

Lecture 3: Bar Graphs

February 6, 2023

Course Administration

1. Hopefully your policy brief proposal is in
 - I will give feedback by next week
 - I'll write comments on your doc
 - Please respond by coming to office hours
2. Make sure you're checking Piazza

Course Administration

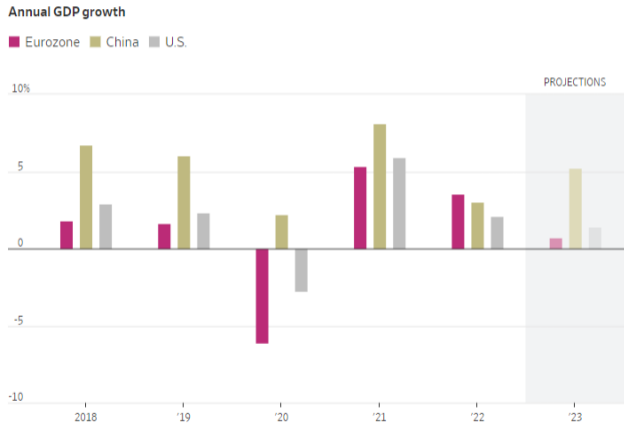
1. Hopefully your policy brief proposal is in
 - I will give feedback by next week
 - I'll write comments on your doc
 - Please respond by coming to office hours
2. Make sure you're checking Piazza
3. Grading first two tutorials this week
4. How to treat Chang reading
5. Peer tutor coming soon
6. Anything else?

Next Week's Good Bad and Ugly

Post by Wednesday noon. You link on google sheet. Earlier is ok.

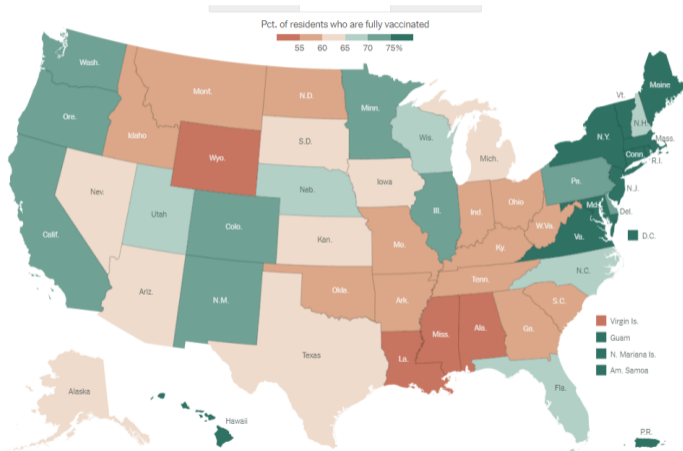
Finder	Commenter
Isabel	Henry
Anna	Hannah

Lancy on Henry's Choice



Source is *Wall Street Journal*, Jan. 31, 2023, [\[link\]](#).

Maddy on Kristiann's Choice: "How Is Each State Doing?"



Sources: Centers for Disease Control and Prevention, U.S. Census Bureau

Source is *New York Times*, updated Oct. 20, 2022, [\[link\]](#).

Plan for Today

Few Chaps. 9 and 10

1. Form
2. Color
3. Spatial Position

Bar Chart overview

Plan for Today

Few Chaps. 9 and 10

1. Form
2. Color
3. Spatial Position

Bar Chart overview

R

1. Graphing in R via ggplot
2. Parts of ggplot
3. Bars via ggplot
4. Titles and axis scaling
5. Factor re-ordering
6. Summary statistics
7. Date variables

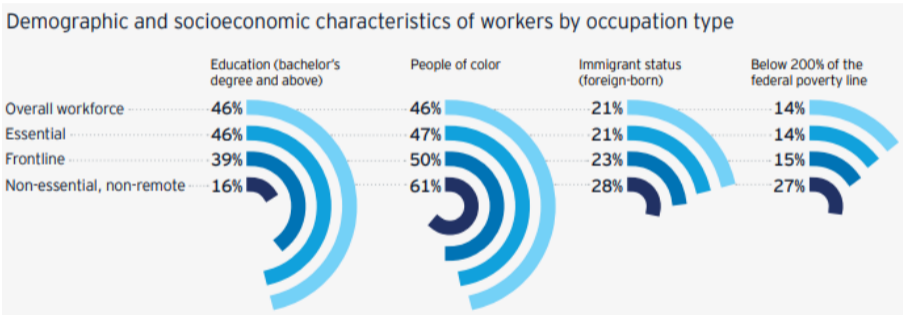
Few: Three Primary Ways to Convey Information

