



Displaying Data

University of Michigan
December 9, 2015

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Introductions

About Me



About You

- ▶ What's your first name?
- ▶ What's your department?
- ▶ Where do you use/want to use data visualization?
- ▶ What do you hope to get out of this class?

Today

- ✓ Introductions & Agenda
- Why Visualize Data?
- Selecting Charts & Graphs
- Graph Basics
- Parts of the Whole
- Text Values
- Geographic Data
- Concepts, Words & Relationships
- Encoding Data
- Storytelling, Data-Ink, & Icons
- Colors, Fonts, & Animation

Why Visualize Data?



PBS

KIDS

pbskids.org



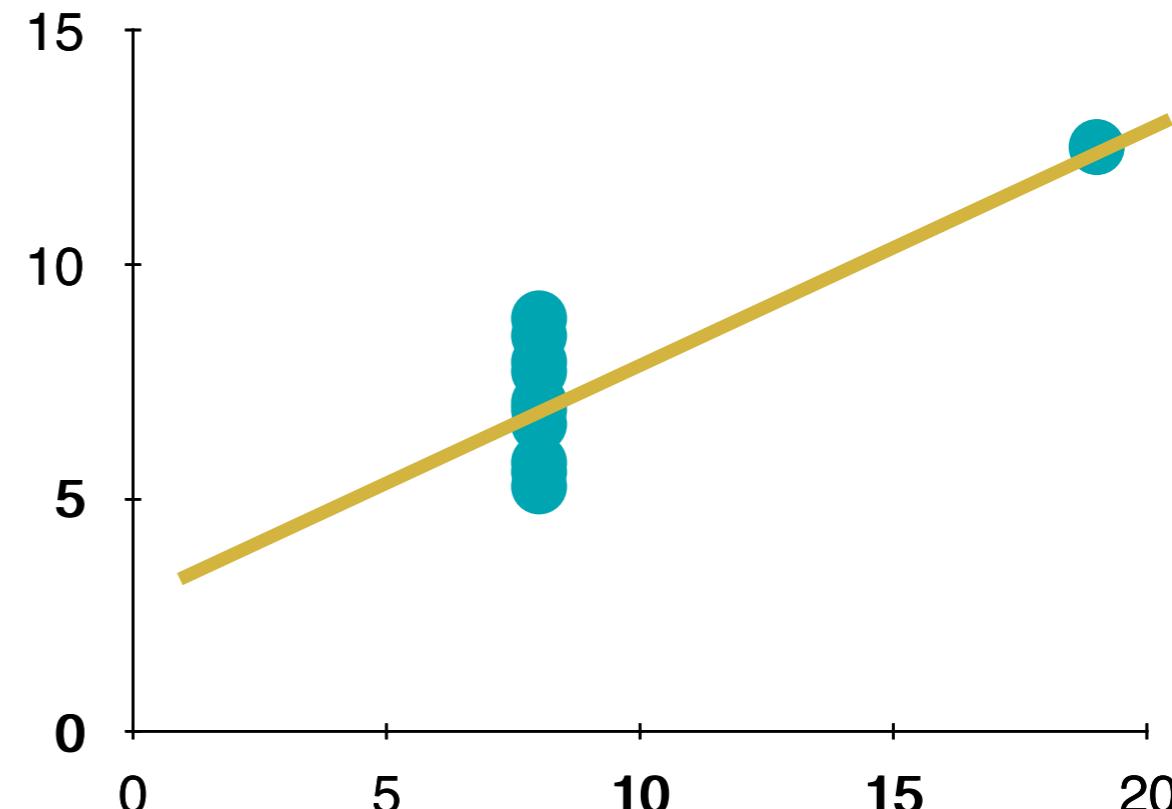
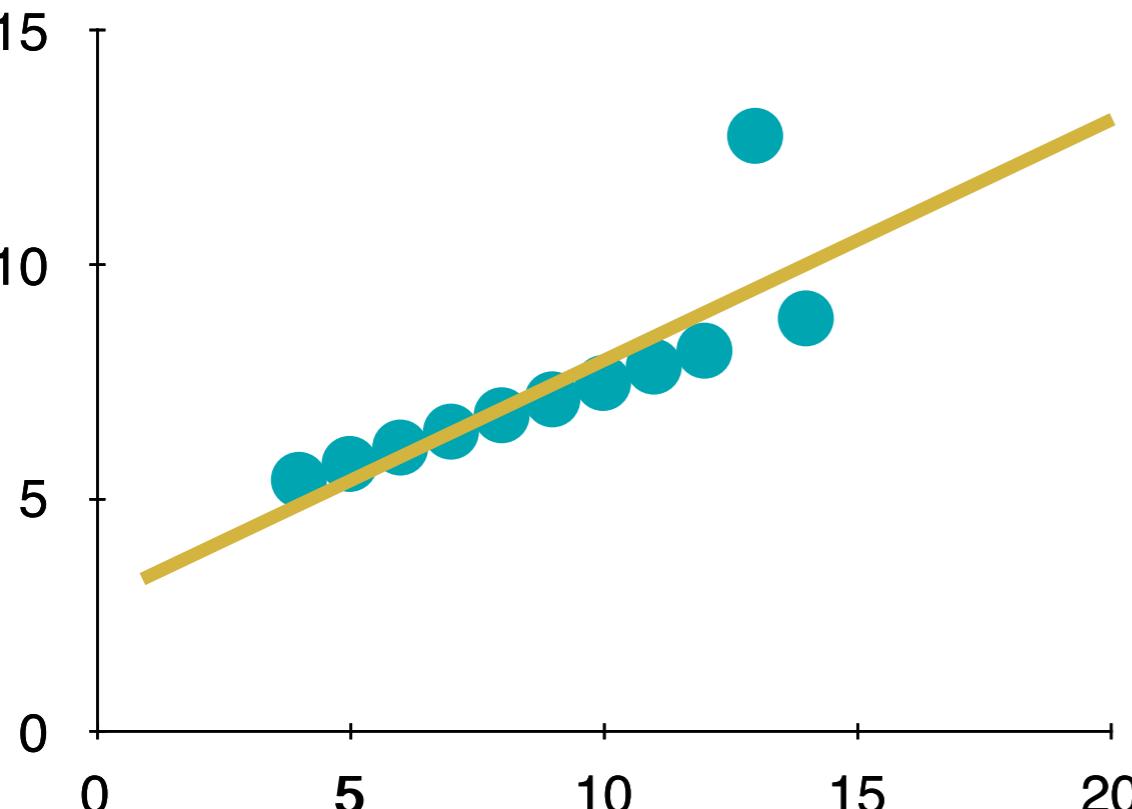
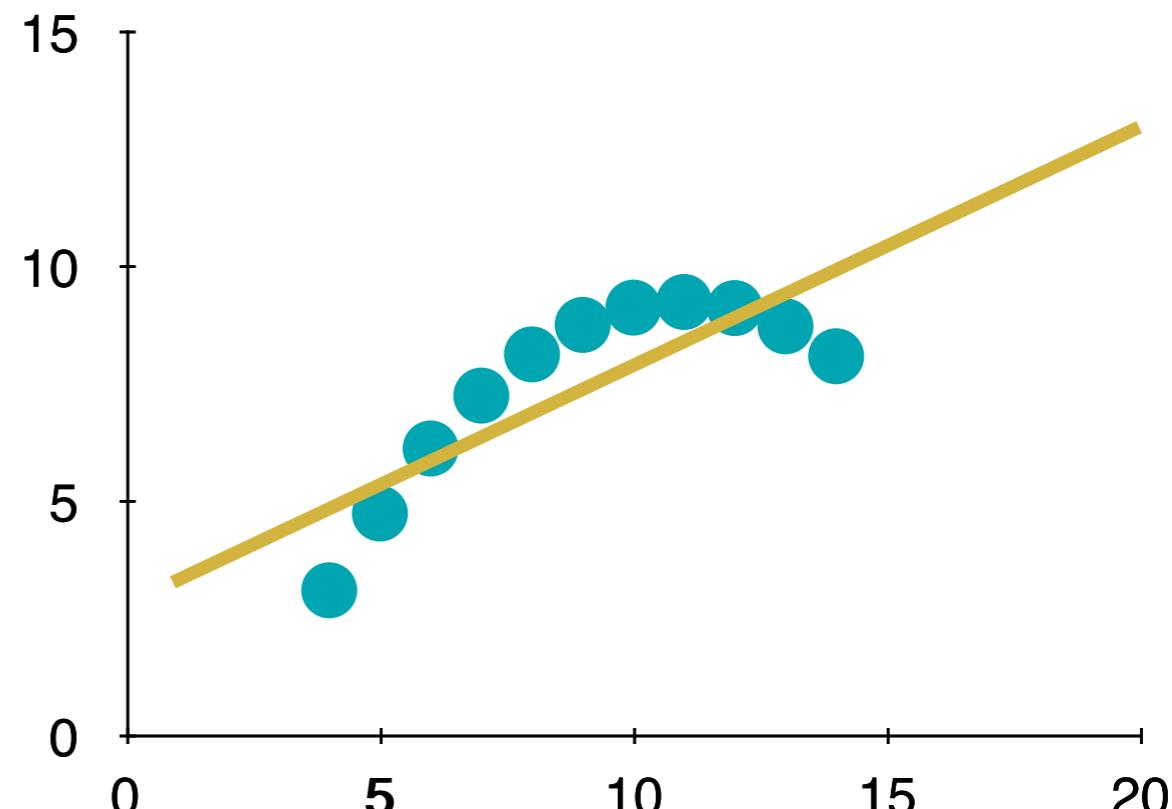
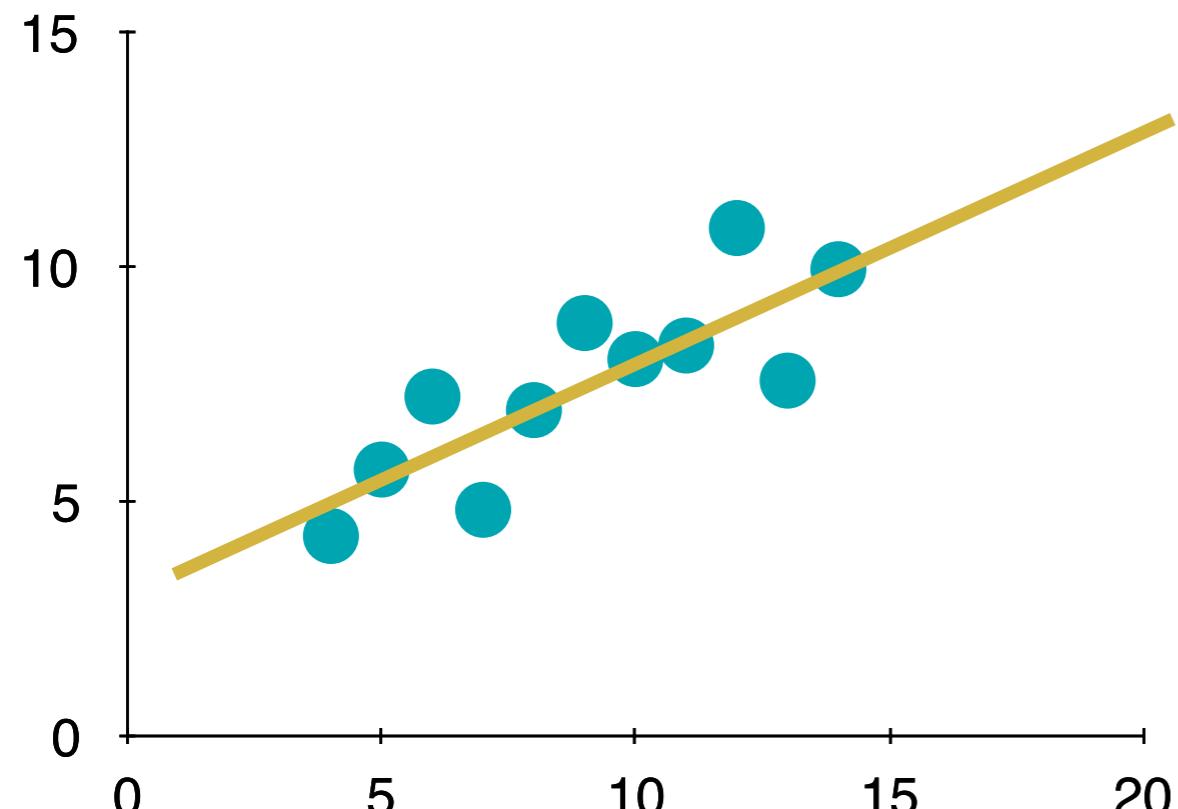


1	5	8	9	3	5	6	2	3	4
6	7	9	2	4	1	5	6	6	7
8	4	3	1	4	9	7	8	5	9
3	4	2	5	7	2	5	3	1	8
7	9	1	3	4	6	2	5	9	1
3	2	4	3	5	5	2	5	1	4
9	8	7	1	2	3	4	3	2	1
2	5	8	9	8	7	6	2	4	5
9	2	3	5	2	8	7	5	6	4
1	2	3	7	9	4	2	3	2	1
8	6	4	2	1	3	5	7	9	8
4	4	2	4	9	8	1	3	2	4
5	7	6	4	1	3	1	2	5	9
1	3	7	9	5	7	3	4	6	2
9	2	3	5	7	2	9	4	1	3

Why Visualize?

