

CHAPTER OVERVIEW

7: Randomization Design Part I

Objectives

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

1. Understand the importance of randomization design, the second component of experimental design, and how it impacts on our interpretation of results.
2. Identify any blocking factors and the randomization design used in a study.
3. Use statistical software to obtain the randomization design that assigns the treatment levels to the experimental units schematically.
4. Gain experience in utilizing statistical software to analyze data obtained from a given experimental design.

Previously in the course, we have referenced how experimental design drives the statistical model to be fitted. Recall that in Chapter 5, we discussed the two components of the experimental design that accounts for two aspects of a study.

- The treatment design component, which was addressed in Chapters 5 and 6, describes the treatment levels of interest, treatment type (fixed vs. random), and also the relationship of treatments with each other (crossed vs. nested).
- The randomization design component takes into account the treatment design aspects and also the physical layout of the study setting, including other influencing factors such as confounding (or blocking) variables.

In our discussions of treatment designs, we looked at experimental data in which there were multiple observations made at the treatment applications. We referred to these loosely as *replicates*. In this lesson, we will work formally with these multiple observations and how they are to be collected. This brings us to the right-hand side of the schematic diagram portraying the randomization design component:

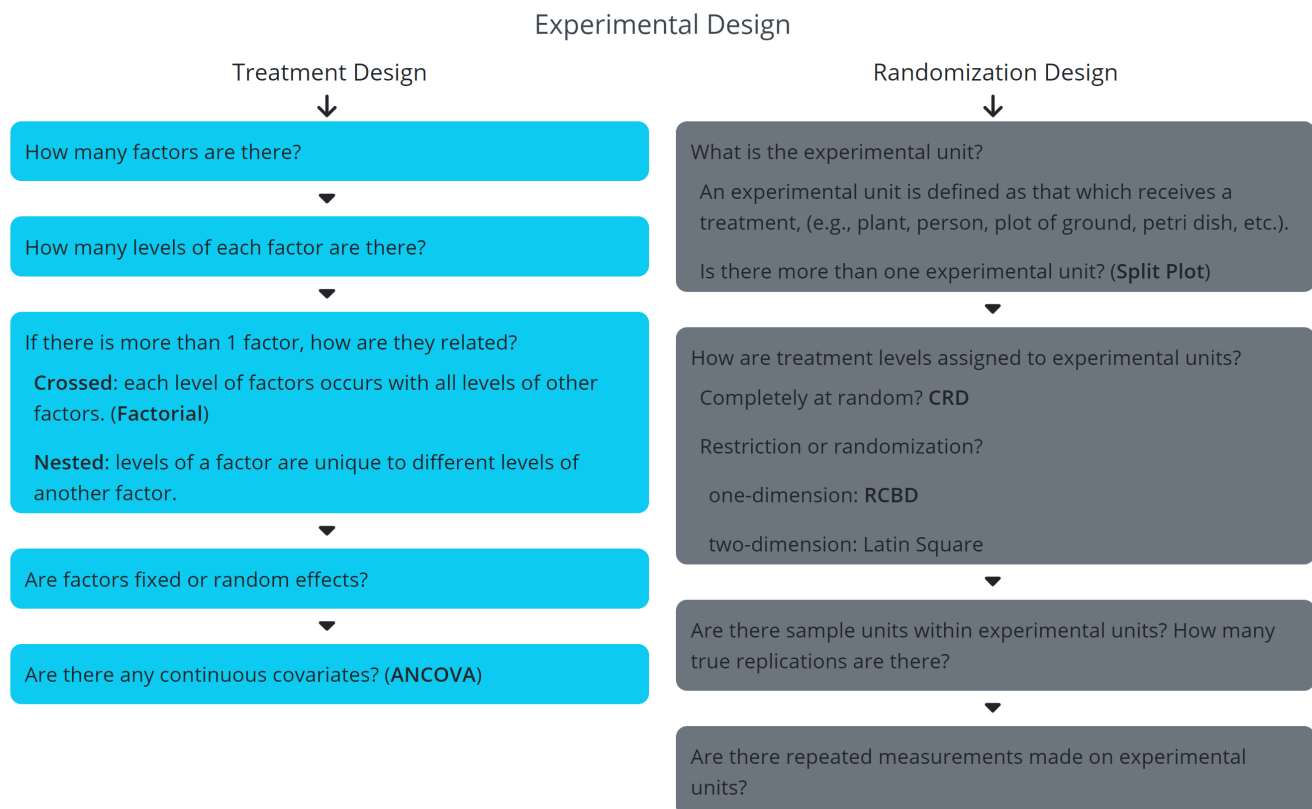


Figure 7.1: Steps of treatment design and randomization design in experimental design.

As can be seen in the diagram above, the treatment design addresses specific characteristics of the experimental factors under study. The randomization design addresses how the treatments are assigned to experimental units. Overall, the experimental design sets the stage in collecting data systematically and also dictates the statistical model to be used and the ANOVA-related calculations.

[7.1: Experimental Unit and Replication](#)

[7.2: Completely Randomized Design](#)

[7.3: Restriction on Randomization - RCBD](#)

[7.4: Blocking in 2 Dimensions - Latin Square](#)

[7.5: Try It!](#)

[7.6: Chapter 7 Summary](#)

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