HYPOTHESIS

What is hypothesis?

When a researcher conceptualizes her research problems, she thinks about it in general terms. Research questions or hypotheses help look at the specific aspects of the problem. So hypotheses or research questions enable us to carry out meaningful analysis. Hypotheses are specific statements about the problem made at the initial stage of the research, which may be proved right or wrong at the end of the analysis (Henn et al 2006).

Hypotheses are formulated at the third stage of the research process (see Diagram 1). According to Goode and Hatt (1981: 56), '[a] hypothesis states what we are looking for.' They write '[i]t is a proposition which can be put to a test to determine its validity.' Hypotheses are primary assumptions about the interrelations of different variables which set the direction of the entire research process. It may be noted that "a variable is simply an attribute on which cases vary. 'Cases' can obviously be people, but they can also include things such as households, cities, organizations, schools, and nations. If an attribute does not vary, it is a constant" (Bryman 2012: 48). Once a hypothesis assumes a relationship between two or more variables, the validity of such assumption, made on the basis of the personal experiences, knowledge and insights of the researcher, is tested through suitable statistical techniques. Hence, hypothesis is '[a]n informed speculation, which is set up to be tested, about the possible relationship between two or more variables' Bryman (2012: 712). If the primary assumptions are proved correct after the analysis of data, they become part of the theory. So it is said that 'hypothesis provides the link between the empirical world and the theory' (Majumdar 2005: 78). Hypothesis formulation and testing are closely associated with the quantitative approach to study social phenomena (Jupp 2006).

Features of a good hypothesis

'A hypothesis is a specified testable expectation about empirical reality that follows from a more general proposition' (Babbie 2004: 44). It is the assumption made about the relationship between different variables on the basis of existing knowledge or common sense. But all declarative statements or assumptions are not hypotheses. Let us discuss some examples: Examples: 1. 'The rate of dropout is higher among the girl students'. 2. 'The rate of dropout varies with gender with the girl students having a higher dropout rate'. The first assumption is not an example of a good hypothesis as it does not clearly state the two variables. But, the second one is a better one because it clearly mentions gender and rate of dropout as two variables and a relationship between them is assumed.

The features of good hypotheses are as follows:

- Hypothesis generally states (predicts) the relationship between two variables.
- It is expressed as a statement and not as a question (Payne and Payne 2005: 112)
- Hypothesis should be clearly stated, specific and conceptually clear.
- It should be consistent with the known laws of nature (Majumdar 2005)
- Hypothesis is testable (after the final analysis it may prove to be correct or incorrect).

Sources of hypotheses

Hypotheses are not ordinary or casual statements about the empirical reality. They emerge through a systematic and logical process. According to Goode and Hatt (1981), there are four possible sources from which hypotheses can emerge. These are: Culture can furnish hypotheses – Every human society has some distinctive cultural traits. Many social science researches focus on human behaviour or on meaningful social actions. Folkways, mores, values, customs, belief patterns can help formulate hypotheses in these studies.

a) **Hypotheses can emerge from the science itself –**

In the backdrop of any research there should be one or more theories. Hypotheses are often deducted from a theory to verify or modify some of its basic conclusions. Goode and Hatt (ibid.) opine that the socialization process, that a student of a particular discipline undergoes, teaches her/him about the promising areas, paradigms, laws, analytical categories, concepts and methods of that particular discipline. This knowledge can help the student to assume some possible causal relationships between some variables that she or he can put to a test for verification.

b) **Hypotheses can be formulated from analogies –**

Analogies between human society and nature, between two different types of communities are often a fertile source of hypotheses. For obvious reasons, the researcher should take care in making such analogies. Analogies should not be illogical, it should, on the other hand, be consistent with the known laws of nature.

c) **Hypotheses can come out from idiosyncratic, personal experiences of**

the researcher –

The scientist lives in a particular culture or she can encounter some cultural traits of some other cultures. Her personal experiences can help her formulate effective hypotheses.

Types of hypothesis

Hypothesis can be classified in many ways. Goode and Hatt (1981) categorize them into three types on the basis of the level of abstraction.

1. **Hypothesis that state the existence of empirical uniformities –**

   Generally these hypotheses are framed when the researchers want to test the 'common-sense propositions'. In other words, sometimes the researchers are interested to establish the parallels between what people think about a phenomenon and what actually exists. These often lead to the observations of simple differences. In these hypotheses, sometimes, common sense ideas are put into well-defined concepts and then the hypotheses are statistically verified.

2. **Hypothesis that is concerned with complex ideal types** – These hypotheses try to focus on the logically assumed relationships existing among empirical uniformities. In particular, these hypotheses 'lead to specific coincidences of observations' (ibid.: 62). For obvious reasons, these types of hypotheses deal with a higher level of abstraction than the hypotheses that are concerned with the existence of empirical uniformities.
3. **Hypothesis that is concerned with the relation of analytical variables –** According to Goode and Hatt (ibid.) these hypotheses deal with the highest level of abstraction. In this case, the researcher analytically formulates a hypothesis that shows a relationship between changes in one aspect of the phenomenon with the actual or assumed changes in another aspect.

