

CHAPTER 3B

FORMULATING THE HYPOTHESIS

Definition of a Hypothesis

A hypothesis is a statement of the researcher's prediction regarding the outcome of the study. A hypothesis statement is required in all types of research with the possible exception of descriptive studies. This is because the purpose of most of the descriptive studies is to find answers to specific questions which can be found in written documents.

Hypothesis is very similar to the research question. In the hypothesis, the research question is restated adding the expected answer to the research question. The main difference lies in the fact that in the research question, there is no bias towards the outcome of the study. In other words, in the research question, there is no indication of any estimation about the result of the study; only the problem is formulated in a question form. In the hypothesis, however, expectations concerning the variables stated in the purpose of the study are indicated. The difference between a research question and a hypothesis is very well demonstrated by Fraenkel and Wallen (1990) in the following examples:

Question: Will students who are taught history by a teacher of the same gender like the subject more than students taught by a teacher of a different gender?

Hypothesis: Students taught history by a teacher of the same gender will like the subject more than students taught history by a teacher of a different gender.

Question: How do teachers feel about special classes for the educationally handicapped?

Hypothesis: Teachers believe that students attending special classes for the educationally handicapped are thereby stigmatized.

or

Teachers believe that special classes for the educationally handicapped will help such students improve their academic skills. (p. 40)

According to Fraenkel and Wallen (1990), stating research questions as hypotheses has advantages because it

- "... leads to a more sophisticated understanding of what the question implies and exactly what variables are involved."
- "... enables one to make specific predictions based on prior evidence or theoretical argument. "
- "... helps us see if we are, or not, investigating a relationship" (pp. 40-41).

On the other hand, it is disadvantageous because it

- "... leads to a bias, either conscious or unconscious, on the part of the researcher."
- "... may prevent researchers from noticing other phenomena that might be important to study" (p. 41).

Types of Hypotheses

There are different means of categorizing hypotheses. "They can be classified in terms of how they are derived (inductive versus deductive hypotheses) or how they are stated (declarative versus null hypotheses)" (Gay, 1987, p. 55). As very well known, induction is the outcome of a generalization based on observation. In an inductive hypothesis a relation is established between certain variables, and accordingly a tentative explanation is offered.

This type of a hypothesis has scientific limitations because the results produced cannot be inferred to a large population. For instance, a doctor may observe that ten patients suffering from a specific illness are heavy smokers, but he cannot make a generalization on this for the whole population.

Deductive hypotheses, on the other hand, contribute more to the science of education because they provide evidence to accept, refuse, or modify the theory they have been derived from. For instance, in the following example, the researcher starts with a fact and makes a deductive hypothesis based on the given fact and afterwards tries to test its validity.

e.g. If the creative construction process does play a major role in child L2 acquisition, then we should find a more common sequence of acquisition of grammatical structures across diverse groups of children learning the same language.

The type of hypothesis given in research is generally a declarative hypothesis because it is stated in a declarative form. "A research hypothesis [declarative hypothesis] states an expected relationship or difference between two variables, in other words, what relationship the researcher expects to verify through the collection and analysis of data" (Gay, 1987, p. 55). Gay also groups declarative hypotheses under two headings: nondirectional and directional. "A nondirectional hypothesis simply indicates that a relationship exists; a directional hypothesis indicates the nature of the relationship or difference" (p. 56).

This type of hypothesis is also called alternative hypothesis. While Hatch and Lazaraton (1991, p. 25) use this word for only non directional hypotheses; Moore (1983, p. 62) uses it together with directional and nondirectional hypotheses. An alternative hypothesis is statistically formulated as H_1 .

A statistical hypothesis, on the other hand, is stated in the null form. This is because a statistical, or null, hypothesis is used "... to determine whether an observed relationship is probably a chance relationship or probably a true relationship" (Gay, 1987, p. 56). In statistical hypotheses, the expectation given in relation to the outcome of the study are based on logic; therefore, they do not reflect the researcher's own predictions. The null hypothesis is annotated as H_0 .

Moore (1983, p. 61), mentions three types of hypotheses: (a) directional, (b) nondirectional and (c) null hypotheses. The examples provided demonstrate that in a directional hypothesis, direction of the effect of the variable is given; in a nondirectional hypothesis, however, direction of the effect of the variable is not given. The null hypothesis simply indicates that there is no real existence of relationship among the chosen variables.

In the directional hypothesis (a), the group that is expected to do better is indicated. In the nondirectional hypothesis (b), however, a prediction cannot be made in favor of any the groups. In other words, it is not clear which group is predicted to score better, or poorer. In the null hypothesis (c), the prediction made is towards obtaining no significant differences between the two methods. In other words, the researcher sees no direct effect of the independent variables on the dependent variable.

- a) The sight reading method will obtain significant increases in verbal comprehension scores as compared to the phonics reading method.
- b) Significant differences will be found between the sight and phonics reading methods in the increasing verbal comprehension scores.
- c) No significant differences will be obtained between the sight reading method and the phonics reading method in increasing verbal comprehension scores.

Formulation of Hypotheses

There are certain points to take into consideration in formulating the hypothesis of a study. Therefore, a good hypothesis should

- be consistent with the previous research. In other words, it should be based on a sound rationale so that it would take the previous research as a starting point and lead to new research.
- provide a reasonable explanation on the hypothesized outcome of the research regarding the occurrence of expected behaviors, phenomena, or events.
- be stated briefly and clearly.
- indicate the expected relationship or the difference between the two variables.
- provide definitions for variables in operational and measurable terms.
- be testable. There should be a way to collect data to support the hypothesis. The duration of data collection
- should not be too long as to exceed the time given to the graduate student to complete the graduate degree.

Gay (1987, p. 57), in order to bring clarification to the nature of a hypothesis, introduces the following model:

Formula

Xs who get Y do better on Z than

Xs who do not get Y (or get some other Y)

Xs = the subjects
Y = the treatment, in independent variable (IV), and
Z = the observed outcome, the dependent variable (DV)

Having the model in mind and knowing what each letter stands for, the following hypothesis can be interpreted in terms of X, Y, and Z:

Interpretation

Teachers who indulge in activity with the aim of improving their practice or revising their curriculum, undergo a process of professional growth.

In this example,

X= teachers

Y= activity for improving their practice or revising their curriculum

Z= professional growth

In a similar manner, the following model can be given for a null hypothesis:

Formula

There is no difference on Z between Xs who get Y and Xs who do not get Y (or get some other Y).

Interpretation

There is no significant difference on a written grammaticality judgement task between the students who attempt to communicate orally in the target language and the students who do not.

X= students

Y= attempt to communicate orally in the target language

Z= written grammaticality judgement task