

# ANOVA: Comparing 3+ Population Means

In this class, you will work with your group to explore one-way ANOVA models by completing **activities 19-27 from the textbook**. While you work through this activity, make sure that all group members are engaged and contribute ideas, and also follow the code. The [R Manual](#) has useful R code for today's activities.

## The ANOVA Model

As you saw before class, the ANOVA model is given by

$$y_{ij} = \mu + \alpha_i + \varepsilon_{ij}, \quad \text{for } i = 1, \dots, I \quad \text{and } j = 1, 2, \dots, n_i, \quad \text{where } \varepsilon_{ij} \stackrel{iid}{\sim} \mathcal{N}(0, \sigma^2)$$

Once we have data in hand, we can use it to estimate the model parameters of interest. When interest centers on discerning a difference between group means the **effects**,  $\alpha_i$ , are of primary interest.

**Complete activities 19-22.** These activities lead you through estimating the effects (or effect sizes) for the two treatment groups (color distractor and standard game) and visualizing the fitted model using a **main effects plot**. Activity 22 then has you calculate a residual.

The necessary assumptions/conditions for the one-way ANOVA model are:

1. the error terms are i.i.d.
2. the error terms follow a normal distribution
3. the error terms have mean 0
4. the population variance is the same for each group (i.e., within each factor level)

Shonda recommends 16-27...