1. Form
2. Color
3. Spatial Position

Leading to Two Key Rules for All Graphics

1. Maintain visual correspondence to quantity
2. Avoid 3D

When You Don't Maintain Visual Correspondence to Quantity



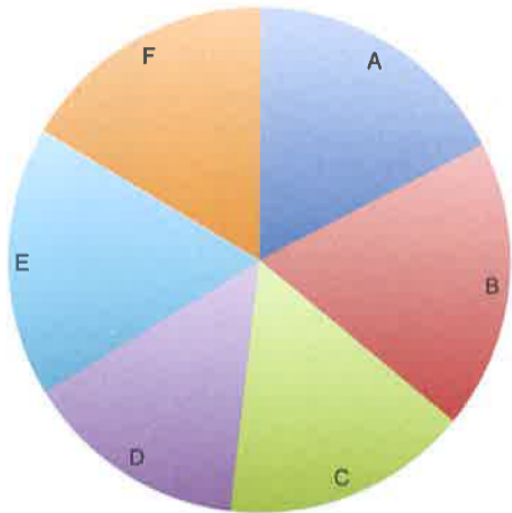
Remote Work in the Capital Region, 2021, Greater Washington Partnership.

Bar Charts

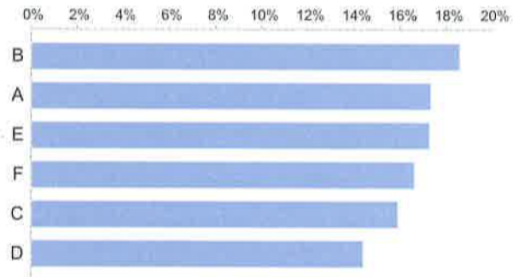
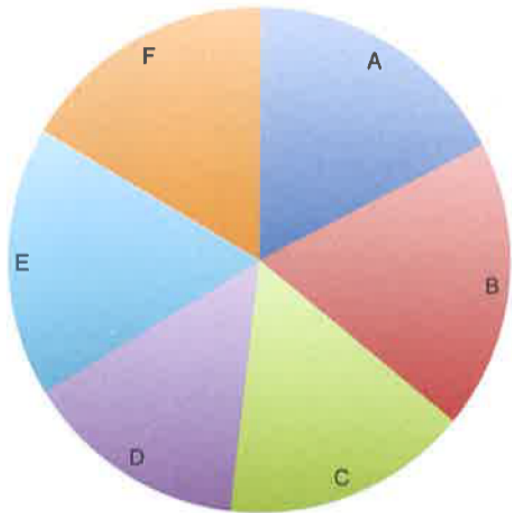
What Does a Bar Chart Do?

Bars compare quantities across categories

When Shape Doesn't Do What You'd Hoped

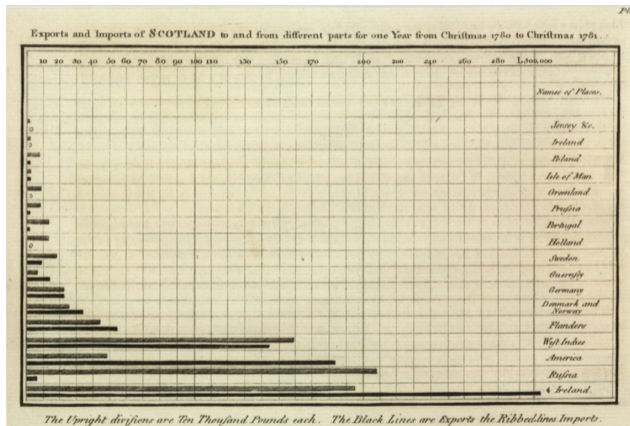


When Shape Doesn't Do What You'd Hoped



Few 6.11 and 6.12

The First Bar Chart



Playfair, William, 1786. *The Commercial and Political Atlas*

An Aside on William Playfair

- 1759-1823
- 5th of 8 children
- Largely educated by [his brother](#) who became a famous mathematician
- Apprenticed to inventor of steam engine
- Engaged in multiple successful and then unsuccessful business ventures
- Late 1790s in debtor's prison
- Blackmailer
- May have stormed the Bastille
- Primary inventor of statistical graphics
 - bar chart
 - line chart
 - pie chart (not so great)
- Motivated by Priestly's sensation

See also [here](#).

