Research Methods in natural sciences

Experimental Research

Types of Research Studies

Intervention studies

Associational studies

Descriptive studies

Intervention studies

- are used to determine if changes in one variable cause corresponding changes in an outcome variable. The researcher intervenes in the environment in order to gain the control necessary for verifying cause and effect relationships. Experimental research falls under the

Associational studies

are used to investigate relationships. These studies are conducted by measuring variables **without purposefully intervening in the environment other than to take measurements.** Relationships found among variables can suggest cause and effect, but cannot verify that the changes in one variable are responsible for changes in other variable. Correlational and Causal-Comparative research fit under the

Descriptive studies

- are used to describe the characteristics of individuals, places, events, or anything else that can be described. Survey research, qualitative research, content-analysis research, and historical research all usually fit best under the general heading of

Descriptive studies

- is a type of research where the researcher manipulates some conditions (e.g., method of instruction) to see if this will effect an outcome (e.g., test scores). Experimental research falls in the general category of intervention research because the researcher intervenes in the environment that he/she is studying. An experiment is the most conclusive way to determine cause and effect relationships. That is because the researcher has the most complete control in this type of study than in any

What are Extraneous Variables?

Extraneous variables are any variables that you are not intentionally studying in your experiment or test. When you run an experiment, you're looking to see if one variable (the independent variable) has an effect on another variable (the dependent variable). In an ideal world you'd run the experiment, check the results. Unfortunately…like many things in life…it's a little more complicated that than. Other variables, perhaps ones that never crossed your mind, might influence the outcome of an experiment. These undesirable variables are called extraneous variables.

Control of Extraneous Variables

- Extraneous variables should be controlled if possible. One way to control extraneous variables is with random sampling. Random sampling does not eliminate any extraneous variable, it only ensures it is equal between all groups. If random sampling *isn't* used, the effect that an extraneous variable can have on the study results become a lot more of a concern.

- Random assignment means that every individual who is participating in the experiment has an equal chance of being assigned to any of the experimental or control groups.

- Random selection means that every member of a population has an equal chance of being selected to be a member of the sample.

Quasi-Experimental Designs

Quasi-Experimental Designs is an empirical study used to estimate the causal impact of an intervention on its target population without random assignment. These designs do not include the use of random assignments but use other techniques to control for threats to internal validity.