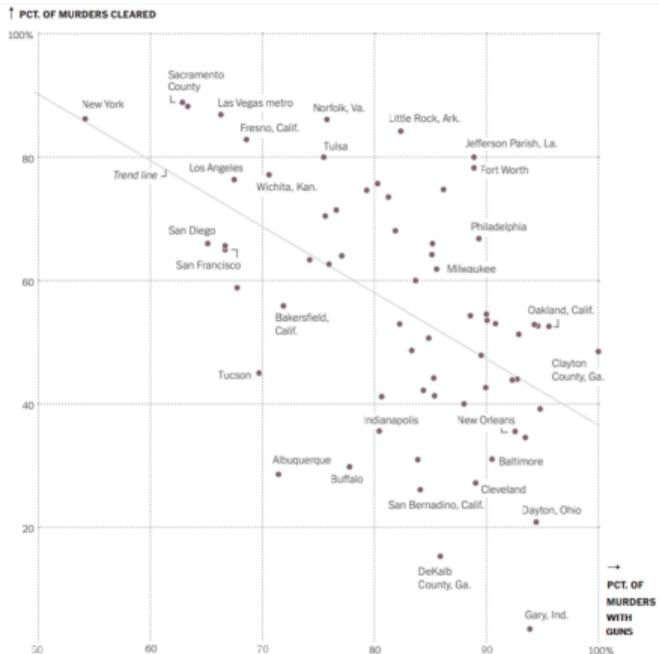


Dayo on Esther's Scatter



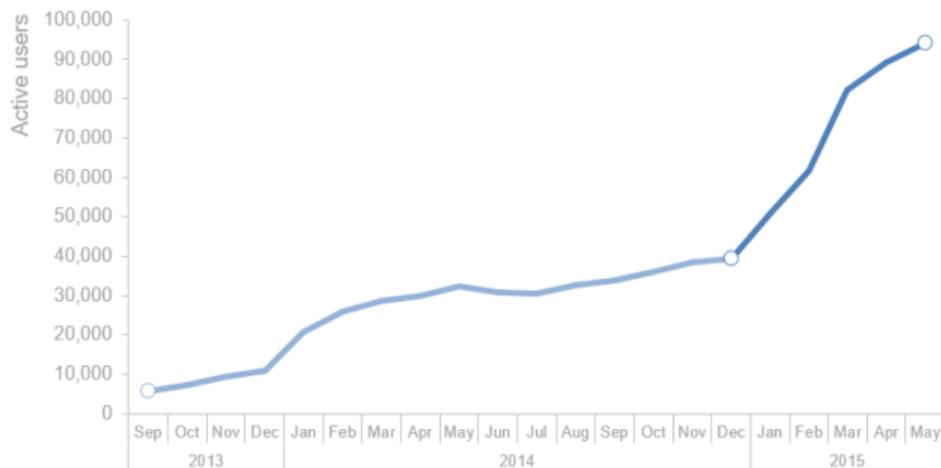
The Learning Network, "What's Going On in This Graph? Solving Gun Murders," *New York Times*, Nov. 4, 2021. [link](#).

2. The Sequential Story

- Knaflic: narrate a line graph
- Mulbrandon: narrate a set of line graphs

Knaflic's Sequential Story: Presentation version

Moonville: active users over time



Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

Few's secondary components

- noisy but easy to read ticks
- dots function as annotations

Knaflic's Sequential Story: Paper Version

Moonville: active users over time



Knaflic's Sequential Story: Paper version

Moonville: active users over time



Few's secondary components

Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

Knaflic's Sequential Story: Paper version

Moonville: active users over time



Few's secondary components

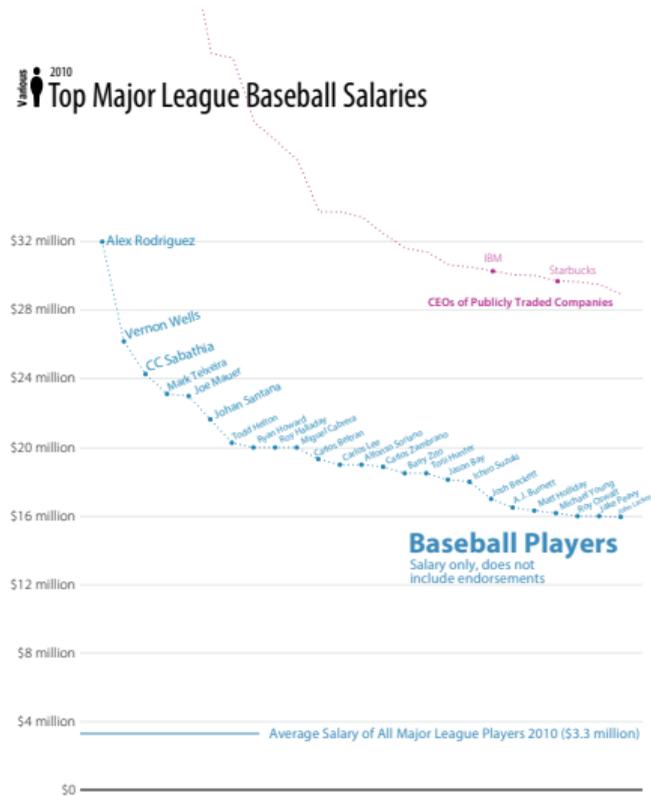
- heavy annotations
- color for main point
- clever: text divides periods

Data source: ABC Report. For purpose of analysis "active user" is defined as the number of unique users in the past 30 days.