- ▶ 4 Data Sets
- ▶ Each has:
 - Mean of X: 9
 - Sample Variance of X: 11
 - Mean of Y: 7.5
 - Correlation of X & Y: 0.816
 - Linear Regression Line: $Y = 3.00 + 0.500X$

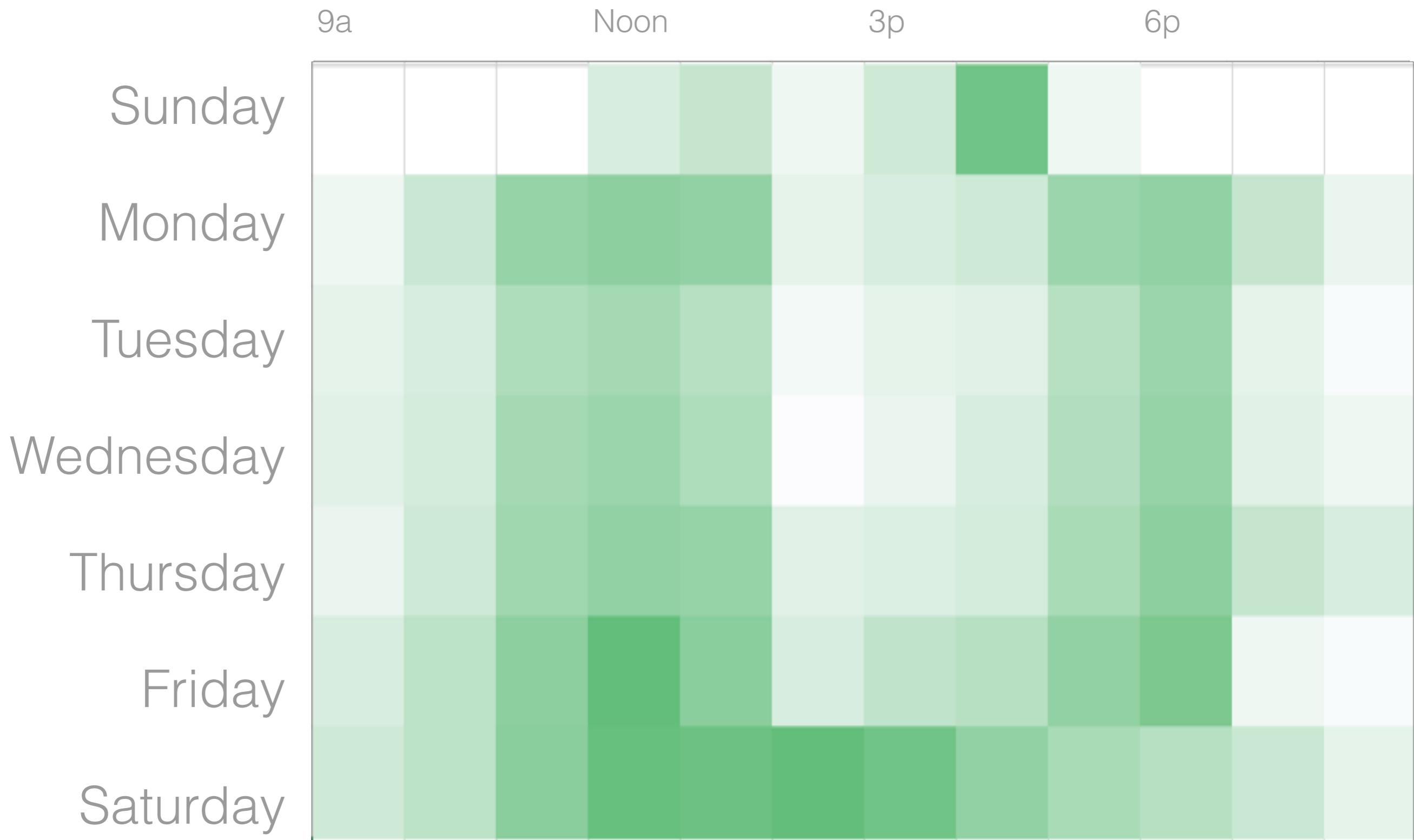
Why Visualize Data?



Source: Anscombe's Quartet

Why Visualize?

Store Arrivals

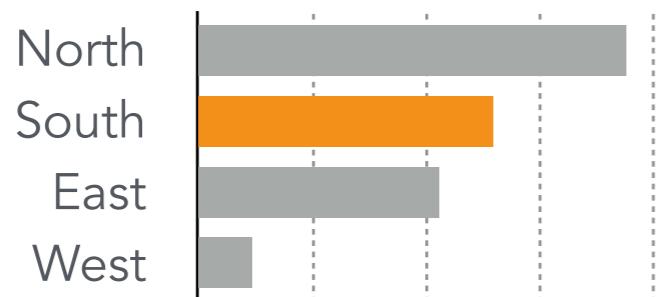


Why Not Visualize?

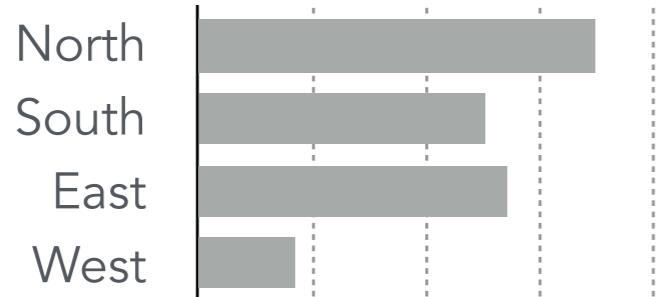
How many **Widgets** did the **South** region sell?

Sales by region

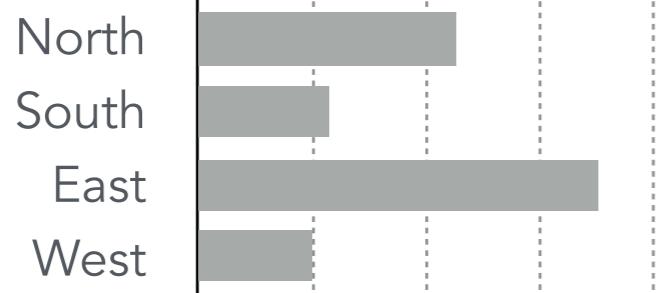
Widgets



Gizmos



Whatsits



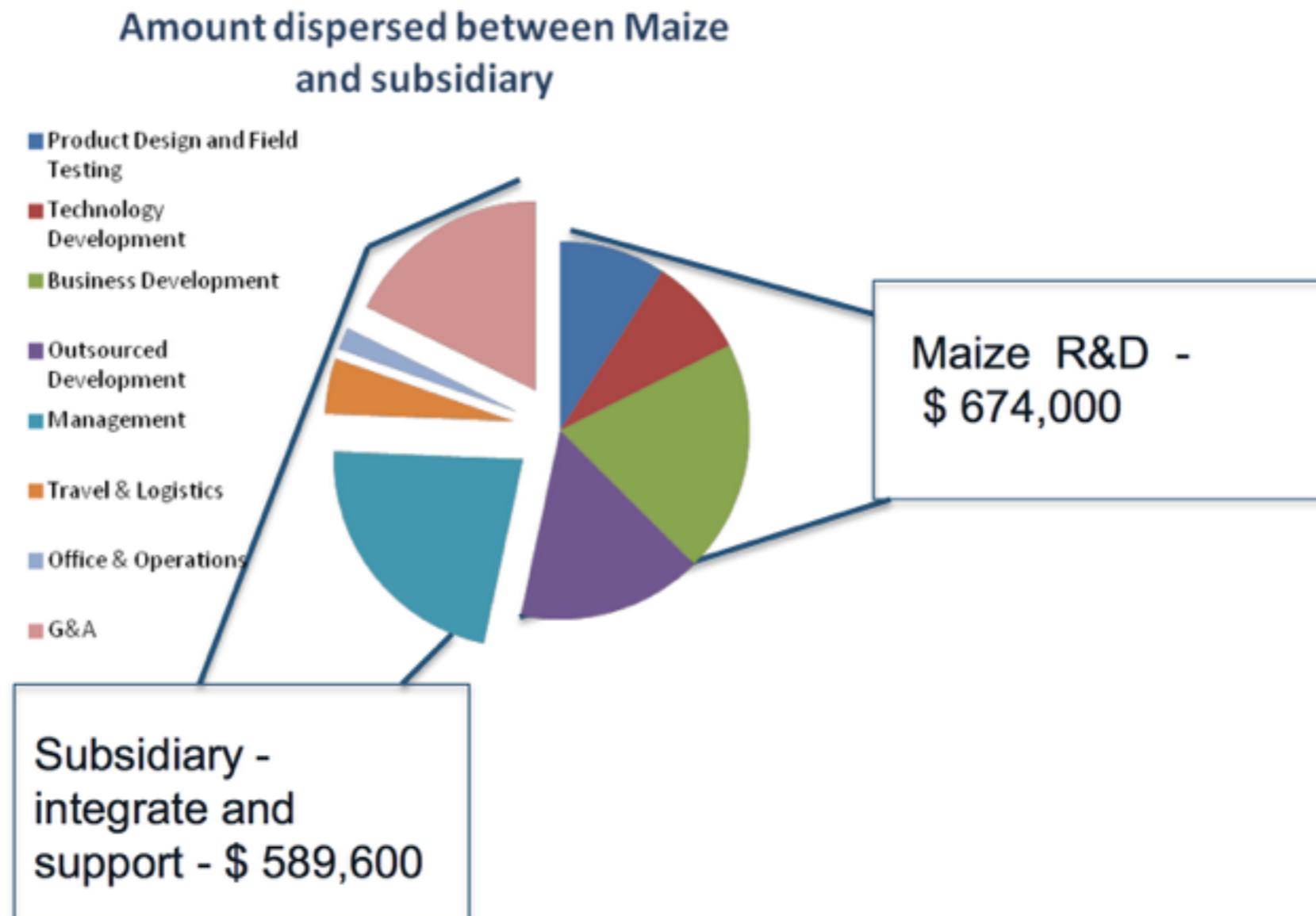
Sales by region

Region	Widgets	Gizmos	Whatsits	TOTAL
North	94	87	57	238
South	65	63	29	157
East	53	68	38	159
West	12	21	25	58
TOTAL	224	239	149	612

Why Not Visualize?

Exhibit 1

➤ Total Budget – \$ 1,263,600



➤ Assume that the management, travel, G&A expenses are minimal for Maize R&D.

Why Not Visualize?

9

Implementation- Product

Product Development

- From 2005 to 2010 the average household in developing nations has increased wireless subscription rates by 137% (83% of households have services).¹
- Over this same time, Internet usage on these services has increase 500% but is still only 5% of the overall low income phone users. The demand is strong but strategic implementation into the market is critical.¹
- Low bandwidth/highly standardized product.

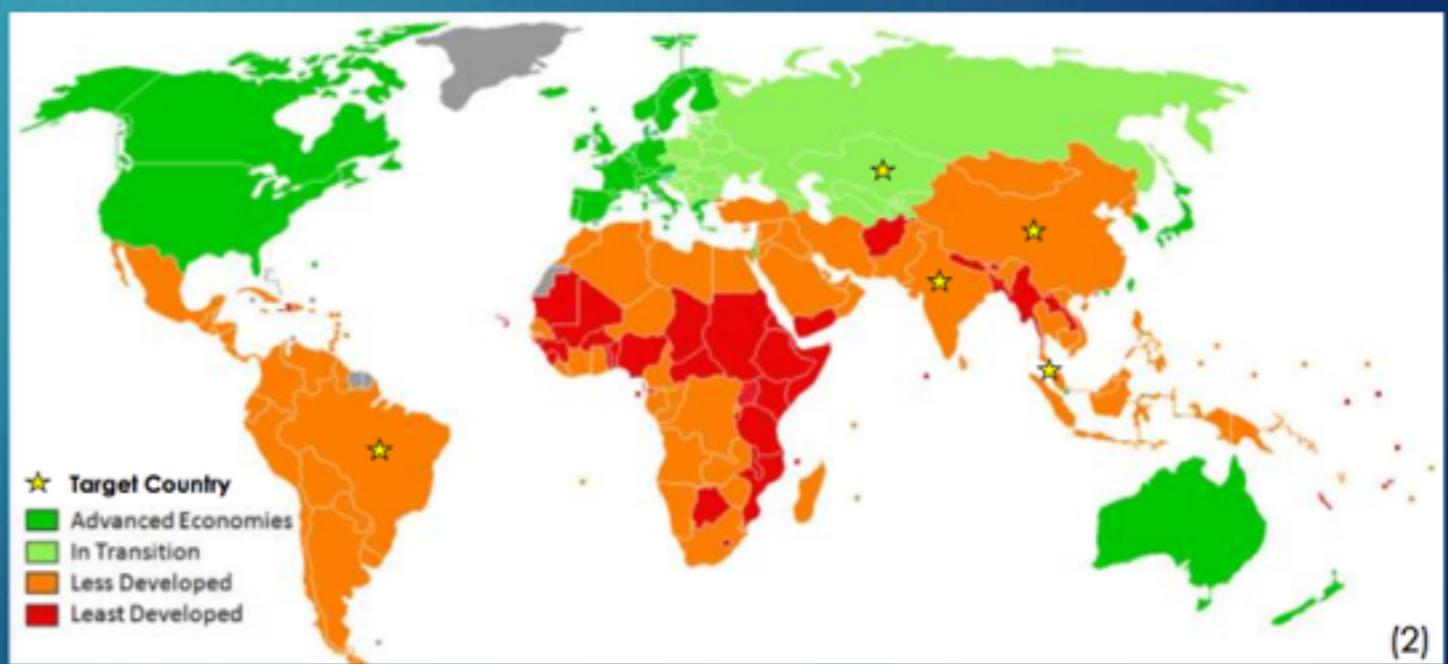
Selling New Products (Manipulate Demand)

- Training program for partners to teach new users about services/products.
- Deployment strategy (Specific to each partnering companies needs).
- Localized "free" data hot spots using wireless broadband internet
- Target large developing nations to promote economies of scale.

