PROFESSIONAL & CONTINUING EDUCATION
UNIVERSITY of WASHINGTON

I. Theoretical:

Arrange Tables

II. Practical

Change Over Time

Week 6
Nov 17, 2015

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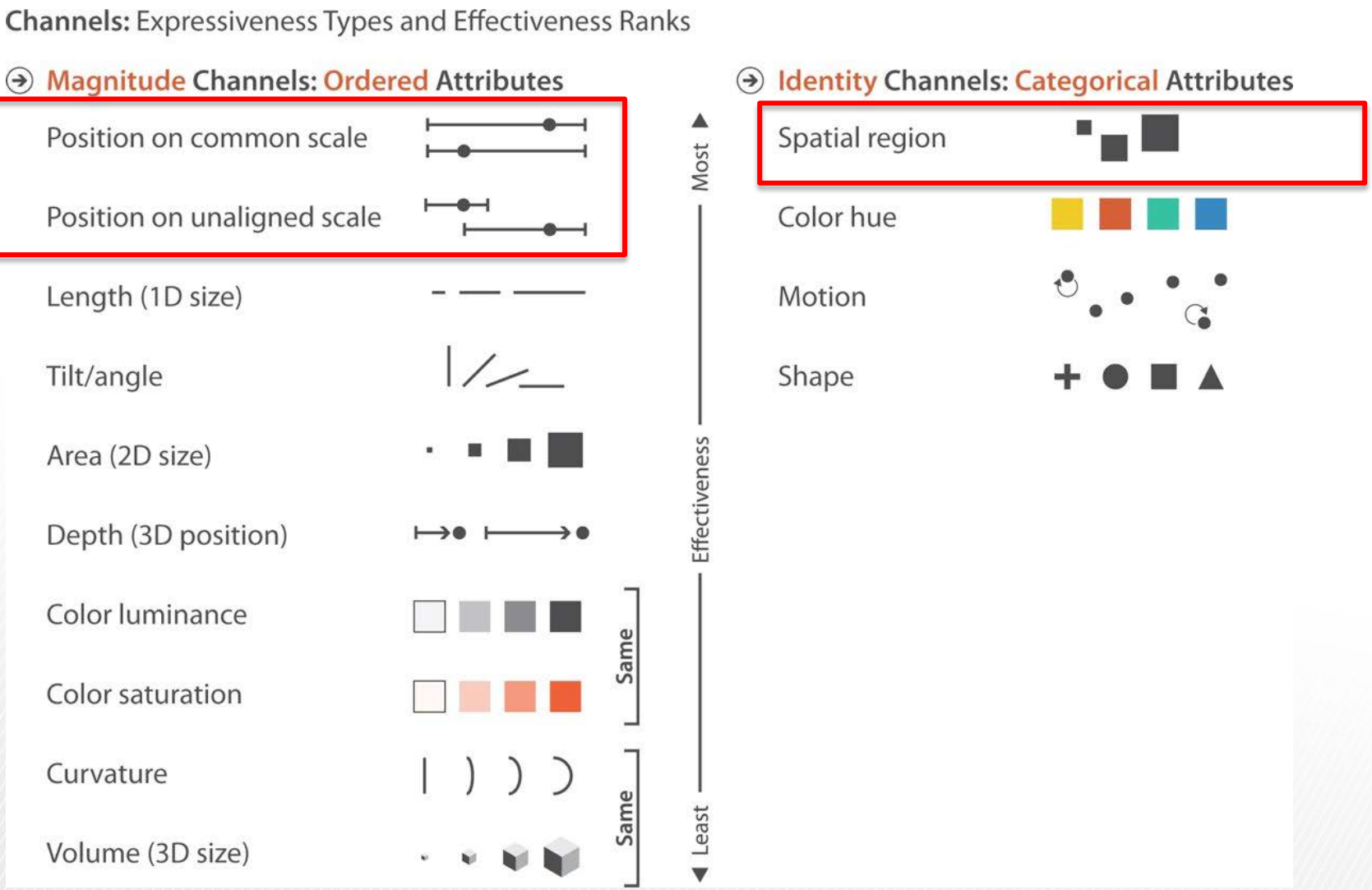
I have a table of data.

How do I arrange the data in the table *spatially*?

Why does this decision matter so much?



How?

Encode

Arrange

- Express
- Separate
- Order
- Align
- Use

Map

from categorical and ordered attributes

- Color
  - *Hue*
  - *Saturation*
  - *Luminance*
- Size, Angle, Curvature, ...
- Shape
- Motion

Direction, Rate, Frequency, ...

Manipulate

Change

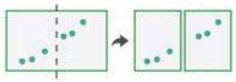
Select

Navigate

Facet

Juxtapose

Partition

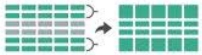


Superimpose

Reduce

Filter

Aggregate



Embed

Arrange Tables

Express Values

Separate, Order, Align Regions

- Separate

- Order

- Align

- *1 Key*
  List

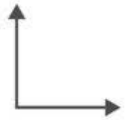
- *2 Keys*
  Matrix

- *3 Keys*
  Volume

- *Many Keys*
  Recursive Subdivision

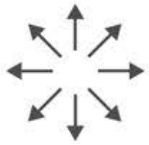
Axis Orientation

- Rectilinear



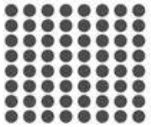
- Parallel

- Radial



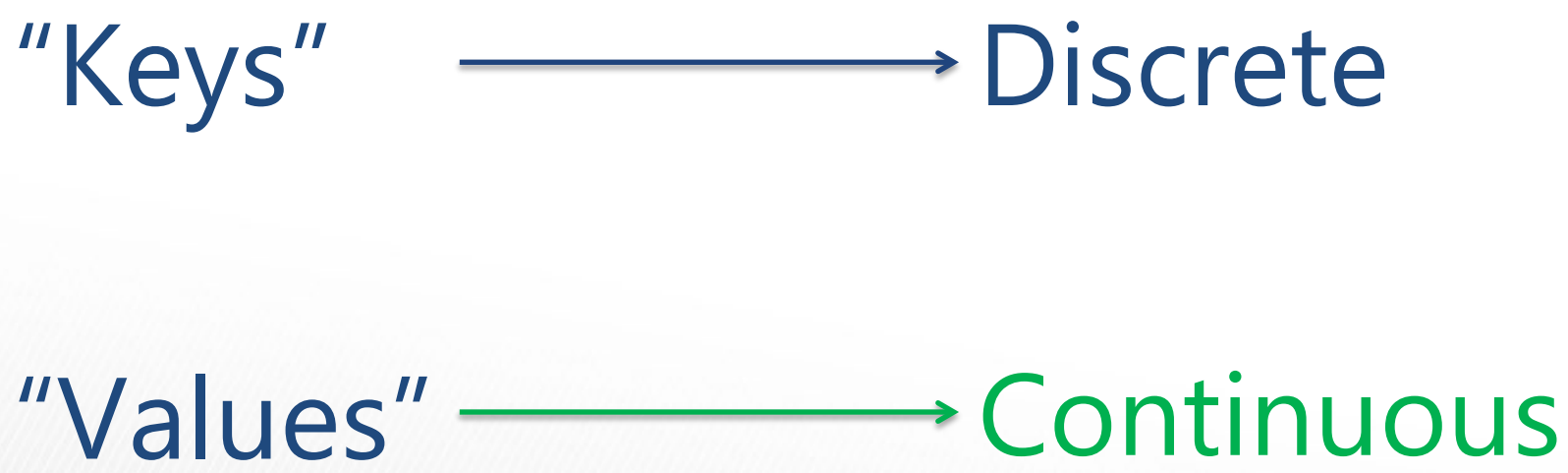
Layout Density

- Dense



- Space-Filling

Translation




REWMASTER

ARRESTS BY CLUB SUPPORTED & TYPE OF OFFENCE - PREMIER LEAGUE 2013-14 SEASON

Table 9

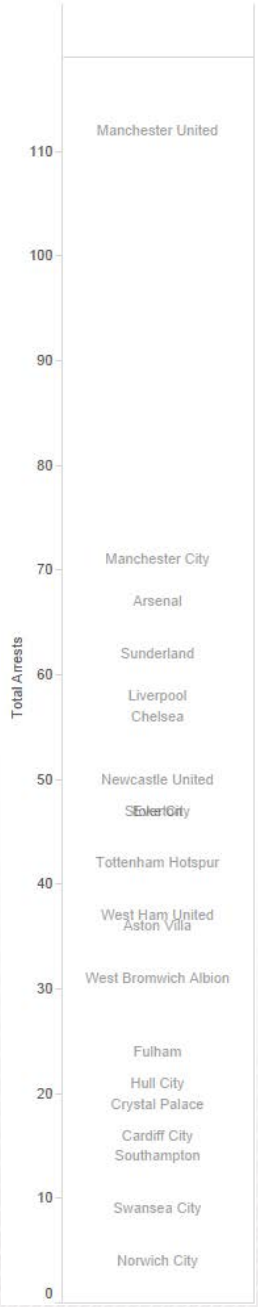
Premier League team supported	Total Arrests	Arrests at Home Matches	Arrests at Away matches	Other[2]	Type of Offence										
(all competitions[1])					Violent Disorder	Public Disorder	Missile Throwing	Racist or Indecent Chanting	Pitch Incursion	Alcohol Offences	Ticket Touting	Possession of Offensive Weapon	Use or Possession of Fireworks or Flares	Breach of Banning Order	Offences against Property
Arsenal	**67**	37	28	2	4	30	1	1	3	21	3	0	2	1	1
Aston Villa	**36**	16	20	0	3	16	0	2	1	8	0	0	6	0	0
Cardiff City	**16**	1	15	0	4	6	1	0	0	4	0	0	1	0	0
Chelsea	**56**	31	23	2	12	14	2	0	1	15	6	3	2	1	0
Crystal Palace	**19**	9	8	2	3	1	1	0	8	5	0	1	0	0	0
Everton	**47**	8	38	1	1	19	2	0	3	12	2	1	5	0	2
Fulham	**24**	9	15	0	1	7	1	0	1	5	5	0	2	0	2
Hull City	**21**	11	10	0	2	10	0	0	0	8	0	0	1	0	0
Liverpool	**58**	17	39	2	15	14	1	0	4	16	2	0	4	1	1
Manchester City	**71**	23	48	0	10	12	1	0	2	29	2	0	8	1	6
Manchester United	**112**	68	43	1	13	19	3	0	1	65	3	0	5	1	2
Newcastle United	**50**	27	23	0	7	6	1	1	8	23	2	0	1	0	1
Norwich City	**4**	2	2	0	0	1	0	0	0	3	0	0	0	0	0
Southampton	**14**	8	6	0	1	7	1	0	1	2	0	0	1	1	0
Stoke City	**47**	6	41	0	2	14	0	2	0	9	0	0	19	1	0
Sunderland	**62**	41	21	0	3	10	0	2	17	26	1	0	1	0	2
Swansea City	**9**	2	7	0	5	1	1	1	0	1	0	0	0	0	0
Tottenham Hotspur	**42**	25	16	1	9	21	4	0	0	6	1	0	1	0	0
West Bromwich Albion	**31**	18	12	1	7	16	0	0	1	5	0	0	1	1	0
West Ham United	**37**	11	26	0	9	13	0	0	1	13	0	0	0	0	1
Total	**823**	370	441	12	111	237	20	9	52	276	27	5	60	8	18