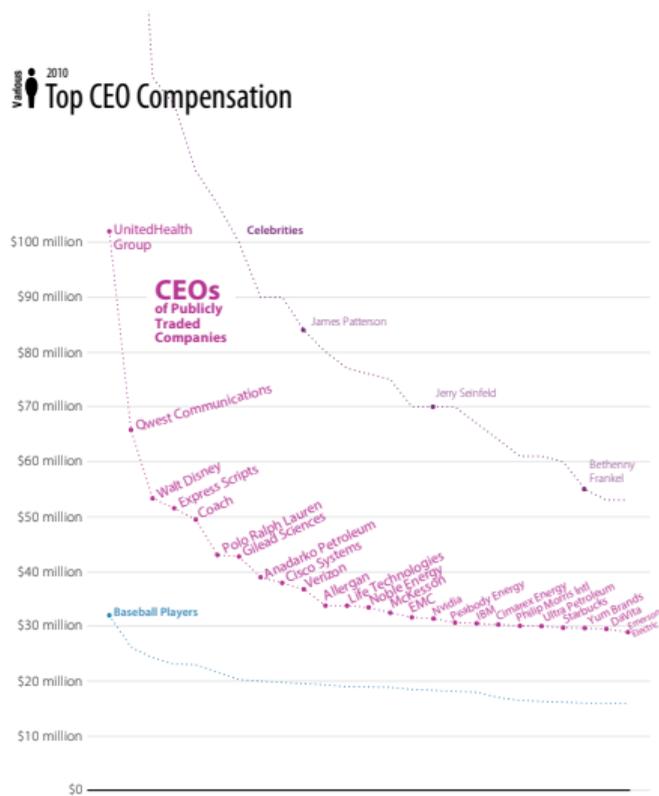
Sequence in Size: Mulbrandon and Top Salaries

- These charts manage to show things that don't actually fit on the same scale
- Impossible in one graph, but possible in two
- And notice that this is a line graph not in time

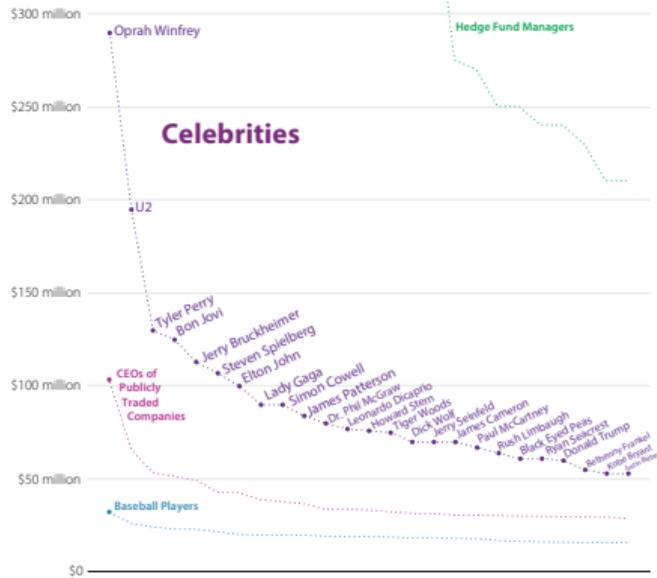
Walden 2010
Top Major League Baseball Salaries



Visualizing 2010
Top CEO Compensation

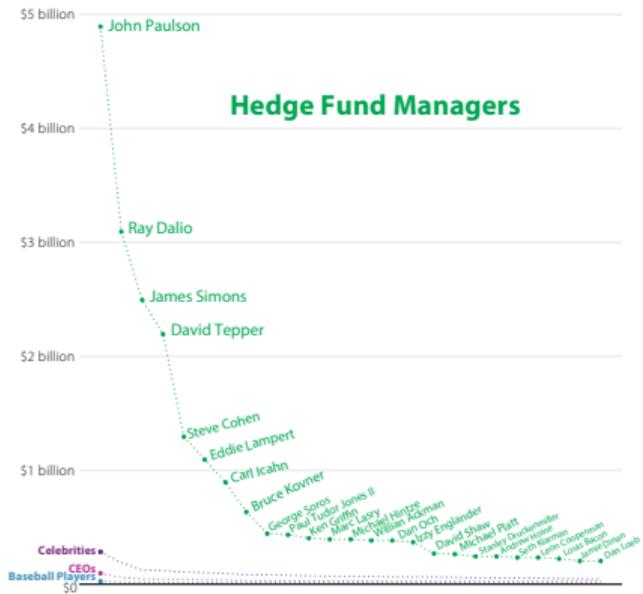


VisualizingEconomics.com 2010
Top Celebrity Income



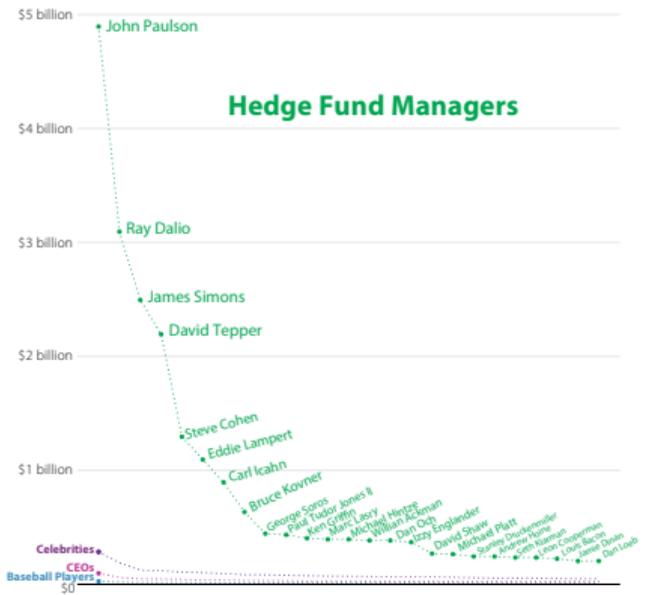
VisualizingEconomics.com
 28 Sources: AR: Absolute Return + Alpha, "The Rich List," April 2011 - Forbes, "Celebrity 100, 2011" - Forbes, "CEO Compensation, 2011" - USA Today, "USATODAY Salaries Databases"

VisualizingEconomics.com 2010
Top Hedge Fund Manager Income



What Would Few Say?