Countries of Focus

- China • 21% of DP, 278% Mobile Demand Growth, 27% Mobile Demand
- India • 18% of DP, 108% Mobile Demand Growth, 58% Mobile Demand
- Malaysia • 53% Mobile Demand Growth, 83% Mobile Demand
- Brazil • 43% Mobile Demand Growth, 43% Mobile Demand
- Kazakhstan • 43% Mobile Demand Growth, 207% Mobile Demand

*Demand growth reported from 2005-2010¹ **Mobile demand for 2010 reported¹



(2)

Selecting Charts & Graphs

Types of Data

Categories

Dog
House
President
Flew
Speak
Written
Red
Large
Beautiful

Numbers

38°55'7"N 77°13'47"W
Here
Virginia
4/24/2009
July 4, 1776
Yesterday
Next week
255.255.0.0
google.com

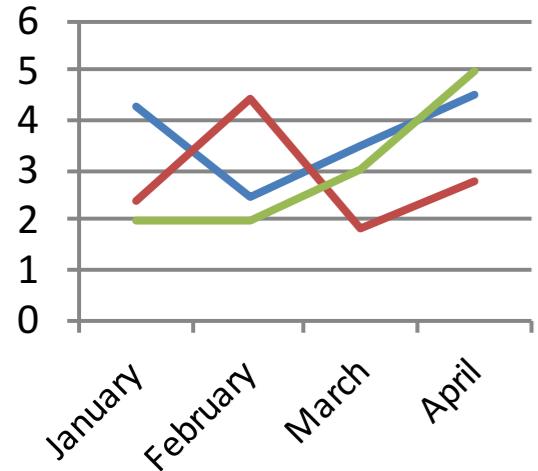
Addition

1	-512
24	thirty nine
5.93	5%

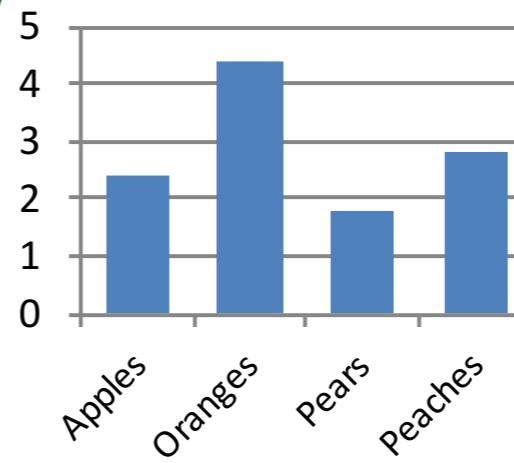
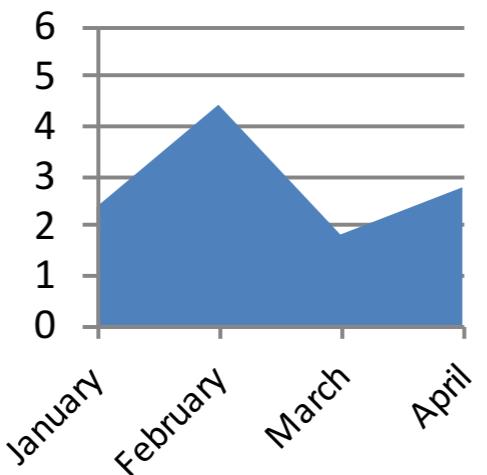
Music

Pictures/Video

10 Basic Ways to Display Data



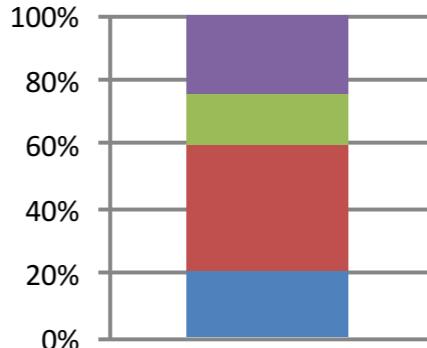
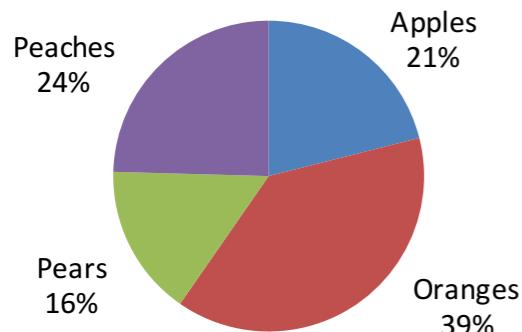
Series
(ordered)



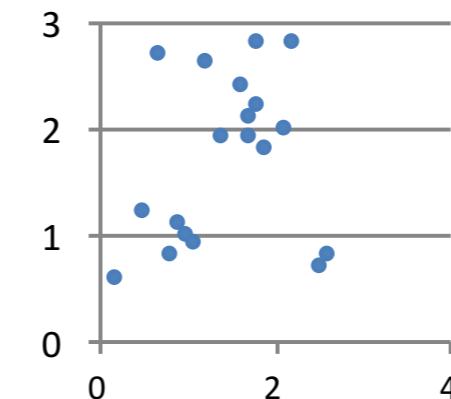
Sales	
Apples	2.4
Oranges	4.4
Pears	1.8
Peaches	2.8

Apples
21%

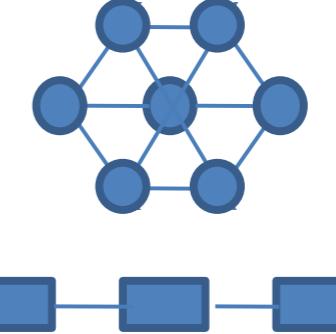
Value



Composition



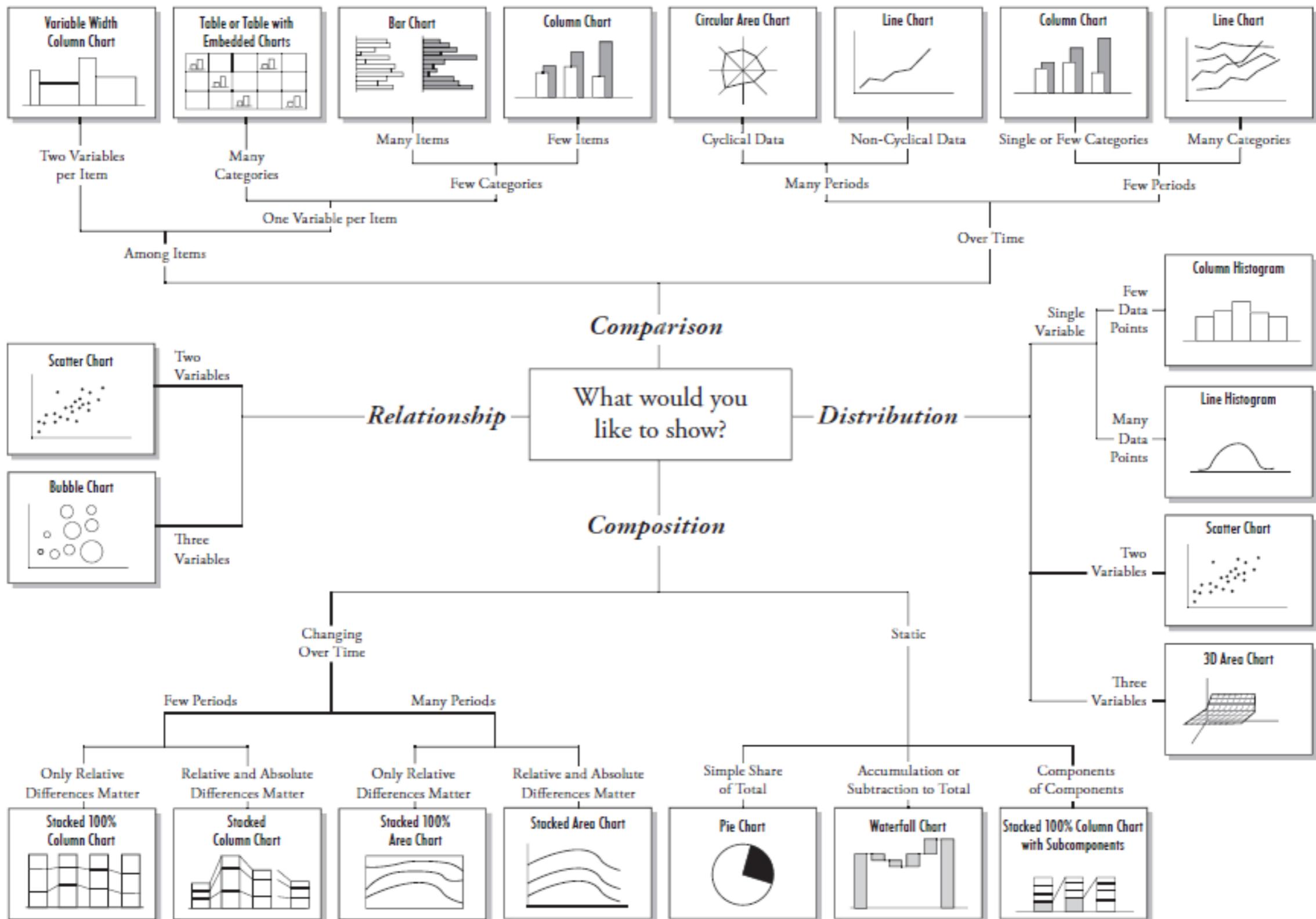
Relationship



Location

Selecting Charts

Chart Suggestions—A Thought-Starter



Selecting Charts

infodesignpatterns.com

Home

Patterns

About

Contact

Simple Bar Chart

Created

2008-07-28 18:52:40

Last Edit

0000-00-00 00:00:00

Specialization

[Sparklines](#)
[Multiset Bar Chart](#)
[Stacked Bar Chart](#)
[Isometric Bar Chart](#)
[Span Chart](#)

Alternative

[Dot Matrix](#)

Feature Similarity

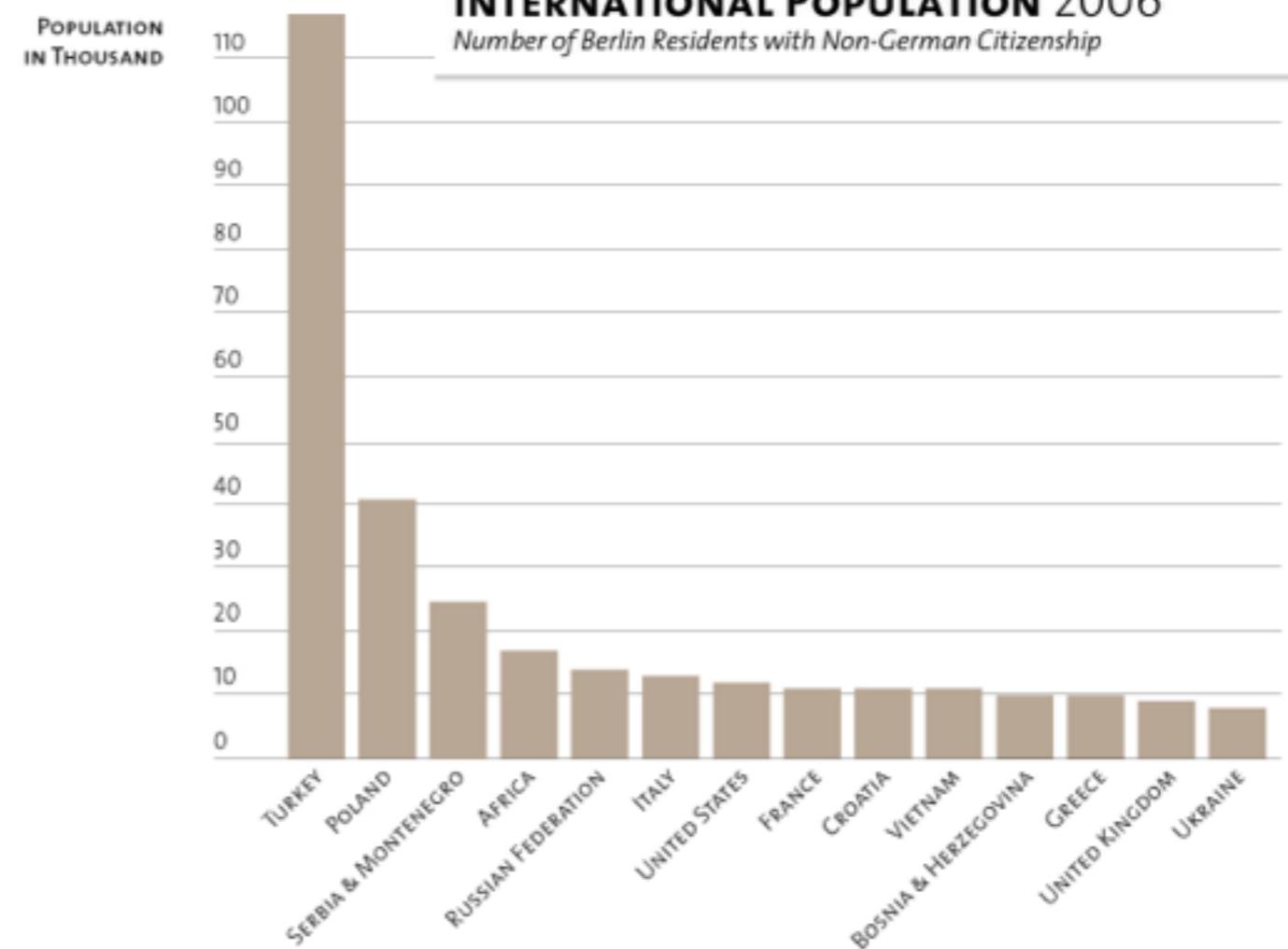
[Ring Chart](#)

User Stats

1509 Views

Rating

 2  0



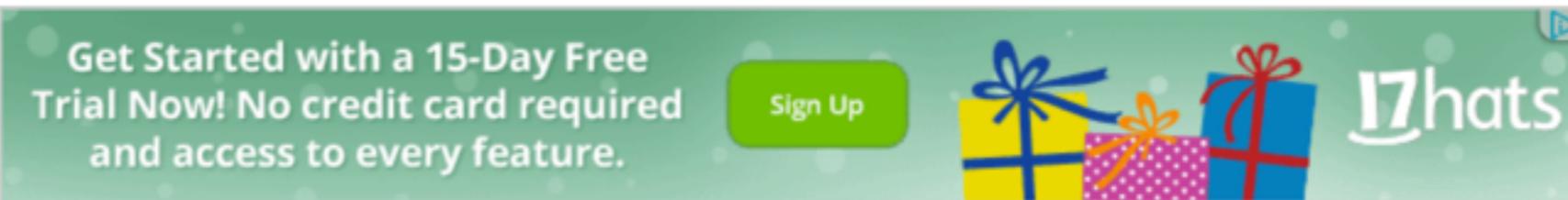
Summary

Bar charts are used to visualize absolute magnitudes of nominal data items. They can theoretically consist only a single data item, but in most cases are used to additionally compare the quantitative value of several entities with each other. Bar charts as a major group of standard display are distinguished charts from line charts and pie charts as they do not display continuous developments over an interval but measure the values of discrete data items. Also, they display absolute numerical values rather than proportions.

