# HYPOTHESIS
# &
# ITS FORMULATION

Meaning
Significance
Characteristics
Types

# PROPOSITION

Statements about variables considered to be true or false

If the phenomenon under consideration happens to be observable reality then the statement could be empirically tested.

Hypothesis is a verifiable counterpart of a proposition.

A proposition that can be verified to determine its reality is a HYPOTHESIS

# Let us imagine…. YOU ARE SEEKING ANSWER TO A PROBLEM

- **CASE 1:** You are at races and you place a bet. You bet on a hunch that a particular horse will win

- **CASE 2:** Suppose you have a hunch that in your class more students are in favour of a particular decision than against.

- **CASE 3:** Suppose you work in area of public health. You have a hunch that a higher rate of particular condition prevails in a particular population subgroup. You want to find out whether or not your hunch is right, and second what are the probable causes of this condition. To explore every conceivable possibility would entail enormous amount of time and resources. You narrow down the probable causes, based on your knowledge, and identify what you assume to be the most probable cause.

# What you do….

- **CASE 1: You observe till the race is over. You will know that your hunch was right.**
- **CASE 2: You ask either all or selected few, and conclude whether your hunch was right or wrong.**
- **CASE 3: You could design a study to collect information needed to verify your hunch. On verification you will be able to conclude that there is prevalence of the assumed condition in the population sub group and the assumed cause is really the reason, your assumptions would be proved right.**

# What you did….

YOU STARTED WITH A SUPERFICIAL HUNCH OR ASSUMPTION.

- **CASE 1: You waited for the event to take place.**
- **CASE 2 & 3: You designed a study to assess the validity of your assumption. After careful investigation you arrived at a conclusion about the validity of your assumptions.**

# RESEARCH HYPOTHESES ARE BASED ON SIMILAR LOGIC

- You do not know about a phenomenon, situation, the prevalence of a condition in a population or outcome of a programme
- But you do have a hunch to form the basis of certain assumptions or guesses
- You test these assumptions by collecting the information that will enable you to conclude whether or not your hunch was right
- The verification process has one of the three outcomes. Your hunch may prove to be
  - Right
  - Partially right
  - Wrong
- Without undergoing the process of verification, you cannot conclude anything about the validity of your assumptions.

# HYPOTHESES

**IN OTHER WORDS HYPOTHESIS IS THE PROBABLE SOLUTION OF THE RESEARCH PROBLEM**

- Thus research hypothesis is a hunch, assumption, suspicion, assertion or an idea about a phenomenon, relationship or situation, the reality or truth of which you do not know
- A researcher refers to these assumptions, assertions, statements or hunches as hypotheses.
- These assumptions become the basis of an enquiry.
- The assumptions are rooted either in previous knowledge, studies, your or someone else's observations.
- Hypothesis narrows the field of investigation
- Hypotheses bring direction, specificity and focus to research study.

# SOME DEFINITIONS

- **Goode & Hutt :** A hypothesis states what we are looking for. A hypothesis looks forward. It is a proposition which can be put to test to determine its validity. It may prove to be correct or incorrect.
- **John W. Best:** A hypothesis is a shrewd guess or inference that is formulated and provisionally adopted to explain the observed facts or conditions and to guide in further investigation.
- **M. Verma :** Hypothesis is a theory stated as a testable proposition formally and clearly and subjected to empirical or experimental verification.
- **Black & Champion :** A proposition that is stated in a testable form and that predicts a particular relationship between two (or more) variables. In other words, if we think a relationship exists, we first state it as a hypothesis and then test the hypothesis in the field.
- **Grinnell :** A hypothesis is written in such a way that it can be proven or disproven by valid and reliable data- it is in order to obtain these data that we perform our study

# To summarize

- Hypothesis is a tentative proposition
- Its validity is unknown
- In most cases it specifies a relationship between two or more variables.

# FUNCTIONS

- Formulation of hypothesis forces you to precisely specify what you want to find out about thus bringing specificity and clarity to your study
- This ensures you only collect the information you need, thereby providing focus to your study.
- This enhances validity of your study as it ensures you are measuring what you set out to measure.
- As the study is focussed, construction of hypothesis enhances objectivity in a study.
- The testing of a hypothesis enables you to specifically conclude what is true and what is false, thus enabling you to contribute towards theory formation.