Note: The same key is used for tables 10, 11, 12 and 13

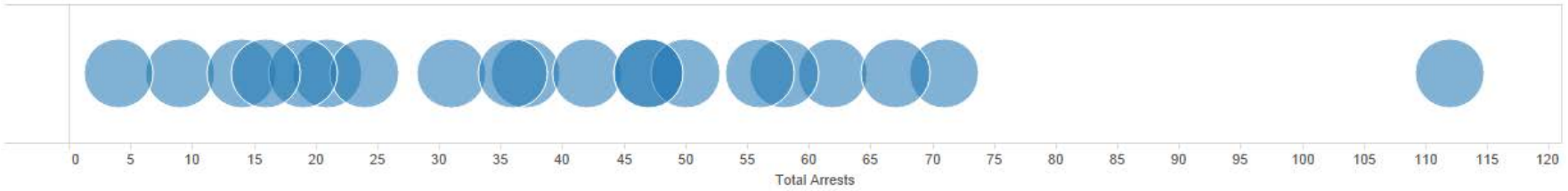
[1] Includes arrests made by British Transport Police

[2] Arrests not corresponding to a match involving the team followed by the arrested individual

1 Key, 1 Value


Total Arrests
110
100
90
80
70
60
50
40
30
20
10
0
Manchester United
Manchester City
Arsenal
Sunderland
Liverpool
Chelsea
Newcastle United
Everton
Tottenham Hotspur
West Ham United
Aston Villa
West Bromwich Albion
Fulham
Hull City
Crystal Palace
Cardiff City
Southampton
Swansea City
Norwich City

1 Key, 1 Value


0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120
Total Arrests

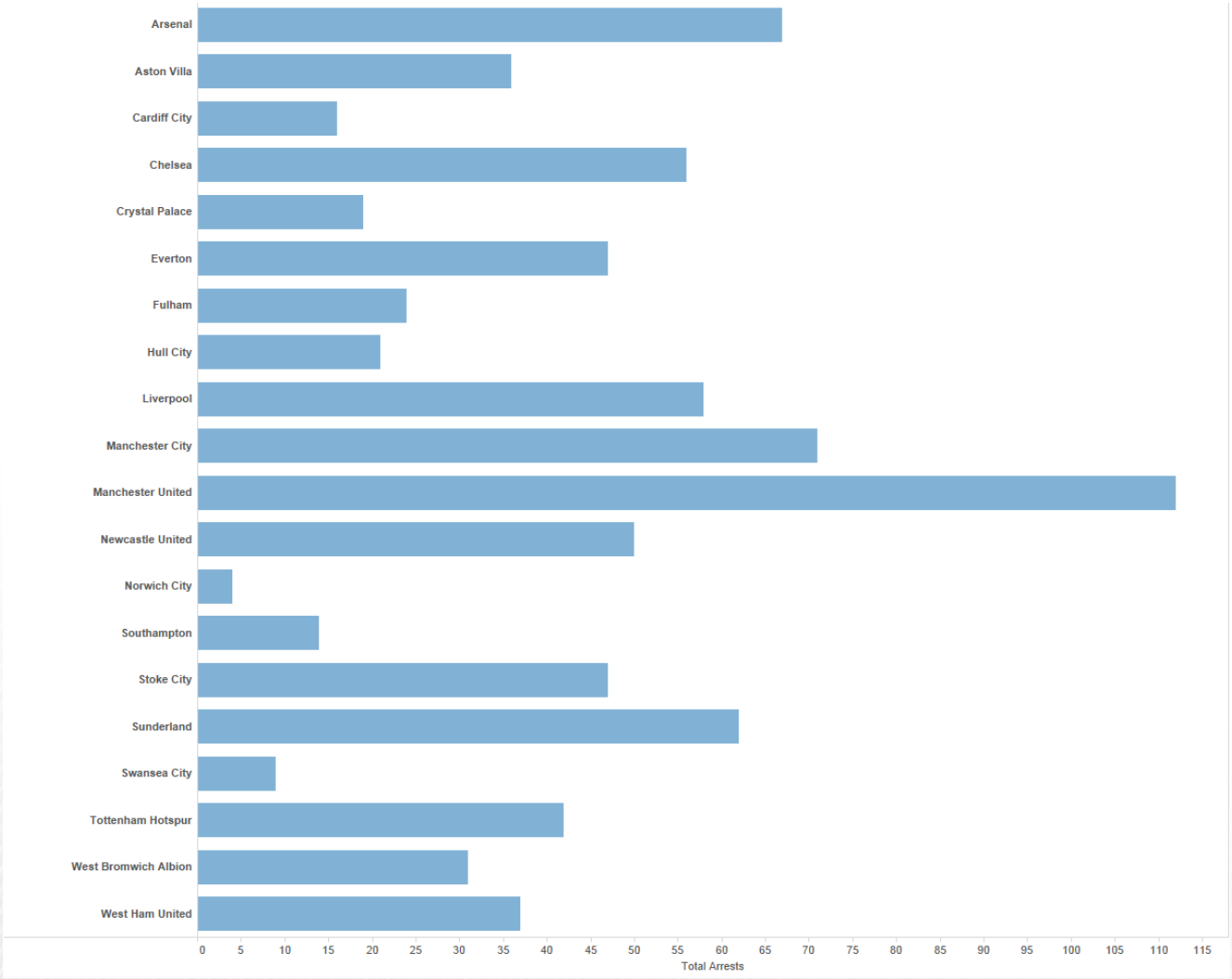

0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120
Total Arrests


ALBION
AVFC
Everton
CHELSEA
Arsenal
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120
Total Arrests

Separated but not Ordered or Aligned

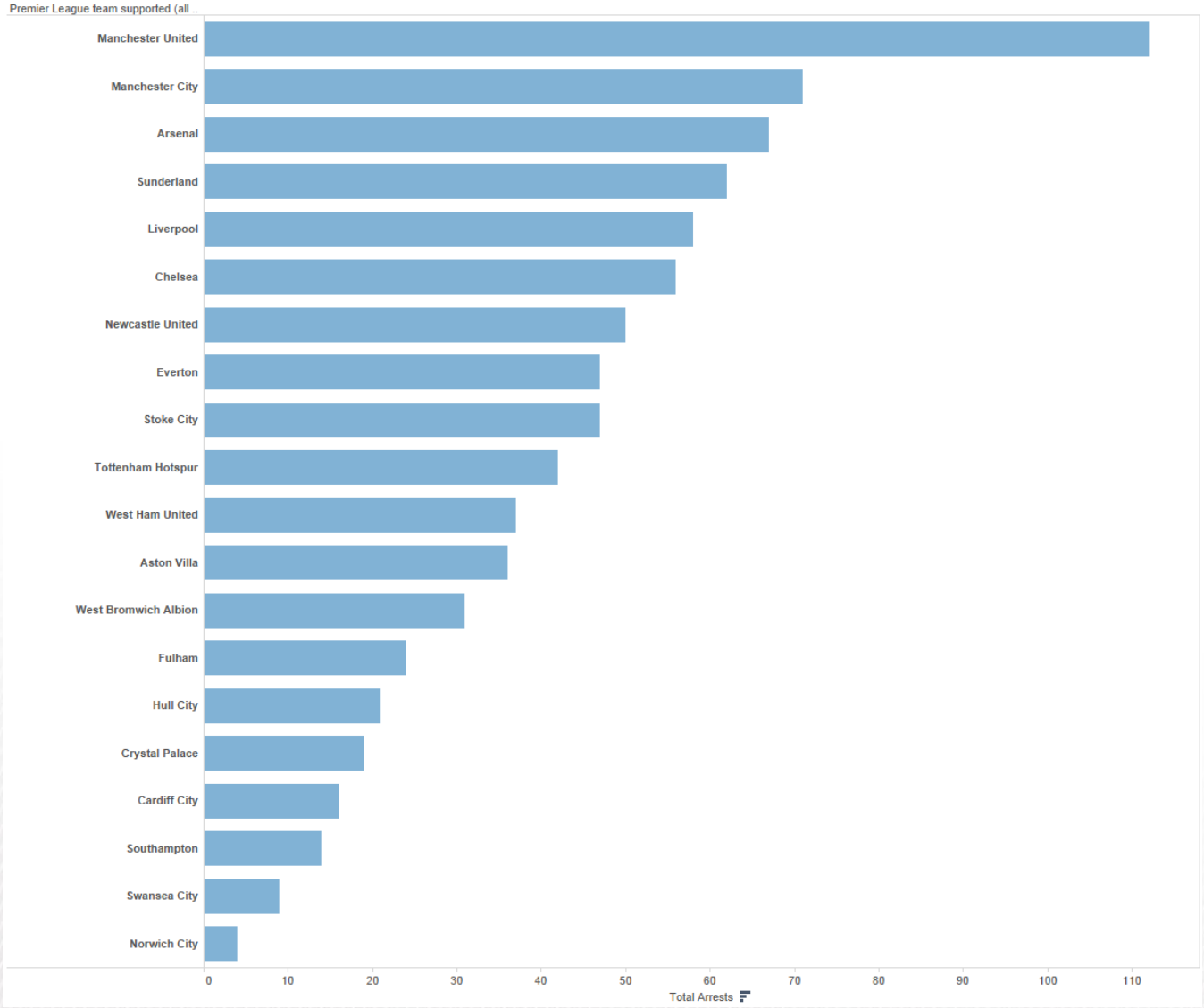
LIMITATION: Hard to make comparisons

Separated and Aligned but not Ordered

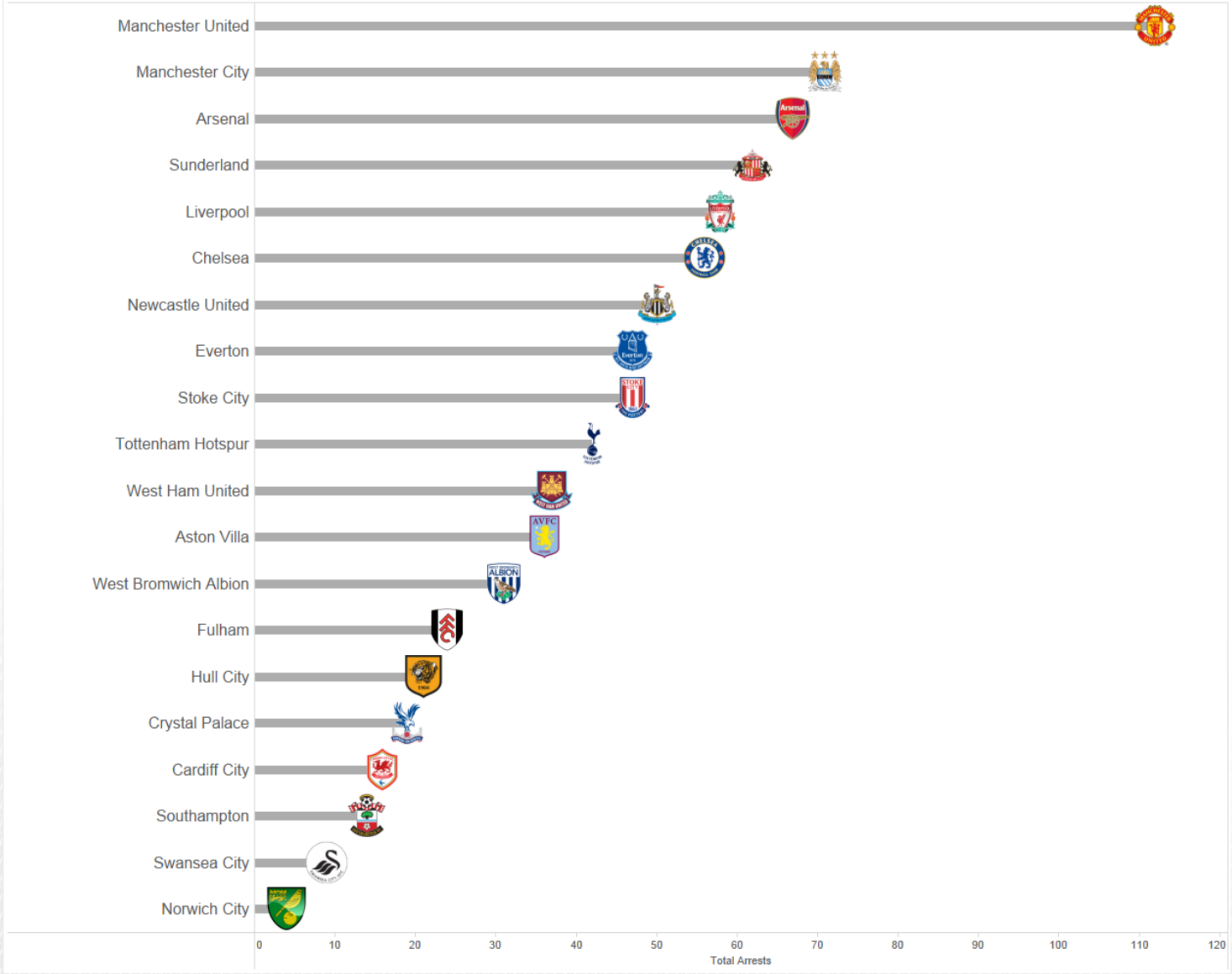


LIMITATION: Hard to know rank. What's the 4th most? The 7th?

