

Experimental Design and Probability

Introduction to course

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Experimental Design and Probability

- ▶ Experimental Design
- ▶ Probability
- ▶ Estimation
- ▶ Hypothesis testing
- ▶ General linear models
- ▶ Computational tools

Computational tools are central to modern statistics

“Working with data requires extensive computing skills. To be prepared for statistics and data science careers, students need facility with professional statistical analysis software, the ability to access and manipulate data in various ways, and the ability to perform algorithmic problem-solving.”

- ▶ The 2014 American Statistical Association curriculum guidelines for undergraduate programs in statistical science

An old trope

by Jef Mallett

May 08, 2006



Statistics, inspiration, change



Textbooks

https://www.openintro.org/stat/textbook.php?stat_book=os

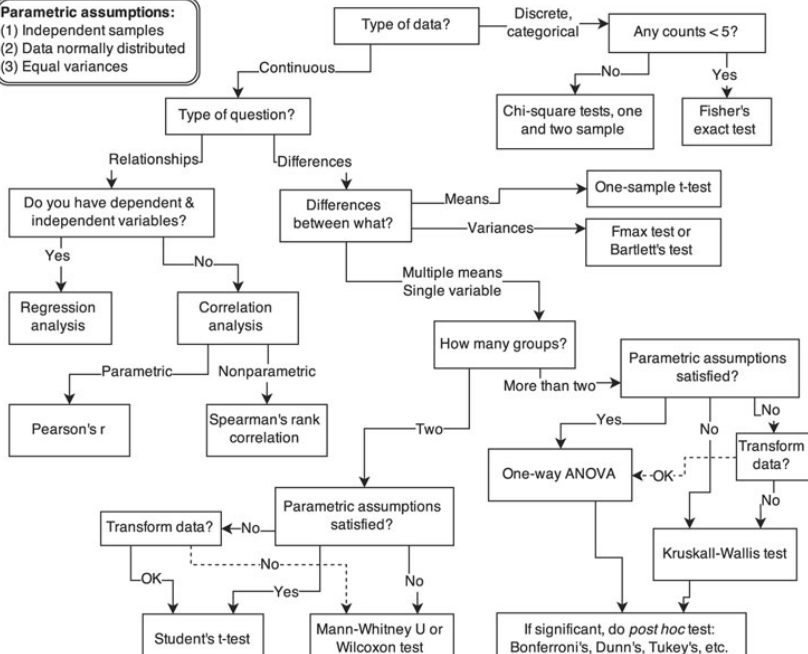
<https://r4ds.had.co.nz/>

Both are on reserve at the library, in addition to a number of other useful texts.

A flow chart for intro stats

Parametric assumptions:

- (1) Independent samples
- (2) Data normally distributed
- (3) Equal variances



Linear models as a unifying framework

We will learn the essentials

- t-tests
- regression
- analysis of variance

in the context of linear models:

$$y = \alpha + \beta x$$

Fixed vs growth mindset



Tips for success

Read materials before AND after class

Participate, ask questions

Do not procrastinate

Teamwork (introduce yourself to your neighbor, swap #s)

Who are you?

1. Name
2. Have you taken any stats before?
3. Have you designed a data-centric study?
4. Have you used a programming language? If yes, which?
5. Why are you here?

Website

<https://elahi.github.io/xdp/>