Ch 1.3 ***Design of an Experiment***

We typically get our data from 2 common methods.

- ***Observational Studies*** - we watch and measure a particular characteristic.
- ***Experiments*** - apply some treatment, then observe the effects of the treatment.

control group- individuals who aren't getting the treatment.

treatment group - the individuals that are getting the treatment.

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4 Basic Steps in conducting an Experiment:

1. Identify your ***objective.***
2. ***Collect*** Sample ***data***- represents the population
3. Use ***random procedures*** that avoid bias
4. ***Analyze*** the data and ***form conclusions.***

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Experimental Techniques:

Placebo Effect - occurs when an untreated person thinks they're receiving treatment and report improvements, but they're not being treated.

Blinding - when a person doesn't know if they're being treated or not.

Double Blind - neither the people conducting or the individuals involved know if they are getting the treatment.

Block - is a group of similar subjects.

Randomized block design - when subjects are grouped by a similar factor. Then randomly determine who in the treatment vs control group.

Matched Pair design - subjects are paired up by similarities and one gets the treatment and the other is the control.

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Types of Sampling:

Completely randomized experimental design - put into blocks through a random process. (computer)

Rigorously controlled design - where each person is chosen so subjects in each block are similar in particular ways.

Replication - is the repetition of an experiment under the same and similar conditions.

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Sampling Methods:

Systematic sampling - every nth item.
ex) count off by 3's

Convenience sampling - use results or individuals that are already available.
ex) on-line, use stats class to collect data

Stratified Sampling - divide the population into at least 2 different groups, then randomly select from those individuals.
ex) boys vs girls, divide by age group

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Cluster Sampling - divide the population into sections, randomly pick a few sections, and then survey ***ALL*** those individuals.
ex) Look at school districts, randomly select some schools, then talk to all their teachers at those districts.

Random sampling - every item has an equal chance of being selected
ex) computer does it for drug testing at schools.

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Errors:

Confounding - occurs in an experiment when the effects from 2 or more variables can't be distinguished from each other.

Ex from book) change in college policy for attending classes and mild weather in the winter.

Sampling errors - difference between the sample result and true population.

Non-sampling error - occurs when the sample data is incorrectly collected, recorded, or analyzed

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