnaires on students. Thereafter, only students who score up to and above the cutoff would form the sample for the study on aggression. Convenience sampling is inexpensive and easy for data collection. The disadvantage of this technique, however, is that the larger the participants, the less likely the results of the research will apply to the target population.

**Purposive Sampling**:

Here, the researcher selects the study participants on the basis of their special characteristics such as expertise or experience that are related to the purpose of the study. A researcher who is interested in studying the effectiveness of different teaching aids would survey teachers and others in the teaching profession. Purposive sampling is often used in case study research.

**Snowballing Sampling**:

With this type of sampling technique, those who are initially selected for a sample on the basis of convenience or purposive sampling nominate others whom they think might be willing to participate in the study. The nominees who agree to participate are then asked to nominate other potential participants and the sample size keeps growing. The advantage of this technique is that it is useful in constructing samples of population who are difficult to reach such as illegal drug users, members of a secret cult, etc.

**Summary**

In this lecture, we have examined the types of sampling techniques used in research.

**Post-Test**

Mention the types of sampling techniques and two methods under each technique.

LECTURE EIGHT

# Types of Research

**Introduction**

Research in the behavioural science is carried out using different research methods. In this study, we will be learning the different types of research used by behavioural scientists as they carry out research.

**Objective**

At the end of this lecture, you should be able to explain the various types of research used in the behavioural science.

**Pre-Test**

What are the two basic types of research? List the types of research known to you.

**CONTENT**

Research is usually classified into two general categories according to its immediate purpose i.e. basic research and applied research.

**Basic Research (or Pure Research)** is the type of research that is designed to test theory in order to formulate general principles of behavior. Basic research is conducted to generate knowledge for the sake of knowledge without being concerned with the immediate usefulness of the knowledge generated. For example, a researcher may be interested in finding out the number of strands of hairs on the head, perhaps among blacks and whites. Basic or pure research is undertaken primarily for the

purpose of acquiring new information or learning something new about a phenomenon without a specific application in view. More specifically, basic research is conducted primarily to satisfy the researcher's curiosity about a phenomenon. It is important to note that the results of basic research are expected to be broad in scope and to be applicable as general principles to a variety of situations.

**Applied Research**, on the other hand, is the type of research that is conducted to find a solution to a problem that is affecting some aspect of society, and its results are intended to be immediately useful in solving the problem, leading to an improvement in the condition of the society. An example of applied research is the application of the various compliant techniques of social psychology (such as the foot-in-door, that's not all, etc) to achieve objectives that are in line with an organization's purpose. The goal of applied research is to identify variables that have large impacts on the problem of interest or variables that can be used to predict a particular behavior. Hence, applied research is sometimes narrower in scope than basic research, focusing on behaviour in only one or a few situations rather than on general principles of behaviour that would apply to a variety of situations. Whereas basic research tends to use the experimental strategy and to be conducted in laboratory settings, applied research is usually conducted in natural settings, frequently using the correlational or case study strategies.

**Action Research**

Action research involves the systematic integration of theory, application, and evaluation (Susman & Evered, 1978). This type of research starts at the point when a person perceives that a problem exists in an applied setting. Take the example of a high rate of absenteeism in a biscuit factory. Using action research, managers of the organization would consult an industrial psychologist, which then comes up with a list of possible causes of absenteeism by consulting theories and models of absenteeism. The researcher would then use observation, surveys and interviews to collect data from the employees concerned. The purpose of data collection by the researcher through these various means is aimed at helping the researcher determine which theories or models best explain the situation at hand. Suppose the researcher finds that the workers are

dissatisfied with pay so they take time off to engage themselves in other jobs, the researcher would then design an intervention (may increase in pay or giving of some other incentives) based on theory and research, and implement the intervention in such a way that its effect could be scientifically evaluated. On the basis of the outcome of the evaluation, the management might continue the intervention, modify it or discard it for a more effective intervention program.

**Steps in Action Research**

1. Someone notices a problem.
2. Defines problem.
3. Collects data on possible causes.
4. Formulates solution.
5. Implements solution.
6. Evaluates solution.
7. Interprets outcome.

**Survey Method**

Essentially, a survey is a study in which people are asked questions about some topic of interest to the researcher. The people selected as respondents may be any group the researcher chooses, but the characteristics of the sample and the way they are chosen are vital determinants of the adequacy of the survey. A survey is that type of social investigation that studies large and small populations by selecting and studying samples chosen from the populations to discover the relative incidence, distribution, and inter-correlation of social and psychological variables, Kerlinger (1964). Survey research are designed based on the assumptions that it is impossible to study the whole population, but researchers can know something about a population when a representative sample of the population is studied. The questions in a survey may be asked *orally* as in an interview, or in writing in a *questionnaire*.

