

Experimental Method

**INTRODUCTION**

An alumnus of ten years, shown a list of current examination questions by his old professor, exclaimed:

"Why, those are the same questions you asked when I was here!"

"Yes," said the professor, "in Psychology we ask the same questions every year."

"But don't you know that students hand the questions along from one year to the next?"

"Sure," said the professor, "but in Psychology we change the answers."

"Some books are to be tasted, others to be swallowed, and some few to be chewed and digested" (Bacon - "On Studies"). The purpose of this course is for you to become experimentally oriented in all aspects of life. Believing what the textbook says, or what a teacher says, per se, is not being experimental. Developing a means of evaluating evidence is a goal in this course.

13-1 The subject matter of science is the knowledge that has been obtained as a result of the application of the scientific method. Some have gone so far as to state that it is the method, not the information gained, which is most important in science. Science not only begins with, but its very essence is its methodology, which is the experimental method. This core of science is the set of rules which it follows. The core of science is the \_\_\_\_\_ method. (experimental)

13-2 If I were to tell you that the moon is made of blue cheese, your previous learning would lead you to question my evidence about the make-up of the moon. We would say you doubt because you have contradictory \_\_\_\_\_ . (evidence or data)

13-3 Likewise, you might question if I were to propose that the phase of the moon causes what we refer to as mental illness; actually, at one time this was a common view of mental illness. The name, "Lunatic," derived from Lunar, meaning moon, has its origin in the belief that lunatic's behavior was influenced by the moon. Again, the false conclusion about the moon and mental illness results from poor or insufficient \_\_\_\_\_ . (evidence)

S.B. 13-1

People gradually are learning the necessity for research and evidence to guide their behavior; as this becomes true, the propaganda value of stating that something is "scientific" has also increased. As a higher value is placed on evidence, one also notes an increase in placing the evidence tag on many non-scientifically established items; for example, "Laboratory findings prove our

soap is best" or "Evidence supports the claim that Dr. Sigmurd's pills cure mental illness three ways." Thus, one must learn how to evaluate evidence about behavior. Simply because one says he/she has the best evidence about behavior, does not mean he/she actually does have the best.

Variables: In an experiment one deliberately produces a change in one variable to see if it produces a change in a second variable. This manipulation is done in a controlled environment so the change in the second variable can be attributed to the variable which has been manipulated. An experiment begins with a controlled situation and variation is introduced by adding one variable at a time.

A variable can be defined as a condition which has a value that can vary or change. One must be able to assign a separate value to each variable to which he/she is going to refer. These variables may or may not occur.

13-4 A variable is:

- A. a changeable condition
- B. something that can occur or not occur
- C. a situation that varies in value (A,B,C)

13-5 Characteristics of persons or things which can assume different values are called \_\_\_\_\_ (variables)

13-6 A person may be a member of an upper, middle, or lower social class. The variable considered here is

- A. social class
- B. classless society
- C. economics (A)

Three types of variables will concern us here:

- ONE: Independent variable
- TWO: Dependent variable
- THREE: Variables to be held constant

One: Independent variable: The independent variable is a variable that is manipulated directly by the experimenter.

Two: Dependent variable: The dependent variable is a variable that systematically changes value and depends upon the manipulations of the independent variable(s). This is the outcome variable.

S.B. 13-2

Example: If ability to read a letter depends upon the distance between the student and the letter, then the independent variable is the distance between the reader and the letter. The dependent variable would be ability to read.

Three: Variable to be held constant: In order to ascertain what effects the independent variable has, all other variables that could affect the dependent variable must be controlled.

- 13-7 The antecedent event (i.e, the one that comes before the dependent variable) that the experimenter manipulates directly is the \_\_\_\_\_ variable. The change that systematically depends upon the manipulation of the independent variable is called the \_\_\_\_\_ variable.  
(independent)  
(dependent)
- 13-8 An independent variable comes before the dependent variable and:  
A. is not dependent on the manipulations of the experimenter  
B. is manipulated by the experimenter to find its effect on the dependent variable  
C. cannot be controlled  
D. cannot be measured (B)
- 13-9 In the experimental procedure, the factor that is under study and varied by the experimenter, is known as the \_\_\_\_\_.  
(independent variable)
- 13-10 The outcome variable is the:  
A. antecedent condition  
B. independent variable  
C. dependent variable  
D. cause (C)
- 13-11 Which of the following conditions are necessary for the use of the experimental method?  
A. observable dependent and independent variables  
B. well defined terms  
C. appropriate control over variables that might influence the outcome  
D. all of the above (D)
- 13-12 The dependent variable is so named because it "depends" on the antecedent condition - the independent variable. If success is dependent on the number of trials, then success is a(n) \_\_\_\_\_ variable.  
A. independent  
B. dependent  
C. intervening  
D. interfering (B)
- S.B. 13-3
- 13-13 The value of an experiment lies in the extent to which:  
A. the experimenter has a good theory, for the data are only of secondary importance.  
B. the independent variable is held constant.  
C. logical constructs are correctly identified.  
D. the dependent variable changes in the predicted direction.  
(D)
- 13-14 In an experiment to determine the effect of the tempo of music on workers' productivity in a factory, the dependent variable is the:  
A. tempo of music

- B. factory setting
- C. number of workers
- D. productivity (D)

13-15 In a study to determine the effect a certain drug may have on learning, the drug is the dependent variable.

