Exploring Data

Let's explore the data in Table 12-3 by calculating the mean for each cell and by constructing a graph. The individual cell means are shown in Table 12-4. Those means vary from a low of 89.6 to a high of 98.4, so they vary somewhat. Figure 12-3 is an *interaction graph,* which shows graphs of those means, and that figure suggests that the performance IQ scores of males and females have different behavior, as seen by the different paths followed by the line segments for females and males. Specifically, females with high lead exposure appear to have *lower* performance IQ scores, whereas males with high lead exposure appear to have *higher* performance IQ scores. This different behavior suggests that there might be an interaction effect. These observations based on Table 12-4 and Figure 12-3 are largely subjective, so we will proceed with the more objective method of two-way analysis of variance.

Interpreting an Interaction Graph

- **Interaction Effect:** An interaction effect is suggested when line segments are far from being parallel (as in Figure 12-3).
- **No Interaction Effect:** If the line segments are approximately *parallel*, it appears that the different categories of a variable have the same effect for the different categories of the other variable.

Table 12-4 Means of Cells from Table 12-3

	Blood Lead Level		
	Low	Medium	High
Male	93.4	91.8	95.4
Female	97.2	98.4	89.6

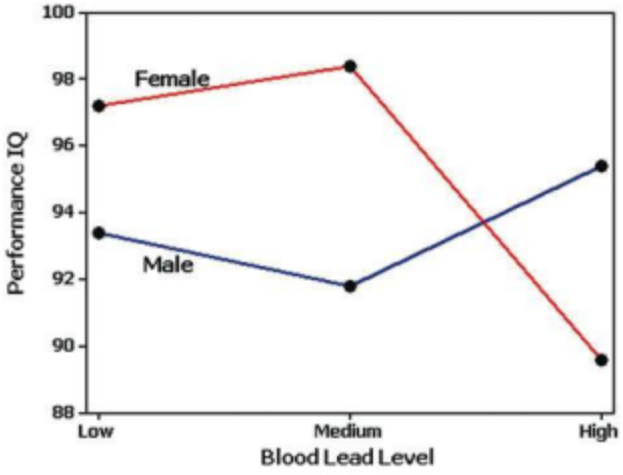

Figure 12-3 Interaction Graph of Sex and Blood Lead Levels: Means from Table 12-4

Here are the requirements and basic procedure for two-way analysis of variance (ANOVA). The procedure is also summarized in Figure 12-4 on page 618.

Objective

With sample data categorized with two factors (a row variable and a column variable), use two-way analysis of variance to conduct the following three tests:

1. Test for an effect of an interaction between the row factor and the column factor.
2. Test for an effect from the row factor.
3. Test for an effect from the column factor.