The subject matter of the questions may vary widely covering knowledge, attitudes, behaviors, personal characteristics, or environmental situations. The format of the questions may also vary from open-ended questions (questions that allow free response), to closed-ended questions (questions that have a limited set of answers to choose from).

**Evaluation Research**

Evaluation research is a research that is directed at collecting, analyzing, and interpreting information on the need for, implementation of, and effectiveness and efficiency of intervention efforts to better the lot of humankind (Rossi &Freeman, 1993). Evaluation research is not a particular type of research methodology or design but may use any or different types of designs including survey, correlational design, experimental design, etc. Evaluation research derives its uniqueness from its goals- which is to determine the effectiveness or how well a given social program is performing. Thus evaluation research may be undertaken for the following reasons as identified by Rossi & Freeman (1993):

- to judge the worth of an ongoing program;
- to estimate the usefulness of attempts to improve them;
- to assess the utility of new programs and initiatives;
- to increase the effectiveness of program management and administration; and
- to satisfy the accountability requirements of program sponsors.

*The following are five models of evaluation research or program evaluation:*

1. Decision-oriented evaluation: this model sees evaluation as the same thing as making choices between alternatives.
2. Goal-oriented evaluation: the key idea here is that evaluation should assess the progress of program participants toward a predetermined goal stated. This perspective is however incomplete because evaluation research should consider not only a program's stated goals, but also its unstated goals and unintended consequences.
3. Adversarial evaluation: this concept of evaluation follows the legal adversarial model, with advocates for and against a program making the strongest case that they can. Its advantages are that its outcome depends on the debating strengths and weaknesses of the advocates, and that many value issues should not be resolved in an either-or manner.
4. Descriptive evaluation: this approach views evaluation merely as a full description of a program, obtained through a case study rather

than through measurement and experimentation. In addition to the likely subjectivity of such an approach, it gives no clear-cut basis for evaluative decisions.

5. Goal-free evaluation: this concept of evaluation is based on a utilitarian philosophy that applies observation and reasoning to determination of a program's operations, effects and costs as well as its morality and need for it.

Bear in mind that in evaluation research, there must be clear definition of what you want to do including identification of your variables of interest and scope of the research so as to make good inference from the study.

**Summary**

In this lecture, we have examined the various types of research used in the behavioural sciences.

**Post-Test**

What are the two basic types of research? List the types of research known to you.

LECTURE NINE

# Types of Research Cont'd

**Correlational Research**

Correlational approach to research is non-manipulative, focusing on *naturally* occurring events. Within the field of social psychology, this would mean studying the naturally occurring characteristics of people, such as their abilities, personality traits, demographic characteristics, or interactions with others. In other words, correlational studies are those studies that are designed to establish the extent to which two or more variables are related. Correlational studies imply causal relationships between two or more variables. For example, suppose a researcher believes that there is a relationship between class attendance and academic performance (those who attend classes frequently perform better than those who do not). He then designs a study to measure the frequency of class attendance and academic performance. The outcome of the study will indicate the degree of relationship between the independent 'variable' (frequency of class attendance) and dependent 'variable' (academic performance). The typical approach then when using the correlational method is to measure two or more characteristics of each member of a group of people, and then to determine the relationship between the scores on one variable and the scores on the other variables.

Correlational research focus on naturally occurring characteristics is valuable when:

1. A variable cannot be experimentally manipulated (e.g. age, gender, personality)
2. Ethical considerations prevent manipulation of a variable (e.g. love between two people, physical danger)

3. Manipulation of variables might be so obtrusive as to change the nature of the phenomenon being studied (e.g. attempts to change the leadership styles of people experimentally).

In spite of its advantages with regards to studying naturally occurring phenomenon, the major limitation of the correlational method lies in the fact that we cannot say variable A caused the observed change (s) in variable B. At best, what we can say is that a change in variable A is associated with a change in variable B, and the direction and strength of the observed changes. For example, suppose we find a correlation between liking and the degree of interaction between two individuals, we cannot conclude that liking leads to more interaction because there are other plausible explanation of the correlation. It could be that interaction can bring about liking; liking and interaction may be the cause of each other in a circular or reciprocal manner; personal similarity in terms of interest may bring about more interaction, etc. A second limitation of correlation is that the researcher cannot exercise control over the variables, and just assumes that the variables of interest go together.

