Coursera Stats Video lecture – Experimental Design

Week 1, Video 4

1. Principals of Experimental Design
   1. Principal 1: Control
      1. compare treatment of interest to a control group
   2. Principal 2:Randomize
      1. randomly assign subjects to a treatment
   3. Principal 3: replicate
      1. collect a very large sample, or replicate the entire study
   4. Principal 4: blocking
      1. block for variables known or suspected to affect the outcome
      2. when a blocking variable is known, first, block subjects into strata, then sample randomly from these blocks
      3. example of blocking: pro and amateur athletes may react differently to an energy gel, so first sort the subjects into pro and amateur blocks, then randomly sample from each block
2. Blocking Variable vs Explanatory Variables
   1. explanatory variables (or factors) – conditions we can impose on experimental units.
   2. blocking variables – characteristics that the experimental units come with that researchers would like to control.
   3. blocking in experiments is basically like stratifying for observational studies
3. Experimental Design Terminology
   1. Placebo
      1. fake treatment used for control groups in medical studies
   2. Placebo Effect
      1. showing change despite being on the placebo
   3. Blinding
      1. experimental units do not know if they are in the treatment or placebo group
   4. Double Blind Study
      1. both researchers and experimental units do not know who is in the control and experimental group