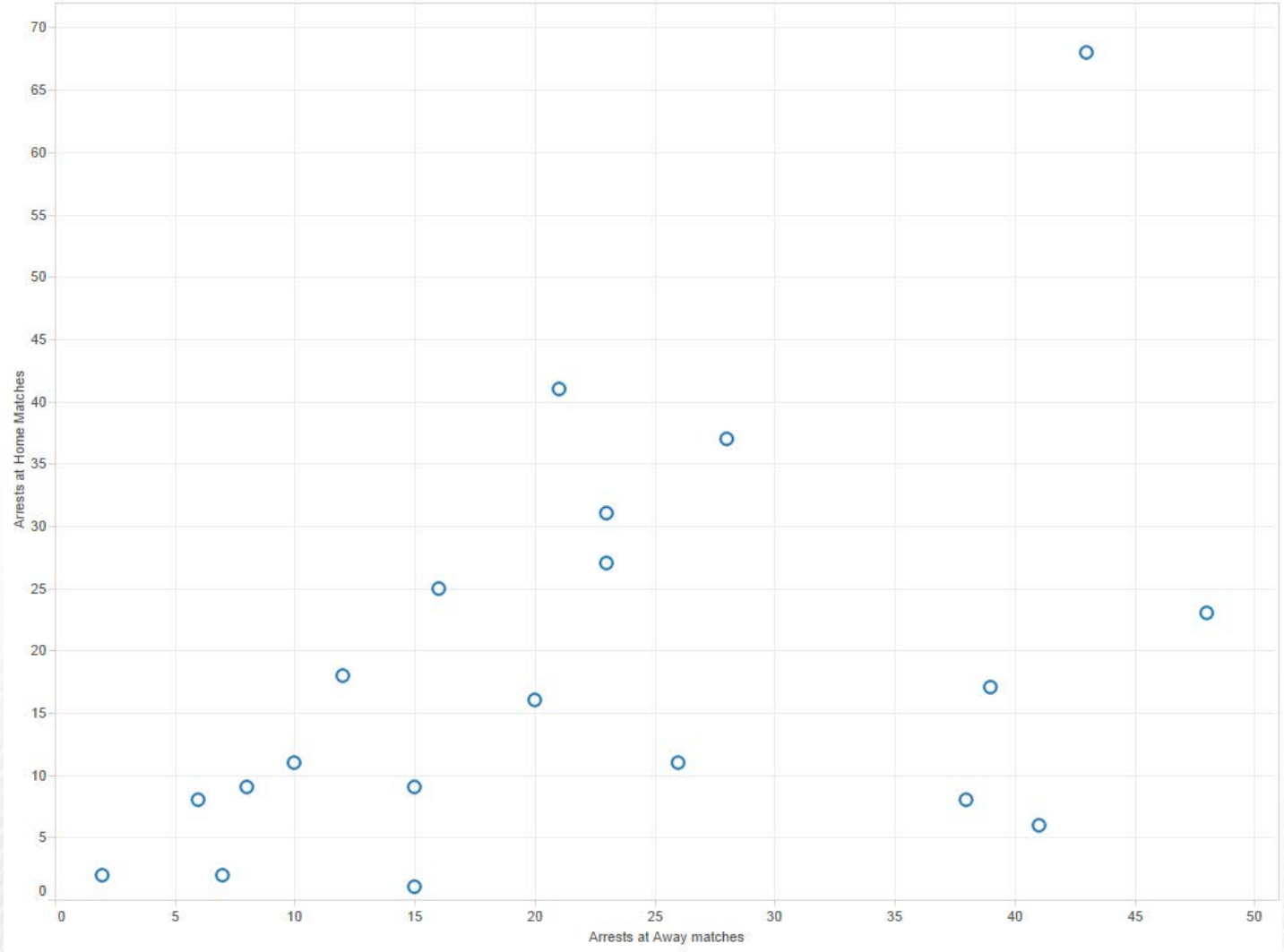
Separated, Aligned and Ordered



It doesn't have to just be "boring bar charts"

