## Goals of experiments:

- Eliminate Bias
  - Controls
  - Random Assignment to Treatment
  - Blinding
- Reduce Sampling Error
  - Replication
  - Balance
  - Blocking
  - Extreme Treatments

# Goals of experiments:

determine how explanatory variable (treatment) affects response variable

Eliminate Bias

**Bias**: a systematic discrepancy between estimates and the true population characteristic

### Goals of experiments:

- Eliminate Bias
  - Controls
    - A group which is identical to the experimental treatment in all respects aside from the treatment itself
    - Placebo sugar pills
    - Multiple control groups
      - » One is a placebo
      - » Second is the current best existing treatment
    - Independent recovery patients tend to seek out treatment when they feel their worst. This means that improvement might be inevitable, even without treatment
      - an untreated group to compare to 'treated' group so that we can measure the effects of a new therapy
      - Control and treatment subjects should be tested randomly or simultaneously to reduce the affect of temporal environmental changes

### Goals of experiments:

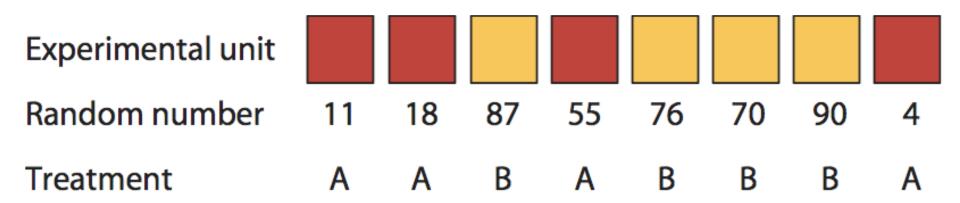
- determine how explanatory variable (treatment) affects response variable
- Eliminate Bias
  - Random Assignment
    - The essential distinction and advantage of an experiment!
    - Individuals are randomly assigned to treatments
    - Theory: breaks association between possible confounding variables and the explanatory variable so that the causal relationship between explanatory and response variable can be measured

## Goals of experiments:

- Eliminate Bias
  - Random assignment
- Random assignment averages out the effects of confounding variables

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### Goals of experiments:

- Eliminate Bias
  - Blinding
    - o Conceal knowledge about which subjects receive treatments
    - o Eliminates unconscious bias
    - o Unblinded studies usually find much larger effects (as much as threefold higher), showing the bias that results from lack of blinding\*
    - \* as pointed out by the textbook, these studies often have other issues, if they have forgotten to incorporate blinding techniques

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