Types of Hypothesis

1. Descriptive and Relational Hypothesis

Research hypothesis can be classified as: descriptive and relational. Descriptive hypotheses are in the form of propositions that only state the existence, size, form, or distribution of some variable (Cooper & Schindler, 2011).

EXAMPLES

- Tribhuvan University (case) is experiencing budget difficulties (variable).
- The Hetauda- Narayangadh sector of the East-West Highway (case) has a higher-than- average accident rates (variable).
- The average stockholders of Nepal Development Bank (case) favor returns in the form of bonus dividends (variable).

These descriptive statements contain only one variable. Hence, the relationship between variable cannot be studied and explored. These statements do not fulfill the criteria of research hypotheses. It is, therefore, advisable to use research questions rather than descriptive hypotheses. The research questions for the above three statements could be stated as follows:

EXAMPLES

■ What is the extent of budget difficulties in Tribhuvan University?

■ Why is the accident rate higher in Hetauda-Narayangadh sector of the East-West Highway?

■ Why do the stockholders of commercial banks favor returns in the form of bond dividends?

A relational hypothesis, on the other hand, describes the relationship between two or more variables with respect to some case. Relational hypotheses are of two types: correlational hypothesis and explanatory (causal) hypothesis. When a statement describes the relationship between two variables, it is called a correlational hypothesis.

EXAMPLES

■ Families with higher incomes spend more for recreation.

■ With education people's political participation will increase.

2. Explanatory Hypotheses

In an explanatory hypothesis, the implications of one variable on the other are stated. How one variable would cause or lead to a change in the other variable? Such causal relations can be unidirectional, in which variable A influences variable B, but not vice versa. They can also be bidirectional, in which each variable influences the other. The following are the examples of unidirectional and bidirectional relations:

EXAMPLES

- The increase in age would lead to decrease in organizational commitment.
- The productivity of skilled workers will increase if the workers are given added pay for production in access of the standard.

3. Directional and Non-directional Hypotheses

The directional hypothesis indicates the particular direction of the expected relationship between two variables. These relationships could be stated in positive or negative form. In stating the relationship between the two variables, the terms such as "positive", "negative", "more than' "less than" and the like are used. The directional hypothesis requires a one-tailed test. The following are the examples of directional hypotheses.

EXAMPLES

- Younger workers are less motivated than older workers.
- The greater the workload, the lower the job satisfaction of the workers..

The non-directional hypotheses are formulated when there are no clues available about the positive or negative relationship between two variables. Hence, these hypotheses do not indicate any direction of the relationship or difference and require a two-tailed test. Non-directional hypotheses are formulated in cases where previous studies do not exist or indicate conflicting findings (Sekaran & Bougie, 2013). The following are some examples of non-directional hypothesis:

EXAMPLES

■ There is a difference between work attitudes of industrial and agricultural workers.

■ There is no relationship between educated and uneducated employees in their occupational commitments.

4. Null and Alternative Hypotheses

There are the two methods of stating the hypothesis: null and alternative: A null hypothesis is

a statistical hypothesis that is tested for possible rejection under the assumption that it is true. The hypothesis contrary to null hypothesis is known as alternative hypothesis. In other words, a null hypothesis is a hypothesis set up to be nullified or refuted in order to support an alternative hypothesis.The null hypothesis is called null because it usually reflects the "no-difference" or "no-effect' situation.

The following example would clarify the concepts of null and alternative hypothesis. Suppose you are interested in a study to determine whether production would increase if the skilled workers are given a bonus or incentive pay for production in excess of a standard. For this investigation, you can formulate a research hypothesis in the following way:

EXAMPLE

The productivity of skilled workers will increase if they are given added pay for production in access of the standard.

This is a positive statement whose validity you would attempt to test through your research However, many researchers would object to the use of a positive hypothesis like this. A positive hypothesis like this may indicate a built-in prejudice on the part of the researcher toward a result favoring the hypothesis. To them, a null hypothesis is more desirable. The null hypothesis takes the form of a statement indicating no prejudice toward an answer. How can then this hypothesis be stated in a null form? The following is an example:

EXAMPLE No significant difference will exit between productivity of skilled workers on an incentives plan and productivity of skilled workers on a regular wage plan.