# ESSENTIAL CHARACTERISTICS

## Considerations to be kept in mind when constructing a hypothesis

- ✓ **Specificity:** All aspects of a problem cannot be studied at once. Hypothesis should be related to a specific aspect of the problem. It should be unidimensional –it should test only one relationship at a time.
- ✓ **Simplicity and conceptual clarity:** The concepts to be tested should be clearly defined. Ambiguity of concepts will make the verification of hypothesis impossible. The language should be simple and clear so that the readers may understand them correctly.
- ✓ **Empirical reference:** The hypothesis should be capable of verification. It should not include abstract concepts but those which can be empirically tested or experimentally validated.

# ESSENTIAL CHARACTERISTICS

## Considerations to be kept in mind when constructing a hypothesis

For example, consider the following two hypothesis

1. The average age of the male students in the class is higher than that of the female students

This hypothesis is clear, specific and easy to test. It tells you what you are attempting to compare (average age), which population groups are being compared (female and female students), and what you want to explore (whether male students have higher average age?)

2. Suicide rates vary inversely with social cohesion

This hypothesis is specific and clear, but NOT easy to test.

How to ascertain 'social cohesion'? ??? What determines social cohesion? How to measure it?

# ESSENTIAL CHARACTERISTICS

## Considerations to be kept in mind when constructing a hypothesis

- ✓ **Related to available techniques:** Methods and techniques should be available for data collection and analysis . There is no point in formulating a hypothesis if it cannot be subjected to verification because there are no techniques to verify it.
- ✓ **Relation to existing body of knowledge:** Hypothesis should emerge from the existing body of knowledge, **should add to it** -which is an important function of research.
- ✓ **Objectivity:** A hypothesis should be free from subjective biases
- ✓ **Operationalisability:** It should be expressed in terms that can be measured. If it cannot be measured, it cannot be tested, and no conclusions can be drawn.

# ROLE / IMPORTANCE OF HYPOTHESIS

- Guides the direction of the study: Limits what shall be studied and what shall not be. Keeps researcher on track. Delimits the scope of research.
- It identifies facts that are relevant and those that are not : who shall be studied, in what context and what aspect of it shall be studied. Brings clarity, specificity and focus to the research
- Suggests which form of research design is likely to be the most appropriate : survey design, experimental design, content analysis, case study, participation observation study, or focus group discussion. Indicates type of data required and type of methods of data analysis to be used
- Validates conclusions/ solutions drawn during course of a research
- Provides a framework for organizing the conclusions/ findings
- Paves way for formulation of theories and new hypothesis to be tested in future researches

