

13.3: Graphing the Results of Factorial Experiments

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The results of factorial experiments with two independent variables can be graphed by representing one independent variable on the x-axis and representing the other by using different kinds of bars or lines. The y-axis is always reserved for the dependent variable.

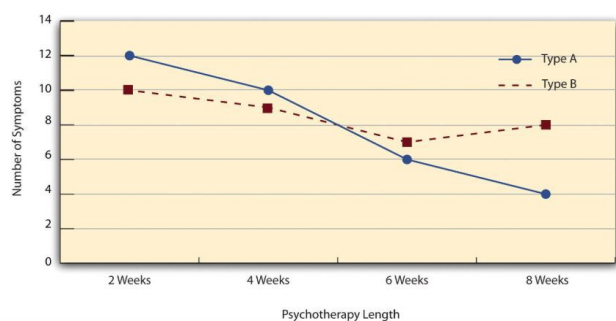


Figure 2. A 4 (Psychotherapy Length) x 2 (Type) ANOVA.

The figure above is a line graph that shows results for a hypothetical 4 x 2 factorial experiment. Psychotherapy length, is represented along the x-axis and has four levels (e.g., 2 weeks, 4 weeks, 6 weeks and 8 weeks) and the other variable (psychotherapy type) is represented by differently formatted lines.

Advantages & Disadvantages

Considerations

A 2-Factor ANOVA design is relatively easy to carry out and requires fewer subjects than other types of designs. There is no pre-testing necessary because one group could serve as the control. Although identifying sample sizes and study design for power is an important consideration using a factorial ANOVA.

Disadvantages

A 2-Factor ANOVA using a between-subjects design provides little information about the effect of the independent variable. The statistic provides information about whether the two groups differed (on average) and in which direction but it is not sensitive to individual differences. Other considerations for 2-Factor ANOVAs include using a *repeated measures*

ANOVA. In this case for a 2-factor ANOVA, each person would be in every condition. So if you had a 2×2 an individual would be in all 4 study conditions. Another considerations is having a *mixed design*. For a mixed design, one factor would be between-subjects and the other would be within-subjects (repeated measures). For example, you might wish to conduct a 2×2 study on drug therapy. You can examine gender differences as one factor and type of drug as the other factor. Participants are only in 1 gender category but would receive both types of drug. A mixed design would give you individual differences in how each participant responded to the drug, but also has some of the challenges of using a within-subjects design (see short discussion in chapter 12 on advantages and disadvantages of using a repeated measures design).

Learning Objectives

Having read the chapter, students should be able to:

- Explain the concept of a two-factor research design and recognize a matrix with levels of one factor being rows and levels of the second factor being columns
- Explain main effects and interactions in a two-factor ANOVA including patterns of findings
- Complete a ANOVA table given some information from the study
- Interpret effect size

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