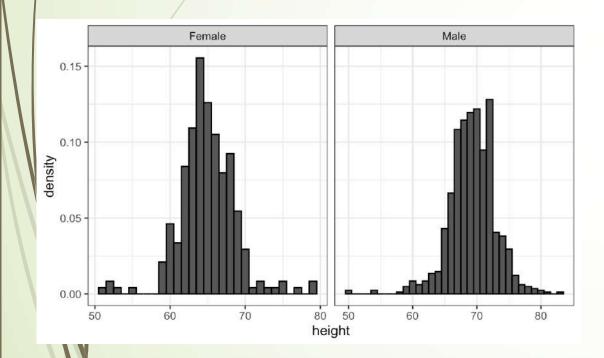
# Data visualization and reshaping

Lecture 3

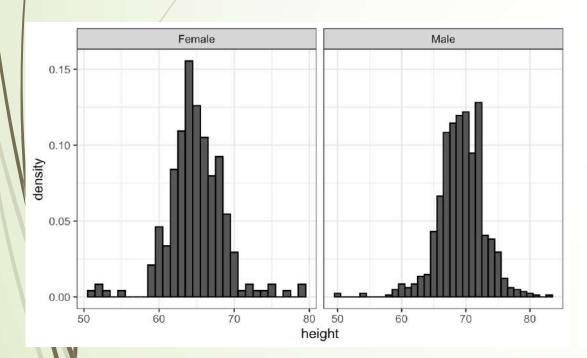
FT6758, Fall 2020

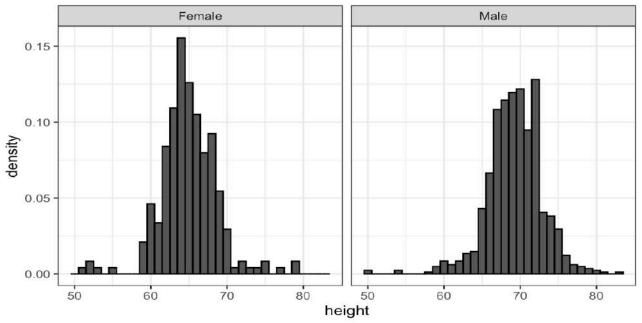
(i) Use common axes

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#### Principles of Data Visualization: 4. Ease

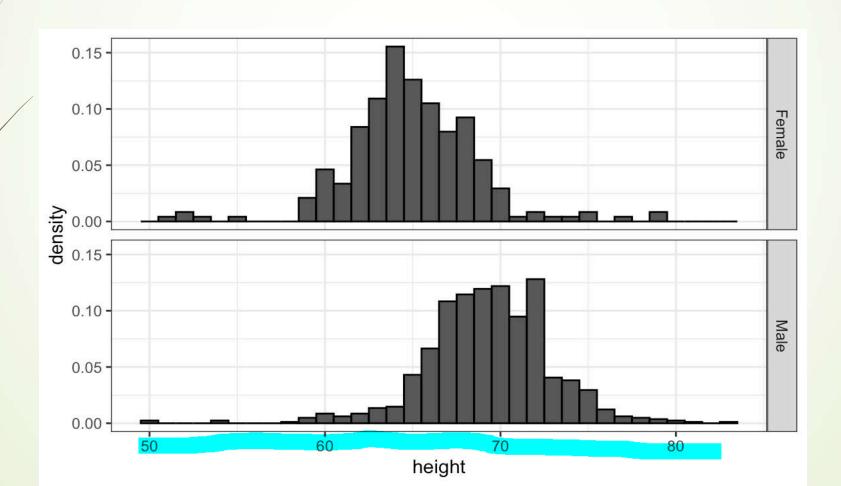
#### comparisons

 (ii) Align plots vertically to see horizontal changes and horizontally to see vertical changes