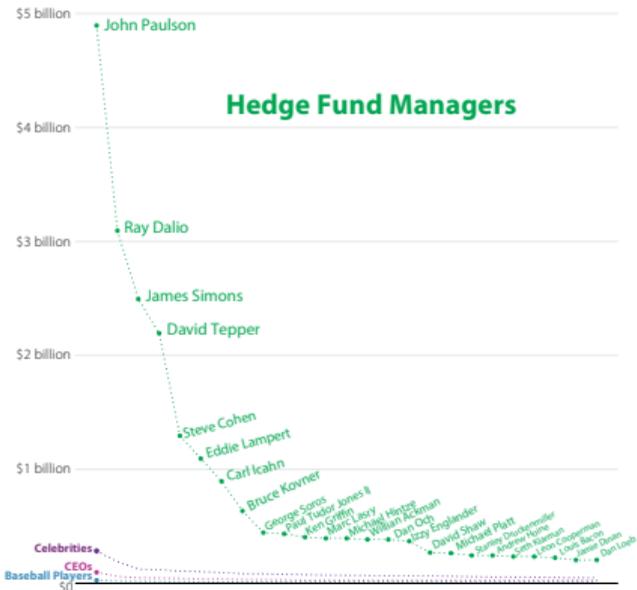
Wardle 2010
Top Hedge Fund Manager Income



Few's secondary components

What Would Few Say?

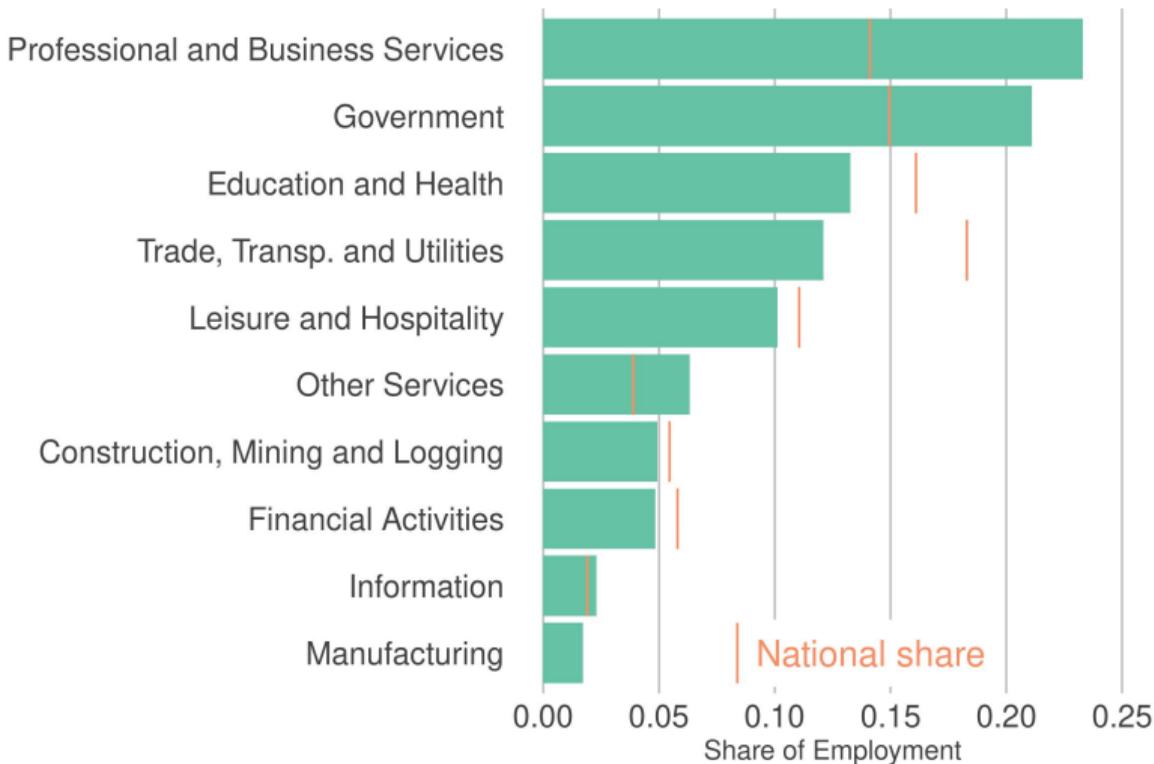
Wardle 2010
Top Hedge Fund Manager Income



Few's secondary components

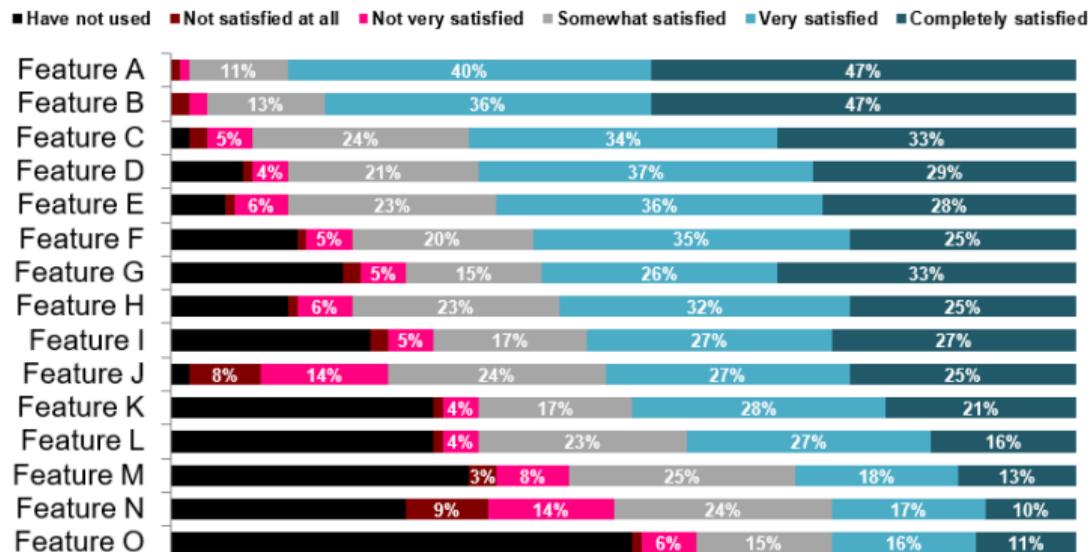
- x axis is rank
- labels on graphs
- colors to divide occupations
- labels for names
- reference line for baseball
- foreshadowing

DC Industrial Mix vs Rest of the Country



Knaflic's Proportion Considerations: Presentation version

How satisfied have you been with each of these features?

