

Research Hypothesis

Research Methodology



HYPOTHESIS

Table of contents



Objectives	3
I - Prerequisites	4
II - WHAT IS A HYPOTHESIS?	5
III - ADVANTAGES OF STATING HYPOTHESES	6
IV - SIGNIFICANT HYPOTHESES	7
V - TYPES OF HYPOTHESIS	8
VI - DEVELOPMENT OF WORKING HYPOTHESIS	11
VII - Activity 1	13
VIII - Exercice : Activity 2	14
IX - Exercice	15
X - Exercice	16
XI - Exercice	17
Bibliography	18

Objectives

By the end of the lesson, students will be able to :

1. differentiate different types of hypothesis
2. formulate specific hypotheses
3. identify a good and a bad hypothesis

Prerequisites



Students should have prior knowledge of :

1. what variables are
2. how to formulate research questions

WHAT IS A HYPOTHESIS?



A hypothesis is, simply put, a prediction of the possible outcomes of a study. For example, here is a research question followed by its restatement in the form of a possible hypothesis:

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.

Note that the dependent variable is liking for history, the independent variable is the gender of the teacher. Possible extraneous variables include the personality and ability of the teacher(s) involved; the personality and ability level of the students; the materials used, such as textbooks; the style of teaching; ethnicity and/or age of the teacher and students; and others. The researcher would want to control as many of these variables as possible.

Here are two more examples of research questions followed by the restatement of each as a possible hypothesis:

Question: Is rapport with clients of counselors using client-centered therapy different from that of counselors using behavior-modification therapy?

Hypothesis: Counselors who use a client-centered therapy approach will have a greater rapport with their clients than counselors who use a behavior modification approach.

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

Hypothesis: Teachers in XYZ School District believe that students attending special classes for the educationally handicapped will be stigmatized.

ADVANTAGES OF STATING HYPOTHESES



First, a hypothesis forces us to think more deeply and specifically about the possible outcomes of a study. Elaborating on a question by formulating a hypothesis can lead to a more sophisticated understanding of what the question implies and exactly what variables are involved. Often, as in the case of the third example above, when more than one hypothesis seems to suggest itself, we are forced to think more carefully about what we really want to investigate. A second advantage of restating questions as hypotheses involves a philosophy of science.

The rationale underlying this philosophy is as follows: If one is attempting to build a body of knowledge in addition to answering a specific question, then stating hypotheses is a good strategy because it enables one to make specific predictions based on prior evidence or theoretical argument. If these predictions are borne out by subsequent research, the entire procedure gains both in persuasiveness and efficiency. A classic example is Albert Einstein's theory of relativity. Many hypotheses were formulated as a result of Einstein's theory, which were later verified through research. As more and more of these predictions were shown to be fact, not only did they become useful in their own right, they also provided increasing support for the original ideas in Einstein's theory, which generated the hypotheses in the first place.

Lastly, stating a hypothesis helps us see if we are, or are not, investigating a relationship. If not, we may be prompted to formulate one

SIGNIFICANT HYPOTHESES

IV

As we think about possible hypotheses suggested by a research question, we begin to see that some of them are more significant than others. What do we mean by significant? Simply that some may lead to more useful knowledge. Compare, for example, the following pairs of hypotheses. Which hypothesis in each pair would you say is more significant?

Pair 1

- a. Second-graders like school less than they like watching television.
- b. Second-graders like school less than first-graders but more than third-graders.

Pair 2

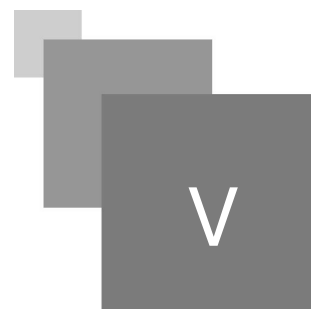
- a. Most students with academic disabilities prefer being in regular classes rather than in special classes.
- b. Students with academic disabilities will have more negative attitudes about themselves if they are placed in special classes than if they are placed in regular classes.

Pair 3

- a. Counselors who use client-centered therapy procedures get different reactions from counselees than do counselors who use traditional therapy procedures.
- b. Counselees who receive client-centered therapy express more satisfaction with the counseling process than do counselees who receive traditional therapy.