General Principles for Bar Charts

- Orientation
- Proximity
- Fills
- Borders
- Base value

Taken from Few Ch. 10, p. 210

Orientation & Proximity

Orientation: Bars horizontal or vertical?

- Horizontal better to fit in long labels
- Vertical better if axis is time

Orientation & Proximity

Orientation: Bars horizontal or vertical?

- Horizontal better to fit in long labels
- Vertical better if axis is time

Proximity – How close should the bars be?

- You want mostly bars, not mostly white space
- But not touching bars
- Why not touching bars?

Orientation & Proximity

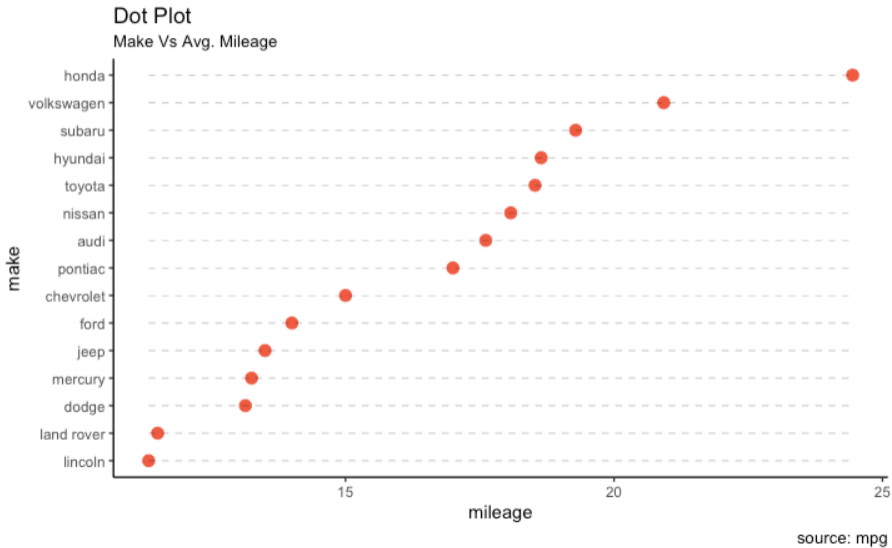
Orientation: Bars horizontal or vertical?

- Horizontal better to fit in long labels
- Vertical better if axis is time

Proximity – How close should the bars be?

- You want mostly bars, not mostly white space
- But not touching bars
- Why not touching bars?
- **Rank when you want to highlight ordering**

Ranked Almost-Bars



Fills

Fills

Do Not

- Use color as decoration
- Use hashed or lined fills

Do

- As much as possible, put legend directly on the graph
- Highlight with color

Fills

Fills

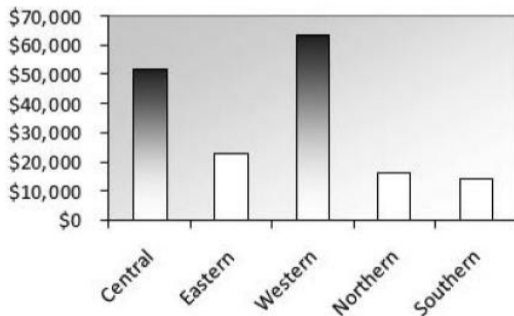
Do Not

- Use color as decoration
- Use hashed or lined fills

Do

- As much as possible, put legend directly on the graph
- Highlight with color

An Uninspiring Example



Fill source is [Excel 2007](#)

Borders and Base Value

Borders

- Use sparingly to highlight
- Colors are better for highlighting

Borders and Base Value

Borders

- Use sparingly to highlight
- Colors are better for highlighting

Base Value

Bars Must Start at Zero!

