EPSY 5261 : Introductory Statistical Methods

Day 6
Estimating Uncertainty

Learning Goals

- At the end of this lesson, you should be able to…

  - Define sampling variability

  - Explain how we can estimate uncertainty

  - Calculate an estimate for uncertainty using R Studio

Mini Activity

- Get your pulse rate (beats per minute)

  - Find your pulse

  - I will time 1 minute on the clock

  - Write down your pulse for that minute

Mini Activity

- GOAL: Find the average class pulse rate

- We don't have time for you all to get everyone's pulse

- Collect a sample of 5 classmates pulse rates

- Calculate the average

Did we all get the same mean?

- NO!

- Why not?

- Sampling Variability!

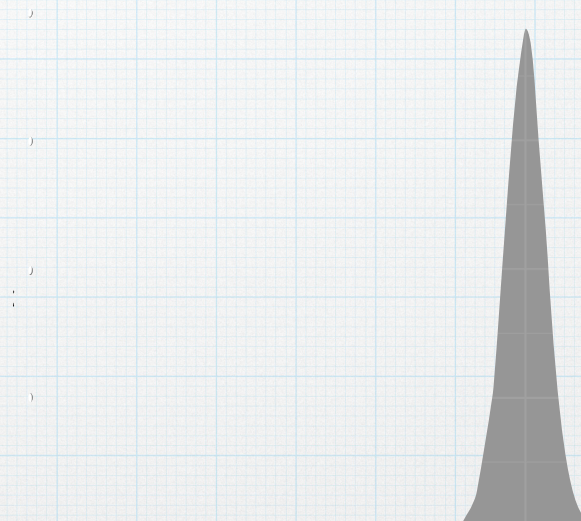 - Our mean pulse rate will vary from sample to sample

How "different" are these estimates?

- Because of sampling variability we have uncertainty in out estimates

- But how much uncertainty?

  - How different are these estimates?

Maybe they look like one of these?
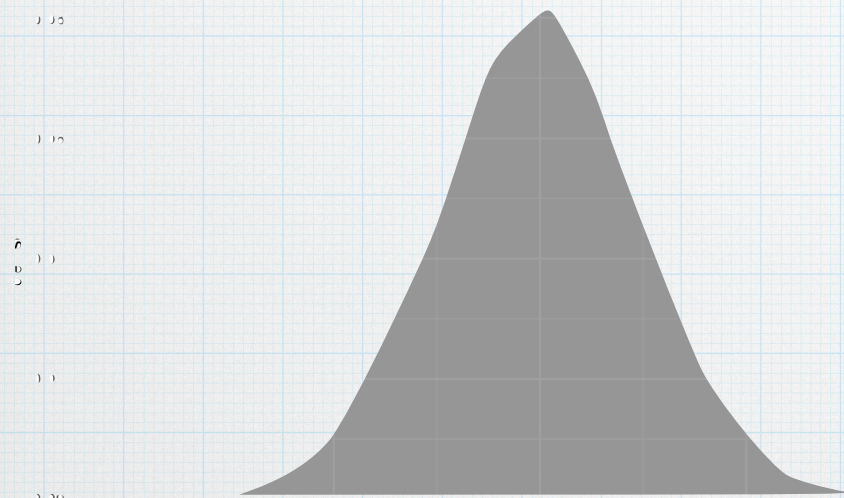
Average pulse

Average pulse

Estimating Uncertainty

- Once way to estimate the uncertainty is with the *standard error*

- We will explore that in the activity today

RStudio

- Install the {mosaic} package

  - Reminder: Use the **Install** button in the **Packages** tab

- Load the {mosaic} package when you load the {tidyverse} and {ggformula} packages.

Estimating Uncertainty Activity

Key Points

- We can estimate sampling variability using the standard error.

- What can we use this for? ....

Consider a scenario

- The data we are working with is from 2017

- You are curious if the average pulse for U.S. adults has changed since then

- You conduct your own study and get an average pulse of 74 beats per minute

- But how can you determine if this is a difference due to sampling variability or a true difference?

- We will explore that next class via hypothesis testing!

Summary

- Sampling variability is the idea that sample estimates vary from sample to sample

- We can estimate the uncertainty by calculating the standard error