#### Principles of Data Visualization: 4. Ease

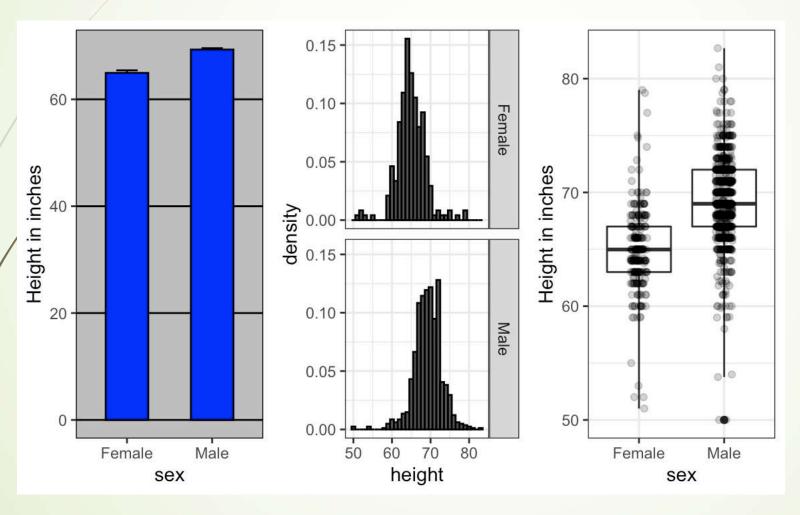
#### comparisons

 (ii) Align plots vertically to see horizontal changes and horizontally to see vertical changes

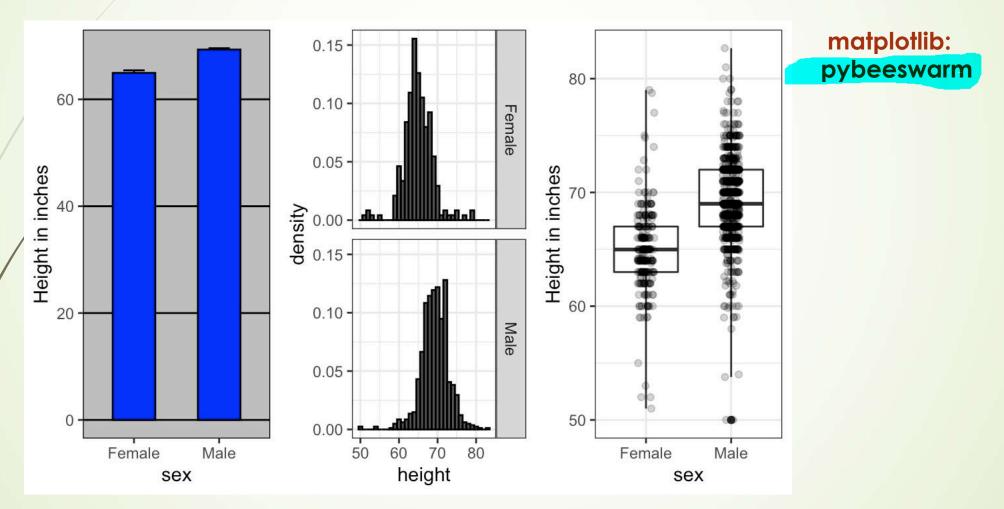


(iii) Use appropriate representation to facilitate distribution and summary

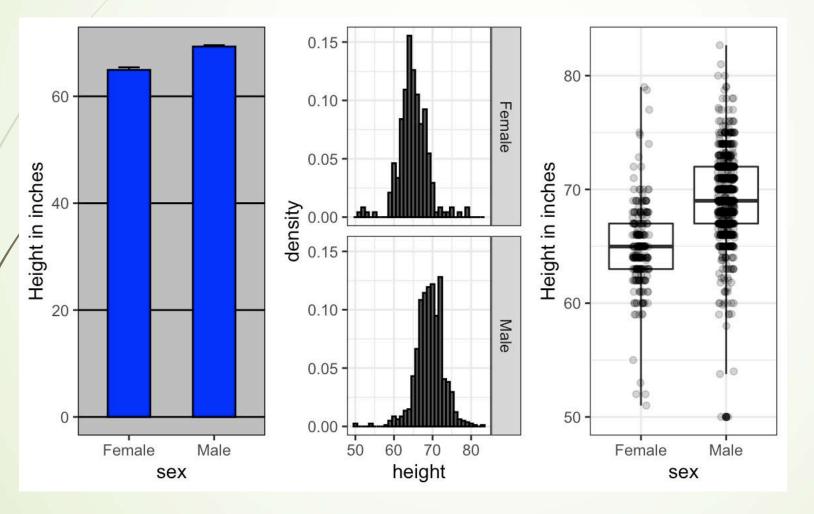
(iii) Use appropriate representation to facilitate distribution and summary