Borders and Base Value

Borders

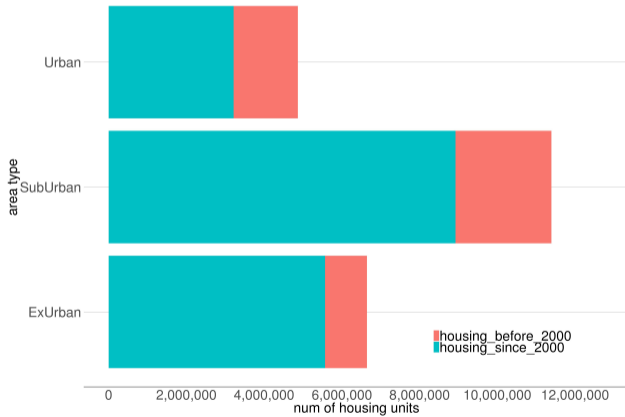
- Use sparingly to highlight
- Colors are better for highlighting

Base Value

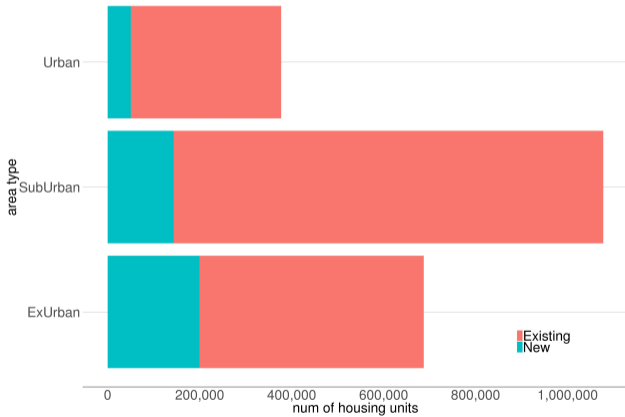
Bars Must Start at Zero!

Why?

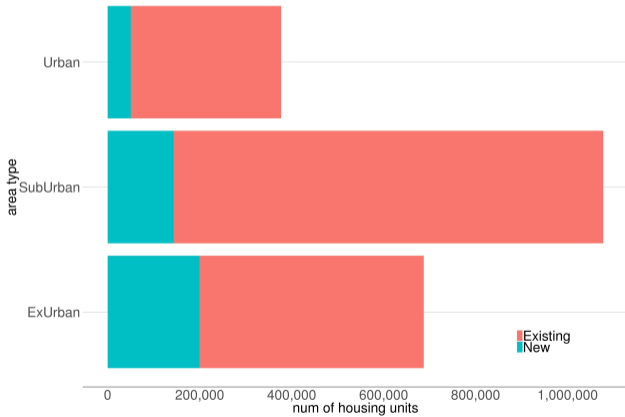
Going From a Bad Bar Chart to a Decent One



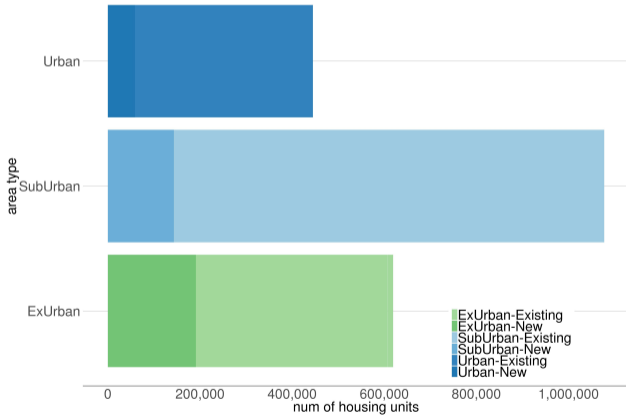
Going From a Bad Bar Chart to a Decent One



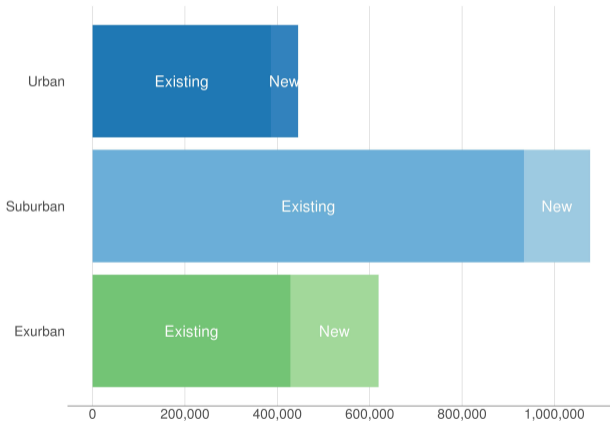
Going From a Bad Bar Chart to a Decent One