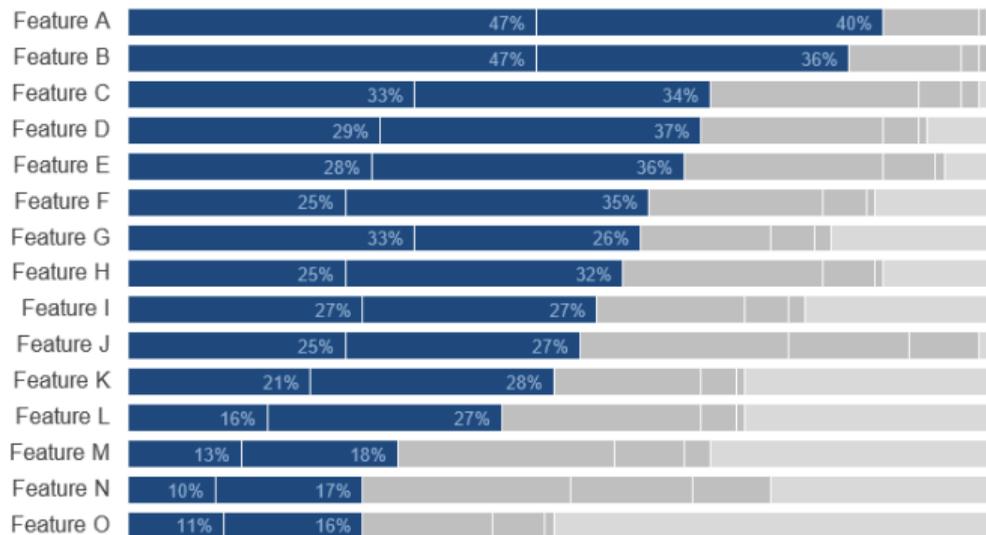


Knaflic's Proportion Considerations: Presentation version

Features A & B top user satisfaction

Product X User Satisfaction: **Features**

■ **Completely satisfied** ■ **Very satisfied** ■ Somewhat satisfied ■ Not very satisfied ■ Not satisfied at all ■ Have not used



Responses based on survey question "How satisfied have you been with each of these features?".

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

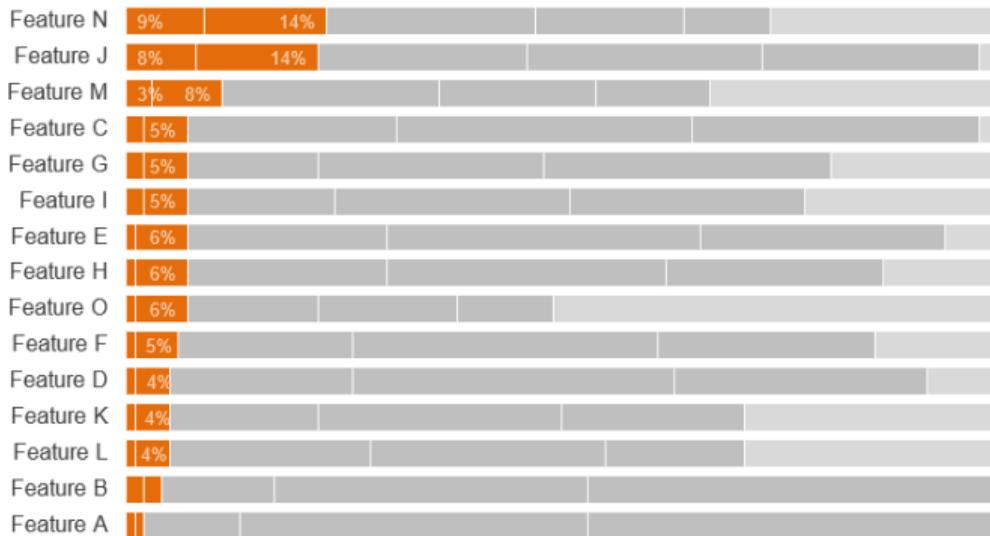
Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Presentation version

Users least satisfied with Features N and J

Product X User Satisfaction: **Features**

■ Not satisfied at all ■ Not very satisfied ■ Somewhat satisfied ■ Very satisfied ■ Completely satisfied ■ Have not used



Responses based on survey question "How satisfied have you been with each of these features?".

Need more details here to help put this data into context: How many people completed the survey? What proportion of users does this represent?

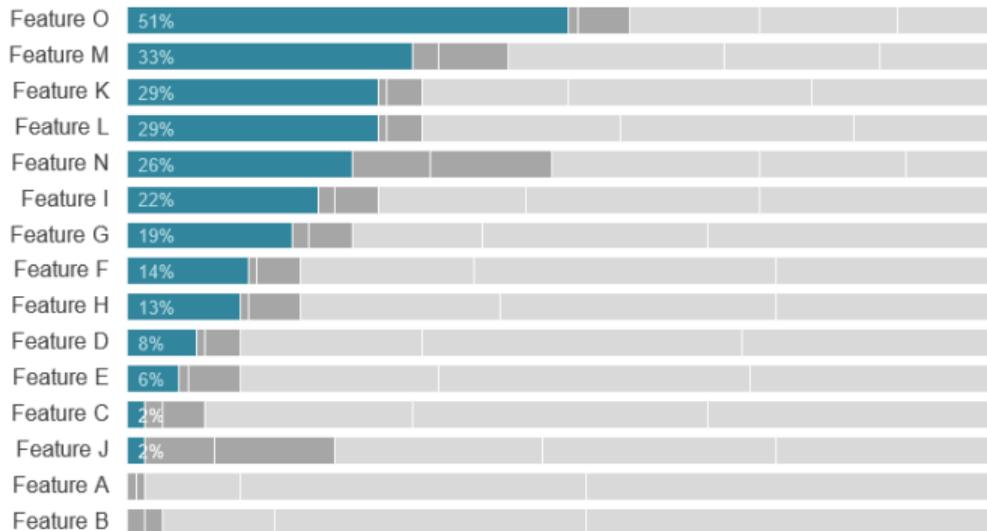
Do those who completed the survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Presentation version

Feature O is least used

Product X User Satisfaction: **Features**

■ Have not used ■ Not satisfied at all ■ Not very satisfied ■ Somewhat satisfied ■ Very satisfied ■ Completely satisfied



Responses based on survey question "How satisfied have you been with each of these features?".

