Examining Interaction between Factors

When you fit a two-way ANOVA model, you examine the effects of two predictor variables simultaneously. At the same time, you might also be interested in determining whether the two predictor variables interact with respect to their effects on the response variable. Interaction is said to occur when the effect of one variable on the response variable depends on the levels of the other variable.

For example, here you can see the interaction plot for **Reading3** scores. The plot shows the average **Reading3** scores of male and female students for different schools. The female scores are denoted with the solid red line and the male scores with the dashed blue line. You can also see in the graph on the left that the average **Reading3** scores for female and male students shows the same change across the different schools, that is, as you move from school C to school D, the average **Reading3** scores for female and male students shows the same change. When you see this type of parallel graph, you can say that there is no interaction between school and gender.

However, in the right pane, you can see that the **Reading3** score for females decreases as you move from school C to school D, but the average **Reading3** score for males increases as you move from school C to school D. This indicates the presence of an interaction between the gender and school variables. Also, notice that the two lines do not need to cross for a significant interaction to exist, but when there is no interaction, the two lines should be nearly parallel.