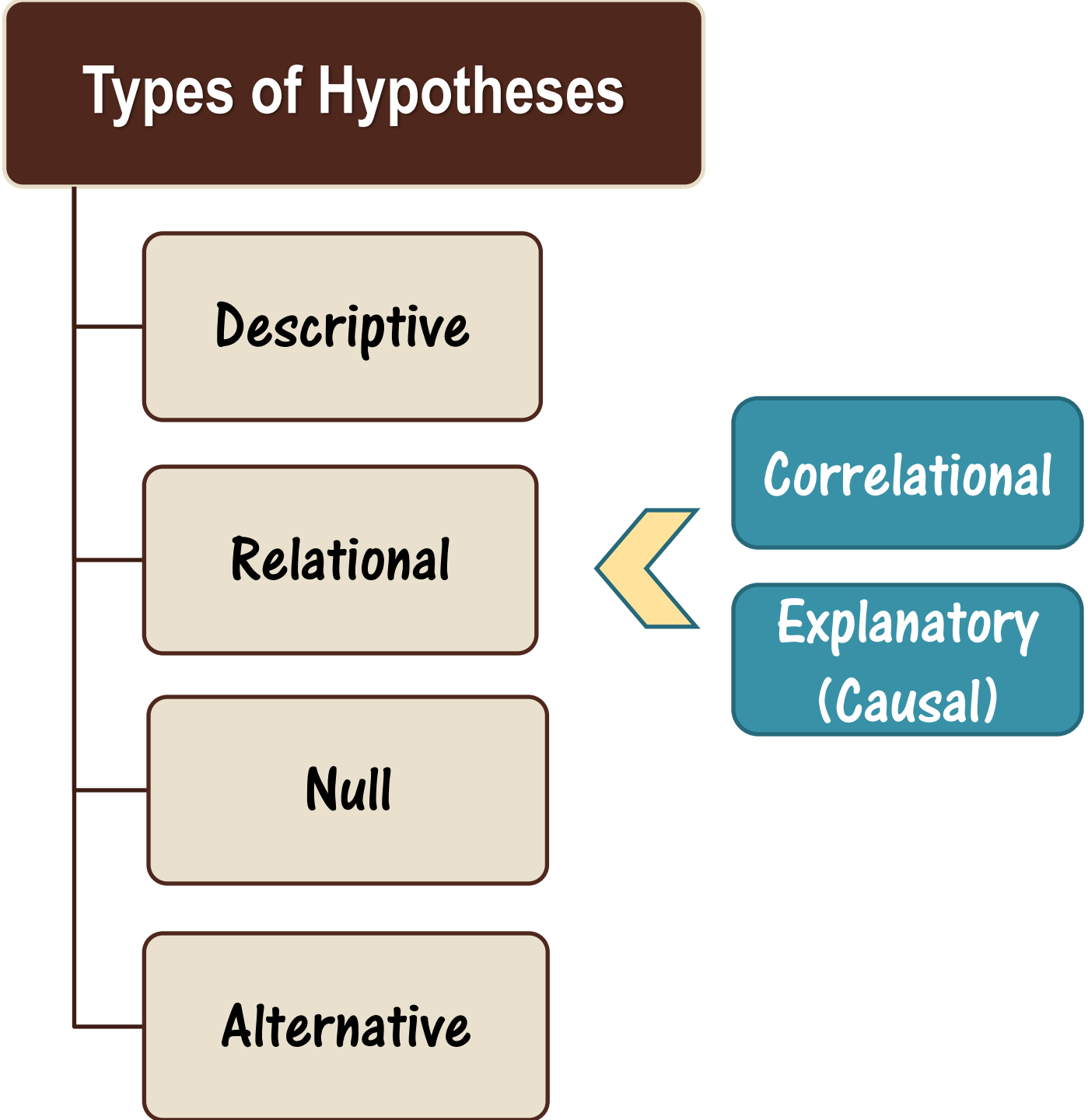
# HYPOTHESIS

A logically conjectured relationship between two or more variables, expressed in form of a testable statement

Some hypotheses

1. Officers in my organization have higher than average level of commitment (one Variable)
2. Level of job commitment of the officers is associated with their level of efficiency (two variables and non-directional relationship)
3. Level of job commitment of the officers is positively associated with their level of efficiency (two variables and positive relationship)
4. The higher the level of job commitment of the officers, the lower their level of absenteeism (two variables and negative relationship, change in problem)

