

Threats to Internal Validity

The greatest threat to internal validity is confounding. Confounding occurs whenever an extraneous variable changes systematically along with the independent variable. Confounding prevents us from inferring a causal relationship between the independent and dependent variables.

The Weaker Threats: The Eight Classic Threats

- | | |
|-------------------|--------------------------|
| • History | • Statistical Regression |
| • Maturation | • Selection |
| • Testing | • Subject Mortality |
| • Instrumentation | • Selection Interactions |

History threat

History threat is a threat to internal validity in which an outside event or occurrence might have produced effects on the dependent variable. For example, if researchers measure hyperactivity in the morning for the control group and in the afternoon for the experimental group, the time of day could produce group differences that are unrelated to the independent variable (medication).

Maturation threat

Maturation threat is a threat to internal validity produced by internal (physical or psychological) changes in subjects. For example, if two groups differed in the time required to complete their respective reading comprehension problems, fatigue could produce group differences in reading comprehension scores that are unrelated to the independent variable (font size).

Testing threat

Testing threat is a threat to internal validity produced by a previous administration of the same test or other measure. For example, if rats practiced navigating a milk maze in a pretest condition and then performed the same task in the posttest condition after receiving a drug, learning could reduce the time required to complete the maze, independent of drug effects.

Instrumentation threat

Instrumentation threat is a threat to internal validity produced by changes in the measurement instrument itself. For example, if a scale did not return to zero after each subject was weighed, group differences in weight could be due to changes in the scale that are unrelated to the independent variable (exercise program).

Statistical regression threat

Statistical regression threat is a threat to internal validity that can occur when subjects are assigned to conditions on the basis of extreme scores on a test. During retest, the scores of extreme scorers tend to regress toward the mean even without treatment.

(continued)

Statistical regression threat (continued)

For example, students with extremely high scores in one basketball game may obtain less extreme scores during a second game without any real change in ability. Conceptually, the initial extremely high basketball score was raised by measurement error (representing the variability across games). When this changed randomly during the next game, high scores were no longer boosted as much as before. This resulted in a regression to the mean.

Selection threat

Selection threat is a threat to internal validity that can occur when nonrandom procedures are used to assign subjects to conditions or when random assignment fails to balance out differences among subjects across the different conditions of the experiment.

For example, if a social psychologist assigned the first 20 student volunteers to an experimental condition and the next 20 to a control condition, these groups could differ on subject variables that could affect the dependent variable (altruistic behavior).

Subject mortality threat

Subject mortality threat is a threat to internal validity produced by differences in dropout rates across the conditions of the experiment.

For example, if dropout rates are different across three different psychotherapy conditions, this could create group differences on subject variables that could affect clinical outcome, independent of the independent variable (type of psychotherapy).

Selection interactions

This is a family of threats to internal validity produced when a selection threat combines with one or more of the other threats to internal validity. When a selection threat is already present, other threats can affect some experimental groups but not others.

For example, if one group is dominated by members of one fraternity (selection threat), and that fraternity has a party the night before your experiment (history threat), your results may be altered for that group.