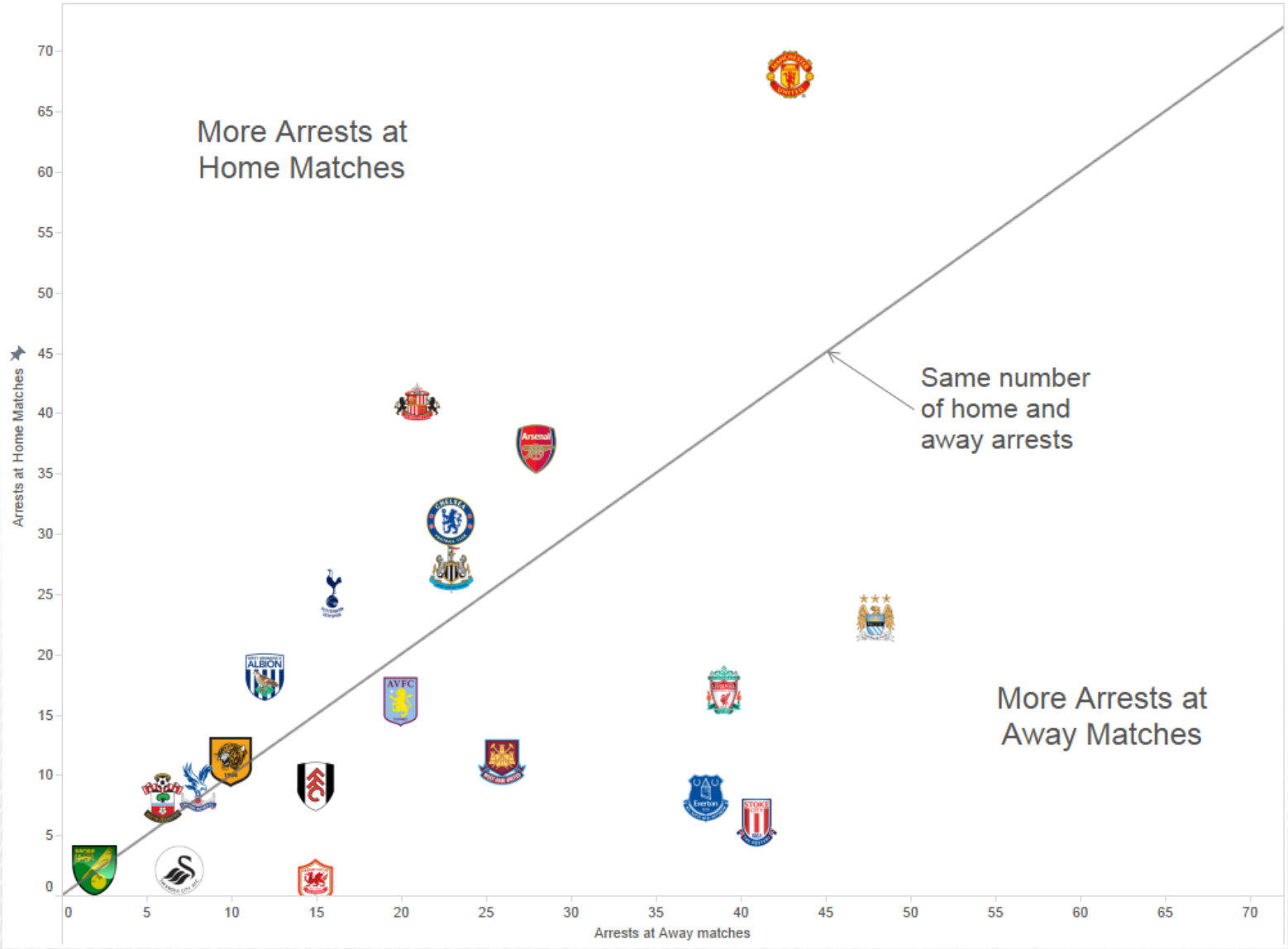


Scatterplots: 1 Key, 2 Values

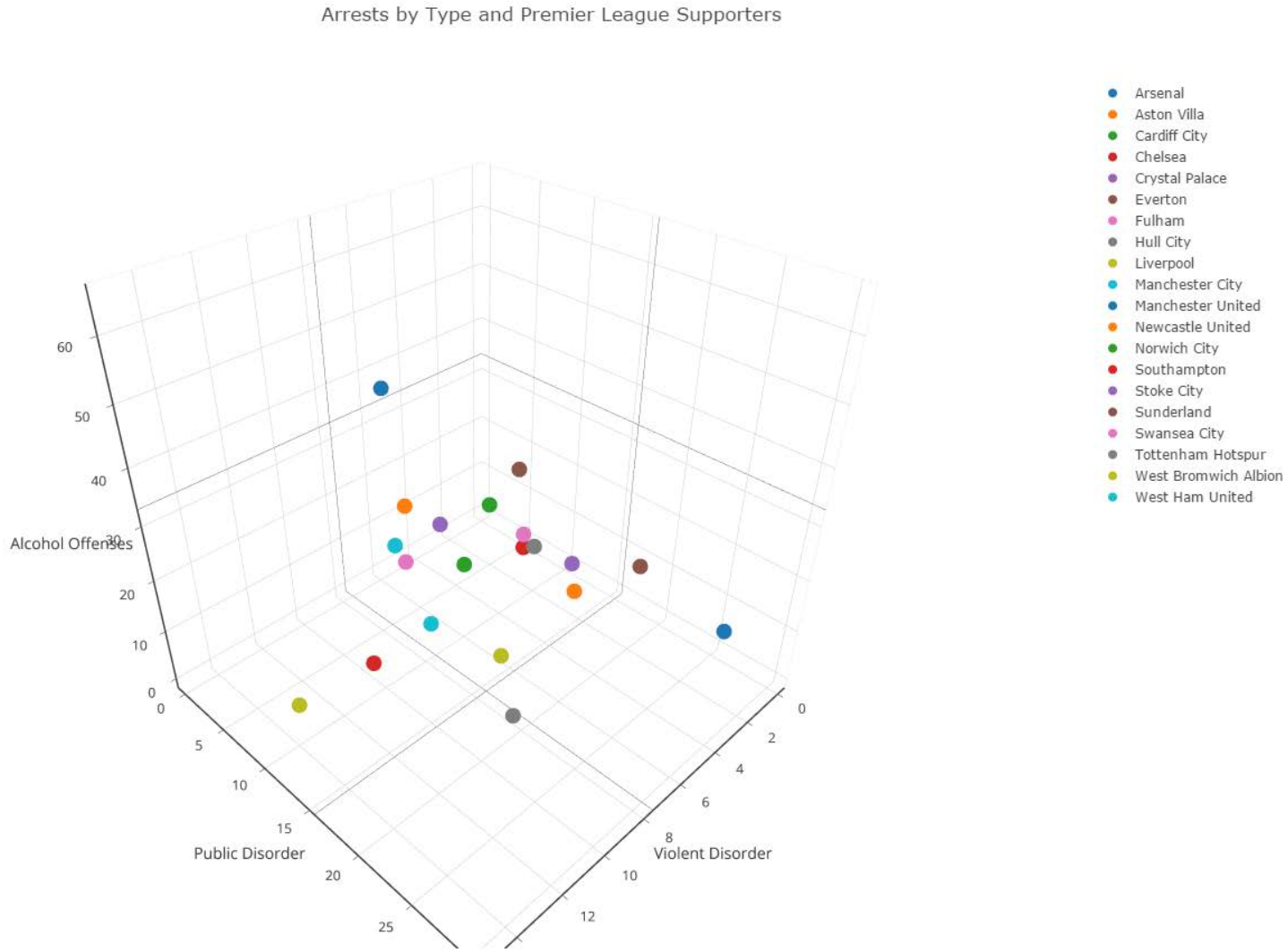


LIMITATION: Hard to read with > 100 dots

Scatterplots: 1 Key, 2 Values

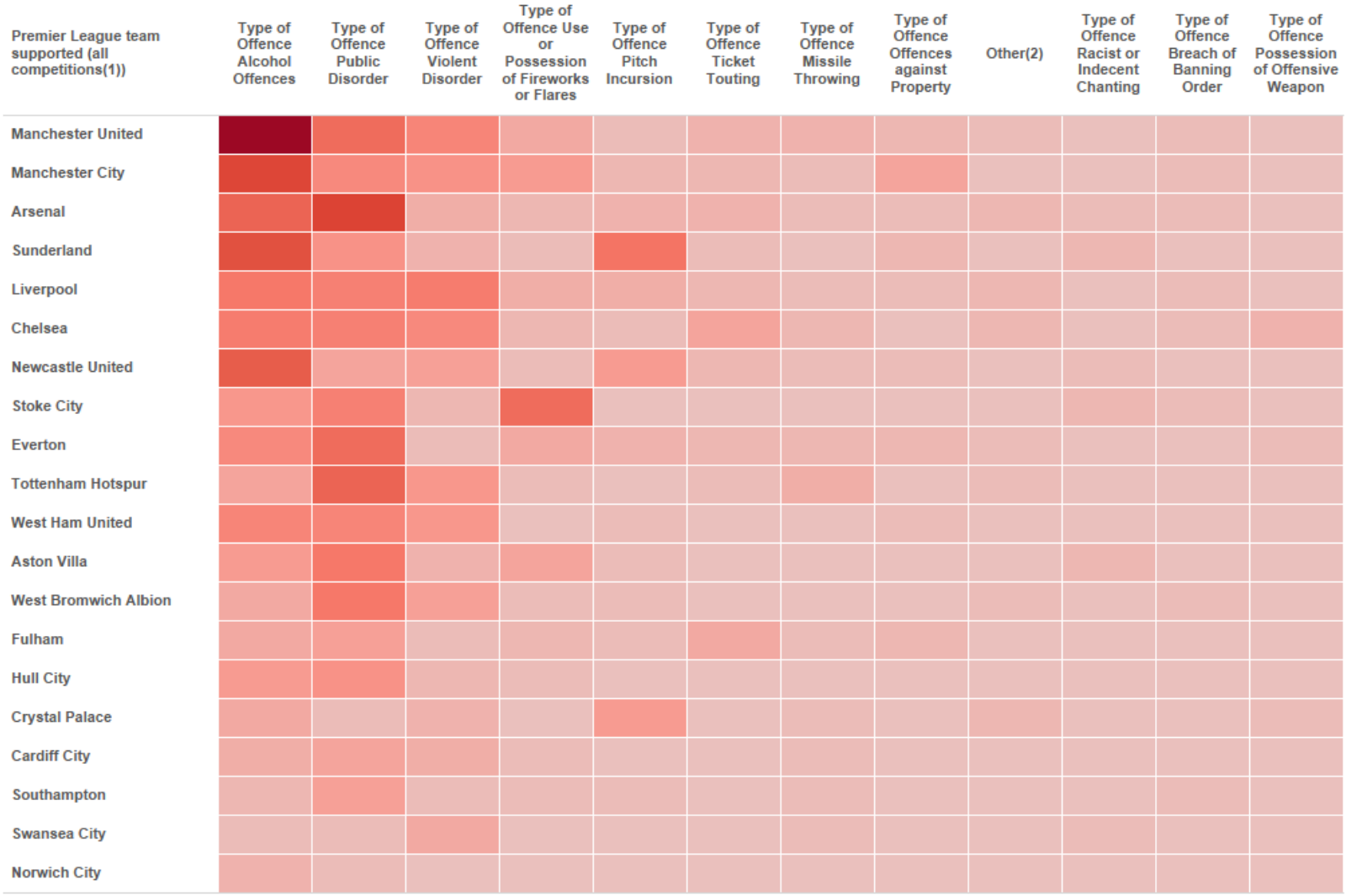


3D Scatterplots: 1 Key, 3 Values



LIMITATION: Hard to gauge 3D position with 2D display

Cluster Heatmaps: 2 Keys, 1 Value

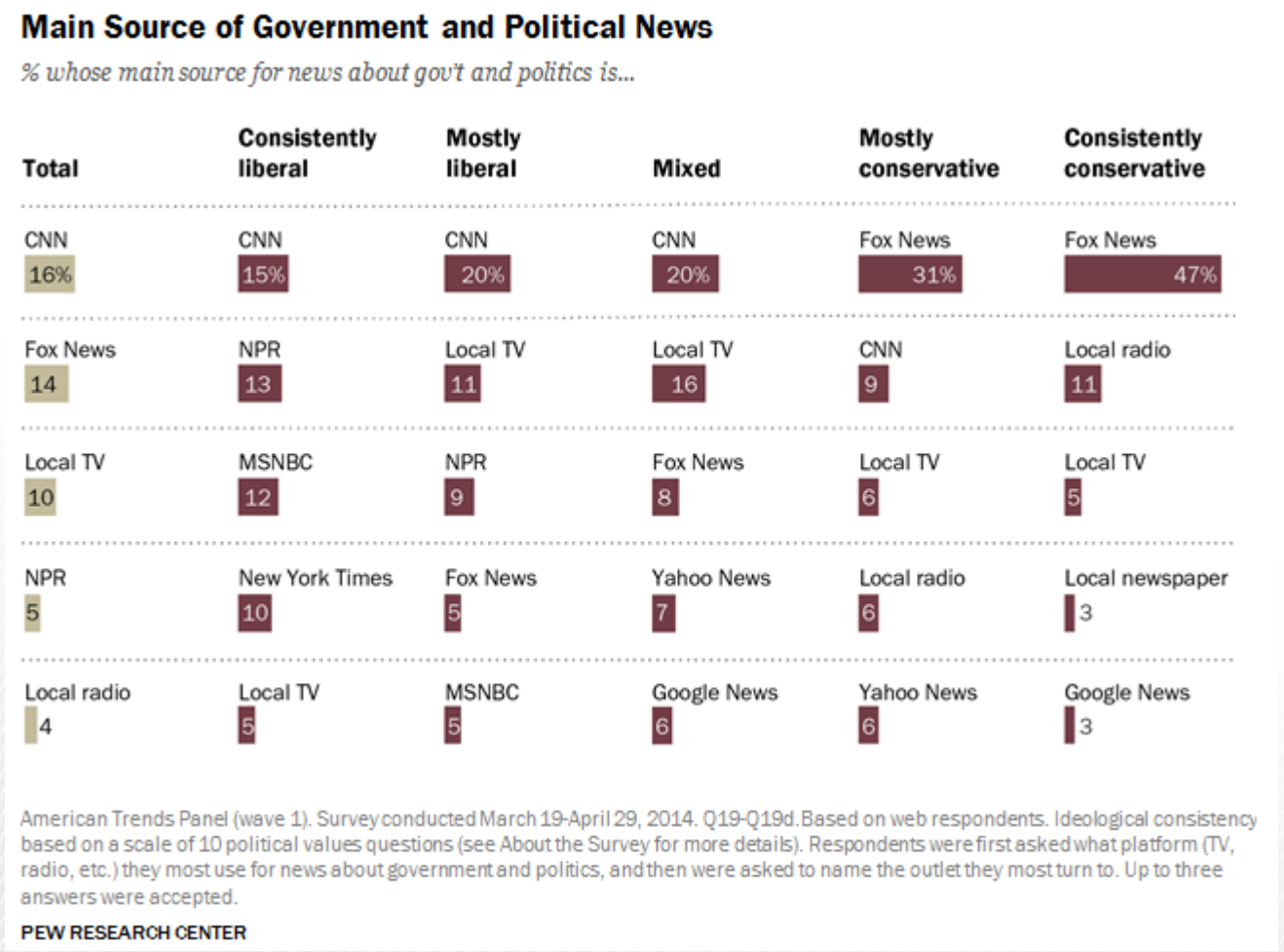


Good for overviews with high information density

2 Keys, 1 Value, but what is the 2nd Key?

Key #1: Ideology

?



Main Source of Government and Political News

% whose main source for news about gov't and politics is...

