

CHAPTER OVERVIEW

17: Bayesian Statistics

In our reasonings concerning matter of fact, there are all imaginable degrees of assurance, from the highest certainty to the lowest species of moral evidence. A wise man, therefore, proportions his belief to the evidence. – David Hume²⁵³.

The ideas I've presented to you in this book describe inferential statistics from the frequentist perspective. I'm not alone in doing this. In fact, almost every textbook given to undergraduate psychology students presents the opinions of the frequentist statistician as *the* theory of inferential statistics, the one true way to do things. I have taught this way for practical reasons. The frequentist view of statistics dominated the academic field of statistics for most of the 20th century, and this dominance is even more extreme among applied scientists. It was and is current practice among psychologists to use frequentist methods. Because frequentist methods are ubiquitous in scientific papers, every student of statistics needs to understand those methods, otherwise they will be unable to make sense of what those papers are saying! Unfortunately – in my opinion at least – the current practice in psychology is often misguided, and the reliance on frequentist methods is partly to blame. In this chapter I explain why I think this, and provide an introduction to Bayesian statistics, an approach that I think is generally superior to the orthodox approach.

This chapter comes in two parts. In Sections 17.1 through 17.3 I talk about what Bayesian statistics are all about, covering the basic mathematical rules for how it works as well as an explanation for why I think the Bayesian approach is so useful. Afterwards, I provide a brief overview of how you can do Bayesian versions of chi-square tests (Section 17.6), t-tests (Section 17.7), regression (Section 17.8) and ANOVA (Section 17.9).

[17.1: Probabilistic Reasoning by Rational Agents](#)

[17.2: Bayesian Hypothesis Tests](#)

[17.3: Why Be a Bayesian?](#)

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