In each of the three pairs, we think that the second hypothesis is more significant than the first since in each case (in our judgment) not only is the relationship to be investigated clearer and more specific but also investigation of the hypothesis seems more likely to lead to a greater amount of knowledge. It also seems to us that the information to be obtained will be of more use to people interested in the research question

TYPES OF HYPOTHESIS



The hypothesis may be stated as a null hypothesis and as an alternative hypothesis.

Imagine you wished to discover if an order exists in the acquisition of English spelling patterns. You do not want to see whether the order is different according to the age of learners or whether the learner's LI might influence the order. The null hypothesis is often annotated as H_0 and the alternative hypothesis is annotated as H_1 .

In the null might be: There is no order of acquisition of English spelling patterns however,
the alternative might be: There is an order of acquisition of English spelling patterns.

Let's assume that spelling patterns have been scaled for difficulty; that is, there is a known order of difficulty for major and minor spelling patterns in English. This order (in literature), however, was established using spelling tests of native speakers of English. The question is whether the order is the same for second language learners. If it is, then ESL beginners should be able to show accurate performance only on the easiest patterns. They would place at the bottom of the spelling order continuum. The more advanced the learner, the higher he or she should place on the continuum of the known order scale of difficulty for spelling patterns.

Now assume that you have been hired to design a course book on English spelling patterns for university students who are in intermediate and advanced ESL classes. You would like to arrange the instruction to reflect the already established spelling continuum. Before you begin, though, you wonder if spelling errors of ESL students change as they become more proficient overall in the language. This time, unlike the previous example, you want to look at a relationship between two things: L2 proficiency and where students place on the spelling continuum. You might state the hypothesis in the following ways:

H_0 : There is no relationship between L2 proficiency and placement on the spelling continuum. This is the null hypothesis and it says that the evidence you gather will show no relation between a student's proficiency and placement on the continuum. If the null hypothesis is correct, then the continuum is useless as a guide to sequencing spelling patterns. If the null hypothesis is incorrect, then the continuum may be helpful.

The alternative hypothesis would be: H_1 There is a relationship between L2 spelling proficiency and placement on the spelling continuum. With both forms, you can test the null hypothesis, H_0 against the alternative hypothesis H_1 . In addition, you may state the alternative hypothesis in a directional form

(positive or negative). That is, on the basis of previous research in the field, you may believe that a relationship does exist and that you can also specify the direction of the relationship. If other researchers have found that the scale "works" for L2 learners--i.e., that the more proficient the learner is in general language development, the higher the placement on the continuum, you can use a directional hypothesis. If previous research suggests a positive direction, the directional hypothesis is in the positive form.

H2 There is a positive relationship between L2 proficiency and placement on the spelling continuum. This says that the more proficient the student, the higher the placement on the spelling continuum. If it is correct, then your data substantiate previous findings and give additional evidence for the use of the sequence in materials development.

H3 There is a negative relationship between L2 proficiency and placement on the spelling continuum. This says that the more proficient the student, the lower the placement on the continuum. This seems an unlikely hypothesis and would not be used unless previous research had suggested that the continuum which was established for first language learners not only does not apply to second language learners (in

which case the null hypothesis would be correct) but that the continuum works in the opposite direction (the negative direction alternative hypothesis is correct).

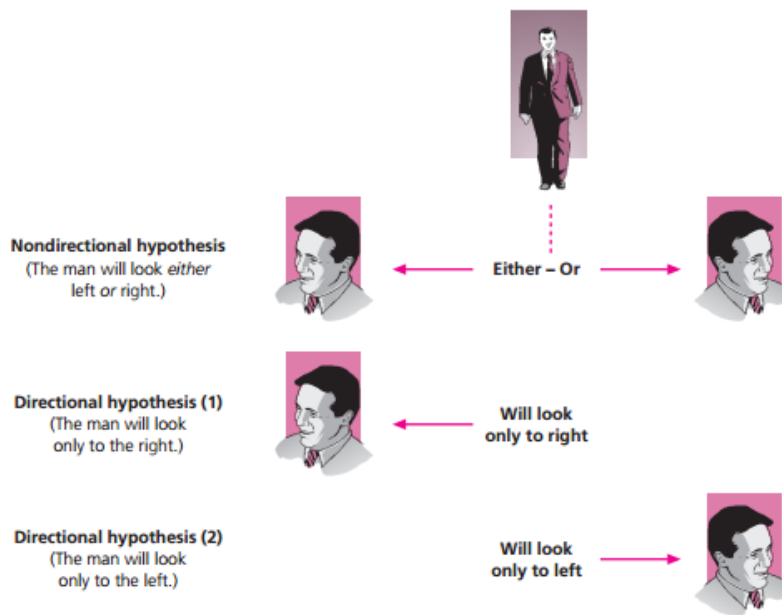
The spelling patterns in the continuum are reversed so that what was difficult for the L1 learner is easy for the L2 learner and vice versa!