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Presentation version

User satisfaction varies greatly by feature

Product X User Satisfaction: **Features**

■ Have not used ■ Not satisfied at all ■ Not very satisfied ■ Somewhat satisfied ■ Very satisfied ■ Completely satisfied



Responses based on survey question "How satisfied have you been with each of these features?".

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

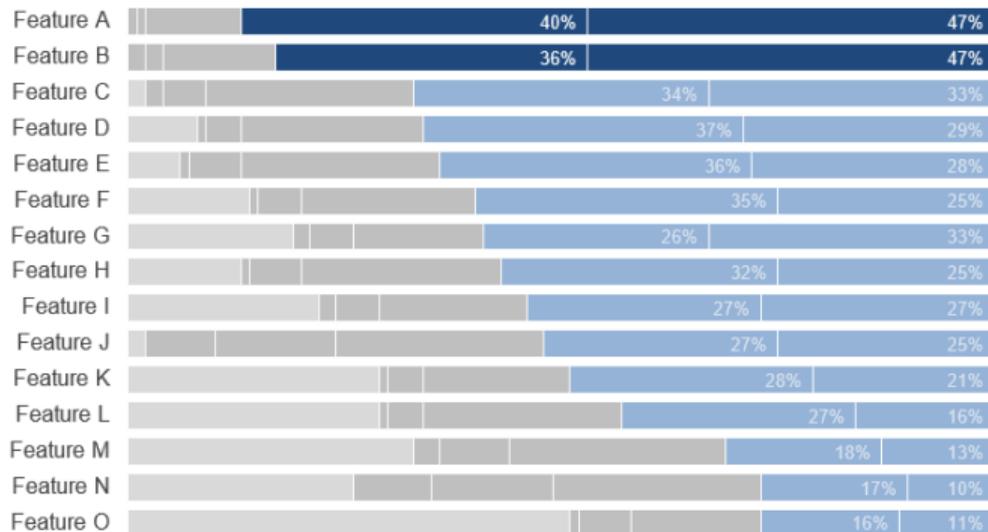
Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Presentation version

User satisfaction varies greatly by feature

Product X User Satisfaction: **Features**

■ Have not used ■ Not satisfied at all ■ Not very satisfied ■ Somewhat satisfied ■ **Very satisfied** ■ **Completely satisfied**



Features A and B continue to top user satisfaction

Responses based on survey question "How satisfied have you been with each of these features?".

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

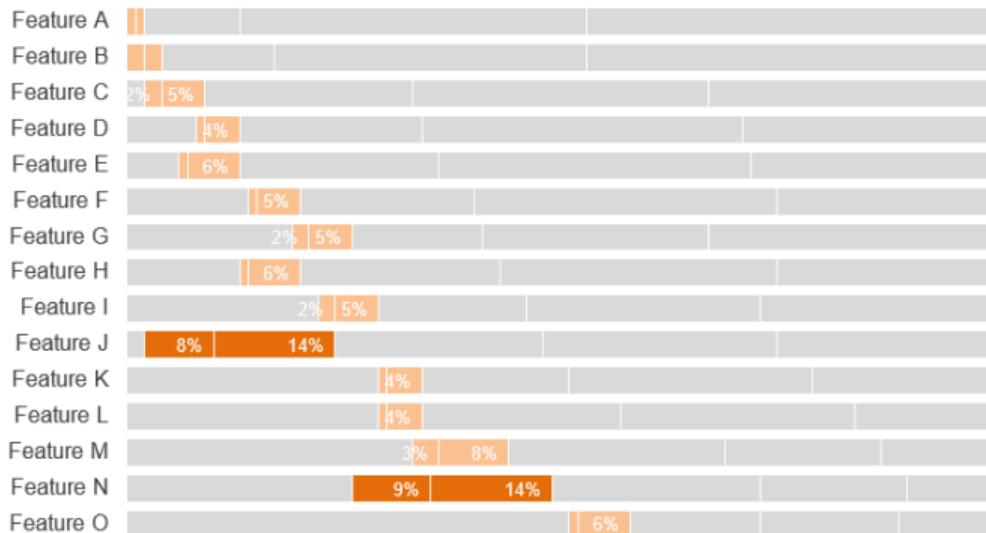
Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Presentation version

User satisfaction varies greatly by feature

Product X User Satisfaction: **Features**

■ Have not used ■ **Not satisfied at all** ■ **Not very satisfied** ■ Somewhat satisfied ■ Very satisfied ■ Completely satisfied



Users are least satisfied with Features J and N; what improvements can we make here for a better user

Responses based on survey question "How satisfied have you been with each of these features?".

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

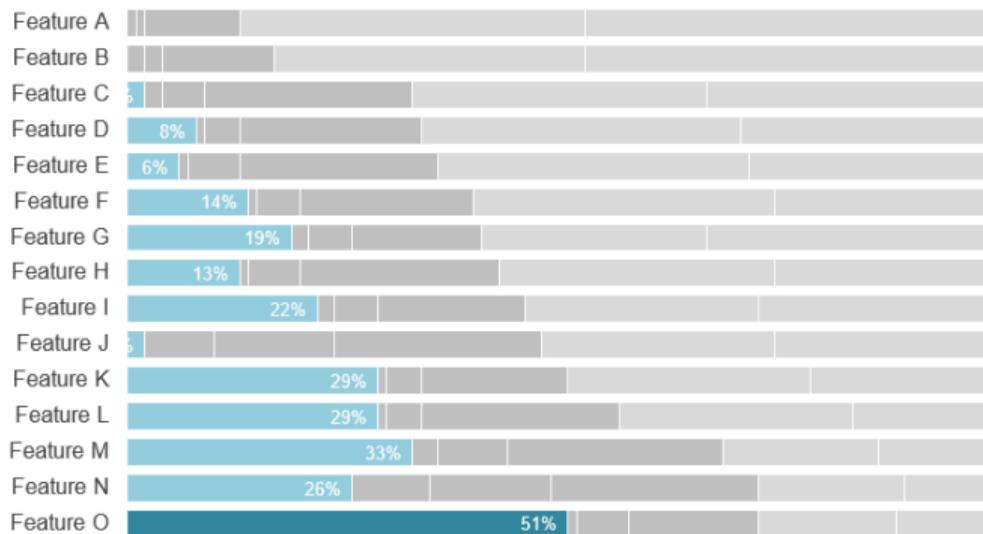
Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Presentation version