Selecting Charts

The Data Visualisation Catalogue

About • Suggest • Shop • Resources



Search by Function

View by List



Arc Diagram



Area Graph



Bar Chart



Box & Whisker Plot



Brainstorm



Bubble Chart



Bubble Map



Calendar



Chord Diagram



Choropleth Map



Circle Packing



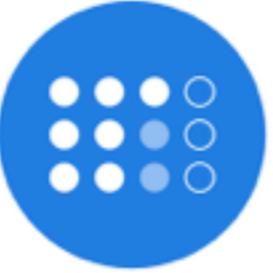
Connection Map



Donut Chart



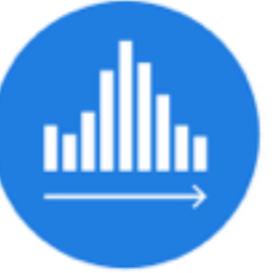
Dot Map



Dot Matrix Chart



Flow Map



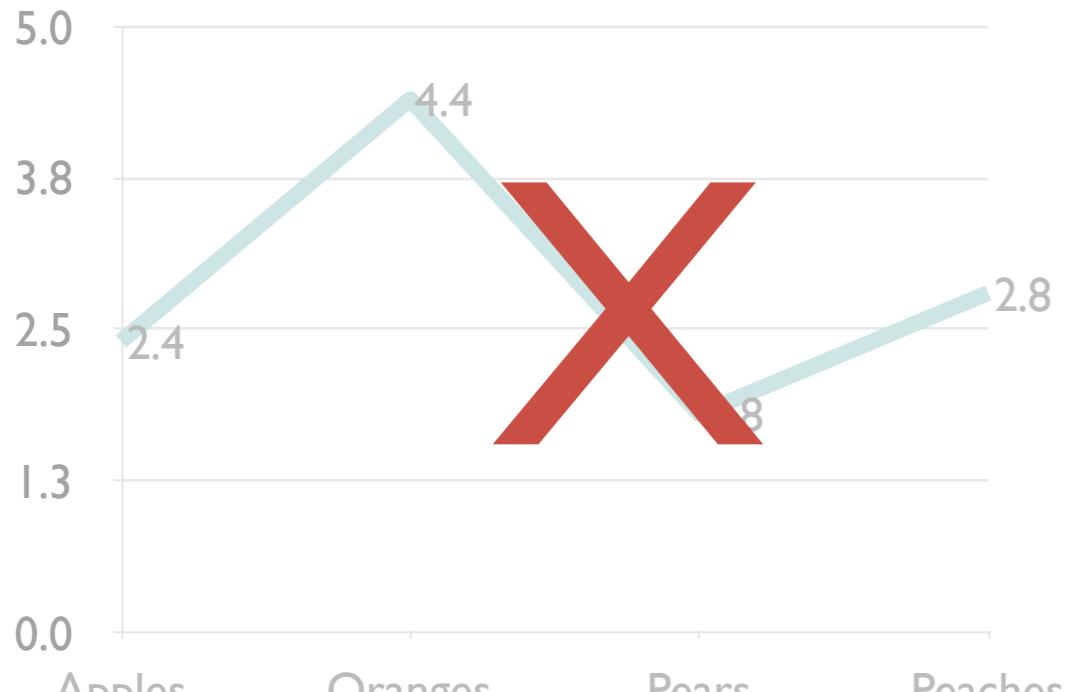
Histogram



Illustration Diagram

Graph Basics

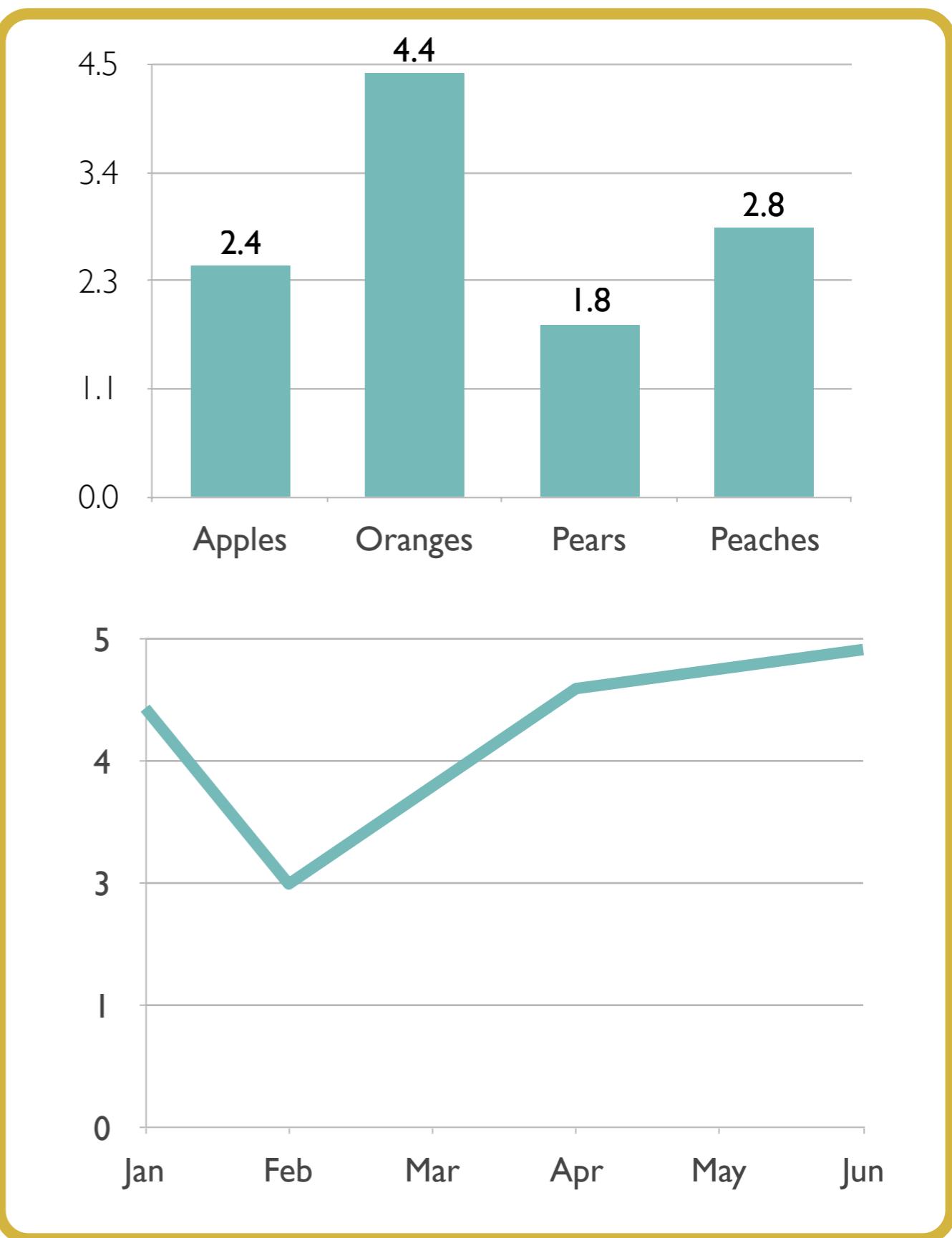
Type of Data



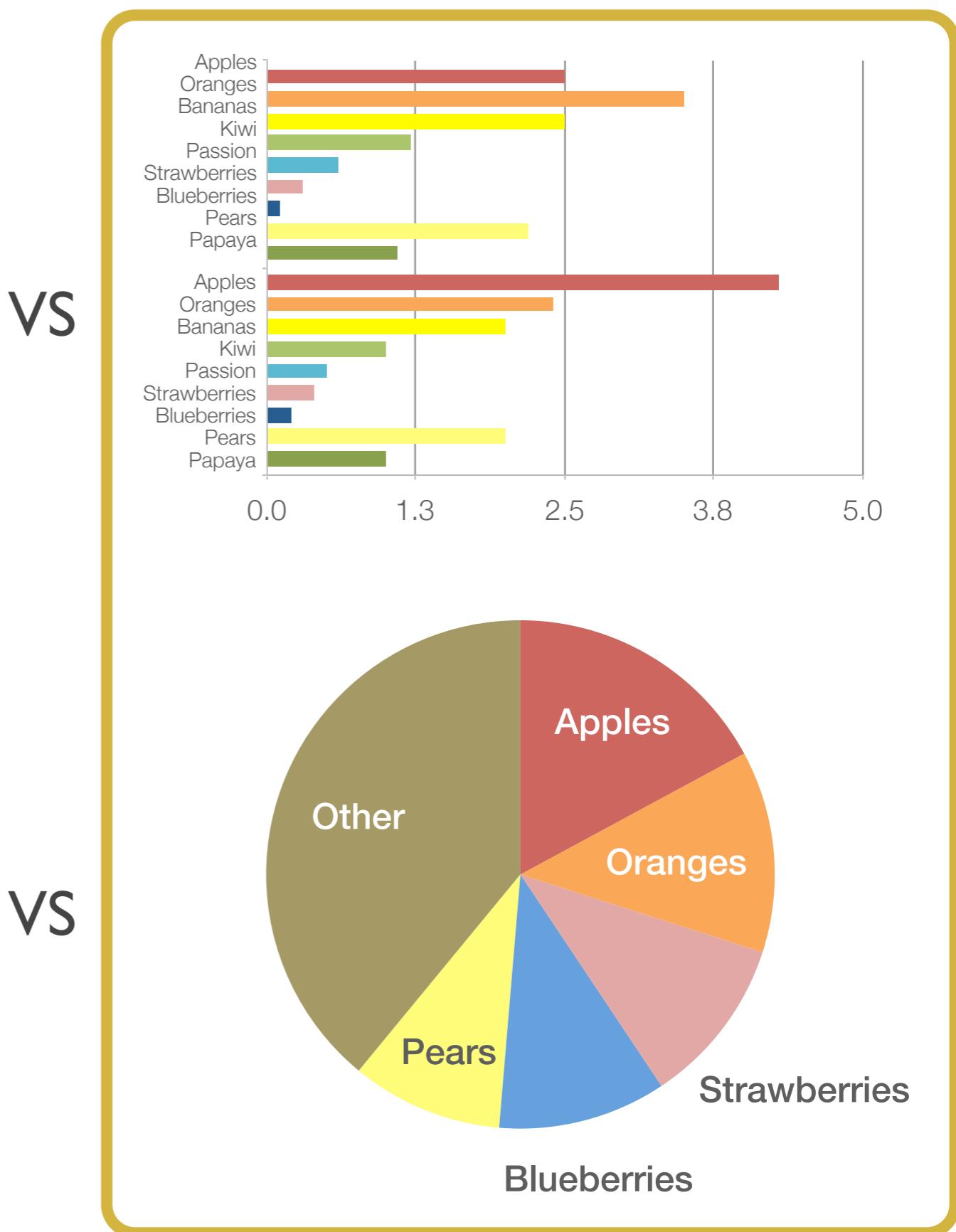
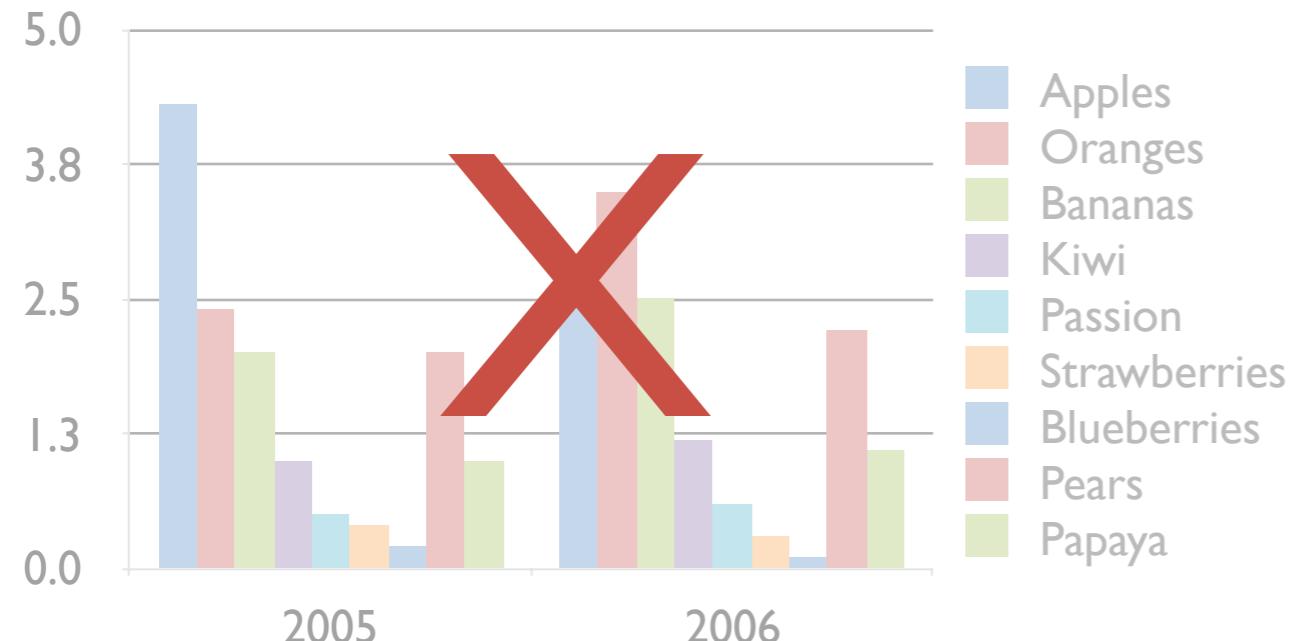
VS