- A. True
- B. False (B)

13-16 A study was performed in which some subjects were read an argument on a topic while they were eating, and another group of subjects were read the same argument while they were not eating. The amount of change in conclusions about the topic was measured for both groups of subjects. Which of the following would be considered the dependent variable?

- A. selection of argument
- B. eating or not eating condition
- C. change in conclusions
- D. selection of topic
- E. amount of salivation (C)

13-17 In the study referred to above, which of the following would be considered the independent variable?

- A. selection of subjects
- B. eating or not eating condition
- C. the amount of attitude change
- D. the persuasive argument (B)

13-18 If a psychotic patient would shave faster when shaving responses were followed by verbal praise, the experimenter would vary the independent variable or the amount of. (verbal praise)

13-19 The rate of shaving (from the previous question) would be the \_\_\_\_\_ variable. (dependent)

13-20 When investigating whether different types of colors affect reading rate, the independent variable is the:

- A. reading rate
- B. color type
- C. age of subjects
- D. all of the above (B)

S.B. 13-4

One must be careful that he/she does not start classifying events, per se, as independent or dependent variables. What a variable is called depends on how it is used in an experiment. (Note the variable "number of practice trials" in the next 3 questions.)

13-21 In an experiment designed to determine the number of practice trials required to learn a lesson under two incentive conditions, the experimenter offers his/her subjects either \$1 or \$5 if they complete the lesson in a certain amount of time. The dependent variable is:

- A. number of practice trials.
- B. subject's incentive.
- C. kind of lesson.

D. amount of money offered. (A)

13-22 An experimenter gave human subjects of both sexes a different number of practice trials in learning a task. He wanted to find out if the variable involved affected the speed of learning the task. The independent variable was the:

- A. number of practice trials.
- B. stimulus condition.
- C. speed of learning.
- D. intelligence of the subjects.
- E. sex of each subject. (A)

13-23 An experimenter gives the same number of practice trials to his/her subjects of both sexes under two different stimulus conditions. He/she is studying the effects of these stimulus conditions. Number of practice trials is:

- A. the independent variable.
- B. the dependent variable.
- C. a variable that has to be controlled and be the same for both groups of subjects. (C)

13-24 If we subjected the statement "A rolling stone gathers no moss" to experimental tests, the independent variable in the experiment would be:

- A. rolling.
- B. the gathering.
- C. no.
- D. moss. (A)

13-25 If one were to design an experiment to study the effect of varying amounts of alcohol upon steadiness of handwriting, the dosage of alcohol to be administered would be the \_\_\_\_\_. (Independent variable)

13-26 The ability to control and vary the conditions of observation makes the \_\_\_\_\_ method possible. (experimental)

S.B. 13-5

13-27 A good student of experimental evidence would:

- A. change his position when data proved him/her wrong.
- B. just trust his/her fate to Skinner
- C. believe that everybody has experimental evidence to support his/her position on the treatment of alcoholism.
- D. say that his/her experimental colleague was acting stupidly for not studying. (A)

There is built into the experimental methodology a self-corrective feature. If one manipulates the wrong variables, the experimental method has a feedback system that will quickly tell him/her that he/she is wrong. The findings are not replicated

13-28 The strength of the experimental method lies in the fact that:

- A. it tends to self-correct via of replication.
- B. it claims absolute certainty for its findings for all time.
- C. it is immune from everything.
- D. it involves doubt for the sake of doubting. (A)

An experiment can be conducted on anything that can be objectively defined. An experiment can be conducted any place where control of variables and manipulation of variables is possible.

13-29 Which of the following is a statement for which experimental evidence could be derived without further defining the terms?

- A. Socialism is evil.
- B. It's warm in this room.
- C. Florida oranges are juicier than California oranges.
- D. Something must be done about juvenile delinquency.
- E. The super ego, an invisible voice, determines if we feel guilty. (C)

Testing an unproved statement, called a hypothesis, is said by many to be the sole reason for experimentation. Sidman lists the following to also be reasons for experimentation:

ONE: experiments performed to indulge the investigator's curiosity about nature.

TWO: experiments performed to try out a new method or technique.

THREE: experiments performed to establish the existence of a behavioral phenomenon.

FOUR: experiments performed to explore the conditions under which a phenomenon occurs.

13-30 Sidman states several reasons for experimentation. Which is not a statement made by Sidman? Experiments are conducted:

- A. to test new methods or techniques.
- B. to explore the conditions under which a phenomenon occurs.
- C. to establish the existence of a behavioral phenomenon.
- D. to indulge the investigator's curiosity about nature.
- E. to establish public information. (E)