

Problem Statement, Theory, and Hypotheses

Problem statement. Inquirers confront problems that puzzle and stimulate. These problems may be expressed as interrogatives, viz., Are fathers essential for positive child development? Do student-generated, higher-order questions facilitate comprehension? What is the effect of text summarization on classroom test performance? Does learning to read faster improve the comprehension of poor readers? Are favorable instructor course evaluations related to course work load (or grades)? Do students feel they have learned more when the presentation is simple and easy to understand? Do they feel they have learned less when they must struggle with the material? Relevant theories, models, hypotheses, and empirical observations exist for many of these problems.

The empirical observations from a particular study are useful to the investigator who conducted the inquiry but may be of little use to other investigators unless these findings can be integrated into the larger body of knowledge. Hence, the empirical observations from individual studies are incorporated into theory.

Theory. Kerlinger¹ (1986) defines theory as “a set of interrelated constructs (concepts), definitions, and propositions that presents a systematic view of phenomena by specifying relationships among variables, with the purpose of explaining and predicting phenomena” (p. 9).

The purpose of scientific inquiry is first to understand a phenomenon, then to explain and to predict, and, if possible, to control the occurrence of a phenomenon. Ideally, theory integrates, organizes, and classifies the many facts documented in individual empirical studies. A theory explains by incorporating empirically established relationships among variables, and predicts by stating the theory's antecedent-consequent (cause-and-effect) relationships.

Theories are developed by combining logic with the results of observations. Theories may be expressed in such a way that constructs can be symbolized and the rules of logic applied to permit deductions. In other instances, a theory contains a model that depicts the relationships among constructs and permits conjecture.

Hypothesis. Popular opinion views theory as merely “vague conjecture.” This is partly correct: theory is conjecture, but theory must be explicit, clear, and unambiguous in order to generate specific, testable hypotheses. Operational definitions are the linkage between theory constructs (i.e., Shakespeare's “airy nothingness”) and variables that can be measured. Hypotheses (or research questions) are developed to be tested; theories are developed to explain the empirical observations and to predict.

The process of theory development involves a continual refinement of the interaction between constructs and empirical observations in a manner that makes possible deduction leading to explanation and prediction. The input for theory development results from the research activities of observation, study, and experimentation.

Theories play several roles in the development of science. Theories:

1. organize the existing knowledge in particular areas. A theory pulls together and enables deeper meaning by connecting the results of individual studies.
2. explain the results of research studies. However, explanation in most areas is never complete and is subject to revision as more empirical evidence becomes available.
3. predict future phenomena. Although theory is not an absolute truth, some theories are sufficiently developed to allow prediction with a high level of accuracy.
4. enable control of occurrences of phenomena. Difficulty in manipulating variables limits inquirers; nevertheless, a goal of science is to enable control through theory.
5. suggest new avenues for inquiry. Rather than being finished, theory generates ideas for further investigation.

The formulation and testing of a hypothesis related to the problem statement provides empirical observations that, combined with logic, are the basis for developing theories.

1. Kerlinger, F. N. (1986). *Foundations of behavioral research* (3rd ed.). New York: Holt, Rinehart, & Winston.