# Types of Hypotheses



# Types of Hypotheses

- Descriptive
- Relational
- Null
- Alternative

Contains only one variable thereby c/a Univariate hypothesis

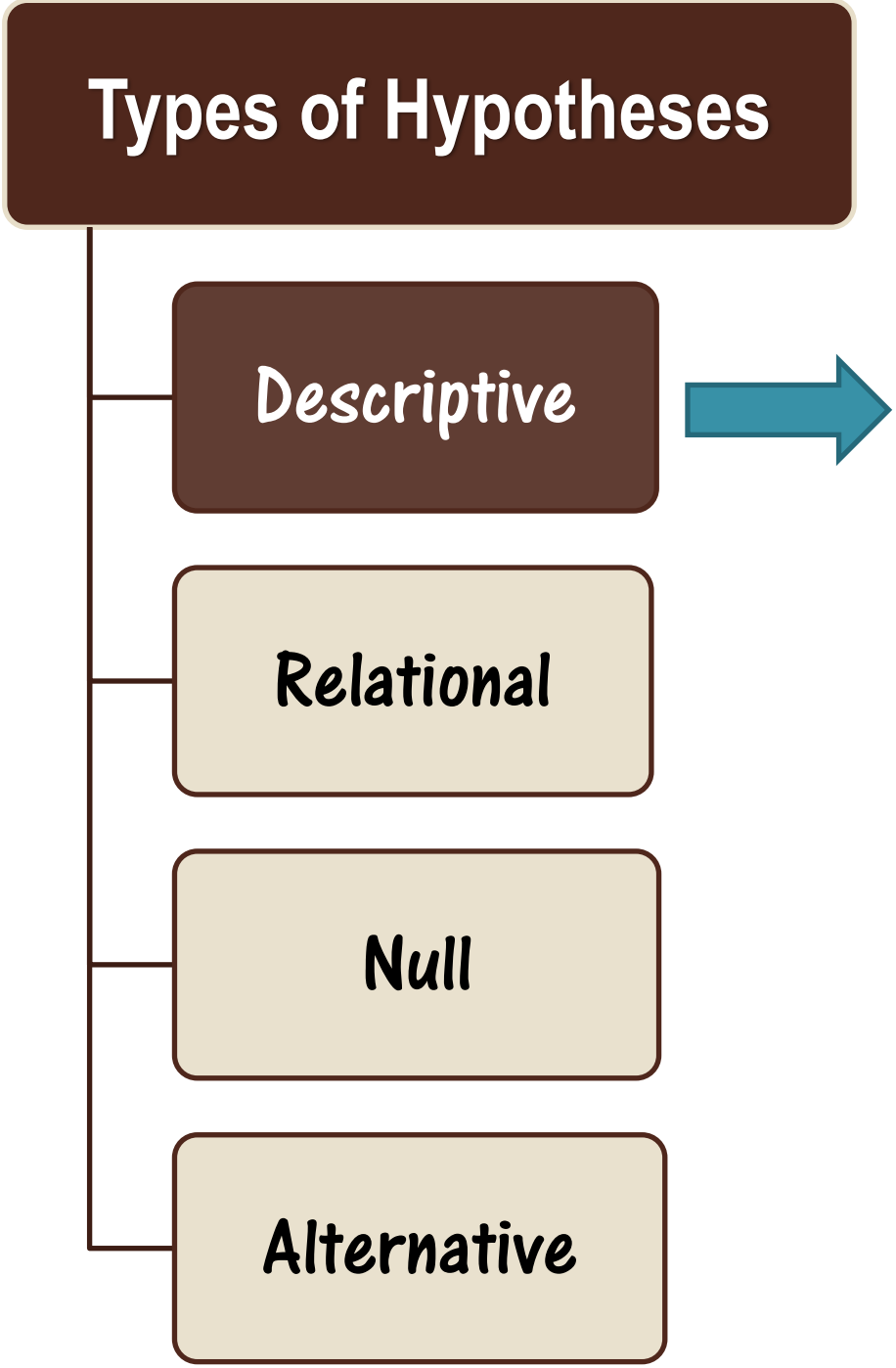
- Typically states the existence, size, form, or distribution of some variable
- Example First Hypothesis

  Officers in my organization have higher than average level of commitment (Variable)

