Classical Experimental Method

1. Identify the sampling frame (population from which sample is to be drawn)

2. Draw sample and randomly assign units to a control or experimental group

3. Pre-test both groups on the dependent and independent variables to confirm similarity of the two groups.

Classical Experimental Method

4. Administer the “test agent” to the experimental group but not the control group
5. Allow time for the “test agent” to have an effect
6. Post-test both groups on the dependent and independent variables to determine if “test agent” had an effect and to confirm continued similarity of the two groups.

Components of Experiments

1. **Independent** and **dependent** variables (dependent variable "depends on" or is affected by the independent variables)

2. **Pretesting** to ensure similarity of two groups and **posttesting** to determine affect of "test agent"

Components of Experiments

3. **Experimental and control groups**.

--Must be as similar as possible.

Why have a control group?

--Control group represents what the experimental group would have been like had it not been exposed to the test agent.

--Control group guards against assigning affects to the test agent when it was actually something in the environment.

Components of Experiments

4. Use of **placebo** (a fake test agent) for the control group to guard against “testing” effects

   Example:

   1. sampling frame of patients who have allergies that cause asthma
   2. gave placebo (saline solution) and told subjects it was designed to make their allergies worse,
   3. placebo caused asthma to get worse
   4. gave subjects asthma medicine but told them it was a strengthened version of what they received the first time
   5. asthma got even worse even though they had actually been given the medicine

Components of Experiments

5. **Double-Blind experiment –neither the subjects nor the experimenters know which group is the experimental group**

Selecting Subjects

How can we select subjects so that the control and experimental groups are very similar?

- **Probability sampling** to obtain the sample of subjects and then use **randomization** to assign them to the experimental and control groups.

Selecting Subjects

2. **Matching**—such as by developing a quota matrix and looking for subjects to pair together based on their similarity in these.

   --May be used when there are a relatively small number of subjects available (say less than 100)

   --Subjects that have no corresponding person to be paired with would not be included in study.

Problems with Matching

- May not know which variables will be relevant for matching process.
- Most statistics used to analyze results assume randomization.

Preexperimental Research Designs

(used when more effective designs are not possible)

- **One-shot case study** - single group of subjects is measured on a variable following experimental stimulus.
- **One-group pretest-posttest design** - adds a pre-test for the group, but lacks a control group.
- **Static-group comparison** - includes experimental and control group, but no pre-test.

Sources of Internal Invalidity

(something other than the test agent is affecting the outcome, the results aren't reflecting what we think they are reflecting)

Consider how the **CLASSICAL EXPERIMENT** helps us to avoid each of these.

- **Historical events** may occur during the course of the experiment.
- **Maturation** of the subjects.
- Testing and **retesting can influence** behavior.
- **Instrumentation**—using different questions in the pre and post test to measure the same thing

Sources of Internal Invalidity

- **Statistical regression** of subjects starting out in extreme positions
  --starting out so low that the score can't get any lower and can only improve, consequently, it may look like it was the test agent that caused the improvement).

- **Selection biases** (experimental and control groups need to be similar).

- **Experimental mortality** - subjects drop out of the study before it's completed (requires large sample).

External Validity

- **We can have problems generalizing the findings to the “real world” even when internal validity is high.**
- **How do we know that the test situation is similar to the “real world?”**
- **How people respond in a laboratory may be different than in a real world situation.**

"Natural" or "Quasi-experimental" Designs

- Important social scientific experiments occur outside controlled settings and in the course of normal social events.

- Raise validity issues because researcher must take things as they occur.

Experimental Method

Strengths:

- Isolation of the experimental variable over time.
- Experiments can be replicated several times using different groups of subjects.

Experimental Method

Weaknesses:

- Artificiality of laboratory setting.
- Social processes that occur in a lab might not occur in a more natural social setting.