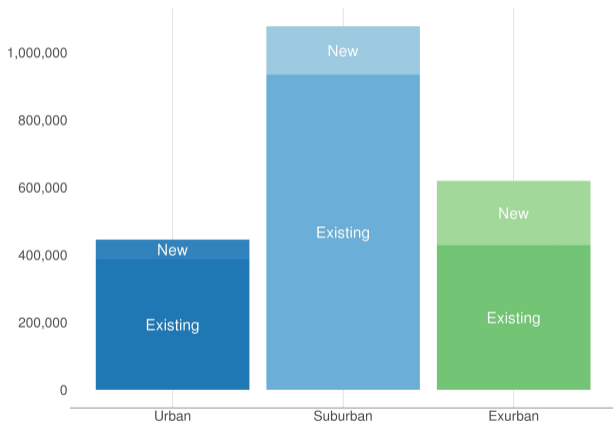
Going From a Bad Bar Chart to a Decent One



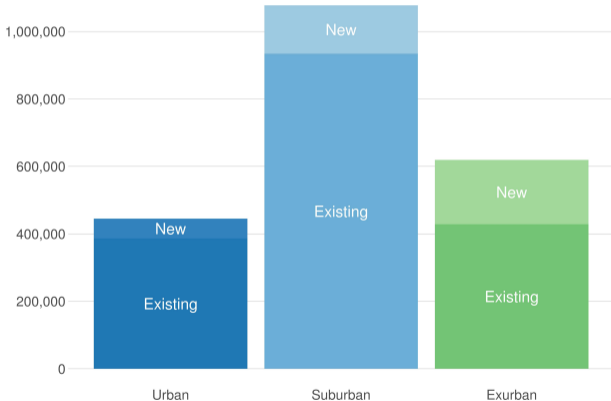
Going From a Bad Bar Chart to a Decent One



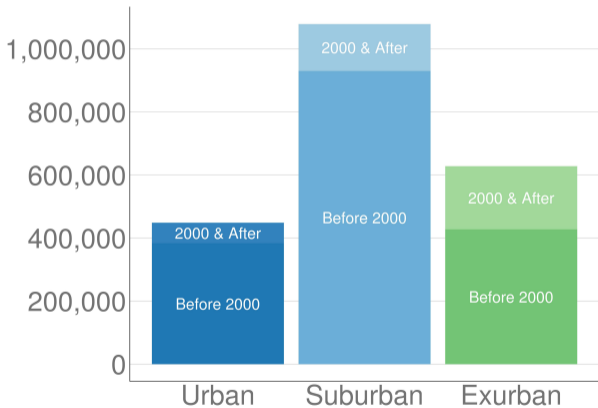
Going From a Bad Bar Chart to a Decent One



Going From a Bad Bar Chart to a Decent One



Going From a Bad Bar Chart to a Decent One



When the Number is Too Big for a Bar

People really have trouble with big numbers

- is \$2 billion a large part of a \$4 trillion budget?

When the Number is Too Big for a Bar

People really have trouble with big numbers

- is \$2 billion a large part of a \$4 trillion budget?

Microsoft plan for conveying big numbers, from *WSJ*

- attribute
- scaling factor
- reference

When the Number is Too Big for a Bar

People really have trouble with big numbers

- is \$2 billion a large part of a \$4 trillion budget?

Microsoft plan for conveying big numbers, from *WSJ*

- attribute
- scaling factor
- reference

“a conservation group that reclaimed about 100 million acres of land across the Earth. ... How big do you think that is?”

When the Number is Too Big for a Bar

People really have trouble with big numbers

- is \$2 billion a large part of a \$4 trillion budget?

Microsoft plan for conveying big numbers, from *WSJ*

- attribute
- scaling factor
- reference

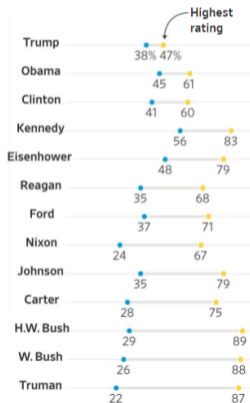
“a conservation group that reclaimed about 100 million acres of land across the Earth. ... How big do you think that is?”