Research usually use Research Questions rather than Descriptive Hypothesis

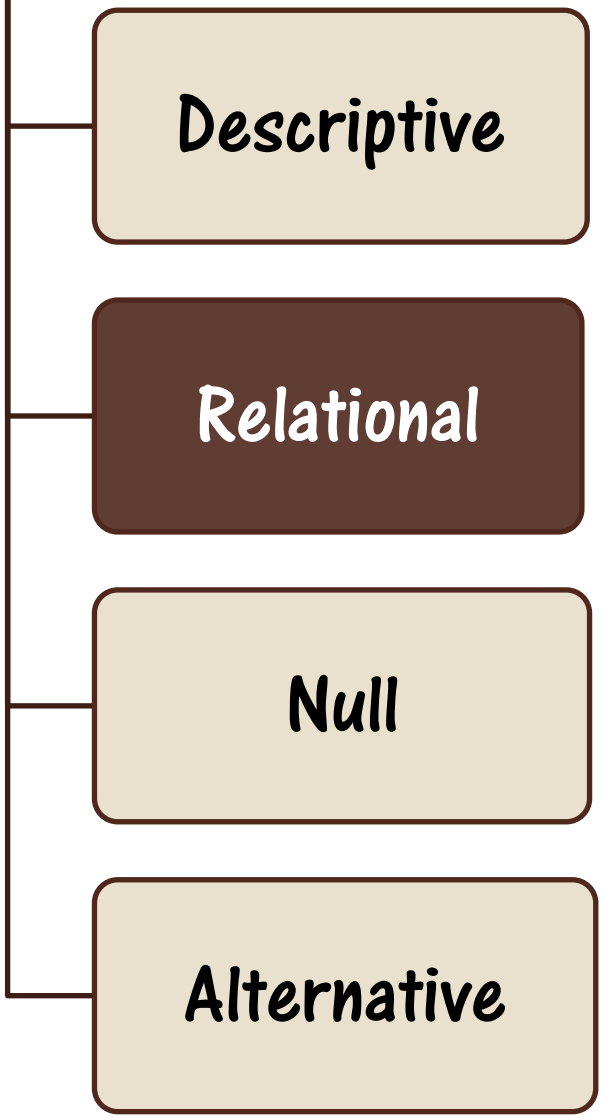
Eg. What is the level of commitment of the officers in your organization?

# Types of Hypotheses




- Primary aim of research is to describe the characeristics of the selected situation, community, phenomenon or event.
- The study is designed to test the hypothesis through collection of relevant facts
- Goode and Hutt calls these as 'Empirical Hypothesis' since these are based on empirical observations.
- Simplest hypothesis which state only the existing trend of the variable – do not attempt to explore the causality

# Types of Hypotheses




**Propositions that describe a relationship between two or more variables**

- Relationship could be non-directional or directional, positive or negative, causal or simply correlational
- For stating directional relationship, terms like positive, negative, more than or less than are used (Eg. Hypotheses 3 & 4)
- In non-directional hypothesis, direction of association is not specified. Eg. Hypothesis 2

# Types of Hypotheses

- Descriptive
- Relational
- Null
- Alternative

May be of four types

- X is related to Y
- Y is dependent on X
- Y decreases as X increases
- X and Y are not related

May be bivariate (two variables) or multivariate (more than two variables)

For e.g. Increasing population results in increase in crime rate

- Increasing industrialization is responsible for change in family composition
- More is population density, more is the consumption of drugs, crime rate and lower is the level of literacy in an area

