

CHAPTER OVERVIEW

6: Random Effects and Introduction to Mixed Models

Overview

So far, in our discussion of treatment designs, we have made the (unstated) assumption that the treatment levels were chosen intentionally by the researcher as dictated by his/her specific interests. The scope of inference in this situation is limited to the specific (or fixed) levels used in the study. However, this is not always the case. Sometimes, treatment levels may be a (random) sample of possible levels, and the scope of inference is to a larger population of all possible levels.

If it is clear that the researcher is interested in comparing specific, chosen levels of treatment, that treatment is called a **fixed effect**. On the other hand, if the levels of the treatment are a sample of a larger population of possible levels, then the treatment is called a **random effect**.

Learning Objectives

Upon completion of this lesson, you should be able to:

1. Extend the treatment design to include random effects.
2. Understand the basic concepts of random-effects models.
3. Calculate and interpret the intraclass correlation coefficient.
4. Combining fixed and random effects in the mixed model.
5. Work with mixed models that include both fixed and random effects.

[6.1: Random Effects](#)

[6.2: Battery Life Example](#)

[6.3: Random Effects in Factorial and Nested Designs](#)

[6.4: Special Case - Fully Nested Random Effects Design](#)

[6.5: Quality Control Example](#)

[6.5.1: Using Minitab](#)

[6.5.2: Using R](#)

[6.6: Introduction to Mixed Models](#)

[6.7: Mixed Model Example](#)

[6.7.1: Using Minitab](#)

[6.7.2: Using SAS](#)

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[6.9: Try It!](#)

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