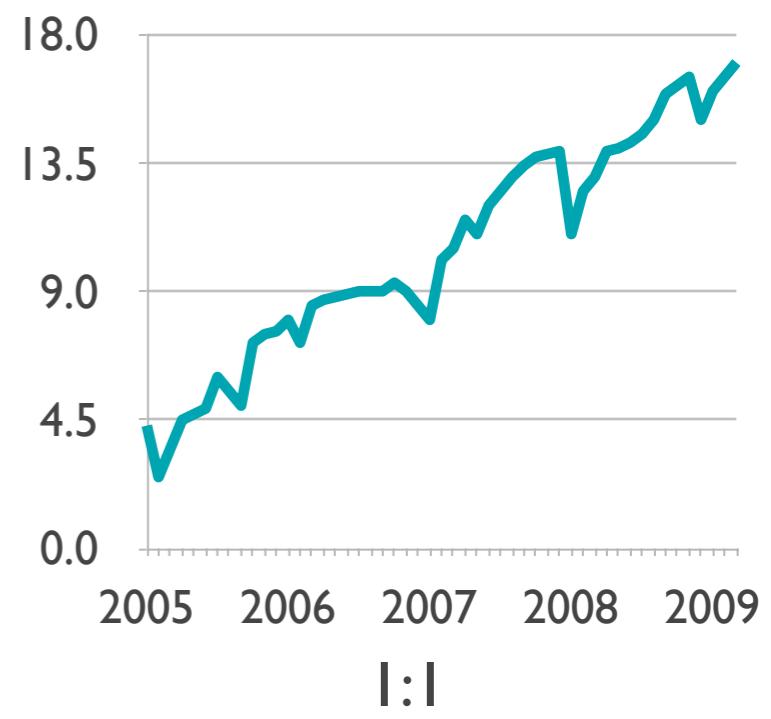
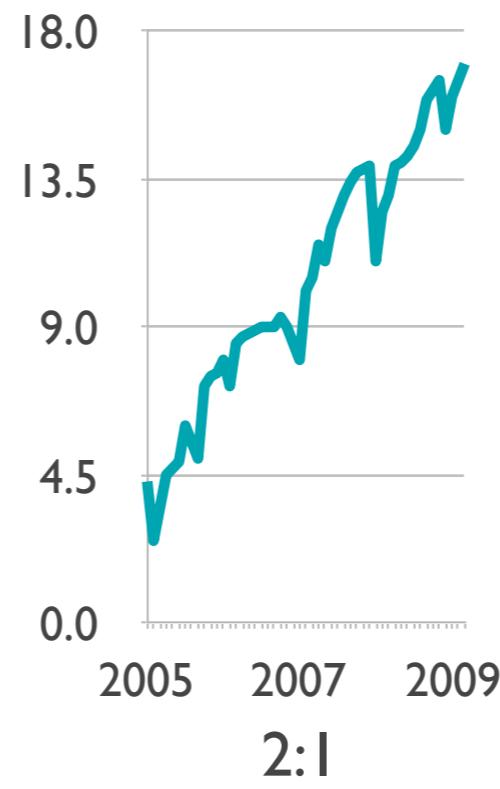
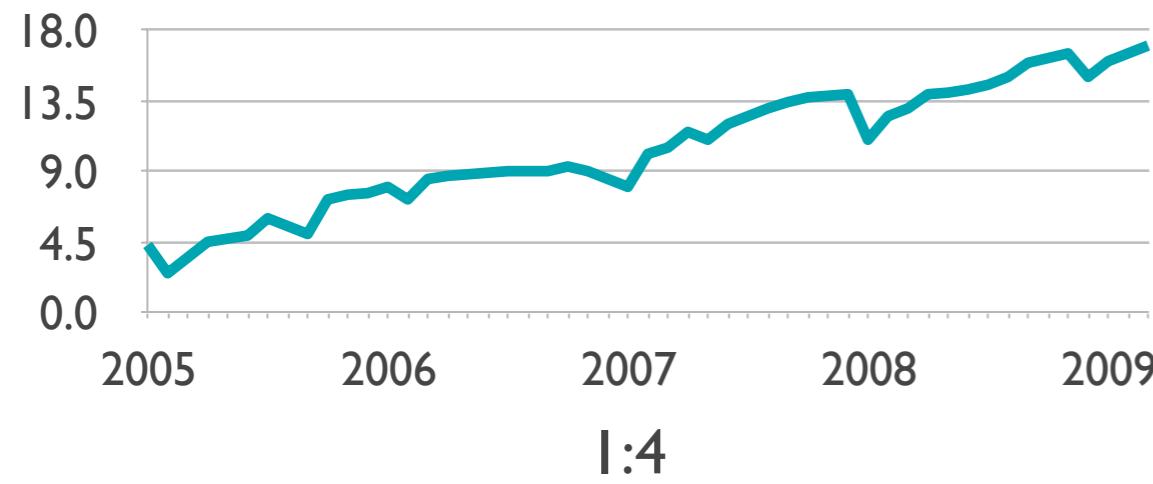
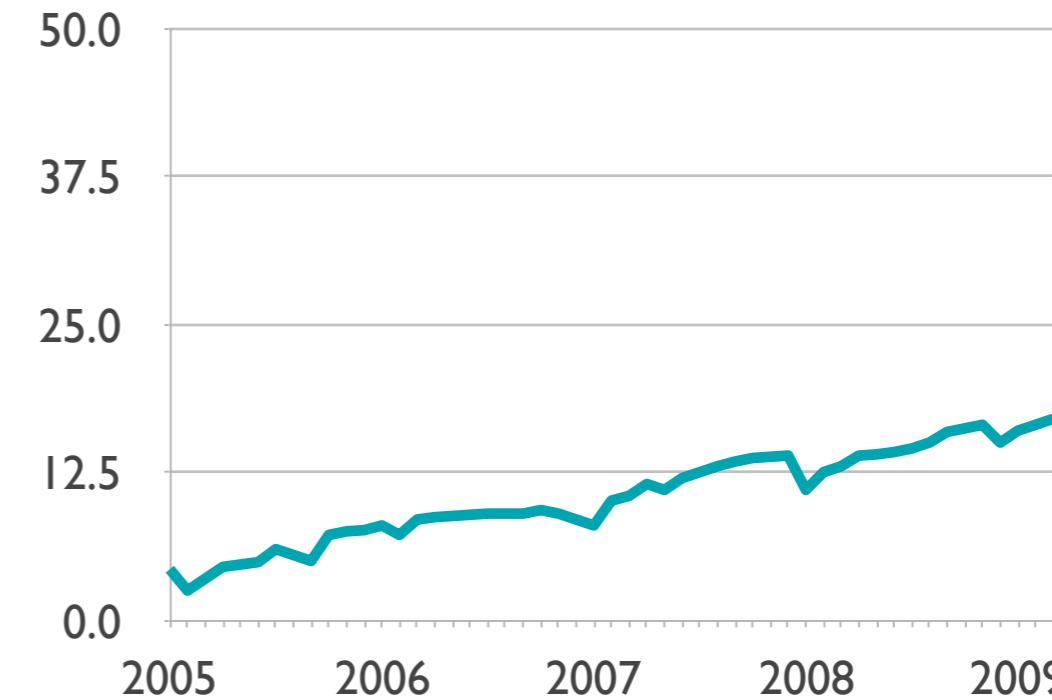
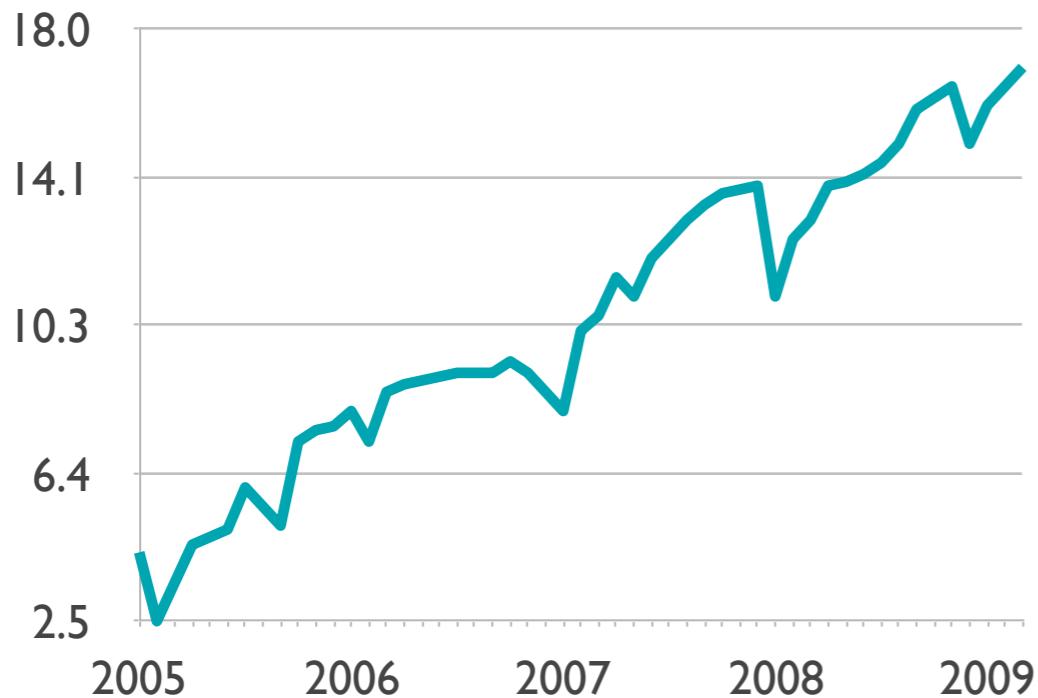
VS