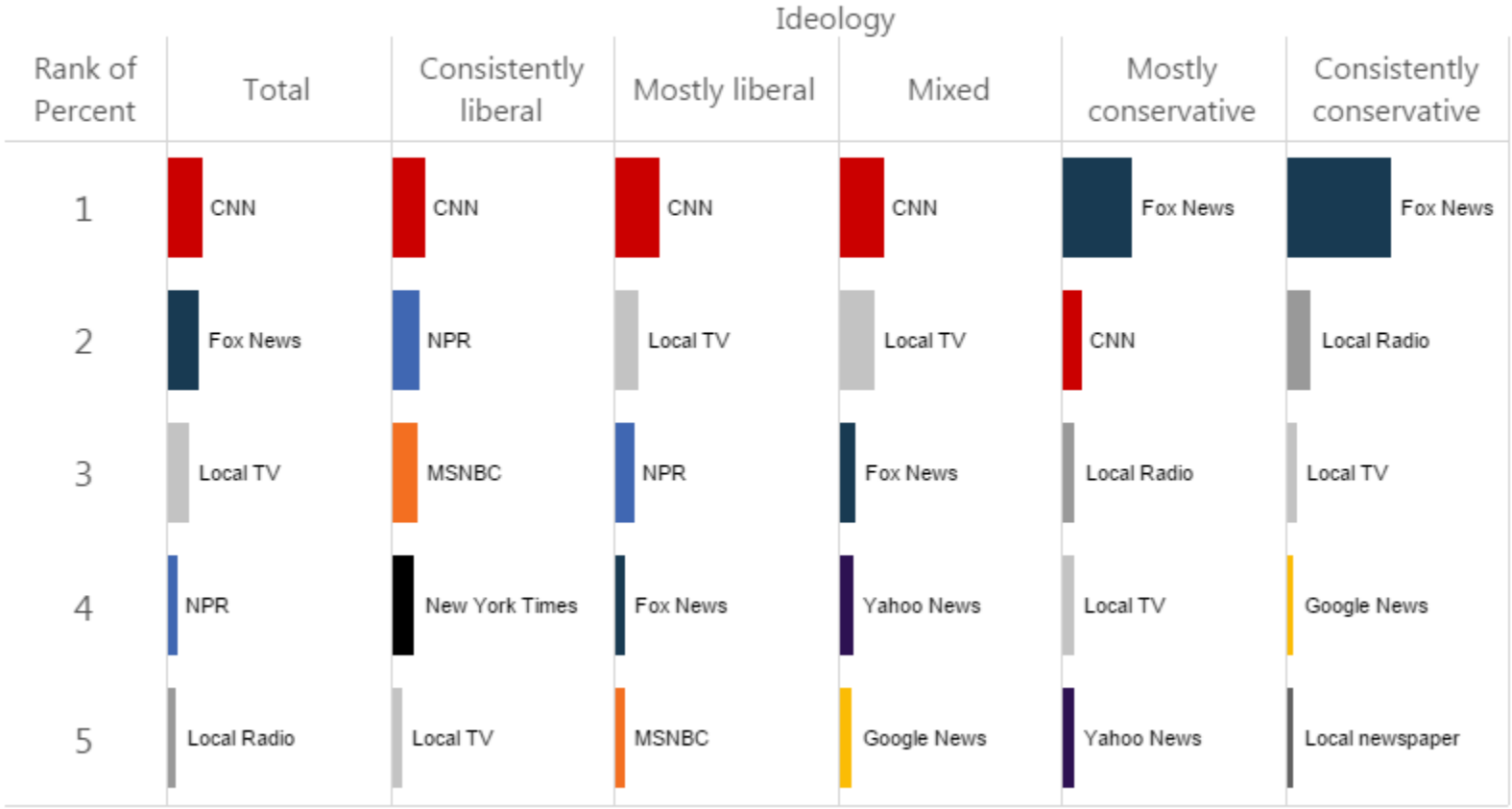
Total	Consistently liberal	Mostly liberal	Mixed	Mostly conservative	Consistently conservative
CNN 16%	CNN 15%	CNN 20%	CNN 20%	Fox News 31%	Fox News 47%
Fox News 14	NPR 13	Local TV 11	Local TV 16	CNN 9	Local radio 11
Local TV 10	MSNBC 12	NPR 9	Fox News 8	Local TV 6	Local TV 5
NPR 5	New York Times 10	Fox News 5	Yahoo News 7	Local radio 6	Local newspaper 3
Local radio 4	Local TV 5	MSNBC 5	Google News 6	Yahoo News 6	Google News 3

American Trends Panel (wave 1). Survey conducted March 19-April 29, 2014. Q19-Q19d. Based on web respondents. Ideological consistency based on a scale of 10 political values questions (see About the Survey for more details). Respondents were first asked what platform (TV, radio, etc.) they most use for news about government and politics, and then were asked to name the outlet they most turn to. Up to three answers were accepted.

PEW RESEARCH CENTER

The 2nd Key is Rank

Alternative #1. Simply Add Color: *Main Source of Gov't & Politics News*



Source: http://www.journalism.org/2014/10/21/political-polarization-media-habits/#media-sources-nearly-half-of-consistent-conservatives-cite-fox-news

Instead of just labeling news outlets, what if we colored them?

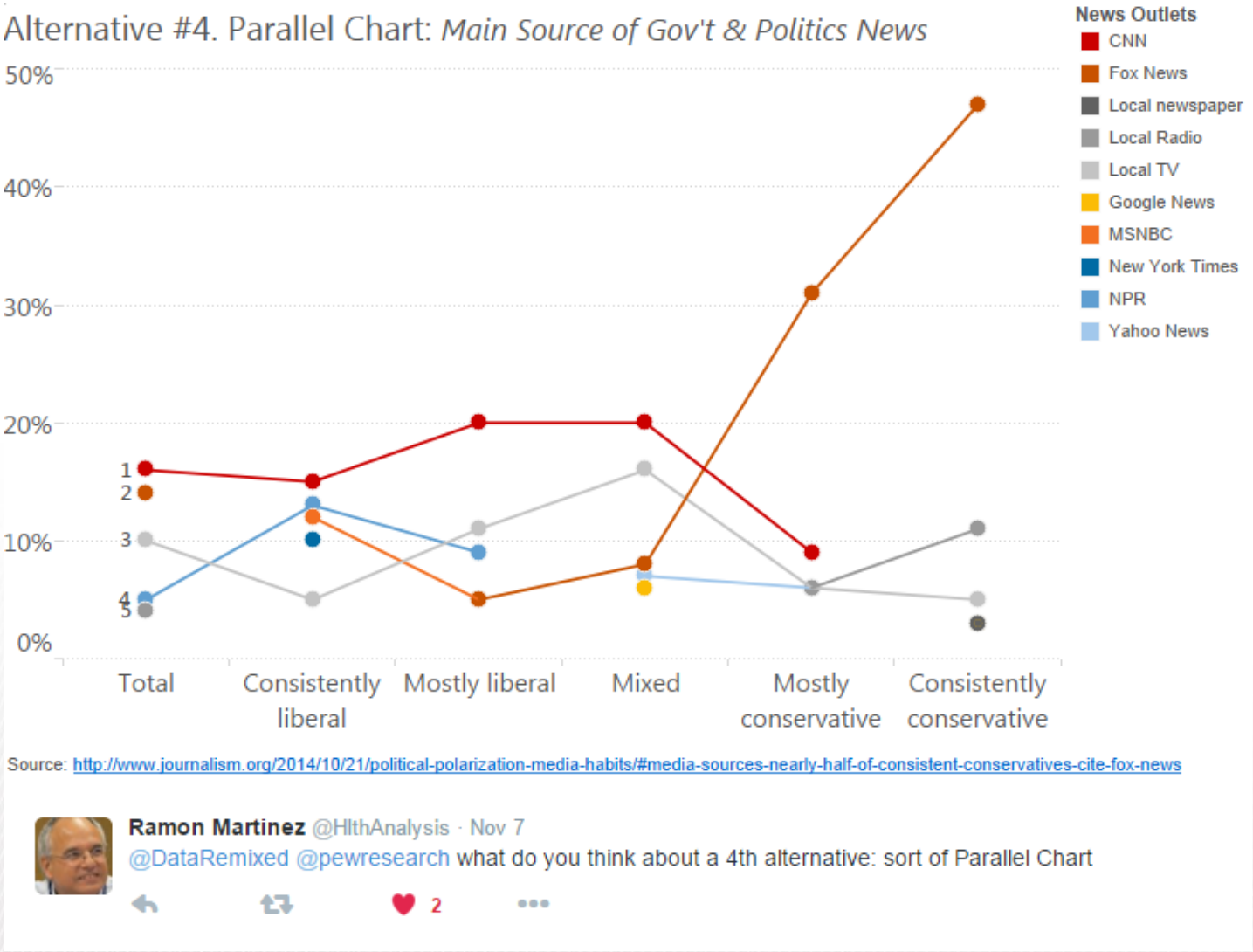
What if we change the 2nd Key to News Outlet?

Alternative #3. HeatMap Table: *Main Source of Gov't & Politics News*

		Ideology				
News Outlet Mostly Used	Total	Consistently liberal	Mostly liberal	Mixed	Mostly conservative	Consistently conservative
CNN	16%	15%	20%	20%	9%	
Fox News	14%		5%	8%	31%	47%
Local TV	10%	5%	11%	16%	6%	5%
NPR	5%	13%	9%			
Local Radio	4%				6%	11%
MSNBC		12%	5%			
Yahoo News				7%	6%	
New York Times		10%				
Google News				6%		3%
Local newspaper						3%

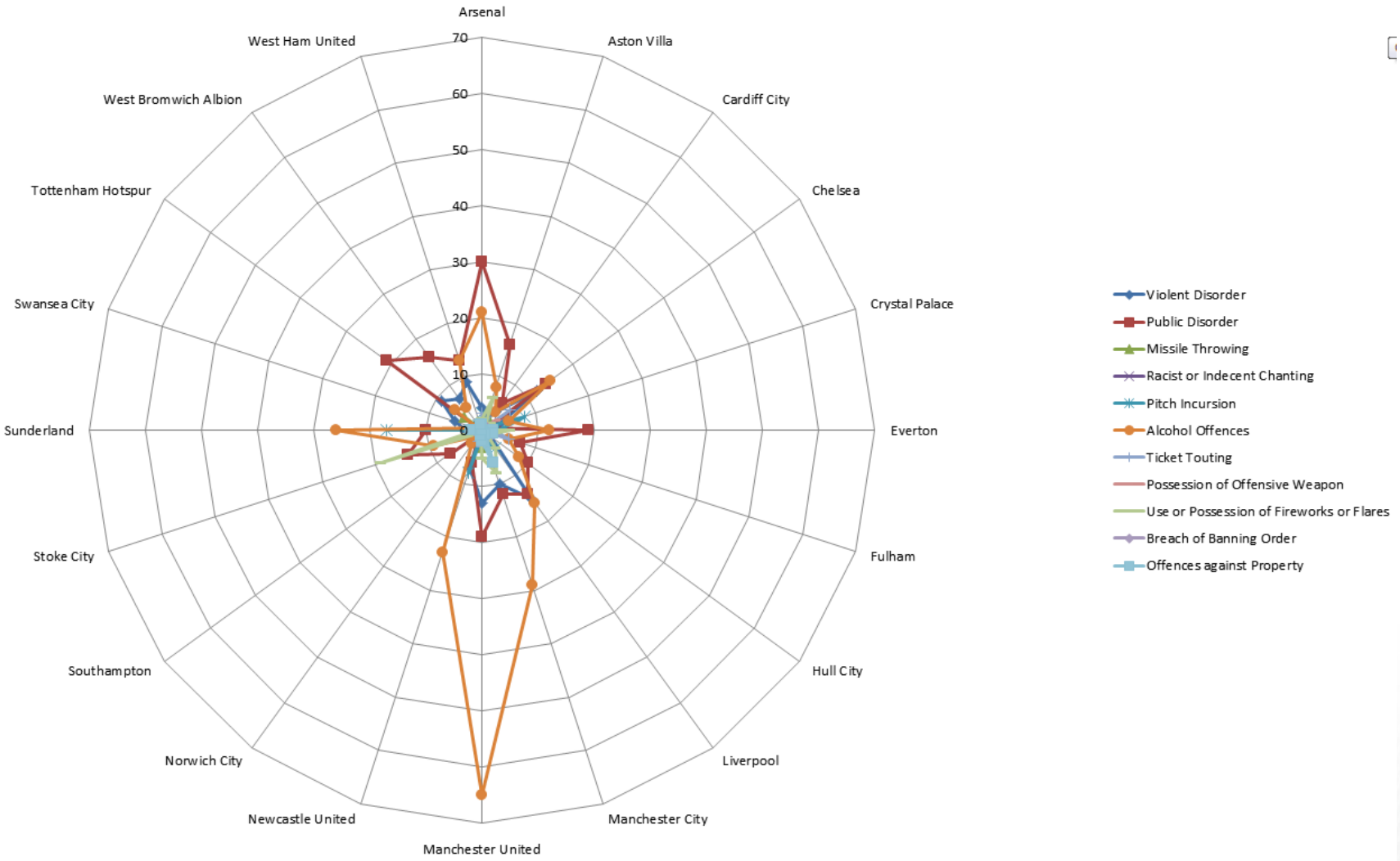
Source: http://www.journalism.org/2014/10/21/political-polarization-media-habits/#media-sources-nearly-half-of-consistent-conservatives-cite-fox-news

