Module 3: Ensuring Validity

Confounding Variables

A confounding variable is an extraneous variable that is statistically related to (or correlated with) the independent variable. This means that as the independent variable changes, the confounding variable changes along with it. Failing to take a confounding variable into account can lead to a false conclusion that the dependent variables are in a causal relationship with the independent variable. Take, for example, a hypothetical study that found that people who carry a lighter in their pocket tend to have higher rates of cancer. It would be incorrect to conclude that there is a direct relationship between these two variables or that carrying a lighter in one's pocket causes cancer. Instead, there is a confounding variable of smoking; people who carry a lighter in their pocket are more likely to be smokers, and those who smoke are more likely to be diagnosed with cancer. Researchers should be careful to identify and control for potential confounding variables so that associations between the dependent variable and the independent variable can be accurately identified and measured.

Validity

The remainder of this short course in research methods will examine various threats to validity that exist at each stage of the research process. Validity refers to whether a study is well-designed and provides results that are appropriate to generalize to the population of interest. Trochim's "Research Methods Knowledge Base" provides a succinct and useful summary of each type of validity; the three main types of validity with which a researcher should be concerned are discussed in this module.(1)

Internal Validity

Internal validity applies in studies that seek to establish a causal relationship between two variables and refers to the degree to which a study can make good inferences about this causal relationship. Internal validity is achieved when a researcher can definitively state that the effects observed in the study were due to the manipulation of the independent variable and not due to another factor. Variables outside the researcher's control or consideration can affect the outcome of a study and can therefore prevent internal validity.(2)

Construct Validity

Construct validity is closely related to the process of *operationalizing* which we discussed in Module 1. It refers to the extent to which a researcher can claim that accurate inferences can be made from the operationalized measures in a study for the theoretical constructs on which they were based. Construct validity is concerned with generalizing from the specificities of a study to the broader concept that the study attempts to measure or draws conclusions. A study is considered to have construct validity if the

researcher can demonstrate that the variables of interest were properly operationalized.(3) For example, if, in the Module 1 example of near-sighted individuals obtaining corrective lenses, the researcher had chosen to operationalize "economically productive" as "the amount of money a person has in his or her savings," the researcher would have obtained entirely different results. It is possible for people to have other sources of income (gifts, spouse's income, inheritances, etc.) other than personal weekly wages that may affect this variable, meaning that amount of money in savings is *not* a good measure of economic productivity; this therefore affects the construct validity of the study.

External Validity

A researcher often cannot work with the entire population of interest but instead must study a smaller sample of that population in order to draw conclusions about the larger group from which the sample is taken. External validity involves the extent to which the conclusions can be generalized to the broader population. A study is considered to be externally valid if the researcher's conclusions can in fact be accurately generalized to the population at large.(4) The sample group must be representative of the target population to ensure external validity.

As a researcher, it is important to keep the concept of validity in mind at all times when designing a study. A good researcher will discuss the project design with an advisor or a group of colleagues to help ensure that validity is preserved at every stage of the process. A research project that lacks validity may draw conclusions that are inappropriate or even dangerous if applied to the target population.

Ensuring Validity

For more information about how to ensure the validity of research, please review Research Validity.

Go To Module 4: Study Design Measures >>

Footnotes

(1) Trochim, W. M. K. "Design" *Research Methods Knowledge Base 2nd Edition.* Accessed 2/24/09.

(2) Ibid.

(3) Ibid.

(4) Pelham, B. W.; Blanton, H. *Conducting Research in Psychology: Measuring the Weight of Smoke, 3rd Edition.* Wadsworth Publishing (February 27, 2006).

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