About as big as (1.15x = scaling factor)
California (reference)

The Power of Lollipops

Americans Locked In

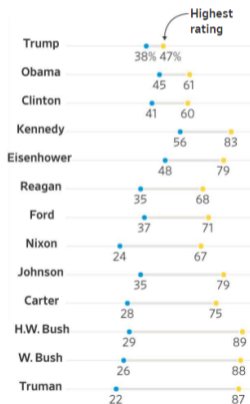
President Trump's job approval rating has held unusually steady throughout his term, moving up and down in the tightest range on record.



The Power of Lollipops

Americans Locked In

President Trump's job approval rating has held unusually steady throughout his term, moving up and down in the tightest range on record.

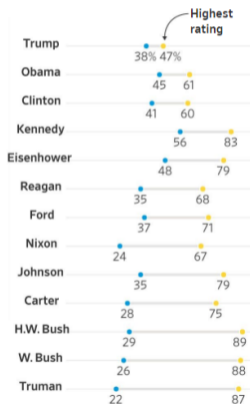


What is the point?

The Power of Lollipops

Americans Locked In

President Trump's job approval rating has held unusually steady throughout his term, moving up and down in the tightest range on record.



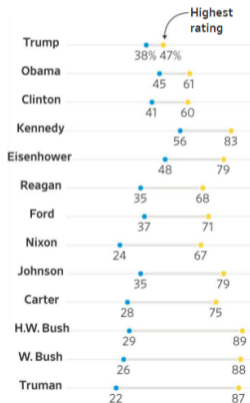
What is the point?

What is this doing that a bar cannot?

The Power of Lollipops

Americans Locked In

President Trump's job approval rating has held unusually steady throughout his term, moving up and down in the tightest range on record.



What is the point?

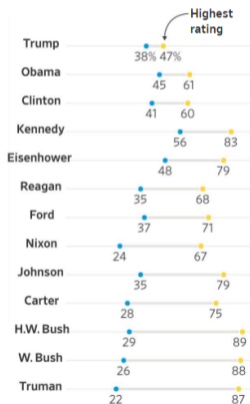
What is this doing that a bar cannot?

What info does this convey?

The Power of Lollipops

Americans Locked In

President Trump's job approval rating has held unusually steady throughout his term, moving up and down in the tightest range on record.



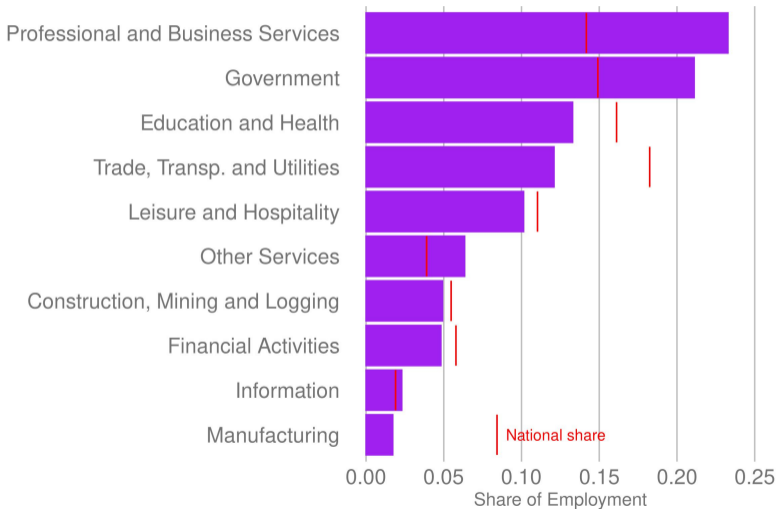
What is the point?

What is this doing that a bar cannot?

What info does this convey?

- max and min
- approximately the variance
- by administration
- so a trend in variance!
- note the point in the title

Showing More than One Number Per Bar



R: Finally, Graphs!

Next Class

- I'm here till 5:20 for questions on anything
- Turn in PS 3
- Few, Chapter 6
- Chang, Chapter 6 (through 6.5)
- Linked Bloomberg article on quantities of land