CHAPTER OVERVIEW

11: Comparing Two Means

In the previous chapter we covered the situation when your outcome variable is nominal scale and your predictor variable[184] is also nominal scale. Lots of real world situations have that character, and so you'll find that chi-square tests in particular are quite widely used. However, you're much more likely to find yourself in a situation where your outcome variable is interval scale or higher, and what you're interested in is whether the average value of the outcome variable is higher in one group or another. For instance, a psychologist might want to know if anxiety levels are higher among parents than non-parents, or if working memory capacity is reduced by listening to music (relative to not listening to music). In a medical context, we might want to know if a new drug increases or decreases blood pressure. An agricultural scientist might want to know whether adding phosphorus to Australian native plants will kill them.[185] In all these situations, our outcome variable is a fairly continuous, interval or ratio scale variable; and our predictor is a binary "grouping" variable. In other words, we want to compare the means of the two groups.

The standard answer to the problem of comparing means is to use a t-test, of which there are several varieties depending on exactly what question you want to solve. As a consequence, the majority of this chapter focuses on different types of t-test: one sample t-tests are discussed in Section 13.2, independent samples t-tests are discussed in Sections 13.3 and 13.4, and paired samples t-tests are discussed in Section 13.5. After that, we'll talk a bit about Cohen's d, which is the standard measure of effect size for a t-test (Section 13.8). The later sections of the chapter focus on the assumptions of the t-tests, and possible remedies if they are violated. However, before discussing any of these useful things, we'll start with a discussion of the z-test.