Parallel Orientation: Parallel Layout



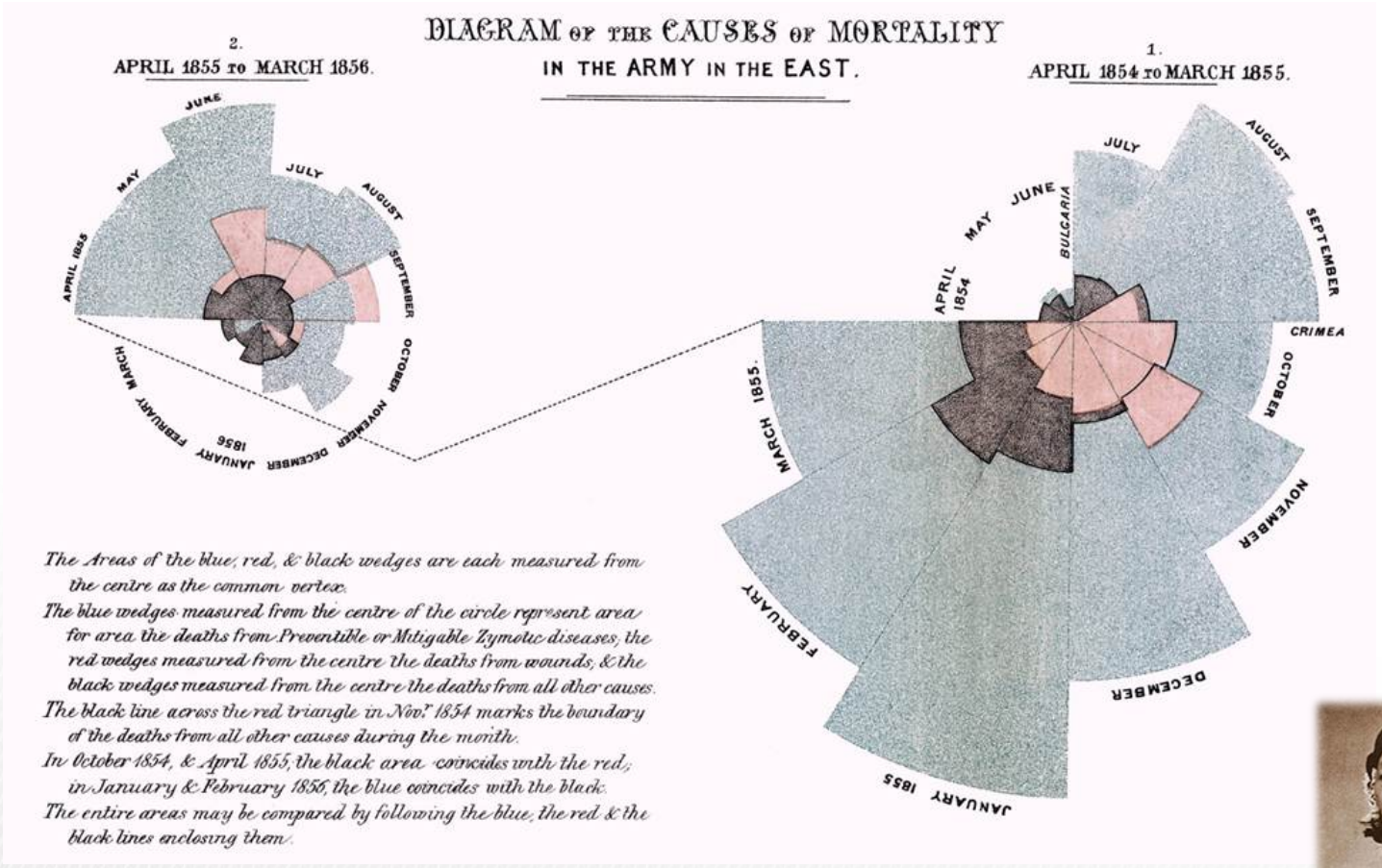
LIMITATION: How to determine order of the axes? Training time

Radial Orientation: Radar Plots

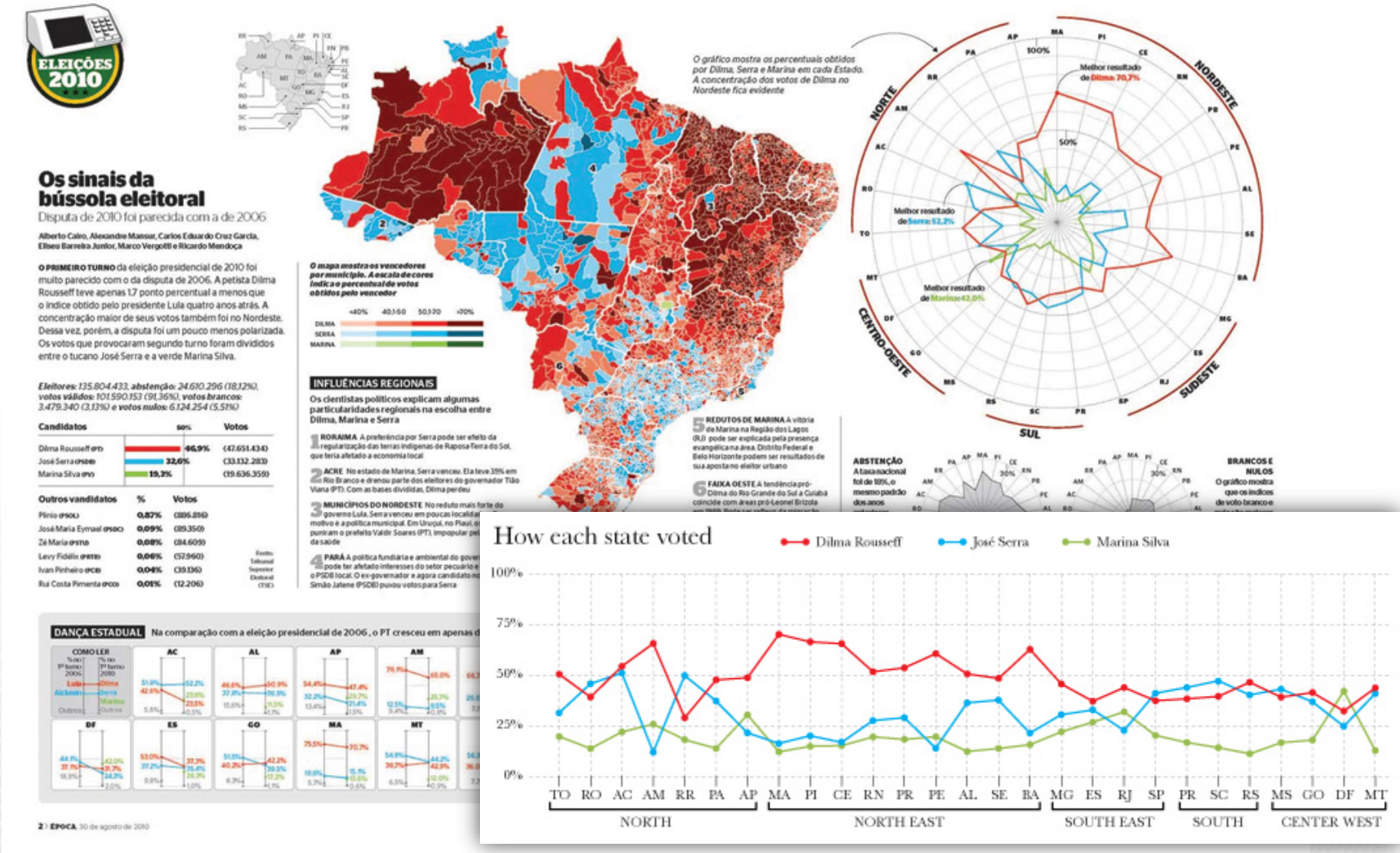


LIMITATION: Not good when categories aren't cyclic

"Diagram of the causes of mortality in the army in the East" (1858)



“Radar graphs: Avoid them (99.9% of the time)”



http://www.thefunctionalart.com/2012/11/radar-graphs-avoid-them-999-of-time.html

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I.

Theoretical:

Arrange Tables

II.