Legends



Range & Scale

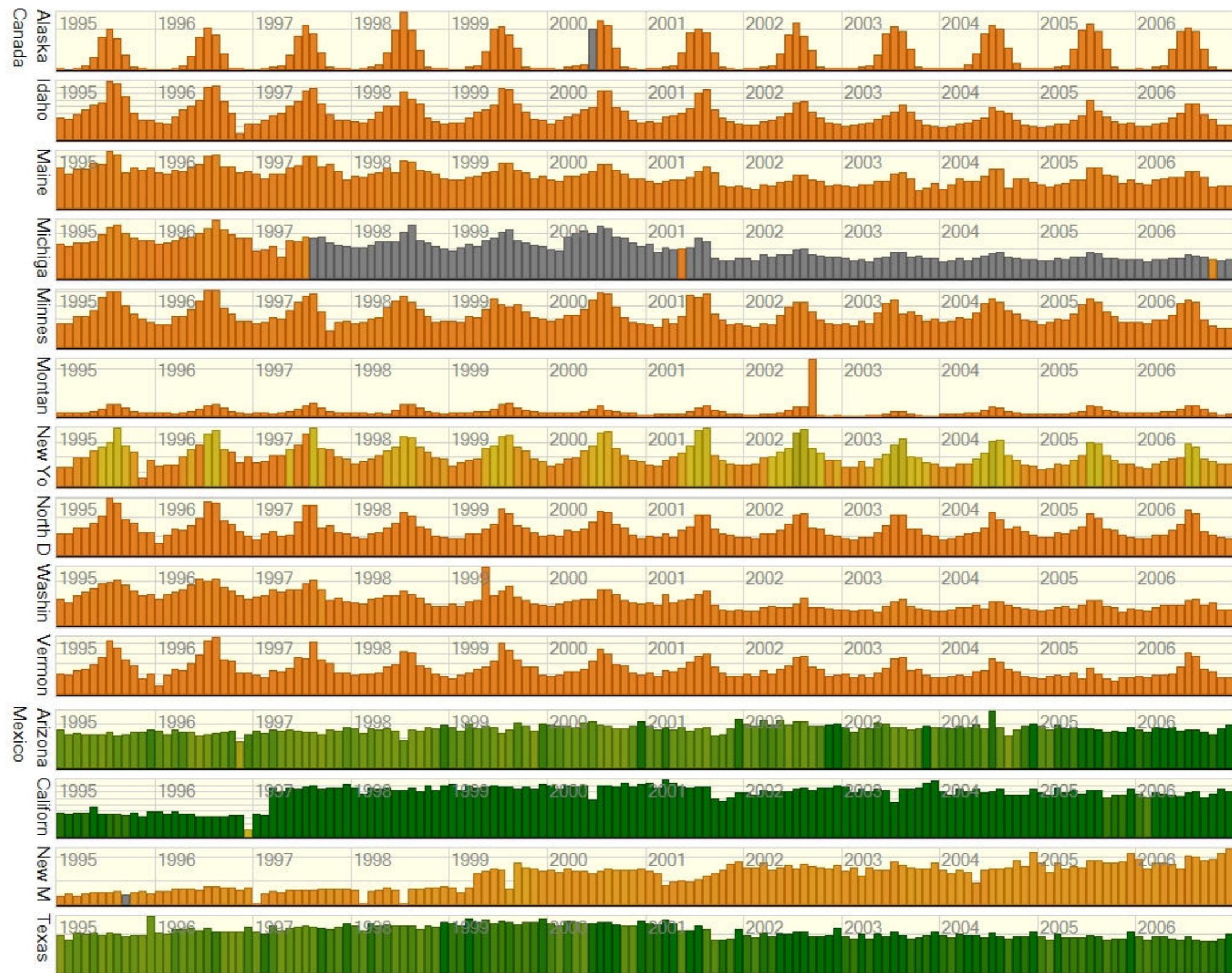


|:4

2:1

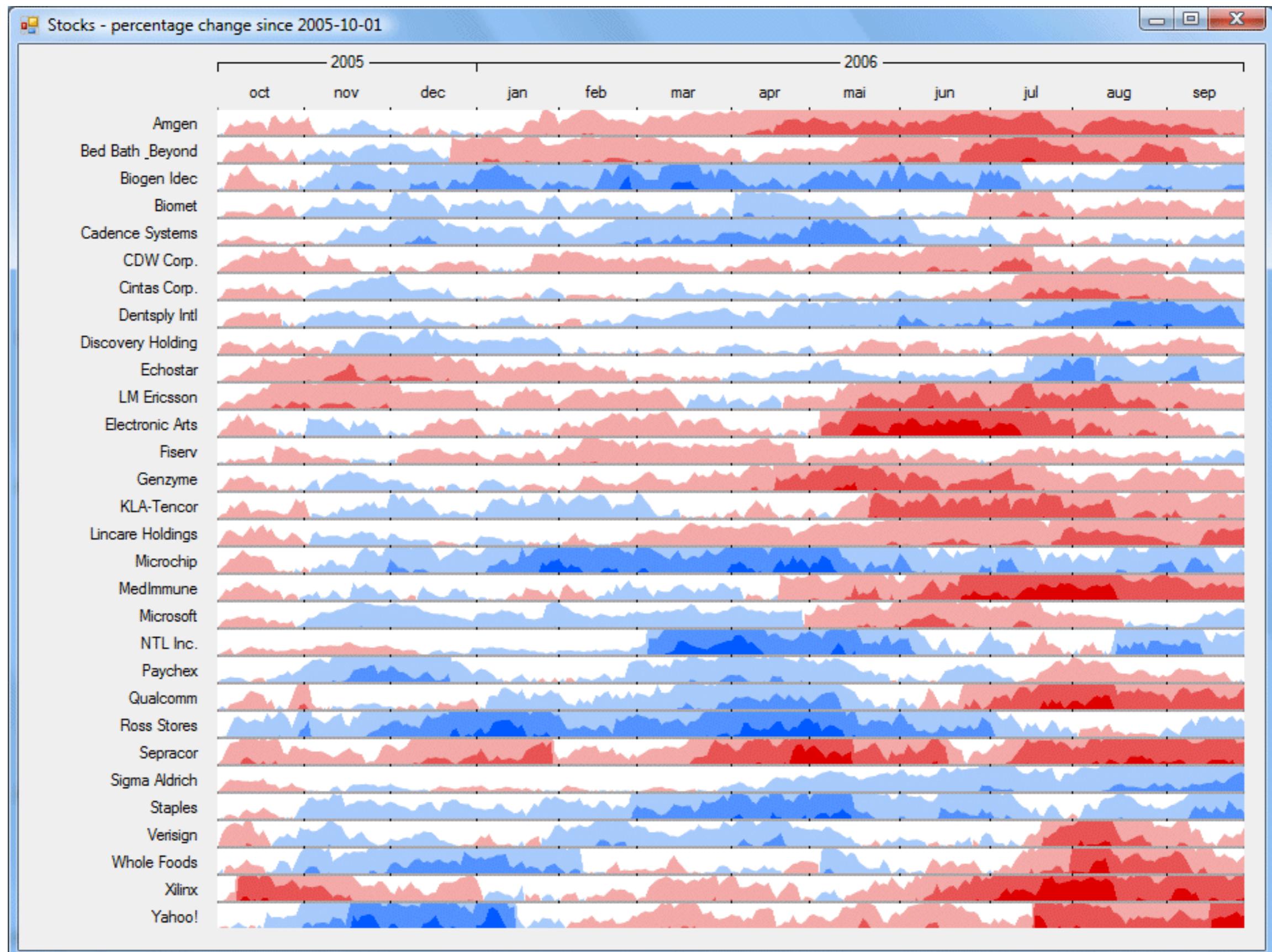
1:1

Amount of Data



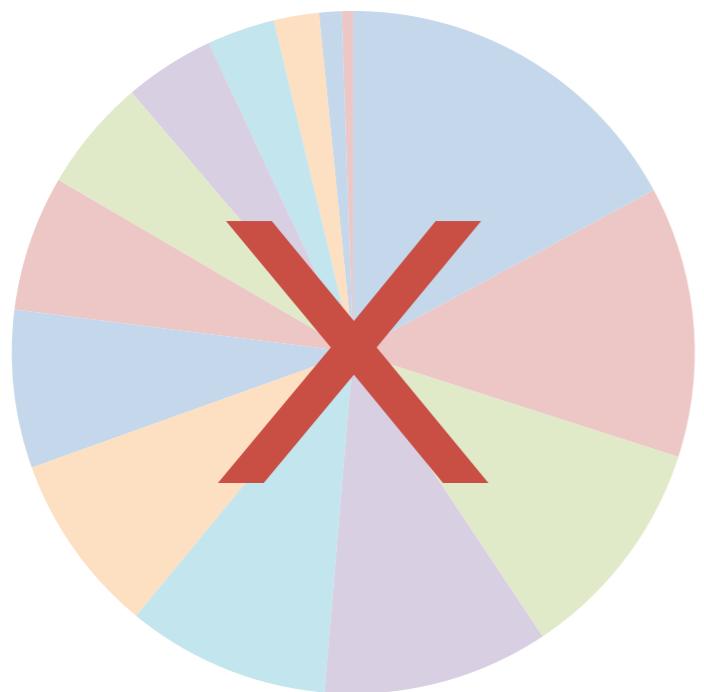
Source: Panopticon

Amount of Data



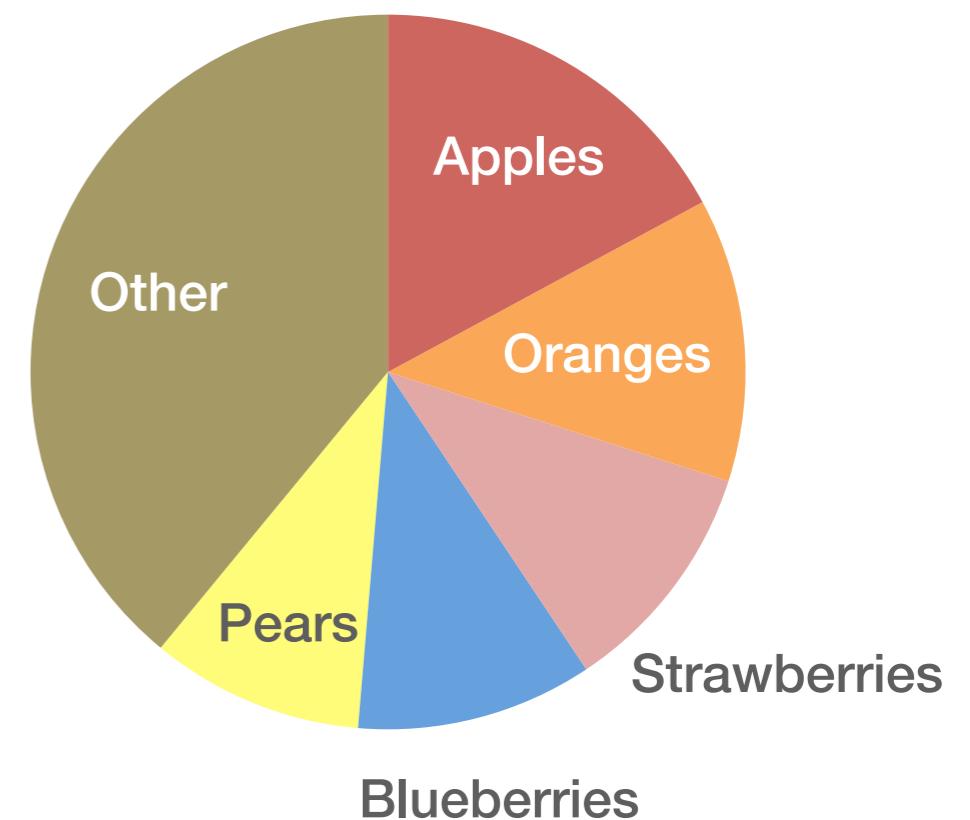
Source: Panopticon

Amount of Data

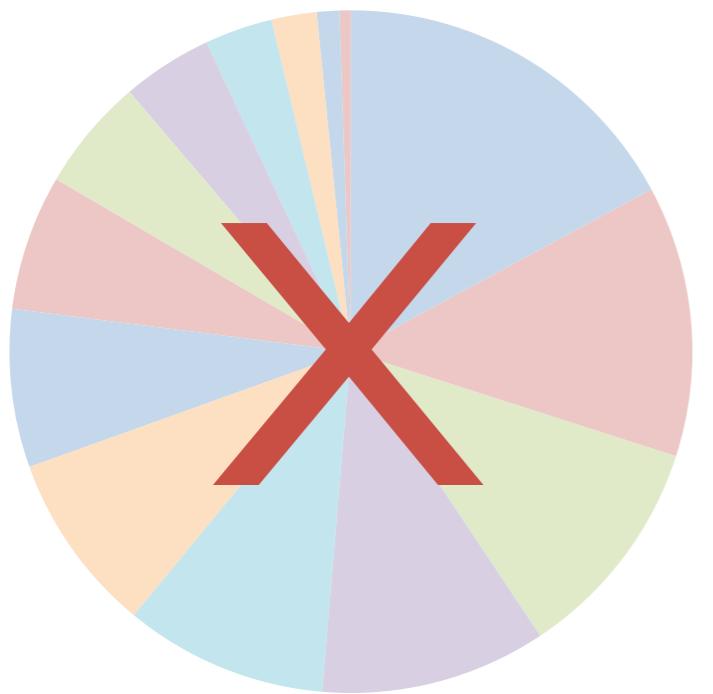


- Apples
- Oranges
- Strawberries
- Blueberries
- Pears
- Kiwi
- Passion
- Papaya
- Peaches
- Grapefruit
- Mango
- Lemon
- Lime
- Tomato

VS

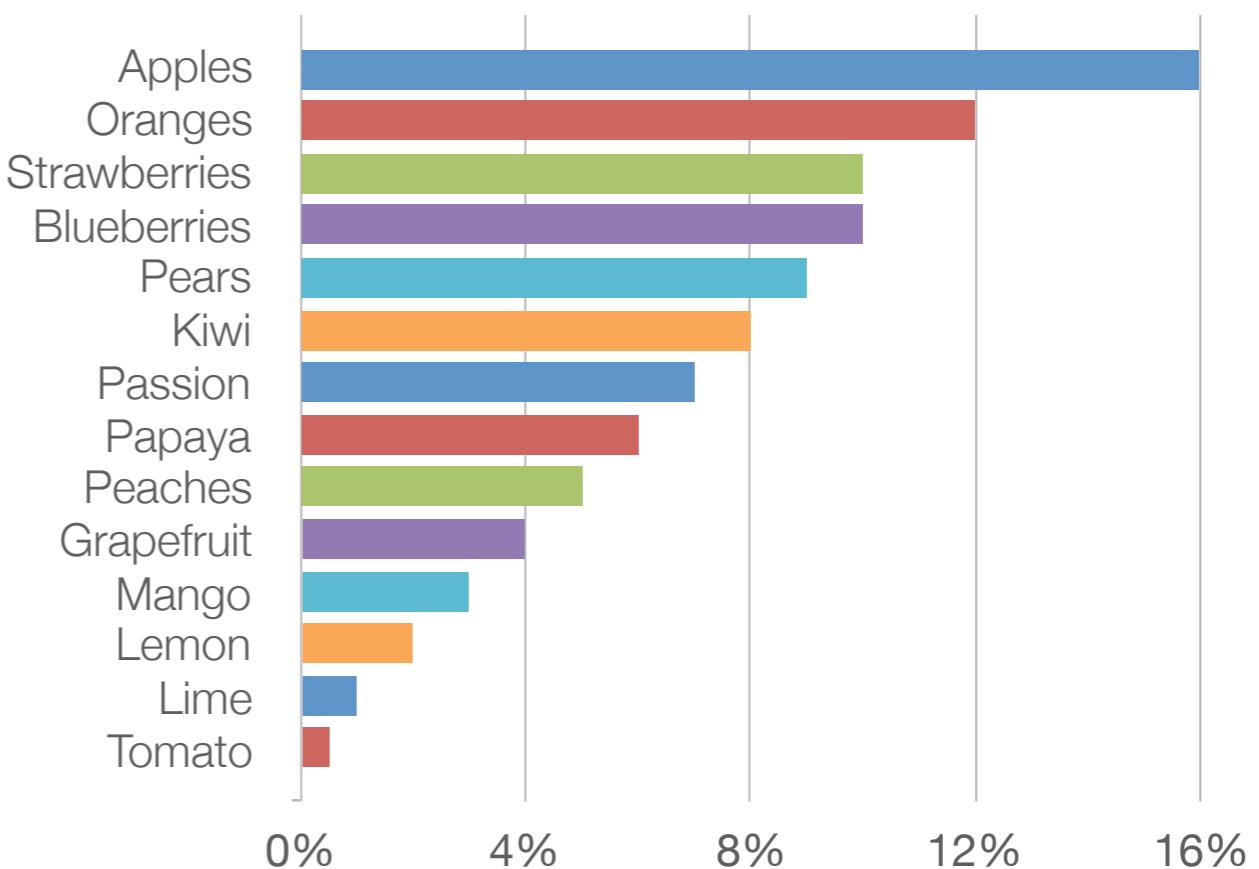


Amount of Data



Apples
Oranges
Strawberries
Blueberries
Pears
Kiwi
Passion
Papaya
Peaches
Grapefruit
Mango
Lemon
Lime
Tomato

VS



Amount of Data

[Health Statistics](#) > [Tobacco](#) > Adult male smokers (most recent) by country

VIEW DATA: [Totals](#)

[Definition](#)

[Source](#)

[!\[\]\(76a3e3fa4264769e246efa8017fe5370_img.jpg\) Printable version](#)

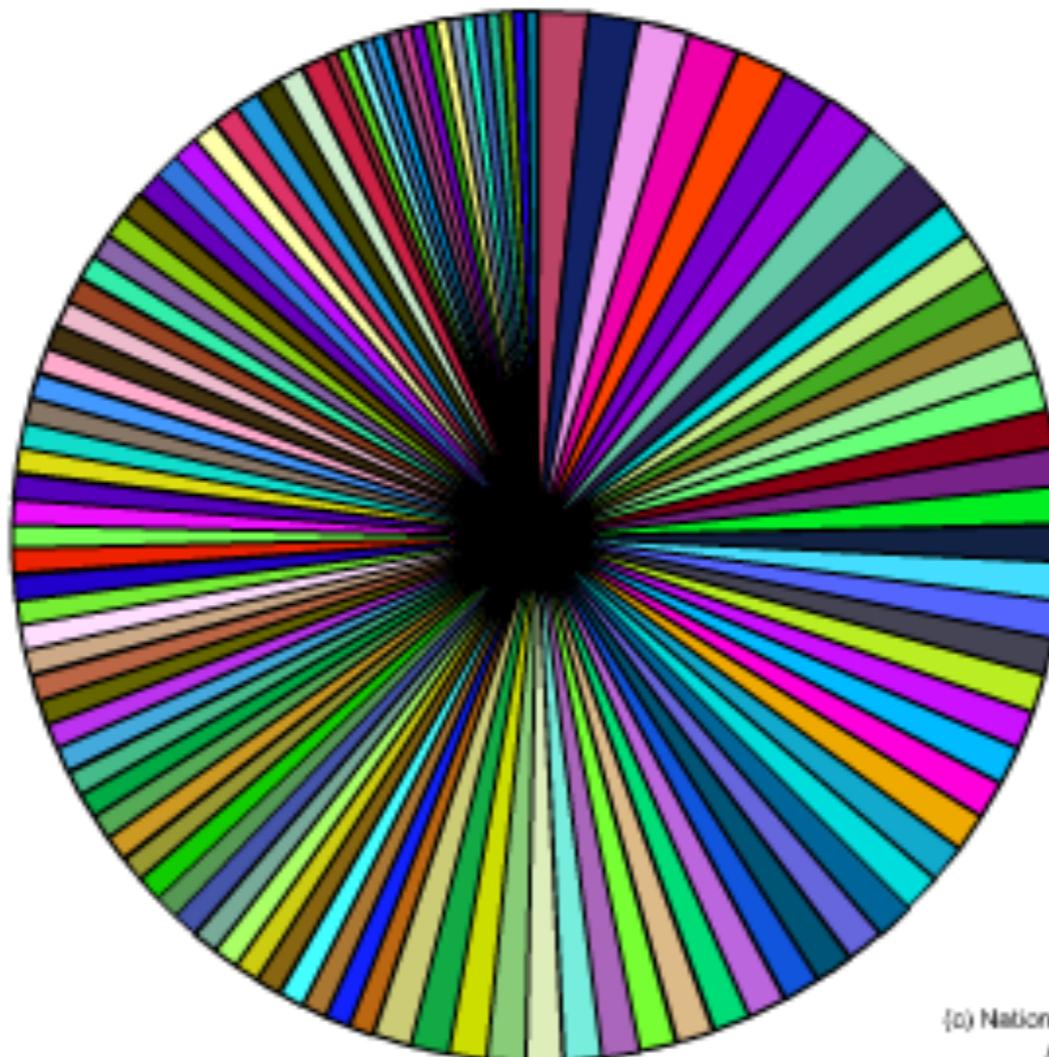
[Bar Graph](#)

