6. Experimental Research I

Key Terms:

Campbell and Stanley terminology and symbols
Case study
Experimental design
Experimental group (condition) and control group (condition)
Independent variable and dependent variable
Intact (self-selected, static) groups
Internal validity
Pre-experimental designs
Pretest and posttest
Pretest sensitization (reactive effect of testing)
Random assignment
Solomon randomized four-group design
Threats to external validity
- Selection (sample) bias
- Reactive effects of experimental arrangements
- Reactive effects of testing
- Multiple-treatment interference

Threats to internal validity
- History
- Maturation
- Instrumentation
- Testing
- Statistical regression (regression toward the mean)
- Selection
- Mortality (attrition)

Key Principles:

6.1 Experimental designs are the best method for investigating cause-and-effect relationships (see 1.4).

6.2 In an experiment, the independent variable (the treatment) is operationalized through the creation of two or more groups (conditions) to which participants are assigned by the researcher.

6.3 Random assignment of participants to groups (conditions) assures that the assignment will be unbiased and that the groups (conditions) will be initially equivalent.

6.4 If participants are randomly assigned, and if the groups differ on the dependent variable measured after the treatment, and if all other factors were held constant, then the difference can be attributed to only one of two causes: the treatment, or random error.

6.5 True experiments can include pretest-posttest designs, posttest-only designs, and Solomon randomized four-group design.

6.6 The pretest-posttest design allows for a direct measure of change, but is also vulnerable to pretest sensitization of participants.

6.7 The posttest-only design eliminates the problem of pretest sensitization but provides no measure of change.

6.8 The Solomon randomized four-group design combines the best of both, but requires more participants.

6.9 For most research questions, it is desirable to have at least 12 participants per group (condition).

6.10 True experimental designs do control for all threats to internal validity and thus allow for the inference that the treatment caused the observed changes.

6.11 The ability to generalizing from an experiment is compromised by threats to external validity.

6.12 Internal validity and external validity of an experiment are totally separate considerations, and more of one tends to produce less of the other.

6.13 Pre-experimental designs contain an experimental treatment but otherwise fail to meet the requirements to be considered true experiments and this cannot support causal inferences.

6.14 Pretest-posttest one group and pretest-posttest intact groups do not control for threats to internal validity and thus are not considered true experimental designs.

6.15 Pre-experimental designs can be appropriately used for pilot studies.