Biostats Lecture 1: Descriptive Statistics

Public Health 783

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Learning Objectives

1. Understand why descriptive statistics is important, and useful
2. Know the difference between discrete and continuous variables/data
3. Have some ideas of which summaries and figures are appropriate for different types of data

Descriptive Statistics

- What: the art of describing data with few important measures ('summary statistics')
- Why:
  - know your population!!
  - explore your data
- How: try to get an idea of the distributions of variables included
  - what's a distribution?!
  - what's a variable?!

Data Types

Two general data types:

- Discrete data
  - categorical
    - no natural ordering
    - examples: sex, race, blood type, political orientation, etc.
  - ordinal
    - naturally ordered
    - educational level, age groups, disease severity scales, etc.
  - summarized by
    - frequency counts
    - relative frequencies
- Continuous data
  - numerical
    - examples: age, height, weight, BMI, proportions, etc.
  - infinite (uncountable, actually...) number of potential values
  - summarized by
    - location measures
    - spread/variation measures

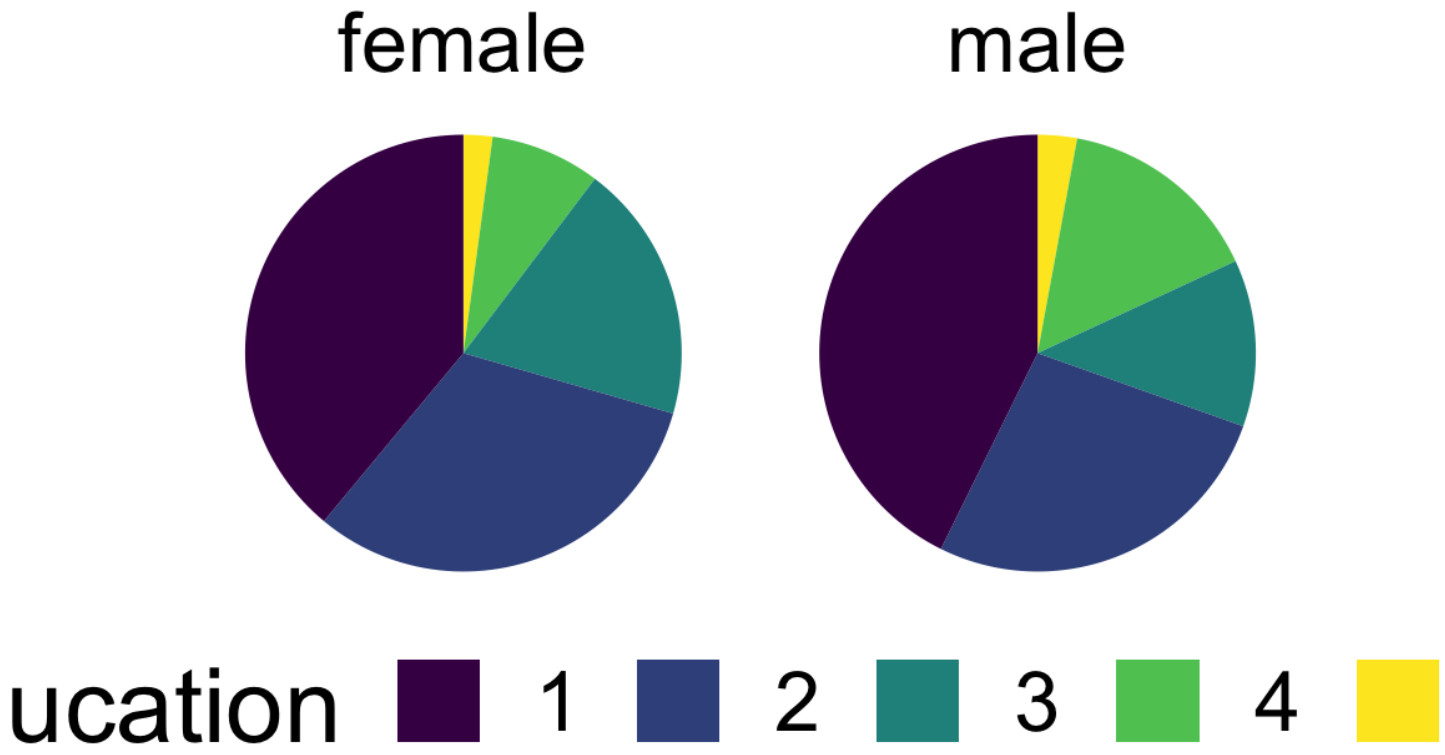
Example

Framingham Heart Study

Quick Detour

What NOT to do with categorical data.