This null hypothesis thus indicates a definitive, exact relationship between two variables. That is, it states that the population correlation between two variables is equal to zero, or that the difference in the means of two groups in the population is equal to zero. In statistics, the only way of supporting your hypothesis is to refute your null hypothesis. Rather than trying to prove your idea (the alternative hypothesis) right, you must show that the null hypothesis is likely to be wrong. You have to refute or nullify the null hypothesis. You have to assume that your alternative hypothesis is wrong until you find evidence to the contrary. The following is another example of null hypothesis:

H_0: There is no difference between male and female statistically in their productivity.

Statistically expressed: H_o: $\mu_l = \mu_2$

Where, H_0= the null hypothesis

μ_1 = the productivity of male workers

μ_2 = the productivity of female workers

The alternate form of the above null hypothesis can be formulated as follows:

H_A : Male workers will have more productivity than female workers, or female workers will have less productivity than male workers.

Statistically expressed: $H_A : \mu_1 >$

μ_2 where, H_A = the alternate

hypothesis μ_1 = the productivity

of male workers

μ_2 = the productivity of female workers

From the above example, it is clear that an alternative hypothesis, which is the opposite of the null, is a statement expressing a relationship between two variables or indicating differences between groups. The following are some other examples of null and alternative hypotheses:

• H_0: There is no relationship between working conditions and job satisfaction of employees.

H_A: If the working conditions are improved, then the job satisfaction of employees will

improve. H_0: There is no difference between male and female workers in their organizational

commitment. H_A: Male workers will have greater organizational commitment than female

workers.

■ H_0: There is no relationship between pay and

productivity. H_A: Pay and productivity are positively

related.

■ H_0: Working condition, pay and fringe benefits have no influence on job satisfaction of workers.

H_A: Working conditions, pay and fringe benefits all have positive influence on job satisfaction of workers.

Stating the Null Hypothesis

■ There is no difference between the means of the two populations from which the two samples were drawn at random.

■ The two means in the two populations from which the samples were respectively

drawn at random are equal.

Criteria of Good Hypothesis Statement

The main requirement of hypothesis formulation is that it should fulfill certain basic criteria. Many different criteria can be found in the literature over what are the desirable qualities of a "good" hypothesis. Mason and Bramble (1997) outline the important features (criteria) of good hypothesis statement as follows: •

- Hypothesis should be stated in declarative form.
- Hypothesis should state the expected (articulated) describe a relationship between two or more variables.
- Hypothesis should be testable empirically.
- Hypothesis should be limited in scope.
- Hypothesis should be clearly and precisely stated. There should be no ambiguity in the variables or the relationships proposed.
- Hypothesis should state the conditions and circumstances under which it is supposed to apply.
- Hypothesis should reflect a guess at a solution or outcome to a problem based upon some knowledge, previous research, or identified needs .It should be consistent with most known facts.

Linkage between Research Hypothesis and Statistical Hypothesis

A research hypothesis is a specific and focused hypothesis that guides a research project or study. It is derived from a broader research question or problem, and it reflects the objectives and expectations of the researcher. For example, a research question could be: "How does gender affect the academic performance of students?". A research hypothesis could be: "Female students have higher grades than male students".

A statistical hypothesis is a hypothesis that can be formally tested with statistical methods and techniques. It is usually expressed in terms of parameters or distributions of a population or a sample. For example, a statistical hypothesis could be: "The mean height of men is equal to 175 cm".

In statistical hypothesis there are two types, null and alternative. Null is default hypothesis as statistical tests are designed to test homogeneity only. Almost Statistical tests can't test heterogeneity. This restriction is important as research question may go along with Null or

Alternative hypothesis. It is also useful to avoid further confusion as whatever research question default hypothesis will be null.