Majumdar (2005) has categorized hypothesis into two types – eliminative (or analytic) induction and enumerative induction. In the former case hypotheses are formulated as 'universal generalization' and the presence of any contrary evidence leads to its rejection. In case of enumerative induction, a complete enumeration is required to accept or reject the hypothesis. Look at the following examples:

Examples

Hypothesis I: Female students score better in Research Methodology course

than the male students.

This is an example of eliminative or analytic induction. If any male student is found, who has scored more than the female students; there would be no reason to accept the hypothesis.

Hypothesis II: Ten Percent female students score better in Research Methodology course than the male students. This is an example of enumerative induction. To accept or reject the hypothesis a complete enumeration is necessary.

Hypothesis Testing

A researcher formulates a number of hypotheses (sometimes called experimental hypotheses) and all these hypotheses are tested on the basis of data collected for the study. When a researcher wants to test the hypothesis with the help of some statistical techniques, he or she frames what is called null hypothesis. According to Babbie (2004: 49), in connection with hypothesis testing and tests of statistical significance, the hypothesis that suggests that there is no relationship among the variables under study is null hypothesis. Sometimes null hypothesis states that there is no difference between two variables.

Examples

Null Hypothesis (denoted by H0):

There is no difference between the percentage of male students and the percentage of female students who have got 60 per cent marks in Research Methodology course

If the data collected for the study show, for example, that in reality there are differences between the percentage of male students and percentage of female students who have scored 60 per cent in Research Methodology course, there are statistical techniques to determine whether the difference found is statistically significant, or we can ignore the difference attributing it simply to chance factors and accept the null hypothesis (H0). If the difference obtained from the collected data is statistically significant the researcher rejects the null hypothesis and accepts the alternative hypothesis. For obvious reasons there may be more than one alternative hypotheses (denoted by: H1, H2, H3 etc) the researcher has to select any one from among the alternatives if the null hypothesis (H0) is rejected. The following are the examples:

Alternative Hypothesis (H1):

There is significant difference between the percentage of male students and the percentage of female students who have got 60 per cent marks in Research Methodology course.

Or,

Alternative Hypothesis (H2): The percentage of male students is higher than the percentage of female students who have got 60 per cent marks in Research Methodology course.

Or,

Alternative Hypothesis (H3): The percentage of female students is higher than the percentage of male students who have got 60 per cent marks in Research Methodology course.

It is not always easy to accept a hypothesis from among the alternatives. The researchers often has to find out what is called crucial instance to take a final decision regarding the acceptance of a hypothesis from among a number of options (alternative hypotheses). Sometimes they have to go through an experiment to decide what actually would be the alternative hypothesis (in the above example whether H2 is correct or H3 is correct. It should be noted that both H2 and H3 cannot be correct at the same time.) The experiment which finally helps to come to a final decision regarding which one should be accepted reasonably from among the hypotheses is called experimentum crucis (Babbie 2004; Majumdar 2005). There are a number of statistical techniques like Z-test, t-test, $\chi 2$ -test etc to test the null hypothesis.

Bibliography

Andrews, R. Research Questions. London: Continuum, 2003.

Babbie, E. The Practice of Social Research. Australia: Thomson Wadsworth, 2004.

Bose, P. K. “Problems and Paradoxes of Inductive Social Science: A Critique of Ramkrishna Mukherjee”. Sociological Bulletin 46, no. 2 (1997): 153-171.

Bryman, A, Quantity and Quality in Social Research. London: Routledge, 1988.
…….. Social Research Methods. Oxford: Oxford University Press, 2012.

Das, D. K. L. Practice of Social Research. Jaipur: Rawat Publications, 2004.

Goode, W. J. and Hatt, P. K. Methods in Social Research. Auckland: McGraw – Hill International Book Company, 1981.

Henn, M. et. al. A Short Introduction to Social Research, London: Sage Publications, 2006.

Jupp, V. The Sage Dictionary of Social Research Methods. London: Sage Publications, 2006.

Majumdar, P. K. Research Methods in Social Science. New Delhi: Viva Books Pvt. Ltd., 2005. Mukherjee, R. Systematic Sociology. New Delhi: Sage Publications, 1993.

Payne, G. and Payne, J. Key Concepts in Social Research. London: Sage Publications, 2005.

Singh, Yogendra. ICSSR Research Surveys and Explorations: Indian Sociology. Box Set, Vols 1-3. New Delhi: Oxford, 2013.

Vaus, De D, Surveys in Social Research. London: Routledge, 2002.

White, P. Developing Research Questions: A Guide for Social Scientists. New York: Palgrave Macmillan, 2009.

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