

Hypothesis

Definition

A hypothesis proposes relationship between two or more variables. In common usage, a hypothesis refers to a provisional idea whose merit requires evaluation. For example: **political participation increases with education**. This simple assertion can be seen as a hypothesis. **It has a subject (the variable, political participation), a connective verb (a relationship, increases), and an object (the variable, education)**. This hypothesis takes two basic ideas "political participation" and "education" and suggests that they are connected to the extent that as one increases then the other increases as well. This can be stated in more mathematical terms as one variable being directly proportionate to the other.

Fred N. Kerlinger and H. B. Lee (2000): "A hypothesis is a conjectured statement that implies or states a relationship between two or more variables".

John W. Creswell (2014): "A hypothesis is a formal statement that presents the expected relationship between independent and dependent variables". A hypothesis is thus a statement about the relationship between two or more variables which needs to be investigated for its truth. It is basically a working assumption. If the relationship between two variables is found as the hypothesis predicts, then the hypothesis is supported and a new theory has been suggested. A good hypothesis states as clearly as possible the expected relationship (or difference) between two variables and defines these variables in operational and measurable terms.

Functions of Hypothesis

Specifically, a hypothesis serves the following functions (Kumar, 2011):

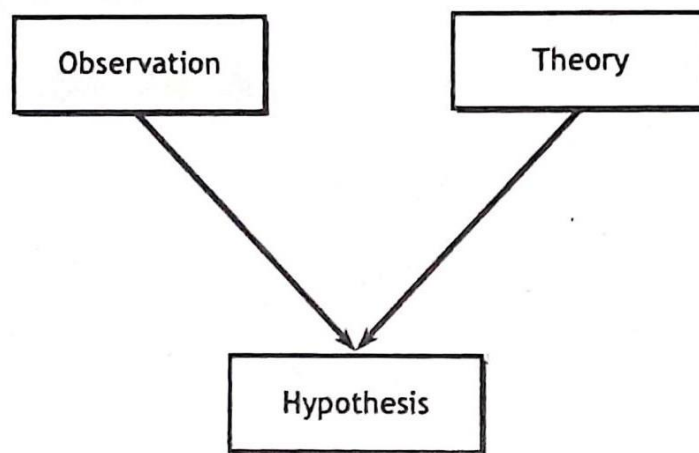
- The formulation of a hypothesis provides a study the focus. It tells you what specific aspects of a research problem to investigate.
- A hypothesis tells you what data to collect and what not to collect, thereby providing focus to the study.
- As it provides a focus, the construction of a hypothesis enhances objectivity in a study.
- A hypothesis may enable you to add to the formulation of theory. It enables you to specifically conclude what is true or what is false.

Hypothesis Formulation

Hypothesis can be derived in a variety of ways i.e. general culture, past research/scientific theory, personal experience, discussion and conversations and intuition. A researcher observes a social situation and come to a conclusion about some of the variables which are operating within it. You could then develop some hypotheses which connect two or more of these variables. Generally there are two grounds on which a hypothesis may be justified: logical and empirical.

Logical justification is developed from arguments based on concepts and theories relating directly to the research problem. Empirical justification is based on reference to other research found in the literature. Hence, in order to formulate a useful hypothesis, you need to have good knowledge of the background to the subject and the nature of the problem or issue which is being addressed. A hypothesis statement is derived directly from the statement of the problem. Hypothesis can be stated rather easily once the research problem is known. The hypothesis is thus more operational than the problem statement.

A diagrammatic presentation of the process of hypothesis formulation is given in figure.



Hypothesis generation and testing require an understanding of the deductive and inductive reasoning. A simple definition of deductive reasoning is "taking a known idea or theory and applying it to a situation with the intention of testing whether it is true". Deduction is thus the process of arriving at conclusion by interpreting the meaning of the results of the data analysis. In this form of reasoning, one goes from general knowledge to specific knowledge. For example, consider the following two arguments:

Argument 1

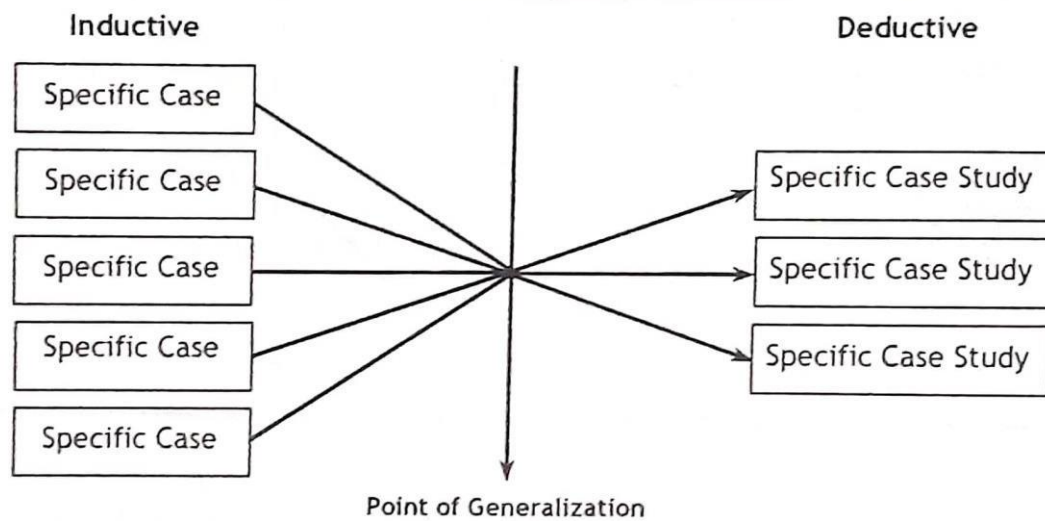
- All books have pages (theory or generalization).
- This is a book (empirical observation - fact).
- Therefore, this book has pages (logical conclusion).

Argument 2

- Lung cancer is caused by smoking (theory or generalization).
- John has lung-cancer (empirical observation-fact).
- John was a cigarette smoker (logical conclusion).

Deduction starts from a generalization and goes to a specific case. Inductive reasoning is the opposite. A simple definition of inductive reasoning is "using observation to formulate an idea or theory". Induction is thus the process of examining many cases and then generalizing from them. In this form of reasoning, one goes from a specific knowledge to the general knowledge. Looking at the cigarette-cancer example, the researcher would investigate whether the people who have long-cancer had previously smoked before they received cancer. Both induction and

deduction are used by the researchers to organize facts, describe results, develop new relationship, and suggest new research.



Deductive logic, as stated above, is useful for going from a general problem to a specific hypothesis. This statement can be understood by an example:

■ **Problem:** Nepal's population is increasing so rapidly that if it continues at its present rate, in 30 years, it will not be possible to feed all of its citizens.

■ **Theory:** Population growth can be controlled through family planning clinics.

■ **Hypothesis:** Family planning can reduce the growth of population in Nepal.

The above example is stated in very general terms and later will be made specific so that it can be tested, but it is a good example of the deductive logic used in a thesis. The problem statement has been created from the facts of Nepal's present population and from the prediction of its growth in the future. The prediction is made from examining past facts of population growth in Nepal. The theory is a very general theory, which has been true in other parts of the world; it has almost become a principle for population control. The hypothesis is the result of deductive logic from the first two statements.

It is now possible to examine the stating of problems and hypotheses. The problem asks about the relation between several facts or observations. Accordingly, the hypothesis suggests that the relationship exists. It is important to realize that the hypothesis has to be stated in a very specific terms so that the means of investigating the hypothesis are included in the statement. A problem is formulated in the form of a question; it serves as the basis or the origin from which a hypothesis is derived. A hypothesis is a suggested solution to a problem. A problem (question) cannot be directly tested, whereas a hypothesis can be tested and verified. Hence, a problem cannot be scientifically solved unless it is reduced to hypothesis form.

EXAMPLE

Research Problem: What is the relationship between population growth in Kathmandu before the introduction of family planning and after the introduction of family planning?

Research Hypothesis: There is a significant difference in the population growth in Kathmandu between when family planning was first introduced and five years later.

Hypothesis statements should be clear if the definition of a variable is understood as some characteristic, which changes. The above hypothesis is simply stating that two groups exist in relation to some characteristic. If there is a significant difference between the two groups then the hypothesis is supported. The theory that family planning can reduce the growth of population in Nepal is supported and becomes tentative. Hence, there appears to be a solution to the population problem in Nepal.

One-sided Vs Two-sided Hypothesis

During the planning of our research, we need to specify whether we plan to use a one-sided or two-sided hypothesis. A one-sided hypothesis states a specific direction (e.g. increase or decrease). If a change in the unexpected direction is equivalent in practice to no change, then we should use a one-sided hypothesis. A two-sided hypothesis states that there is a difference between the dependent and independent variable, but does not specify the direction. If we expect that a change in either direction is possible and that changes in either direction are interested, then we should use a two-sided hypothesis.

Formats of Stating Hypothesis

The different formats of hypothesis construction based on association and correlation between variables are as follows:

Correlation There is a significant relationship between Variable A and Variable B for Group 1,

Difference between Means

There is a significant difference between mean levels of Variable A for Group 1 and Group 2.

Difference between Frequencies

There is a significant relationship between Group 1 and Group 2 for Variable A. There is a significant difference between Group 1, 2 and 3 for the following variables:

Variable A **Variable B** etc.