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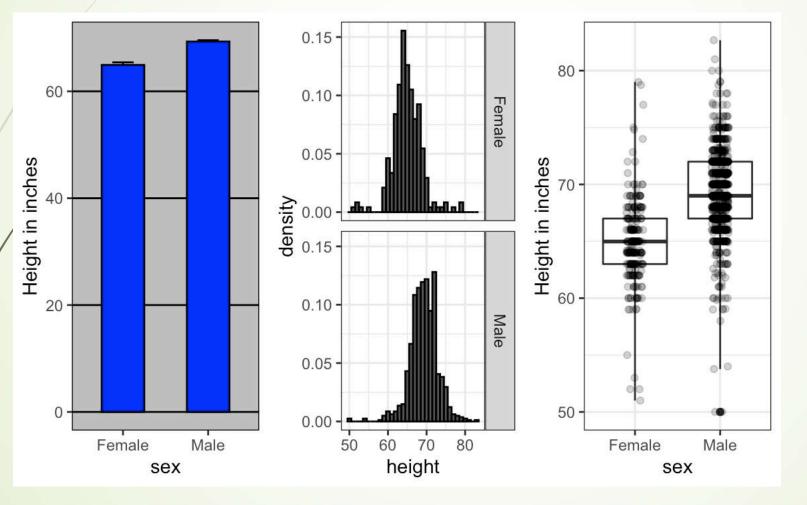
(iii) Use appropriate representation to facilitate distribution and summary



#### matplotlib: pybeeswarm

from beeswarm import \*
import matplotlib.pyplot as plt
import numpy as np
d1 = np.random.uniform(low=-3,
high=3, size=100)
d2 =
np.random.normal(size=100)

(iii) Use appropriate representation to facilitate distribution and summary



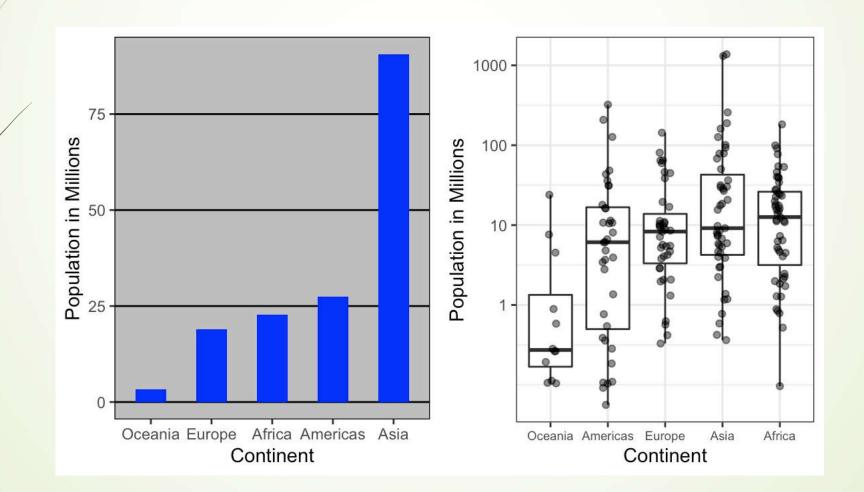
#### matplotlib: pybeeswarm

from beeswarm import \*
import matplotlib.pyplot as plt
import numpy as np
d1 = np.random.uniform(low=-3,
high=3, size=100)
d2 =
np.random.normal(size=100)

bs, ax =
beeswarm([d1,d2],
method="swarm",
labels=["sample 1",
"sample 2"],
col=["blue","red"])

(iv) Consider transformations

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Principles of Data Visualization: 5. Think of the color blind

### Principles of Data Visualization: 5. Think of the color blind

- Seaborn color pallettes
- Color Brewer website provides some guidance on which palettes are color blind safe.
- Seaborn choose\_colorbrewer\_palette: interactive widget to browse options and tweak parameters; must be used in a Jupyter notebook
- <u>Example code</u> to understand how the the seaborn color palettes compare for different type of colorblindness (e.g., deuteranopia, protan)
- There is a variety of <u>kinds</u> of color blindness, but the **most common** variant leads to **difficulty distinguishing reds and greens**.
- Seaborn colorblind palette:

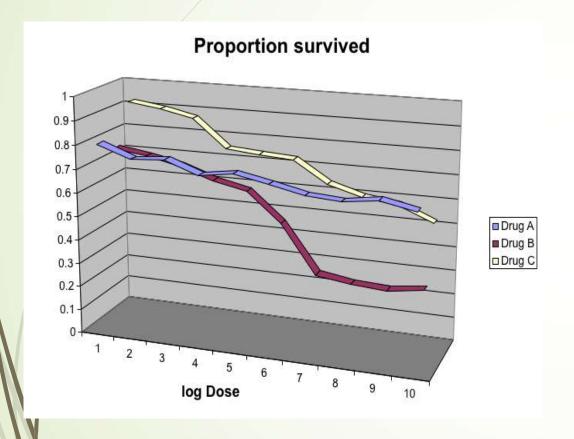
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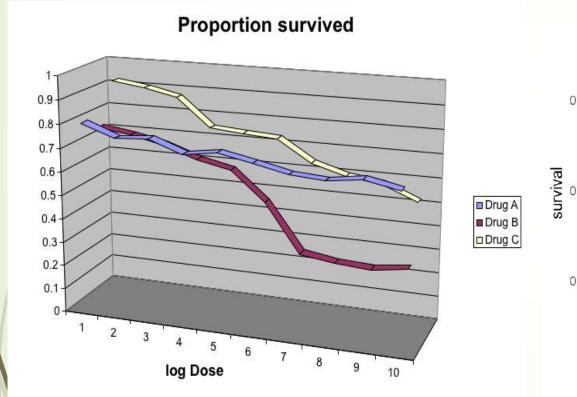
Example code: color\_pal = sns.color\_palette("colorblind", 6).as\_hex()

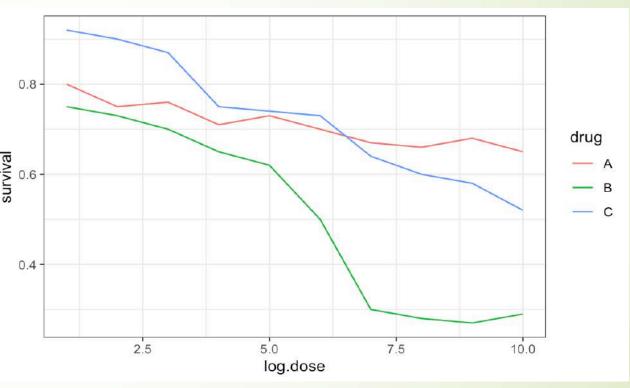
Principles of Data Visualization: 6. Avoid pseudothree-dimensional plots

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Principles of Data Visualization: 7. Avoid too many significant digits

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| state      | year | Measles    | Pertussis  | Polio     |
|------------|------|------------|------------|-----------|
| California | 1940 | 37.8826320 | 18.3397861 | 0.8266512 |
| California | 1950 | 13.9124205 | 4.7467350  | 1.9742639 |
| California | 1960 | 14.1386471 | NA         | 0.2640419 |
| California | 1970 | 0.9767889  | NA         | NA        |
| California | 1980 | 0.3743467  | 0.0515466  | NA        |

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| state      | year | Measles    | Pertussis  | Polio     |
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| California | 1980 | 0.3743467  | 0.0515466  | NA        |
|            |      |            |            |           |
| state      | year | Measles    | Pertussis  | Polio     |
| California | 1940 | 37.9       | 18.3       | 0.8       |
| California | 1950 | 13.9       | 4.7        | 2.0       |
| California | 1960 | 14.1       | NA         | 0.3       |
| California | 1970 | 1.0        | NA         | NA        |
|            |      |            |            |           |

1980

0.4

NA

California

Principles of Data Visualization: 8. Place values being compared on columns rather than on rows

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| state      | year | Measles | Pertussis | Polio |
|------------|------|---------|-----------|-------|
| California | 1940 | 37.9    | 18.3      | 0.8   |
| California | 1950 | 13.9    | 4.7       | 2.0   |
| California | 1960 | 14.1    | NA        | 0.3   |
| California | 1970 | 1.0     | NA        | NA    |
| California | 1980 | 0.4     | 0.1       | NA    |

### Principles of Data Visualization: 8. Place values being compared on columns rather than on rows

| state      | year | Measles | Pertussis | Polio |
|------------|------|---------|-----------|-------|
| California | 1940 | 37.9    | 18.3      | 0.8   |
| California | 1950 | 13.9    | 4.7       | 2.0   |
| California | 1960 | 14.1    | NA        | 0.3   |
| California | 1970 | 1.0     | NA        | NA    |
| California | 1980 | 0.4     | 0.1       | NA    |

| state          | disease   | 1940 | 1950 | 1960 | 1970 | 1980 |
|----------------|-----------|------|------|------|------|------|
| Californi<br>a | Measles   | 37.9 | 13.9 | 14.1 | 1    | 0.4  |
| Californi<br>a | Pertussis | 18.3 | 4.7  | NA   | NA   | 0.1  |
| Californi<br>a | Polio     | 0.8  | 2.0  | 0.3  | NA   | NA   |