A.K.A. my least favorite chart of all time...



Quick Detour

Why don't I like pie charts?

What we want from figures:

1. self-explanatory
2. important information should be easy to get
3. show trends (if available)
4. only as complicated as the data
5. free of unnecessary complexity
    - irrelavent decorations
    - 3D effects --(**BIG YIKES!!!!!**)

The pie chart violates 2, 4, and 5.

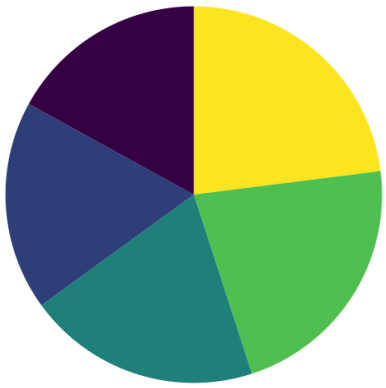
- 5: a bar chart is almost always more appropriate
- 2 and 4: pie charts compare angles. Humans are awful at comparing angles!

Quick Detour

From Wikimedia Commons

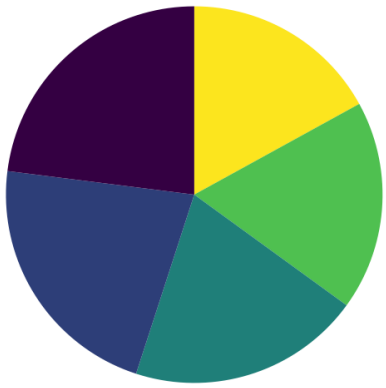
For each of the following, rank the colors in terms of size:

1



2

3



Quick Detour

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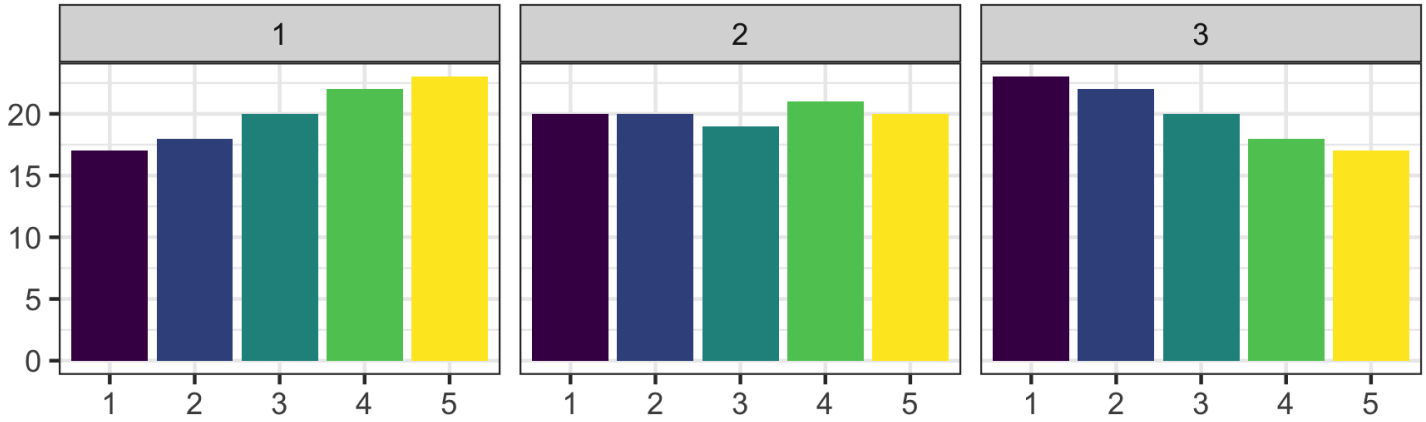

Quick Detour

Quick Detour

> "Only pie chart ever allowed:"
>
> 
>
>
> --- Me (24/9/2019)

That was two days ago, though. Things change... I guess.

> "All pies might not be made equal.....?"
>
> --- Me (25/9/2019)

Before using a pie chart, read this, this, and this. This Twitter thread is also great!

Quick Detour