Practical

Change Over Time

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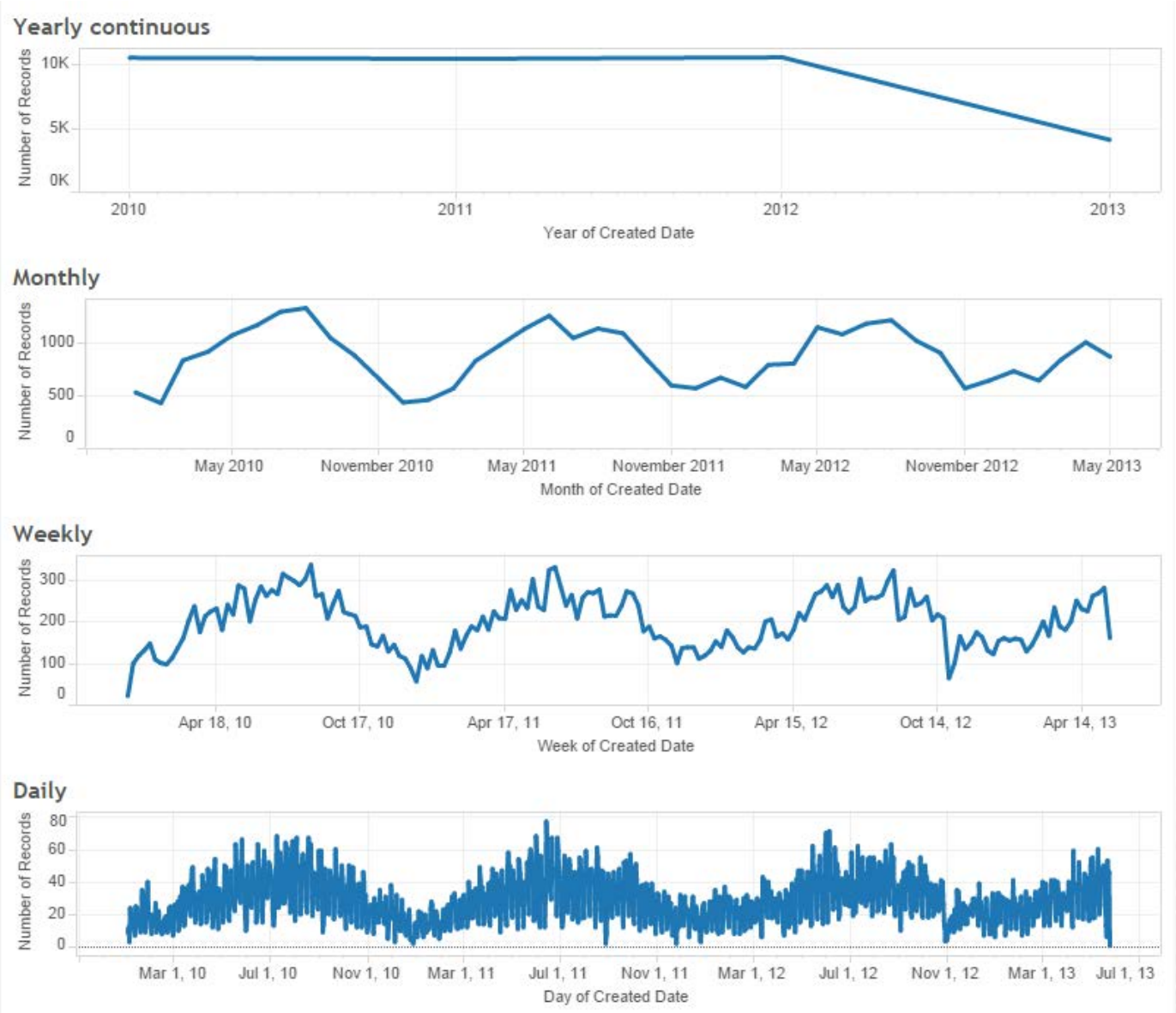
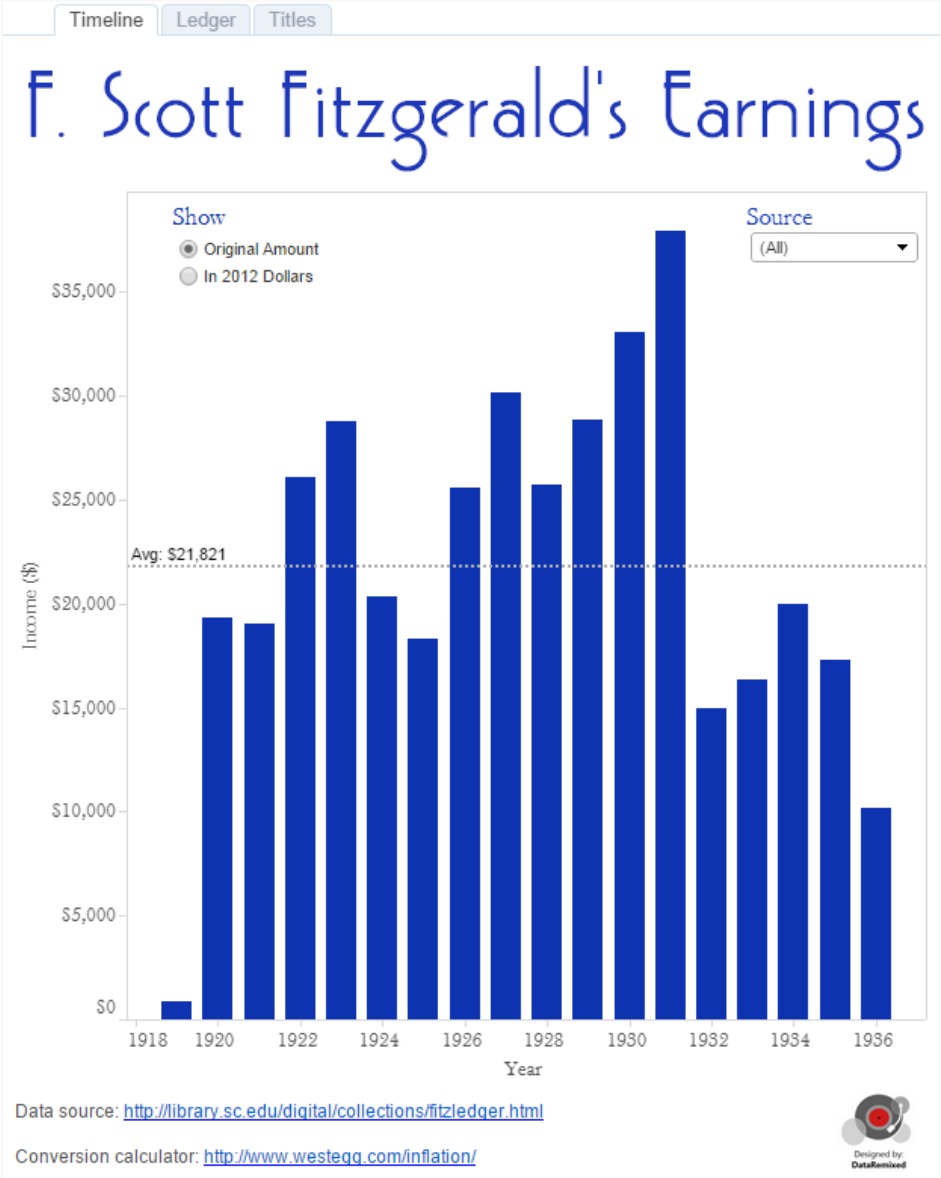
Nov 17, 2015

