1.6: Non-Experimental Research

What Is Non-Experimental Research?

Non-experimental research is research that lacks the manipulation of an independent variable. Rather than manipulating an independent variable, researchers conducting non-experimental research simply measure variables as they naturally occur (in the lab or real world).

Most researchers in social sciences consider the distinction between experimental and non-experimental research to be an extremely important one. This is because although experimental research can provide strong evidence that changes in an independent variable cause differences in a dependent variable, non-experimental research generally cannot. As we will see, however, this inability to make causal conclusions does not mean that non-experimental research is less important than experimental research. It is simply used in cases where experimental research is not able to be carried out.

When to Use Non-Experimental Research

As we saw earlier, experimental research is appropriate when the researcher has a specific research question or hypothesis about a causal relationship between two variables—and it is possible, feasible, and ethical to manipulate the independent variable. It stands to reason, therefore, that non-experimental research is appropriate—even necessary—when these conditions are not met. There are many times in which non-experimental research is preferred, including when:

- the research question or hypothesis relates to a single variable rather than a statistical relationship between two variables (e.g., how accurate are people's first impressions?).
- the research question pertains to a non-causal statistical relationship between variables (e.g., is there a correlation between verbal intelligence and mathematical intelligence?).
- the research question is about a causal relationship, but the independent variable cannot be manipulated or participants cannot be randomly assigned to conditions or orders of conditions for practical or ethical reasons (e.g., does damage to a person's hippocampus impair the formation of long-term memory traces?).

Again, the choice between the experimental and non-experimental approaches is generally dictated by the nature of the research question(s).

Types of Non-Experimental Research

The most common type of non-experimental research conducted in social sciences is correlational research. Correlational research is considered non-experimental because it focuses on the statistical relationship between two variables but does not include the manipulation of an independent variable. More specifically, in **correlational research**, the researcher measures two variables with little or no attempt to control extraneous variables and then assesses the relationship between them. As an example, a researcher interested in the relationship between self-esteem and school achievement could collect data on students' self-esteem and their GPAs to see if the two variables are statistically related. Another example is a researcher interested in the relationship between education levels and annual income can collect data on individuals highest education levels and their annual income to see if the two variables are statistically related. In the first example, both variables are interval (continuous). In the second example, one variable is categorical (educational levels) and one is continuous. In either case, we are studying the variables as they naturally occur or have occurred.

Cross-Sectional, Longitudinal, and Cross-Sequential Studies

When social scientists wish to study change over time (for example, when developmental psychologists wish to study aging) they usually take one of three non-experimental approaches: cross-sectional, longitudinal, or cross-sequential. **Cross-sectional studies** involve comparing two or more pre-existing groups of people (e.g., children at different stages of development). What makes this approach non-experimental is that there is no manipulation of an independent variable and no random assignment of participants to groups. Using this design, developmental psychologists compare groups of people of different ages (e.g., young adults spanning from 18-25 years of age versus older adults spanning 60-75 years of age) on various dependent variables (e.g., memory, depression, life satisfaction). Of course, the primary limitation of using this design to study the effects of aging is that differences between the groups other than age may account for differences in the dependent variable. For instance, differences between the groups may reflect the generation that people come from (a **cohort effect**) rather than a direct effect of age. For this reason, **longitudinal studies**, in which one group of people is followed over time as they age, offer a superior means of studying the effects of aging.

However, longitudinal studies are by definition more time consuming and so require a much greater investment on the part of the researcher and the participants. A third approach, known as **cross-sequential studies**, combines elements of both cross-sectional and longitudinal studies. Rather than measuring differences between people in different age groups or following the same people over a long period of time, researchers adopting this approach choose a smaller period of time during which they follow people in different age groups. For example, they might measure changes over a ten year period among participants who at the start of the study fall into the following age groups: 20 years old, 30 years old, 40 years old, 50 years old, and 60 years old. This design is advantageous because the researcher reaps the immediate benefits of being able to compare the age groups after the first assessment. Further, by following the different age groups over time they can subsequently determine whether the original differences they found across the age groups are due to true age effects or cohort effects.

Internal Validity Revisited

Recall that internal validity is the extent to which the design of a study supports the conclusion that changes in the independent variable caused any observed differences in the dependent variable. Figure 1.6.1 shows how experimental, quasi-experimental, and non-experimental (correlational) research vary in terms of internal validity. Experimental research tends to be highest in internal validity because the use of manipulation (of the independent variable) and control (of extraneous variables) help to rule out alternative explanations for the observed relationships. If the average score on the dependent variable in an experiment differs across conditions, it is quite likely that the independent variable is responsible for that difference. Non-experimental (correlational) research is lowest in internal validity because these designs fail to use manipulation or control. Quasi-experimental research falls in the middle because it contains some, but not all, of the features of a true experiment. For instance, it may fail to use random assignment to assign participants to groups. Imagine, for example, that a researcher finds two similar schools, starts an anti-bullying program in one, and then finds fewer bullying incidents in that “treatment school” than in the “control school.” While a comparison is being made with a control condition, the inability to randomly assign children to schools could still mean that students in the treatment school differed from students in the control school in some other way that could explain the difference in bullying (e.g., there may be a selection effect).

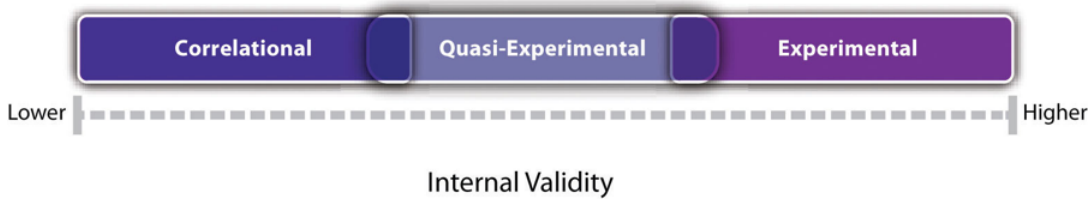

Figure 1.6.1: Internal Validity of Correlation, Quasi-Experimental, and Experimental Studies. Experiments are generally high in internal validity, quasi-experiments lower, and correlation (non-experimental) studies lower still.

Notice also in Figure 1.6.1 that there is some overlap in the internal validity of experiments, quasi-experiments, and correlational (non-experimental) studies. For example, a poorly designed experiment that includes many confounding variables can be lower in internal validity than a well-designed quasi-experiment with no obvious confounding variables.
