CHAPTER OVERVIEW

13: Assumptions of Parametric Tests

Introduction

Chapters 8, 10 and 12 were concerned primarily with tests of means among groups of treatments. ANOVA, t-tests, linear models, all involve estimation of parameters, qualities of populations. Although we have included assumptions about these statistics along the way, this chapter provides a summary about assumptions needed to be met in order to correctly interpret results of these statistical tests. Assumptions of parametric tests include how the data are presumed to be distributed (e.g., normality) and about the variability within groups (e.g., we assume equal variances). One important caveat: you can always estimate regardless of whether or not the assumptions are met. And, certainly, R and other statistical software will allow you to perform these calculations without warning. However, to the extent one or more assumptions do not hold, your conclusions, e.g., p-value and Type I error, will be influenced. That's what we mean by **statistical thinking** — knowing when your conclusions are valid.

This is the classic approach — provide tests of assumptions to justify use of ANOVA, etc. The modern approach, perhaps even the best practice approach, is instead to use more powerful statistical modeling approach, e.g., **generalized linear model (GLS)** to model for correlations among residuals (lack of independence assumption) or heteroscedastic variances (equal residual variances).