Basic Timelines – Working with Dates

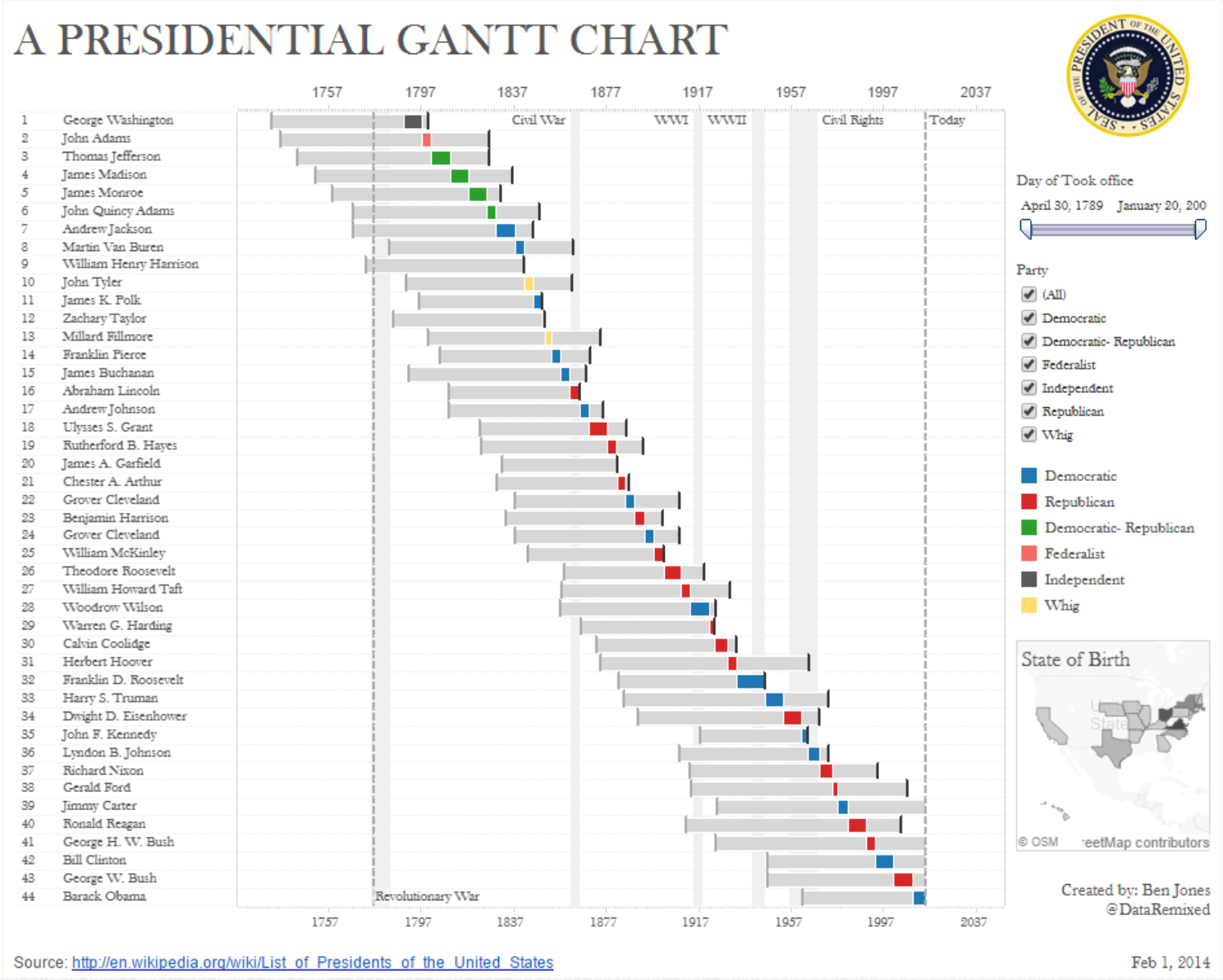


Column Charts

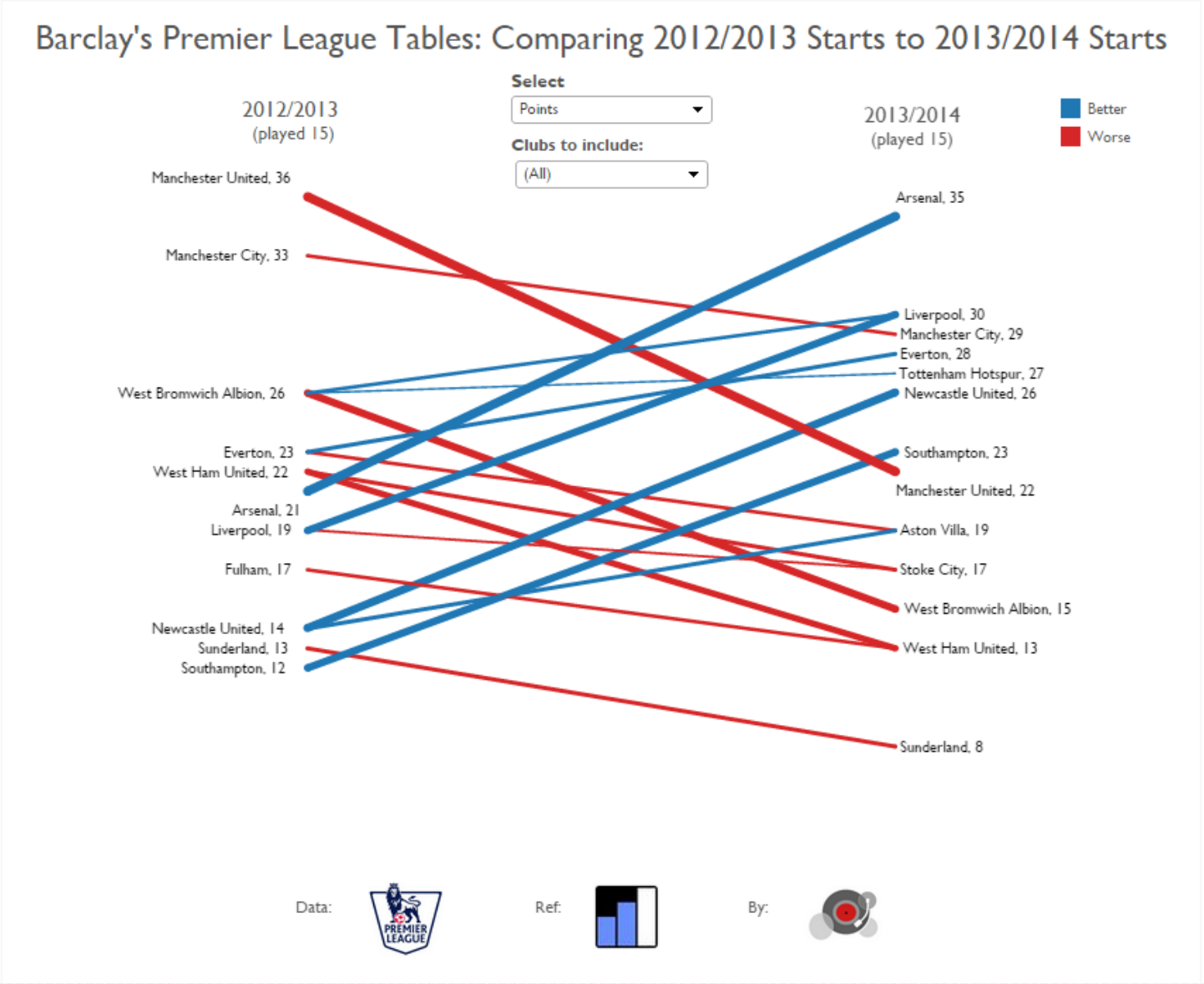


Inverted Column Charts

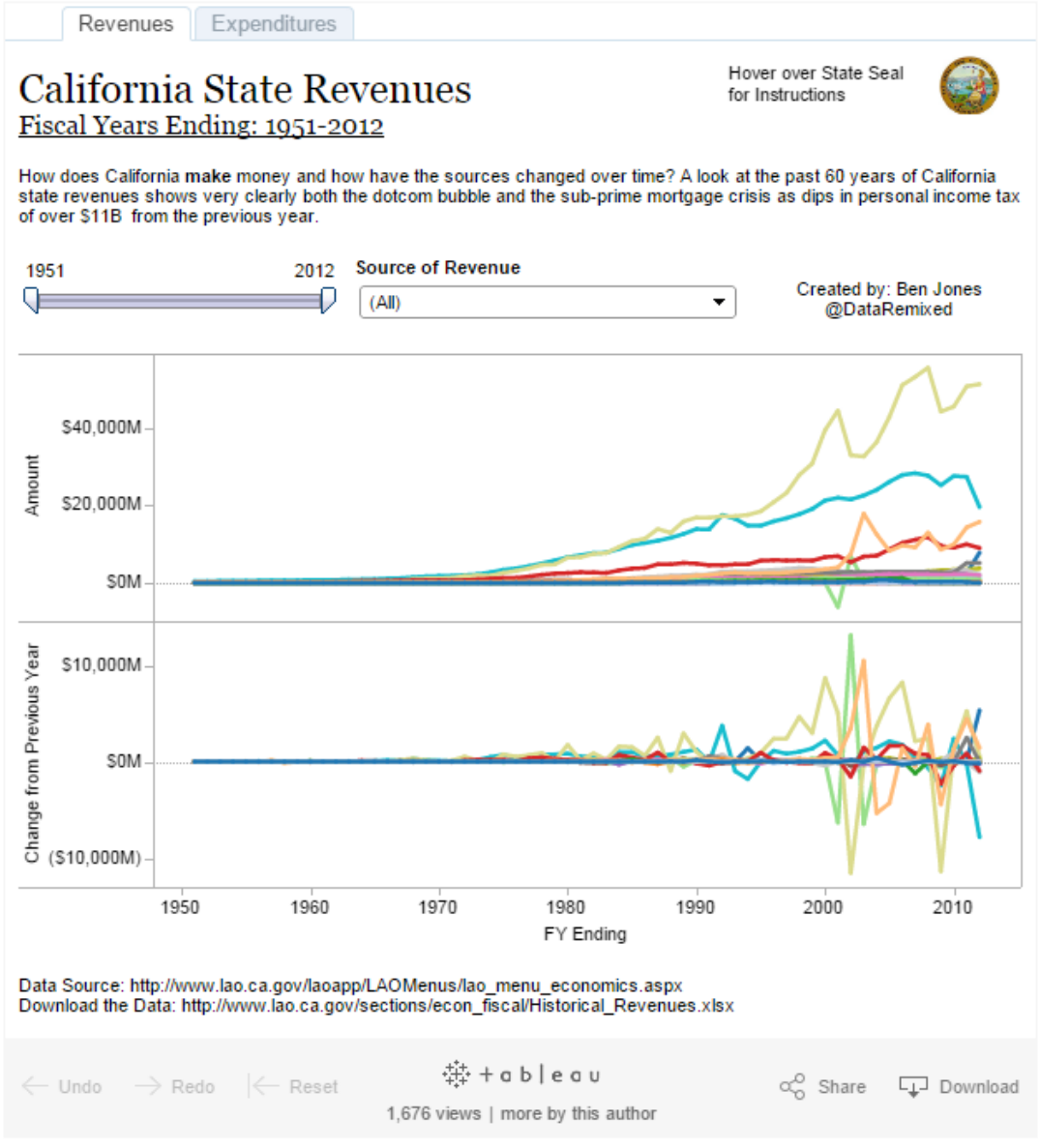
Gantt Charts



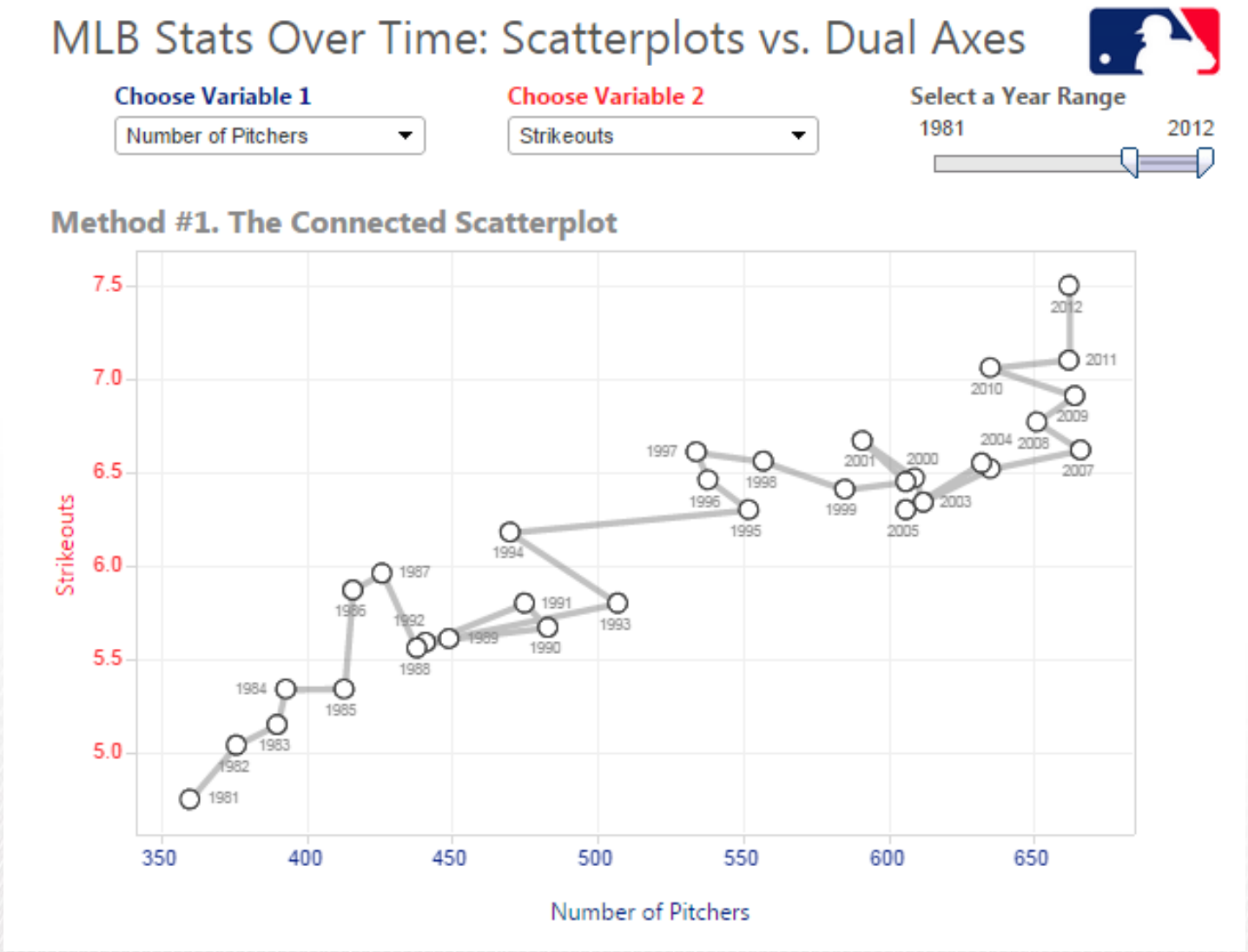
Slopegraphs



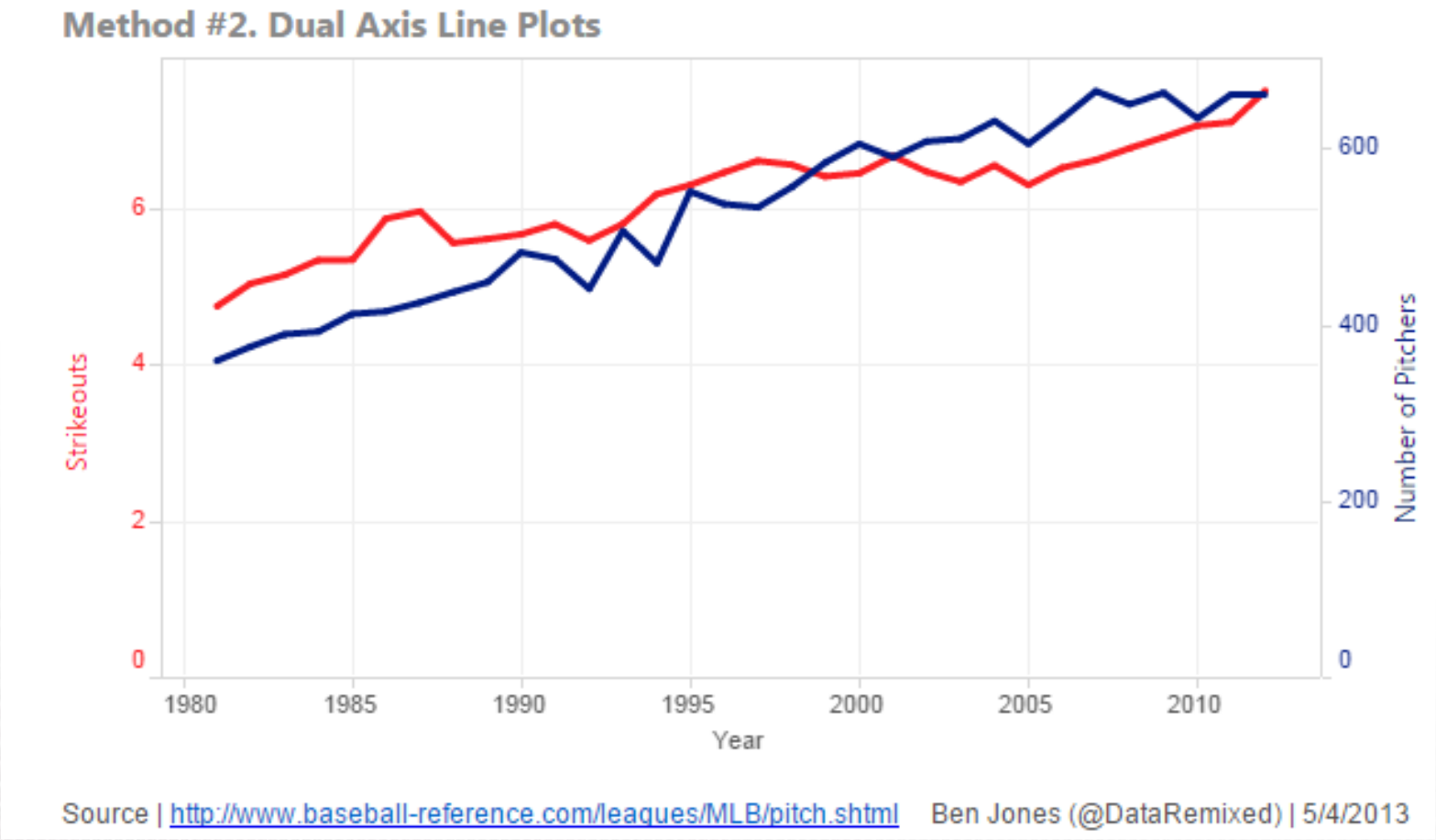
Change from Previous



Connected Scatterplots



Dual Axis Line Plots



Week 6 Homework

- Read the chapters for the Week 7 Lecture:
  - Munzner, *Visualization Analysis & Design*, Ch. 8
  - Jones, *Communicating Data with Tableau*, Ch. 10-11

- Visualization
  - Find (or create) a data set that includes at least one time field and create a visualization that shows how a variable changes over time.