In most research reports, the null hypothesis (even though it may not be formally stated) is tested rather than a directional alternative hypothesis. This is because there is seldom a body of research which has already established a relationship among the variables included in our research. Strange as it may seem, it is easier to find evidence that supports a directional hypothesis than it is to reject a null hypothesis. Nevertheless, there are times when a directional hypothesis is appropriate (when previous research has shown evidence in this direction). Different statistics will be used based on this distinction of whether the hypothesis is directional. Sometimes it is necessary to write more than one hypothesis to cover the research question. For example, in the task of preparing materials for a spelling textbook, you might also want to know whether students from different first language groups (as well as of differing proficiency levels) get the same scores on general tests of spelling. The null hypothesis for first language membership could be stated as: There is no relationship between first language membership and spelling test scores.

This means you expect to find no difference among the groups. However, there is still a possibility that there could be large differences among students from different groups when students are beginning learners and that this difference might disappear over time so that there would be no difference among advanced learners. In such a case, our results would show an interaction where the effect of language proficiency interacts with the effect of the first language. This requires a hypothesis about the possible interaction between first language membership and proficiency with spelling scores. There is no interaction between first language and proficiency and spelling test scores.

If the results are such that an interaction is found, then you cannot say that either first language or

proficiency act alone. Rather, they interact so that differences in first language groups do show up at some levels of proficiency but not at others.



Types of hypothesis

DEVELOPMENT OF WORKING HYPOTHESIS

VI

After extensive literature survey, researcher should state in clear terms the working hypothesis or hypotheses. Working hypothesis is tentative assumption made in order to draw out and test its logical or empirical consequences. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. In most types of research, the development of working hypothesis plays an important role. Hypothesis should be very specific and limited to the piece of research in hand because it has to be tested. The role of the hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track. It sharpens his thinking and focuses attention on the more important facets of the problem. It also indicates the type of data required and the type of methods of data analysis to be used.

How does one go about developing working hypotheses? The answer is by using the following approach:

- (a) Discussions with colleagues and experts about the problem, its origin and the objectives in seeking a solution;
- (b) Examination of data and records, if available, concerning the problem for possible trends, peculiarities and other clues;
- (c) Review of similar studies in the area or of the studies on similar problems; and
- (d) Exploratory personal investigation which involves original field interviews on a limited scale with interested parties and individuals with a view to secure greater insight into the practical aspects of the problem.

Thus, working hypotheses arise as a result of a-priori thinking about the subject, examination of the available data and material including related studies and the counsel of experts and interested parties. Working hypotheses are more useful when stated in precise and clearly defined terms. It may as well be remembered that occasionally we may encounter a problem where we do not need working hypotheses, specially in the case of exploratory or formulative researches which do not aim at testing

the hypothesis. But as a general rule, specification of working hypotheses is another basic step of the research process in most research problems.

See "Hypothesis"

Activity 1

VII

Formulate the null and alternative hypothesis based on the following questions

1. Do students who attend more lectures get better exam results?
2. Is there an age-related effect on learning the grammar of a second language ?

Exercise : Activity 2

VIII

The research hypothesis includes

- ☐ only the null hypothesis.
- ☐ the null and causal hypotheses.
- ☐ only the causal hypothesis.
- ☐ none of the above.

Exercise

IX

A research hypothesis

- ☐ is a tentative statement.
- ☐ must include at least three variables.
- ☐ is used only at the experimental level.
- ☐ (d) cannot be directly tested.

Exercise



If the null hypothesis is false then which of the following is accepted?

- ☐ Null Hypothesis
- ☐ Positive Hypothesis
- ☐ Negative Hypothesis
- ☐ Alternative Hypothesis.

Exercise

XI

Alternative Hypothesis is also called as?

- ☐ Composite hypothesis
- ☐ Research Hypothesis
- ☐ Simple Hypothesis
- ☐ Null Hypothesis

Bibliography

XI

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