The result of correlation is usually stated in terms of zero correlation, positive correlation, or negative correlation. Zero correlation occurs when changes in one factor does not result to any change in the other factor. When one unit change in one factor is accompanied by one unit change in another factor, there is perfect correlation. It is perfect positive correlation if one unit increases in factor A, brings about one unit increase in factor B. In this wise, both factors tend to go up together or go down together. Or perfect negative correlation, which occurs when one unit increase in factor A, brings about one unit decrease in factor B.

**Observational Method**

This is another method of study utilized by researchers when they want to observe how events occur in their natural environment. Observational research is premised on the assumption that, using scientific procedures and instruments, certain phenomena can be best studied in their natural environment. Another name for observational research is naturalistic observation because the researcher makes observations in a particular natural setting over an extended period of time, using a variety of techniques to collect information. The final report usually includes the observations made and the researcher's interpretations of the findings.

Observational method is suited for situations where the researcher is interested in describing and understanding how people in a social or cultural setting live, work and experience their environment. Also, it is important that the event to be observed is clearly defined, and the method of observation explicit enough to allow for replication by others. A researcher who wants to observe behaviour in a social setting such as a drinking bar, must first define (that is, operationalise) what type of behavior she wants to observe (may be, between the sexes) and deciding content, tone etc of interaction.

**Types of Naturalistic Observation**

1. Participant observation (also non-concealed observation): here the researcher assumes an active, insider role. Since participant observation allows the researcher to observe the setting from the inside, the researcher has the opportunity of experiencing events the same way as the participants themselves. A potential problem with this method is the possibility of the researcher losing the objectivity necessary to conduct scientific observation (as a consequence of group membership). Where the presence of the researcher becomes obvious, it might influence the behaviour of the participants. Thirdly, mixing with certain groups could be potentially risky for the researcher.
2. Non-participant observation (also concealed observation): unlike the participant observer, the non-participant observer is an outsider who does not become an active part of the setting he is observing. It is sometimes preferable when it is suspected that the presence of the observer may influence and alter the behavior of those being observed. This method is less reactive because the participants are not aware that their behaviours are being observed and recorded. For instance, it would be more useful to study students' behaviour from a distance than through participant observation.

**Experimental Research**

Three types of experimental research are common in the behavioural sciences viz: field experiment, laboratory experiment and field studies.

**Field Experiment**: field experiments are experiments that are conducted in settings that are natural for the participants. In many field experiments, the participants are not usually aware that they are subjects in an experiment, while in some they may be aware. For example, Balogun (1991) conducted a field study to examine the effects of bargaining outcomes by manipulating bargaining strategy and mode of dressing. This activity is normal and may not have evoked suspicion from participants. Four cells were created and the outcome of the research highlights the interactive effects of modes of dressing and bargaining strategies on bargaining outcomes in the open market. Thus, in field experiments, the researcher can control the independent variables through manipulation to observe its effect on the dependent variable(s).

One limitation of field experiment is that the researcher cannot say conclusively that the observed change in the dependent variable was as a result of the manipulation of the independent variables since other variables were not controlled. Another limitation has to do with finding a suitable or appropriate setting for the experiment.

**Laboratory Experiment:** laboratory experiments appear more convenient for the researcher principally because they are conducted on home ground where the necessary equipment and subjects are often readily available. They frequently allow more control over conditions, more isolation of variables, and greater precision of measurement than field experiments. Consider this example of a laboratory experiment. Suppose a researcher wants to investigate the effect of noise level (high, medium and low) and sex (male and female) on recall ability of selected participants, the participants are randomly assigned to different experimental conditions and then asked to recall what was read out to them under different experimental conditions. Bear in mind that the research environment is usually in a laboratory where there is high control of external variables that can confound the result of the experiment. Within the laboratory environment, the researcher can manipulate noise to the desired decibels for the study and assign the participants to the different conditions.

Among the disadvantages of the laboratory experiment is the issue of ethical and practical limitations which prevents the use of strong manipulations of certain attributes such as fear, anger and hatred in an experiment. This often reduces the strength of the effect obtained.

**Field Studies:** in field studies, the researcher's interest is primarily in observing variables and using the information obtained to predict their control over other variables of interest while making attempts at controlling the variables. In achieving this, the researcher may use longitudinal field study or cross-sectional field study. Let's say the researcher's interest is to examine the effect of long term alcohol intake on memory. The researcher may use individuals of different ages (say between 18years -23years) and study alcohol effect on their memory, or he could study the effect of alcohol on a particular individual's memory over a five year period.

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