

Review of Experimental Design

Every experiment consists of the following:

- **Purpose/Objective**
- **Design**
 - Treatment Design
 - populations or treatments examined
 - controlled by the researcher
 - Factors – groups or collection of treatments
 - Levels – specific treatments
 1. regression/response surface
 - treatments are quantitative levels of the explanatory variable.
 2. Factorial designs ≥ 2 factors
 - model the response as a function of the treatment
 3. Unstructured design
 - want to pick up “best” treatment using multiple range test, Tukey, Duncan, LSD, etc.
 - Experimental Design
 - Who will receive which treatment
 - Researcher specifies the design
 - Randomization determines who is actually sampled
 1. Complete randomized design (CRD)
 2. Randomized complete block design (RCBD)
 3. Row-Column designs
 - Latin squares
 - Latin rectangles
 - Cross-over designs
 4. Split-plot designs
 5. Repeated measures designs

- Randomization and Experimental units
 - unit of material to which one application of a treatment is applied
 - Replication is when the treatment appears more than once in an experiment (more than one EU)

- **Model**
 - Location or expected values
 - Dispersion or variances and covariances
 - Distribution

- **Analysis**
 - Estimates
 - means and variances
 - Standard Errors
 - standard deviation of an estimator
 - Analysis of Variance
 - summarizes major tests and sources of variation

- **Report**
 - Why you did it
 - What you did
 - What you learned