User satisfaction varies greatly by feature

Product X User Satisfaction: **Features**

■ Have not used ■ Not satisfied at all ■ Not very satisfied ■ Somewhat satisfied ■ Very satisfied ■ Completely satisfied



Feature O is least used. What steps can we proactively take with existing users to increase utilization?

Responses based on survey question "How satisfied have you been with each of these features?".

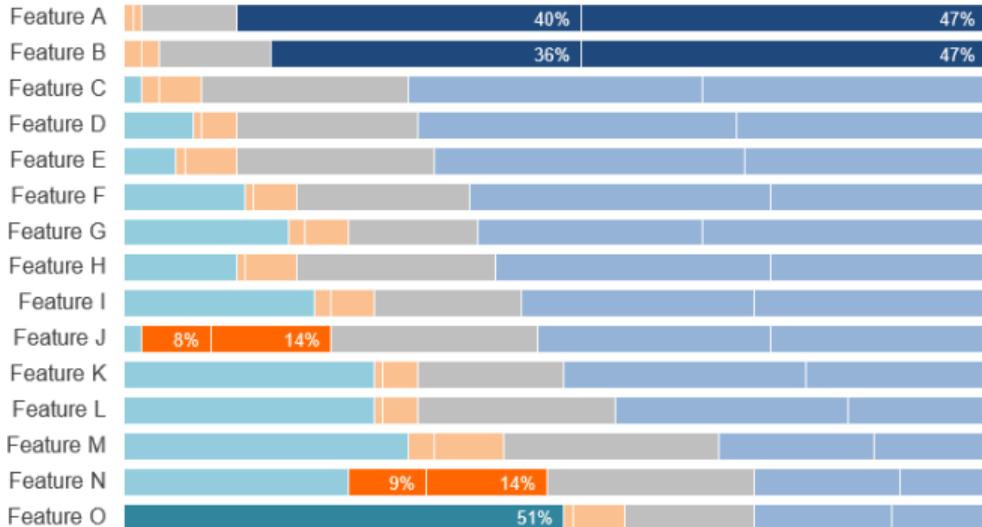
Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent? Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Knaflic's Proportion Considerations: Paper version

User satisfaction varies greatly by feature

Product X User Satisfaction: **Features**

■ Have not used ■ Not satisfied at all ■ Not very satisfied ■ Somewhat satisfied ■ Very satisfied ■ Completely satisfied



Features A and B continue to top user satisfaction

Users are least satisfied with Features J and N; what improvements can we make here for a better user

Feature O is least used. What steps can we proactively take with existing users to increase utilization?

Responses based on survey question "How satisfied have you been with each of these features?".
Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?
Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

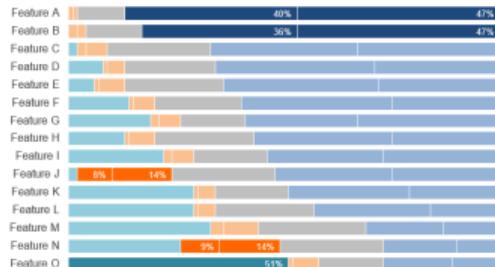
What Would Few Say?

Few's secondary components

User satisfaction varies greatly by feature

Product X User Satisfaction: Features

Have not used Not satisfied at all Not very satisfied Somewhat satisfied Very satisfied Completely satisfied



Features A and B continue to top user satisfaction

Users are least satisfied with Features J and N; what improvements can we make here for a better user

Feature O is least used. What steps can we proactively take with existing users to increase utilization?

Responses based on survey question "How satisfied have you been with each of these features?"

Need more details here to help put this data into context: How many people completed survey? What portion of users does this represent?

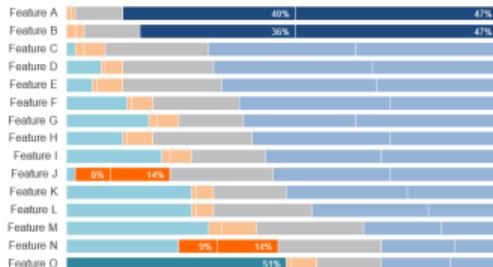
Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

What Would Few Say?

User satisfaction varies greatly by feature

Product X User Satisfaction: Features

Have not used Not satisfied at all Not very satisfied Somewhat satisfied Very satisfied Completely satisfied



Features A and B continue to top user satisfaction

Users are least satisfied with Features J and N; what improvements can we make here for a better user

Feature O is least used. What steps can we proactively take with existing users to increase utilization?

Responses based on survey question "How satisfied have you been with each of these features?"

Need more details here to help put this data into context: How many people completed survey? What proportion of users does this represent?

Do those who completed survey look like the overall population, demographic-wise? When was the survey conducted?

