

## LEARNING CHECK

1. What is the difference between a main effect and an interaction?

A: A main effect is the effect of one and only one factor on a dependent variable. An interaction occurs when the effect of one factor depends on the levels of a second factor. That is, the first factor does not “tell the whole” story about its precise relationship to the dependent variable. We need to examine the levels of the second factor to understand how that first factor affects the dependent variable.

2. Suppose we have a “3×4” factorial design.

- a) How many factors do we have?
- b) How many levels of each factor do we have?
- c) How many main effects are there to analyze?
- d) How many interactions are there to analyze?
- e) How many dependent variables are there in this analysis?

A: a) Two factors

b) The first factor has three levels, and the second factor has four levels.

c) There are two main effects to analyze (one for each factor).

d) There is one interaction to analyze.

e) We don't know the number of dependent variables from the factorial notation.

3. Suppose we have a “2×2×2” factorial design.

- a) How many factors do we have?
- b) How many levels of each factor do we have?
- c) How many main effects are there to analyze?
- d) How many interactions are there to analyze?

A: a) Three factors

b) The first factor has two levels; the second factor has two levels; and the third factor has two levels.

c) There are three main effects to analyze (one for each factor).

d) There are four interactions to analyze:

The first interaction is between the first two factors.

The second interaction is between the first and third factors.

The third interaction is between the second and third factors.

The fourth interaction is among all three factors.