[Pie Chart](#)

[Map](#)

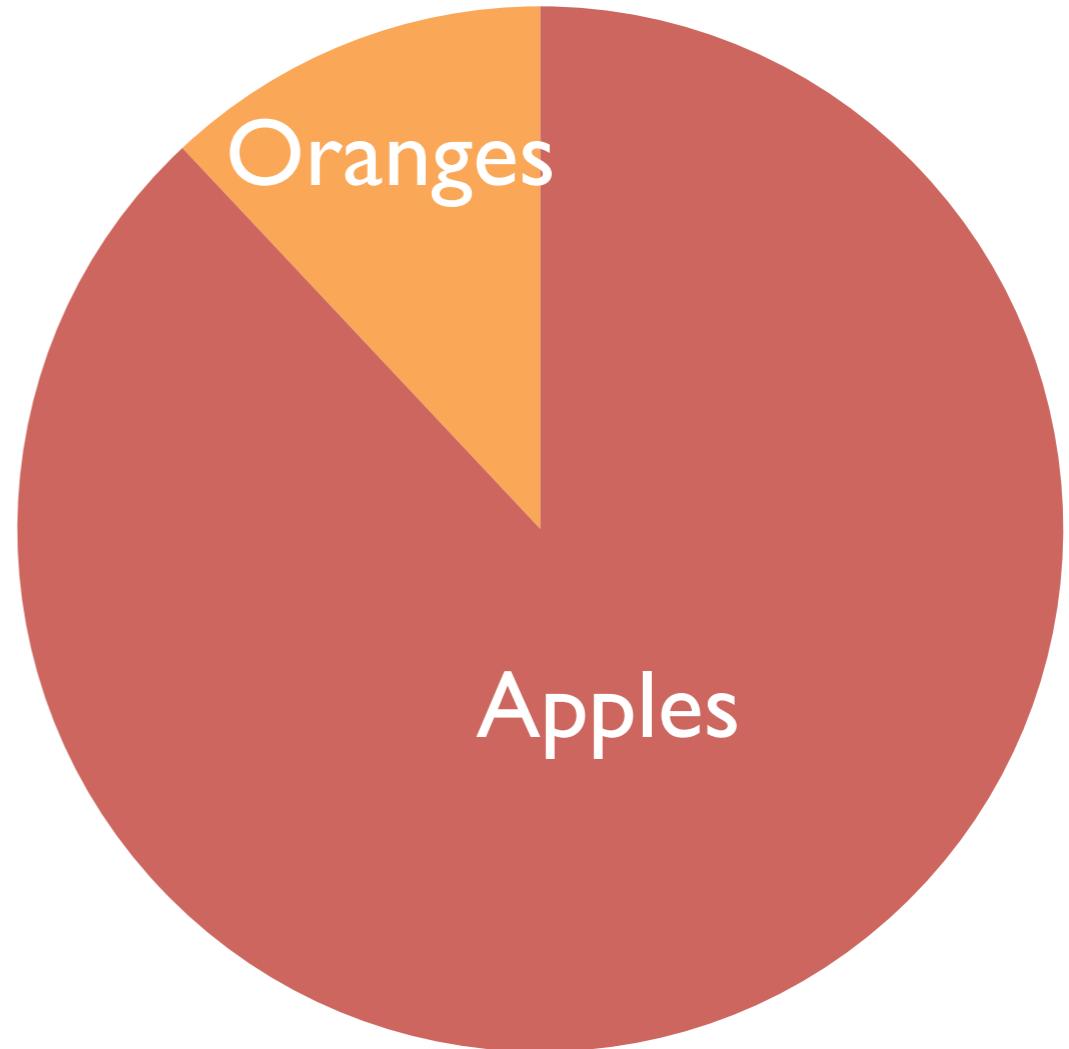
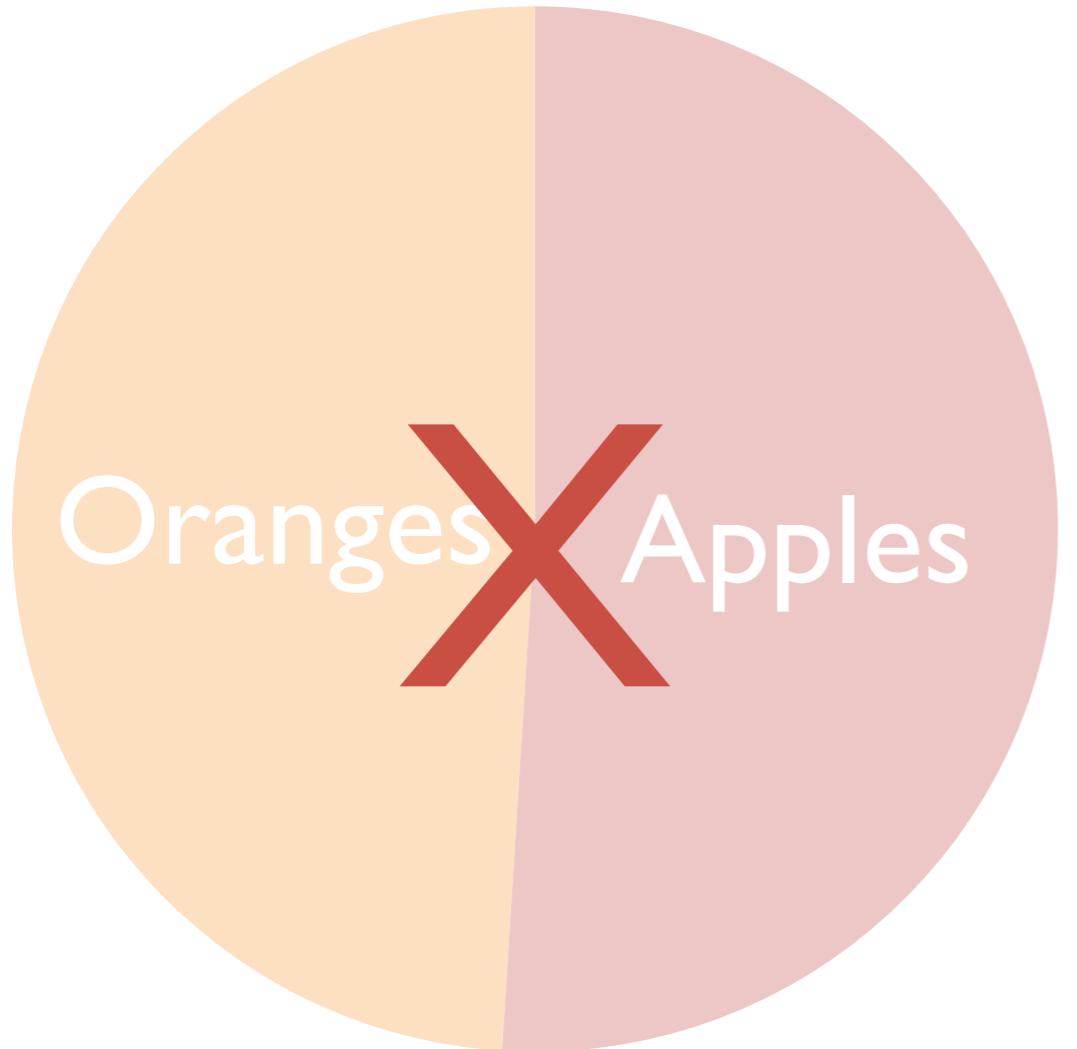
[Correlations](#)

Showing latest available data.



Mongolia	1.5%
China	1.4%
Kenya	1.4%
Cambodia	1.4%
Namibia	1.4%
Armenia	1.4%
Tonga	1.3%
Romania	1.3%
Tunisia	1.3%
Nauru	1.3%
Kazakhstan	1.3%
Kyrgyzstan	1.3%
Albania	1.3%
Yemen	1.3%
Turkey	1.3%
Guinea	1.3%
Indonesia	1.3%
Niue	1.3%
Djibouti	1.2%
Kiribati	1.2%