Few's secondary components

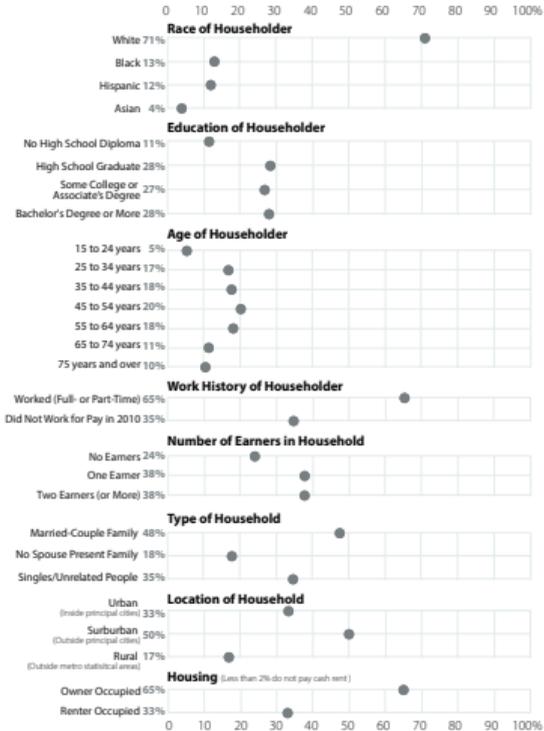
- color and shades of color
- annotation near graphic in matching color
- bright color to emphasize
- no ticks
- no scale!
- labels at top

Mulbrandon on the Relative Size of Things



2010

Demographics of All Incomes





2010

Demographics of Incomes below \$30,000



4. The Fix

Knaflic's fix of an existing graphic to highlight the story

- Instead of the book's example, another from her website
- Transforming hard-to-read bars to easier-to-read formats
- Many similar ideas apply
- I'll just narrate the first one

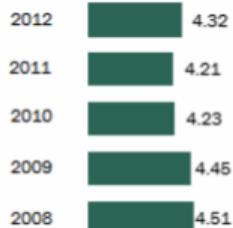
Pew Charts on Number of Newly Married Adults

What's Wrong and How to Fix?

ORIGINAL

Number of Newly Married Adults

In millions



Note: "Newly married" refers to adult respondents who reported marrying within the past twelve months of the interview.

Source: Pew Research Center tabulations of the 2008-2012 American Community Survey (ACS) data

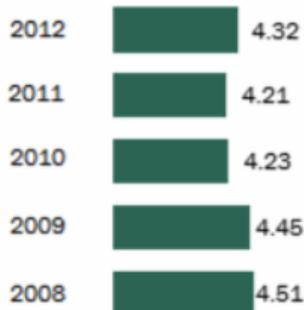
PEW RESEARCH CENTER

Show Change Over Time

ORIGINAL

Number of Newly Married Adults

In millions



Note: "Newly married" refers to adult respondents who reported marrying within the past twelve months of the interview.

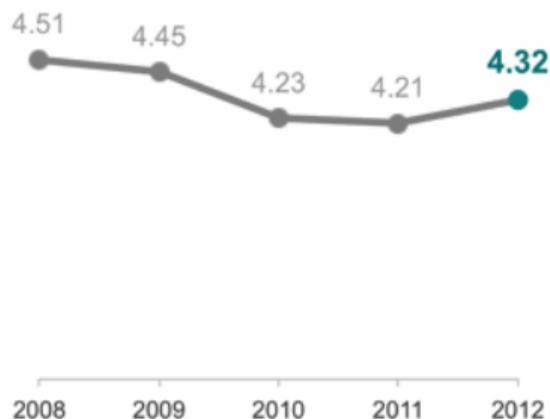
Source: Pew Research Center tabulations of the 2008-2012 American Community Survey (ACS) data

PEW RESEARCH CENTER

COLE's MAKEOVER

Number of Newly Married Adults

In Millions



"Newly married" refers to adult respondents who reported marrying within the past twelve months of the interview.

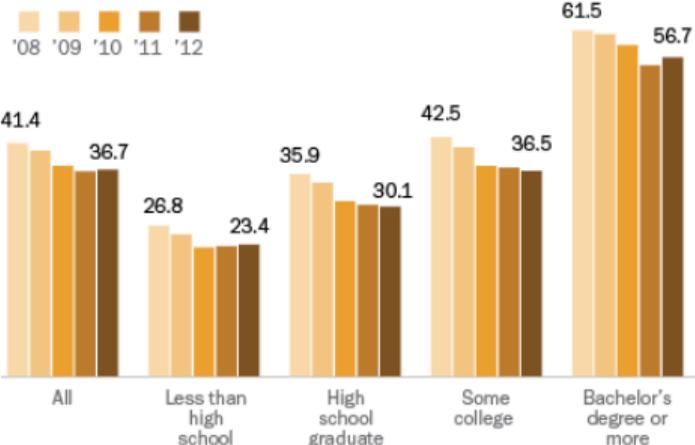
Source: Pew Research Center tabulations of the 2008-2012 American Community Survey (ACS) data.

PEW RESEARCH CENTER

Can You Pick Out the Point Here?

New Marriage Rate by Education

Number of newly married adults per 1,000 marriage eligible adults



Note: Marriage eligible includes the newly married plus those widowed, divorced or never married at interview.
Source: US Census

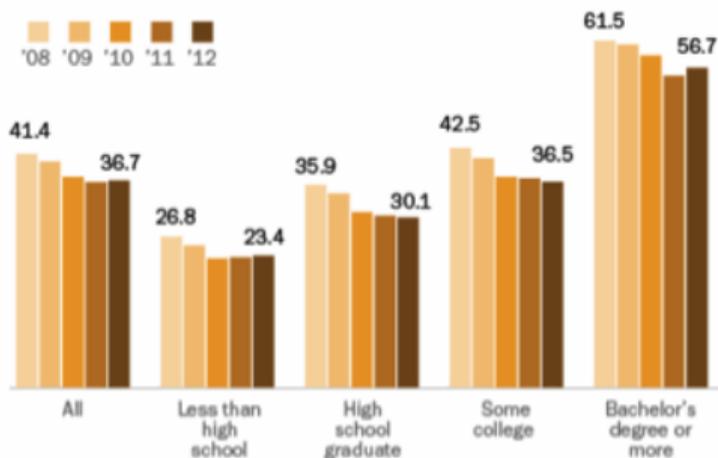
PEW RESEARCH CENTER

Highlighting the Increase for You Guys

ORIGINAL

New Marriage Rate by Education

Number of newly married adults per 1,000 marriage eligible adults



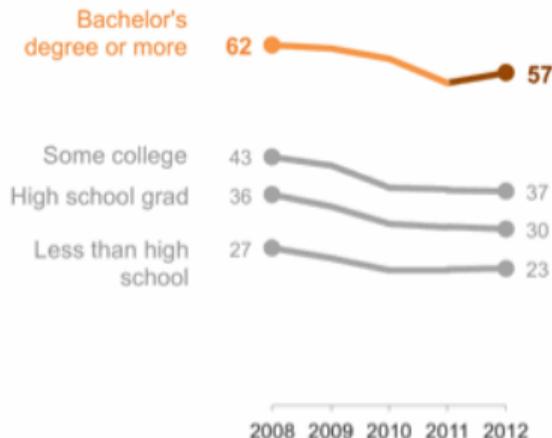
Note: Marriage eligible includes the newly married plus those widowed, divorced or never married at interview.
Source: US Census

