Internal validity is concerned with threats or factors other than the independent variable that affect the dependent variable. In other words, internal validity focuses on threats or rival explanations that influence the outcomes of an experimental study but are not part of the independent variable.

Table 13.1 Threats to Internal Validity

History	Unexpected events occur between the pre and post-tests, affecting the dependent variable.
Maturation	Changes occur in the participants, from growing older, wiser, more experienced, etc., during the study.
Testing	Taking a pre-test alters the result of the post-test.
Instrumentation	The measuring instrument is changed between pre and post-testing, or a single measuring instrument is unreliable.
Statistical regression	Extremely high or extremely low scorers tend to regress to the mean on retesting.
Differential selection of participants	Participants in the experimental and control groups have different characteristics that affect the dependent variable differently.
Mortality	Different participants drop out of the study in different numbers, altering the composition of the treatment groups.
Selection-maturation interaction	The participants selected into treatment groups have different maturation rates. Selection interactions also occur with history and instrumentation.

External validity (sometimes called ecological validity) is concerned with the extent to which the results can be generalized to groups and settings beyond those of the experiment. In other words, external validity focuses on threats or rival explanations that would not permit the results of the study to be generalized to other settings.

Table 13.2 Threats to External Validity

Pre-test-treatment interaction	The pretest sensitizes participants to aspects of the treatment and thus influences posttest scores.
Selection-treatment interaction	The nonrandom or volunteer selection of participants limits the generalizability of the study.
Multiple-treatment interference	When participants receive more than one treatment, the effect of prior treatment can affect or interact with later treatments, limiting generalizability.
Specificity of variables	Poorly operationalized variables make it difficult to identify the setting and procedures to which the variables can be generalized.
Treatment diffusion	Treatment groups communicate and adopt pieces of each other's treatment, alternating the initial status of the treatments' comparison.
Experimenter effects	Conscious or unconscious actions of the researcher affects participants' performance and responses.
Reactive effects	The fact of being in a study affects participants so that they act differently from their normal behavior. The Hawthorne and John Henry effects are reactive responses to being in a study.