# Types of Hypotheses

- Descriptive
- Relational
- Null
- Alternative

**Multivariate** hypothesis is also called as **Complex** Hypothesis

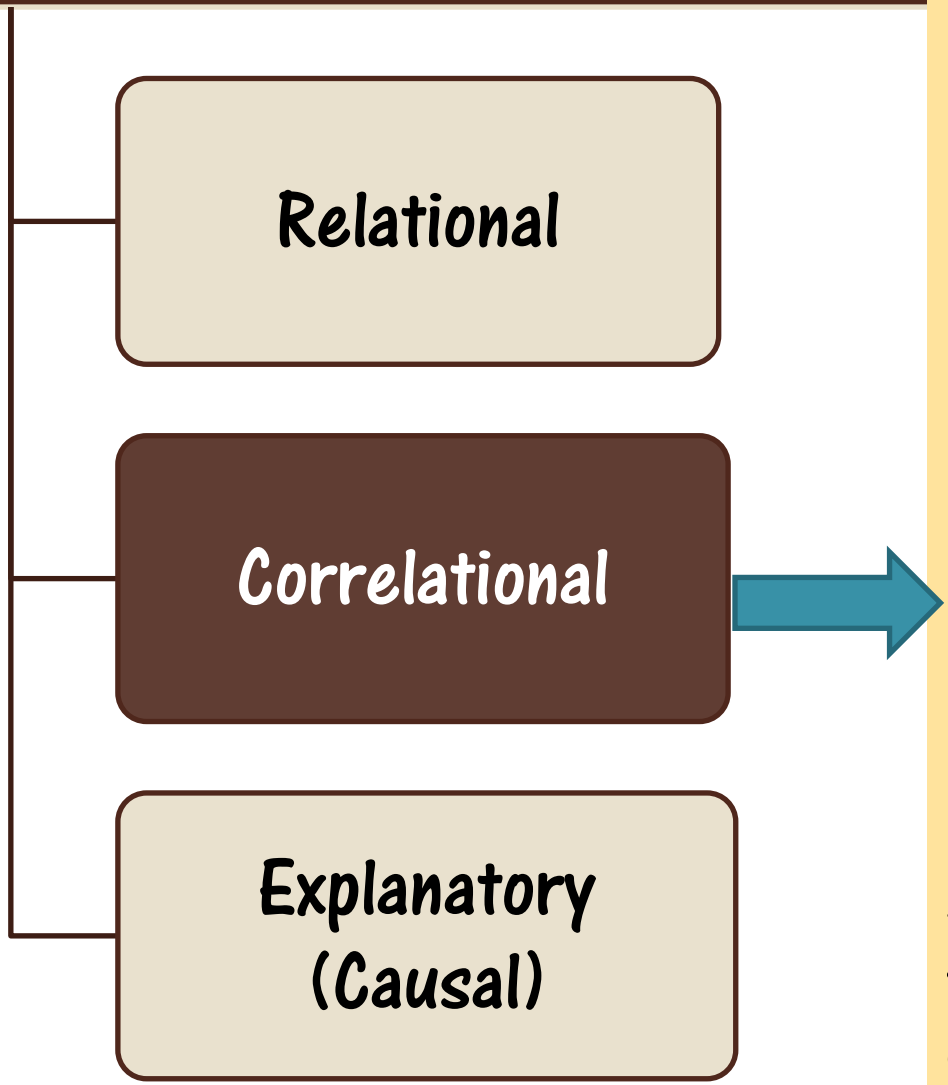
Number of independent variables (population density in the given example ) is less than the number of dependent variables ( drug consumption, crime rate and literacy rate)

Other examples:

Social status of a person is determined by vertical mobility, level of education and income.

Academic aspirations of a child are governed by the education, income and occupation of parents

# Types of Hypotheses




State merely that variables occur together in some specified manner without implying that one causes the other

