Experimental Design Review

Types of Variables

Independent - The variable that is manipulated by the experimenter.

Dependent - The variable that changes as a result of the manipulation of the independent variable. It "depends" on the independent variable.

Constants - Parts of an experimental setup that remain the same between control and experimental groups.

Types of Groups

Control Group - The group in an experiment that does not receive treatment. It is used as a baseline for comparison to the experimental group(s).

Experimental Group - The group or groups in an experiment that receive experimental treatment. Results are compared to the control group.

Experiment-Related Concepts

Experimental Error - Unintended side effects of an experiment. Results seen that are not due to the manipulation of the independent variable. Can be reduced using repeated trials.

Accuracy - Results are consistent with those results deemed widely accepted ("textbook results").

Precision - How sharply results are defined (ex. 3.01g vs. 3.00001g). This does not mean accurate - remember the target example.

Validity - An experiment measures what is set out to measure.

Reliability - An experiment can be repeated many times while reaching the same or very similar conclusion.

Peer Review - Scientists review each other's work and may repeat experiments to ensure results can be replicated and error is minimized.