**THE EXPERIMENTAL METHOD: A TOOL WITH GREAT POWER**

Of all of the methods presented, the experimental method is the one that gives a researcher the most confidence when making the decision to accept or reject a hypothesis. The experimental method is a research tool characterized by a control over variables, the identification of a cause (or causes), and a well defined measure of behavior. These aspects of the experimental method give it great power.

Four key concepts will help you understand the experimental method: (1) the control group, (2) the experimental group, (3) the independent variable, and (4) the dependent variable. Definitions will be presented followed by an example incorporating all four concepts into an experiment. The control group receives no treatment; it is dealt with in a more or less conventional manner. It provides a standard of comparison, a set of observations that can be contrasted with the behavior of the experimental group. The experimental group receives a novel treatment, a condition (or set of conditions) that is presumed to affect behavior. It is the target group, the one that will perhaps provide original or particularly interesting data.

The independent variable is one that is assigned to the subjects by the experimenter. There will be at least two values, or measures, of this variable. It is the variable that is thought of as a cause of behavior.

The dependent variable is a measure of the behavior of the subjects. In most experiments, this variable can be expressed as a set of scores. The dependent variable is associated with the effect of a cause. Scores make it possible to compute statistical measures and make evaluations based on the data.

You will recall that near the beginning of this chapter a teacher named Nora was said to have formed the hypothesis that room temperature has an effect on test performance. Let‘s say that Nora wants to do an experiment to evaluate this hypothesis.

Nora writes the names of sixty students on a set of cards. The cards are shuffled and then dealt into two groups, Group A and Group B. A coin is flipped. She says in advance that if heads comes up, Group A will be the control group. If tails comes up, Group B will be the control group. Heads comes up, and Group A becomes the control group. By default, Group B is designated the experimental group.

It is important to note that the process by which subjects are assigned to groups is a random process, meaning all subjects have an equal chance of being included in either group. The aim of this procedure is to cancel out the effects of individual differences in the subjects that may have an effect on the experiment. Such variables as age, sex, weight, intelligence, and income level are not, for the moment, under study. A practical way to minimize the effects of such variables is to assign subjects randomly to conditions.

The independent variable will be room temperature. Let‘s say that most of the time Nora‘s students take tests in a room that is 68 degrees Fahrenheit. The control group will be tested in a room at this temperature.

Up until now Nora has been thinking that a ― cool room will have a positive effect on test performance. The time has come to define ― coolmore precisely. An operational definition is required, a definition of a variable such as ― cool in terms of its measurement operations. Nora decides that her operational definition of ― cool will be a temperature of 55 degrees Fahrenheit. The word cool is an imprecise, subjective term. On the other hand, 55 degrees Fahrenheit is precise and objective.

The experimental group will be tested at this temperature.

Let‘s say that subjects in both groups are given the same twenty-question multiple-choice test. Scores range from a low of 5 to a high of 20 correct. The mean (i.e., average) score for subjects in the control group is 11. The mean score for subjects in the experimental group is 14. On the surface, it appears that Nora will make the decision to accept her experimental hypothesis. It appears that a cool room does in fact facilitate test performance.

Before a firm decision can be made to accept or reject a hypothesis, a statistical evaluation of the data must be made. A difference between means is sometimes due to chance.

An experiment can, of course, be much more interesting than the one described, and there can be two or more independent variables. However, Nora‘s experiment was presented because it reveals the essentials of the experimental method.

**Decide whether the following statements are true or false**

1. The experimental method is characterized by a control over dependent and independent variables, the identification of a cause (or causes), and a well defined measure of behavior.

2. There are three key concepts of the experimental method: the experimental group, the independent variable, and the dependent variable.

3. The experimental group provides a standard of comparison, a set of observations that can be contrasted with the behavior of the control group.

4. The dependent variable is associated with the effect of a cause.

5. The purpose of a random process is to cancel out the effects of individual differences in the subjects that may have an effect on the experiment.