PEW RESEARCH CENTER

COLE's MAKEOVER

New Marriage Rate by Education

Number of newly married adults per 1,000 marriage eligible adults



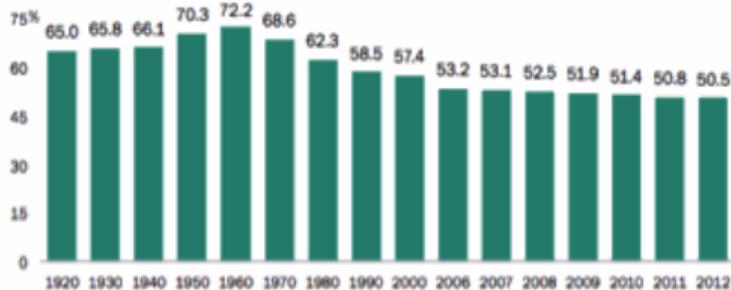
Note: Marriage eligible includes the newly married plus those widowed, divorced or never married at interview.
Source: US Census

PEW RESEARCH CENTER

What Would You Want to Pull Out?

ORIGINAL

Adults Currently Married



Notes: Based on adults age 18 and older. Currently married includes respondents reporting "married, spouse absent." Those reporting "separated" are not included in "currently married."

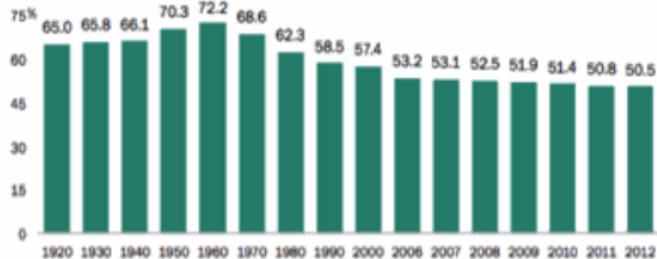
Source: Pew Research Center tabulations of the 1920-2000 Decennial Census data and 2006-12 American Community Survey (ACS) Integrated Public Use Micro Samples.

PEW RESEARCH CENTER

Highlighting Peak and Trough

ORIGINAL

Adults Currently Married



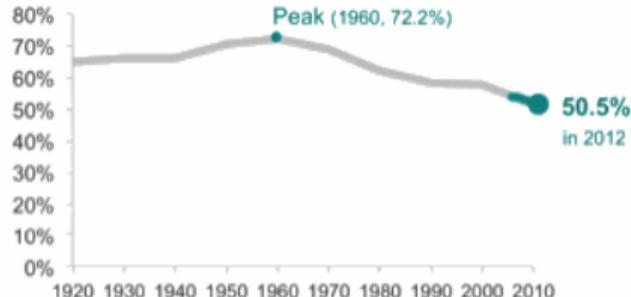
Notes: Based on adults age 18 and older. Currently married includes respondents reporting "married, spouse absent." Those reporting "separated" are not included in "currently married."

Source: Pew Research Center tabulations of the 1920-2000 Decennial Census data and 2006-12 American Community Survey (ACS) Integrated Public Use Micro Samples

PEW RESEARCH CENTER

COLE's MAKEOVER

Adults Currently Married



Notes: based on adults age 18 and older. Currently married includes respondents reporting "married, spouse absent." Those reporting "separated" are not included in "currently married."

Source: Pew Research Center tabulations of the 1920-2000 Decennial Census data and 2006-12 American Community Survey (ACS).

PEW RESEARCH CENTER

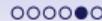
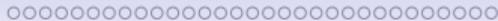
Accessibility

What is Digital Accessibility for Graphics?

- A still-open question

What is Digital Accessibility for Graphics?

- A still-open question
- People with little numeracy
 - Titles help
 - Annotations help



Potential Solutions

Things that are better for everyone

Potential Solutions

Things that are better for everyone

- Labels directly on graphics (apologies to above)
- Line thickness
- Annotations on graphics
- White spaces between colors
- Omit legends only viewable by hovering

Don't Use An Interactive Chart to Tell a Story

- The point of a chart is for you to tell a specific story
- Don't let readers make up their own story!

Overview of Interactive Graphics with D3

1. What do they look like?
2. Writing a webpage
3. D3 from 10,000 feet

2. HTML

The language of the web

- Hyper Text Markup Language
- All commands start and end with <>
- Over time, lots of additions – but this is the basic

A tiny tiny example

```
1 <!DOCTYPE html>
2 You put whatever you want to go on your page
  So I write Hello World.
3 </html>
```

Writing in HTML

- There are thousands of commands
- We use
 - <div> </div> to divide sections
 - <script> </script> to bring in an external script file

Writing in HTML

- There are thousands of commands
- We use
 - `<div> </div>` to divide sections
 - `<script> </script>` to bring in an external script file
- You might be interested in
 - `<head> </head>` for header info, including the title and meta info
 - `<body> </body>` for the displayed content
 - ` text here ` anchor (link) to another webpage

3. Extremely High Level D3 Overview

- You call javascript
- Tell the webpage you have a section for a graphic
- Define the graphic
- Grab the data from somewhere
- Plot it

3. Extremely High Level D3 Overview

- You call javascript
- Tell the webpage you have a section for a graphic
- Define the graphic
- Grab the data from somewhere
- Plot it
- Set interactive parameters as you please

Next Classes

- See you for presentations next week
- Office hours available until papers are in
- Best of luck wrapping up