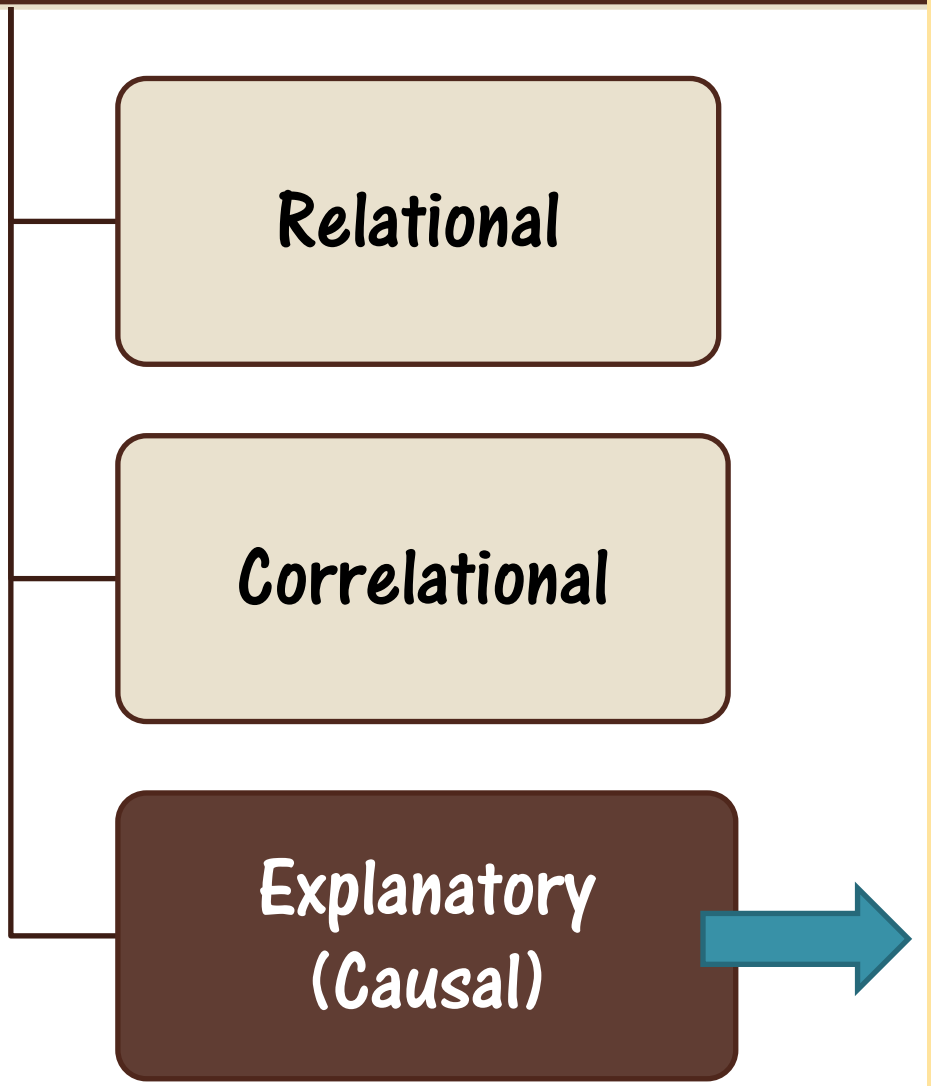
We believe that there are more basic causal forces that affect both variables.

- Eg. Third hypothesis

  Level of job commitment of the officers is positively associated with their level of efficiency

Here we do not make any claim that one variable causes the other to change

# Types of Hypotheses




Implies that the existence of or change in one variable causes or leads to a change in the other variable.

Incorporates the notion of dependent and independent variable.

- Independent variable(IV) may not be the sole reason for existence or change in dependent variable (DV)
- Researcher may have to identify other possible causes, control their effect in case the causal effect of IV has to be determined on the DV

POSSIBLE IN EXPERIMENTAL RESEARCH

# Types of Hypotheses

- Descriptive
- Relational
- Null
- Alternative

Used for testing the hypothesis formulated by the researcher.

Simply states that there is no relationship between the variables or the relationship between variables is zero

Is the inverse of research hypothesis

It is recommended that we test our hypothesis indirectly by testing the null hypothesis (trying to show that predictions made by hypothesis are wrong)

In case we have any credibility in our hypothesis then the research data should reject the null hypothesis ($H_0$)

Rejection of null hypothesis leads to the acceptance of alternative hypothesis

# Types of Hypotheses

- Descriptive
- Relational
- Null
- Alternative

Simply states that

1. there is relationship between the variables under study,
2. the relationship is perfect which is indicated by the number '1'

Symbolically indicated by 'H1'

Eg. H0 - There is no relationship between the level of job commitment and the level of efficiency

OR

The relationship between level of job commitment and level of efficiency is zero (Variables are independent)

H1 - There is a relationship between the level of job commitment of the officers and their level of efficiency

# HYPOTHESIS IN QUALITATIVE RESEARCH

Hypothesis, though important, are not essential for a study.

Since qualitative studies are characterised by an emphasis on describing, understanding or exploring phenomenon using categorical and subjective measurement procedures, construction of hypothesis is not greatly advocated.

Non-specificity of problem as well as methods and procedures makes hypothesis formulation impractical.

Even within quantitative research, the practice of formulating hypothesis varies markedly from one academic discipline to another

Hypothesis are most important if the research relates to test an assertion for causality/ association of a phenomenon, where it becomes important to narrow the list of probable causes so that a specific cause and effect relationship can be studied OR to validate the prevalence of something or establish its existence.