

HYPOTHESIS

Hypothesis comes from the Greek *hupo* and *thesis*. *Hupo* is temporary, while *thesis* is a statement or theory. A hypothesis is a provisional statement. Because of preconceived notions, hypotheses can be true, and they can also be false. Hypotheses can be prepared by researchers based on a strong theoretical foundation and supported by relevant research results.

Zikmunda reveals that a hypothesis is an unproven proposition or conjecture. So, the hypothesis is still tentative. Hypothesis statements only explain phenomena and possible answers to research questions. The real answer was obtained after research.

Researchers must understand about the content and how the steps in formulating a research hypothesis.

The formulation of the hypothesis has requirements or characteristics that must be met by the researcher. There are some characteristics of the formulation of hypotheses as follows:

1. Hypotheses are expressed in *declarative statements*, not question sentences. This statement is the view of researchers based on the results of the study of the theory used.
2. In experimental research hypotheses contain statements about the effectiveness, difference, or influence of one variable to another. In the hypothesis there are at least two variables studied.

3. The hypothesis must be *testable*. The research methodology section should describe the analytical techniques used to test the research hypothesis.

Types of hypotheses

In inferential research, hypotheses are classified into two, namely the directionless hypothesis which is also called the two-way hypothesis and the unidirectional hypothesis, as described below.

1. Directionless hypothesis (bidirectional)

A hypothesis without direction is a formulation (sentence) of a hypothesis that contains statements only about the existence of relationships or only differences, without explaining the direction of relationships between the variables studied, for example in a positive direction (+) or a negative direction (-). For example, the directionless hypothesis "There is a significant relationship between consumption and income".

2. Unidirectional Hypothesis

Unidirectional hypotheses are generally structured as statements that indicate the direction of the relationship or difference between the two variables under study; Direction reflects a positive relationship or vice versa negative. For example, the research hypothesis "The higher the income, the higher the consumption"; indicates a positive direction of the relationship.

How to Construct a Hypothesis

Research hypotheses are not formulated just following the researchers' guesses or assumptions, although the

researchers' guesses can be a starting point in studying theories and predicting future research results. So, hypotheses are formulated not just following the researchers' guesses or assumptions but come from the deciphering of the theoretical foundations compiled earlier.

The theory relates the existence of independent variables with dependent variables. Therefore, theoretical studies and relevant research findings explain problems and enforce predictions of answers to research questions.

Hypotheses must be tested for correctness through statistical tests using appropriate analytical techniques. The hypotheses that have been compiled need to be proven true using advanced statistical analysis techniques. The choice of statistical analysis techniques depends on several things, namely the type of research, research objectives and the type of data scale on each variable.

In the formulation of hypotheses statistically expressed through symbols. There are two kinds of hypotheses, namely the null hypothesis (H_0) and the alternative hypothesis (H_a), which are written always in pairs. If one is rejected, the other must be accepted, so a firm decision can be made, that is, if H_0 is rejected H_a must be accepted. By pairing it, a firm decision can be made, which is accepted, and which is rejected.

Below is an example of a statement that can be formulated as a statistical hypothesis:

In a study entitled "The Effect of Income on Consumption", the formulation of the statistical hypothesis is arranged as follows:

Ho : There is no effect of income on consumption
Ha : There is an effect of income on consumption

Proving Research Hypothesis

The substantiation of a hypothesis is always related to the term significance. An understanding of the level of significance is essential in the use of statistical methods to test hypotheses. This is because the conclusions of inferential research are always based on statistical decisions, which cannot be supported by one hundred percent absolute confidence.

In inferential research, researchers always use probability (chance) i.e. the chance of error in rejecting or accepting a hypothesis. In statistical analyses, the significance level (sig) is often given the symbol p or the symbol alpha (α) expressed in proportion or percentage, which means the probability of error.

According to the agreement of statisticians, the highest still acceptable chance of error is 0.05 or 5%; means a 5% chance of error, meaning 5 out of 100 errors. Conversely, it also means that the confidence level is $100-5 = 95\%$ or 0.95. In social research, especially in education, significance is generally measured from p by 1%, or 5%.

When conducting research analysis, researchers especially need to read (interpret) the results of Sig (p), and followed by reading the value (skore) r (correlation coefficient). While in the different test study, after the researcher read the sig results, followed by the t score (t -test results), or F (Anova results), and r square score (r^2).

It should be emphasized again that the significance of the research results (chance of error) is referred to from the

level of significance (p or sig) it finds. In the research analysis, the distribution of error opportunity results (SIG) is divided into three groups, namely:

1. $p < 0.01$, then the correlation or difference is stated to be very significant. Thus, the hypothesis is accepted!
2. $p < 0.050$ (between $0.011 - 0.050$), then the correlation or difference is declared significant. Thus, the hypothesis is accepted!
3. $P > 0.05$, then the correlation or difference is expressed insignificant (insignificant). Thus, the hypothesis is rejected!

There are differences in proving (testing) hypotheses in inferential research (including experimental research) with action research. Proving hypotheses in inferential research always uses statistical tests, as described above. The acceptance or rejection of a hypothesis is assessed from the results of its significance score. If the significance score obtained is more than 0.050 , then the research hypothesis is not significant or rejected. While in action research, hypothesis testing is reviewed from the results of each action compared with the formulation of indicators of the achievement of the research.