OpenIntro

Chapter 5: Foundations for inference

OpenIntro Statistics, 4th Edition

Review

Last time: Distributions and random variables (Ch. 4)

- Continuous vs discrete random variables
- Distributions: Normal, Geometric, Poisson
- Today we will derive another distribution, used for estimating proportions
- But first...

Point estimates and sampling variability (Ch. 5.1)

Point estimates and error

- We are often interested in *population parameters*.
- Complete populations are difficult to collect data on, so we use *sample statistics* as *point estimates* for the unknown population parameters of interest.
- *Error* in the estimate = difference between population parameter and sample statistic
- *Bias* is systematic tendency to over- or under-estimate the true population parameter.
- *Sampling error* describes how much an estimate will tend to vary from one sample to the next.
- Much of statistics is focused on understanding and quantifying sampling error, and *sample size* is helpful for quantifying this error.

Sampling distributions are never observed

- In real-world applications, we never actually observe the sampling distribution, yet it is useful to always think of a point estimate as coming from such a hypothetical distribution.
- Understanding the sampling distribution will help us characterize and make sense of the point estimates that we do observe.

R Demo: Sampling distributions

Edfinity quiz

Board work: Deriving theoretical sampling distribution in the Binomial case

Introducing bias for small-sample estimation

Rule of succession

- (Placeholder for material)

Board work: deriving two estimators for Binomial case

R Demo: Rule of succession