Formulating Hypotheses and Research Questions

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Introduction

Formulating hypotheses and research questions are important steps in writing research proposals. They are also central to the research programme as well as writing up the thesis.

In a strictly positivistic sense, as found in the natural sciences as well as in economics, psychology etc, a research activity is essentially and exclusively geared towards 'testing' hypotheses. Post-positivist research traditions are usually uncomfortable with the idea of 'hypothesis' and the epistemological foundations of the very activity of 'hypotheses-testing.' However, hypothesis is still useful in research, even when one wants to avoid its positivistic connotations.

Similarly, research activity is usually directed towards finding answers to some key questions derived from the research problem. Such answers are to be found in the collection of data, evidence and information relevant to the issues embedded in research questions. In writing up the thesis, the structure of the thesis is usually organized around research questions, formulated in the research proposal.

We can actually say that the research problem, hypothesis and research questions constitute the 'road map' to research and analysis.

Hypotheses

As we have already noted, the idea of research activity as testing of hypotheses is grounded in the positivist/empiricist tradition of research. It is employed mostly in quantitative and experimental research in social and behavioral sciences.

The idea of hypothesis testing was there in what Francis Bacon presented as the 'scientific method.' In Bacon's scheme of the 'scientific method,' hypotheses are derived from the prevailing knowledge about the subject under study. The 'scientist' tests the hypothesis/hypotheses in a double sense: (i) scrutinizing the validity of existing knowledge claims, and (ii) confirming existing knowledge claims or making new knowledge claims through empirically collected data. It was also based on scientific skepticism about the existing knowledge. In this positivistic approach, testing a

hypothesis involves 'observation,' collection of data through observation, classification of data, testing the hypothesis against the quantitative data, and finally generalization of research findings in the form of theory-building.

In the non-positivist research traditions too, the idea of hypothesis testing has been adopted with modifications. In some of these traditions, concepts like 'testing' and 'data collection' are in favour of 'exploring' and 'information' or 'narratives.'

Hypothesis: Definition

The scientific use of the term 'hypothesis' is not very different from the everyday use of the term, except that in the scientific meaning of it, there are elaborate classifications and forms of hypothesis.

In press conferences as well as cross-examination of witnesses in the court room, there can be occasions when the person who answers would refuse to answer 'hypothetical' questions. For example, a lawyer cross-examining a witness might ask a question like the following: "Witness, what you would have done if you were present at the murder scene, when the victim of shooting pleaded for immediate medical help?" A smart witness, who could see the hidden motives of the lawyer, might answer by saying: "I am sorry, Sir. Yours is a hypothetical question. I cannot give an answer."   Similarly, a smart journalist might ask a politician at a press conference a question like the following. "Sir, what would you have done if you were offered a bribe of a brand new BMW sports car?" A not - so - smart politician might say: "I cannot answer your hypothetical question."

In both these examples, 'hypothetical' means something that has not actually happened. It is an imaginary and assumed situation. In scientific research, the idea of hypothesis suggests a causal situation, or cause and effect relationship, which the researcher assumes to have happened or will happen.

In more specific terms, a hypothesis is a tentative explanation of the research problem. A positivistic definition of the hypothesis, employed in behavioral sciences, would be as follows:

"Research hypotheses are the specific testable predictions made about the independent and dependent variables in the study." (Website of the School of Psychology, University of New England).

Thus, a research hypothesis can be understood as

- A tentative, or proposed, explanation of the problem under investigation

- A testable prediction.
- An intelligent or informed guess.

Before we go to the different ways of formulating a hypothesis, let us look at a few examples:

-When the educational standards of women improve, they tend to prefer nuclear families.

-The more women enter higher education, the greater is the tendency among them to prefer nuclear families.

-Rapid urbanization does not lead to increase in crime among the urban poor.

-The more is the rapidity of urbanization, the lesser (or greater, as the class bias among criminologists goes) is the incidence of crime among the urban poor.

-There is no relationship between the increase in rural income levels and the expansion of saving habits among young women.

-Increase in income levels does not contribute to a culture of saving among rural women.

-The spread of democratic values reduces the space for electoral malpractices.

-The greater is the expansion of democratic values, the lesser is the tendency among political actors to engage in electoral malpractices.

The examples given above help us recognize some of the key features of hypothesis and the manners in which hypotheses are usually formulated. They are:

- ***A hypothesis is an explanatory/ declaratory statement.***

It seeks to ***explain*** in a very precise, short, well-focused and one-sentence formulation the research problem under investigation.

It declares the relationship between the two variables that constitutes the hypothesis. It also declares the researcher's position, tentative though, in relations to other positions available in the academic literature, concerning the problem under study.

- ***A hypothesis is usually composed of two variables: Independent and Dependent.***

A hypothesis represents 'a declarative statement of the relations between two or more variables.' (Kerlinger, 1979).

The relationship between the independent and dependent variable is a cause and effect relationship.

- ***The hypothesis provides the ground for 'testing' the tentative explanation provided in it. As such, the hypothesis is formulated in a manner that allows testability of the explanation claim made by the researcher.***

There are two broad approaches to hypothesis: (i). Hypothesis as the beginning of theory-building, and (ii). Hypothesis as a testable prediction.

An example for the theory-building hypothesis is as follows:

> Changes in the patterns of land tenure do not explain the increasing class stratification in the agrarian countryside.

An example of operational hypotheses is:

> The greater support available for students outside the class-room, the higher is their performance at examinations.

There are other ways of classifying hypotheses.

- **Directional hypothesis** – the researcher posits a direction for the relationship between the two variables.

Example: When the political parties adopt social welfarist platforms, they are more likely to win elections.

(When X increases, Y also increases)

- **Non-Directional Hypotheses**, have no such directional relationship between the variables.

Example: There is a relationship between smoking and divorce.

(X is linked with Y).

Null Hypothesis – there is no relationship between the variables; the relationship is a negative one.

Example: Smoking does not contribute to divorce.

When a null hypothesis is tested, usually an alternative hypothesis is also offered. The alternative hypothesis has to have a positive relationship between the variables and it offers an alternative to the previous null hypothesis.

Example: Excessive preoccupation with money among spouses leads to greater incidence of divorce.

- Quantitative research seeks to establish cause-and-effect (CE) explanations. Hypotheses are formulated by giving expression to that CE relationship.