

Sampling Distributions and Sampling Variance, Part 2

Brady T. West



Why is Sampling Variance Important?

- In practice, we only have the resources to select one sample!
- Important sampling theory (developed in early 1900s) allows us to **estimate features of sampling distribution** (including variance!) based on **one sample**

"Magic" of probability sampling:

Can select one probability sample and features of that design tell us what we need to know about the expected sampling distribution



Why is Sampling Variance Important?

- Because we can estimate variance of sampling distribution based only one sample, we can make inferential statements about where most estimates based on a particular sample design will fall
 - → Can make statements about likely values of population parameters that account for variability in sampling errors that arises from random probability sampling



What's Next?

 Work with a Web App to visualize sampling distributions when selecting random samples from a population with certain features:

https://markkurzejaumich.shinyapps.io/multiple_population_bias/

- See how random sampling generally produces sampling distributions with means close to true population quantity of interest, and how larger samples produce sampling distributions with less variance
- See how biased, non-representative samples can produce sampling distributions that paint misleading pictures of the larger population