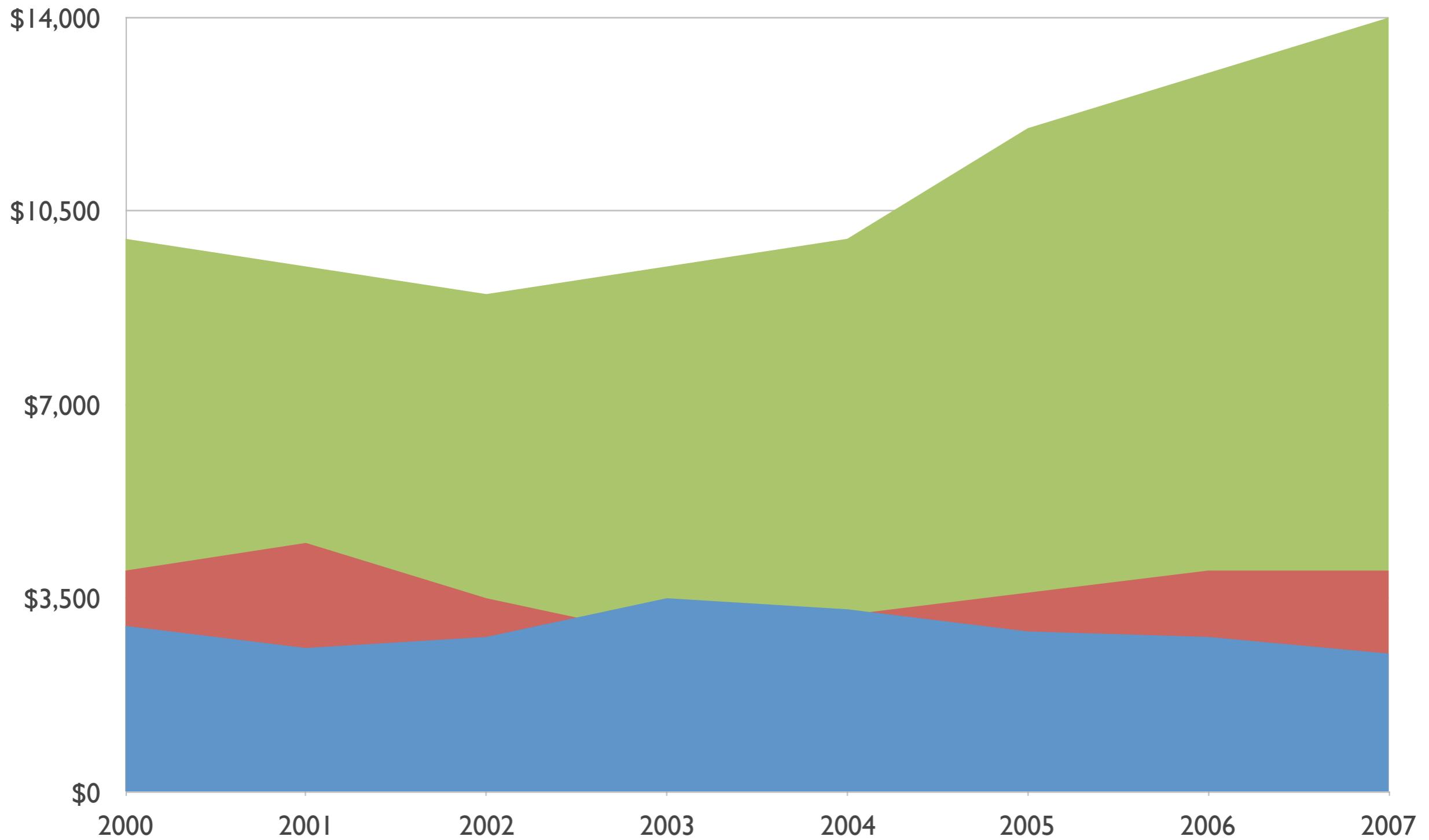
Amount of Data



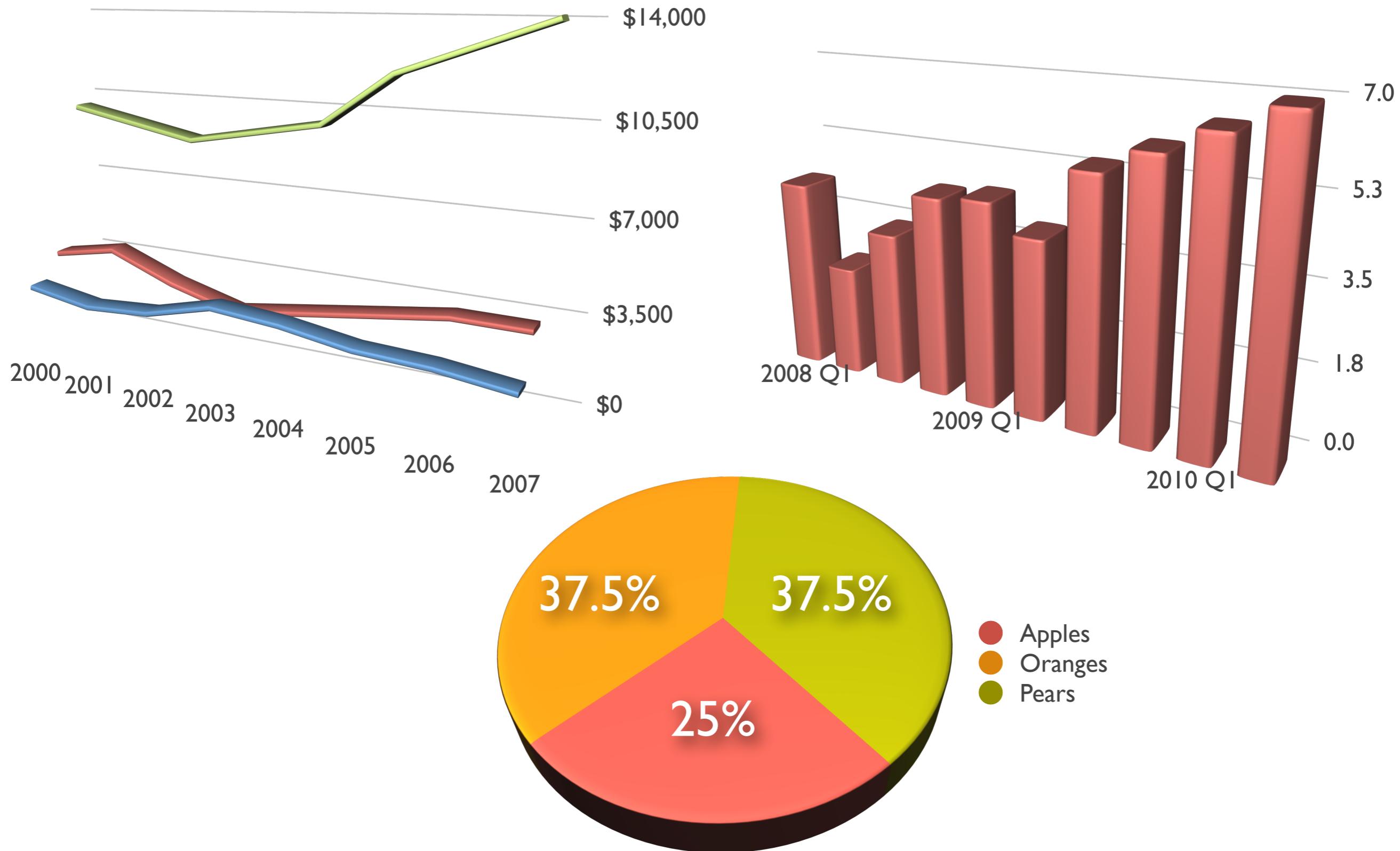
A large pile of ripe red apples with some yellow and green highlights, filling the entire background.

88%

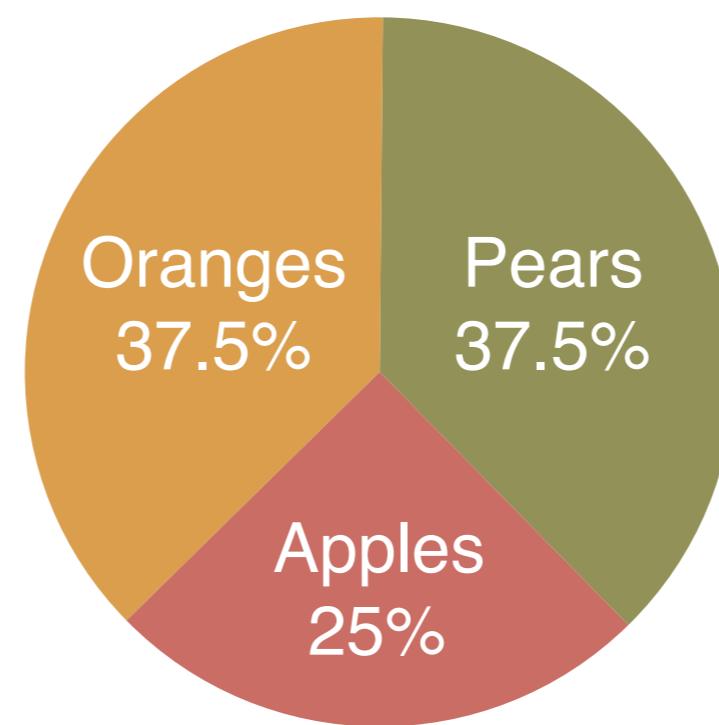
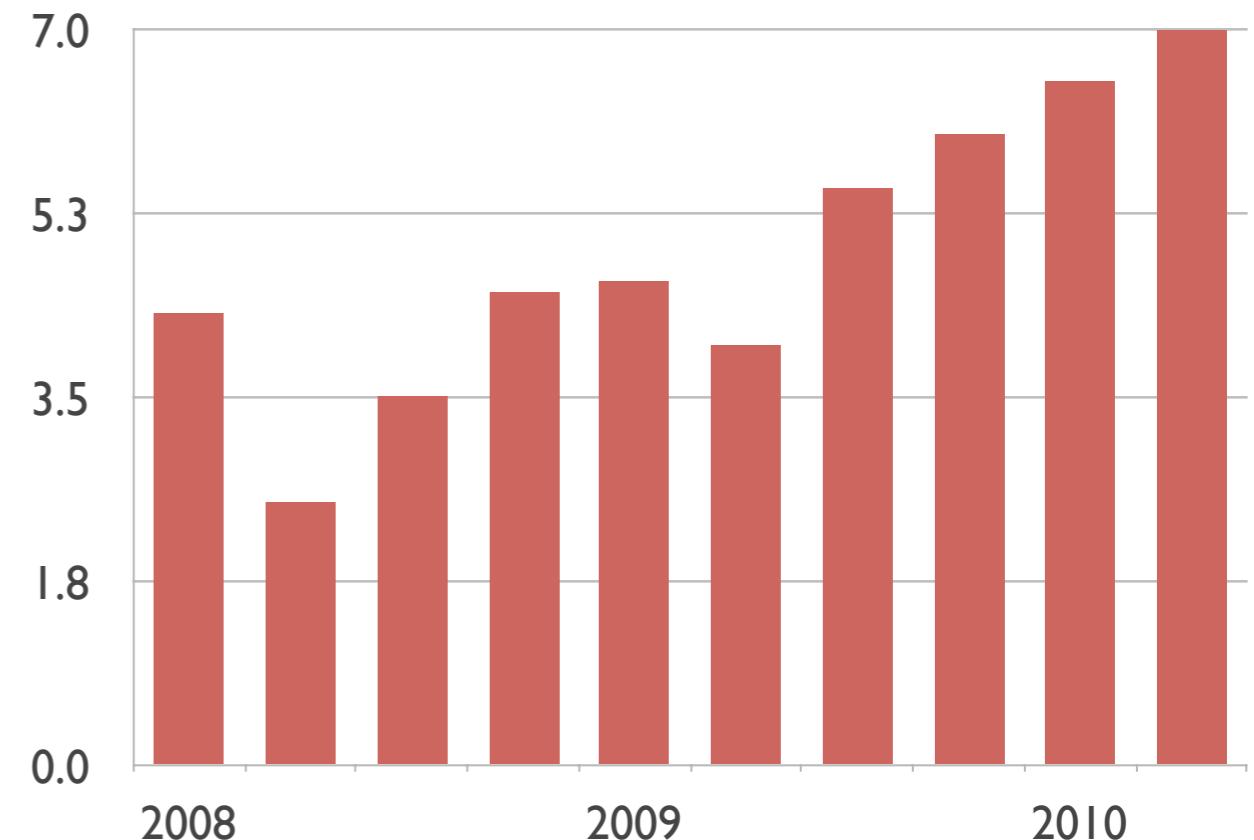
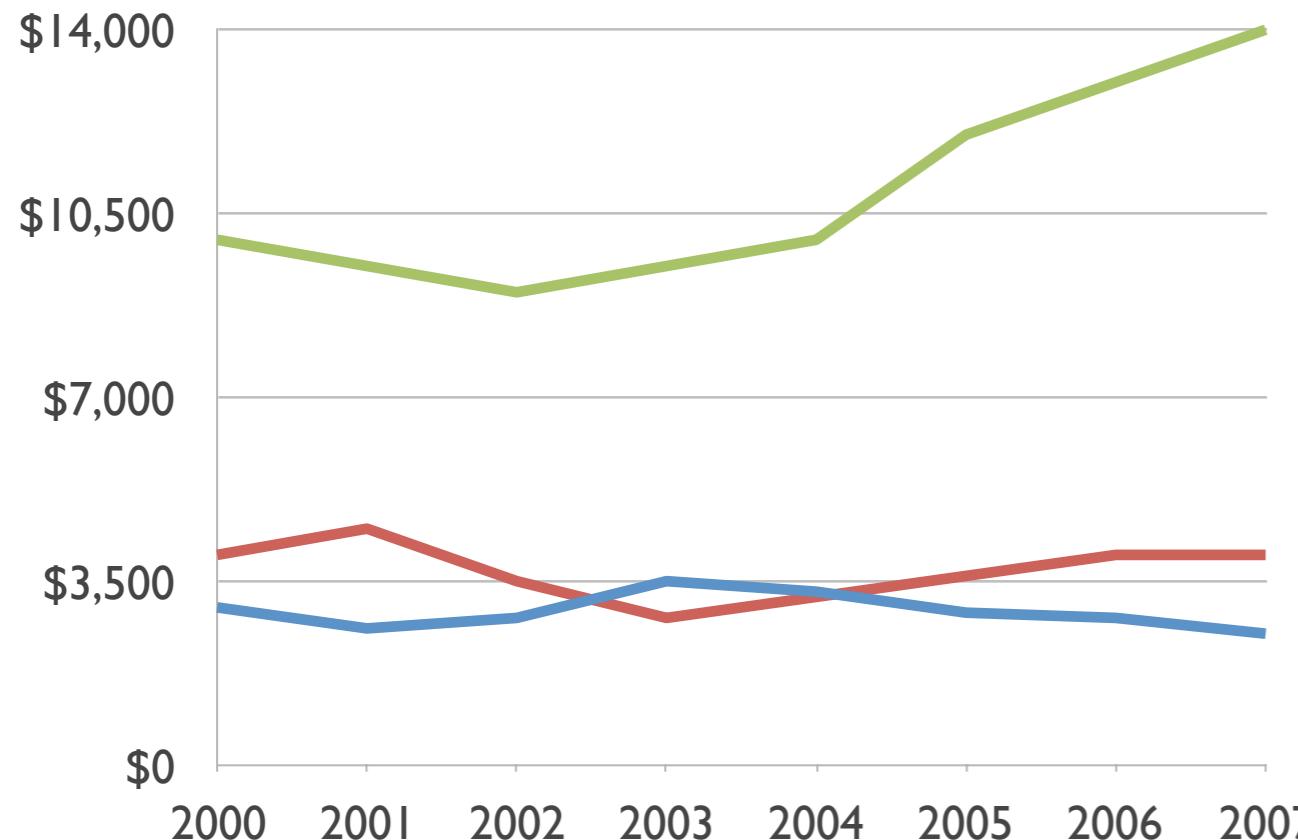
Danger Area



NEVER Use 3D



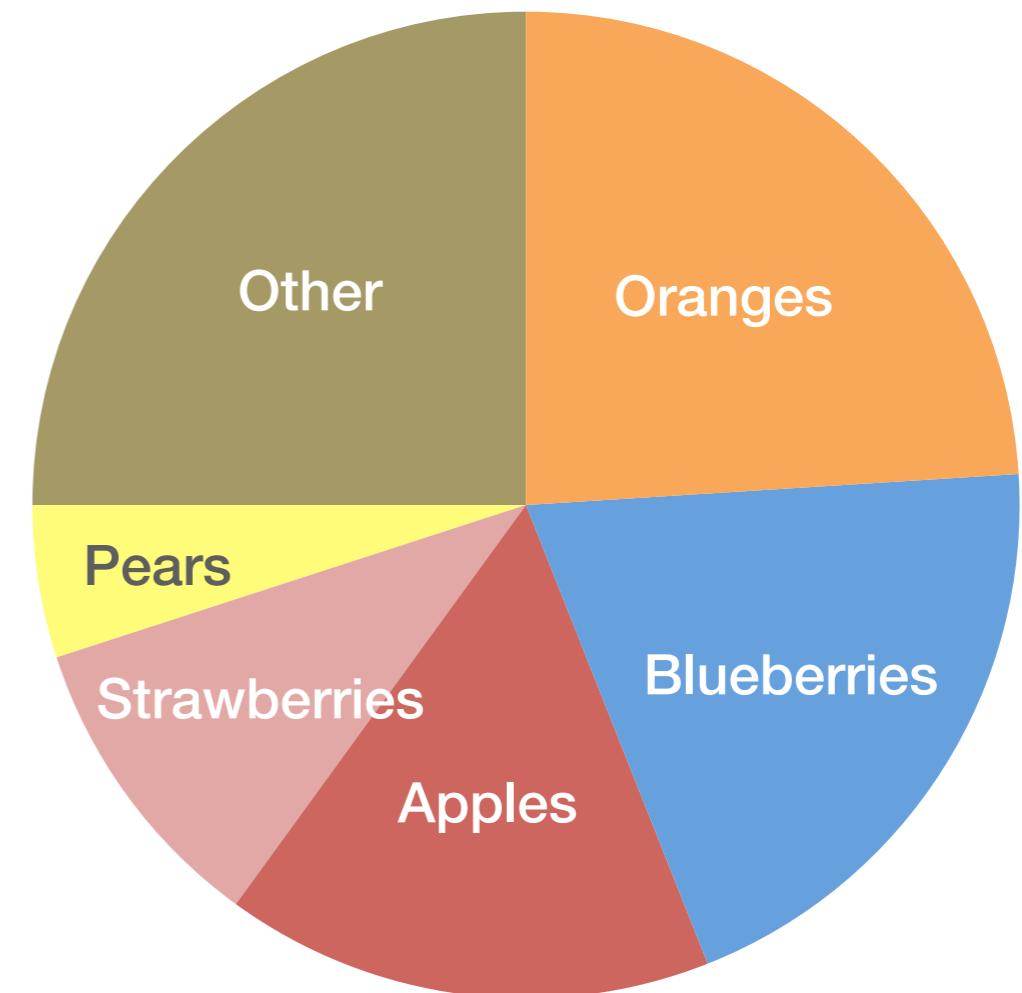
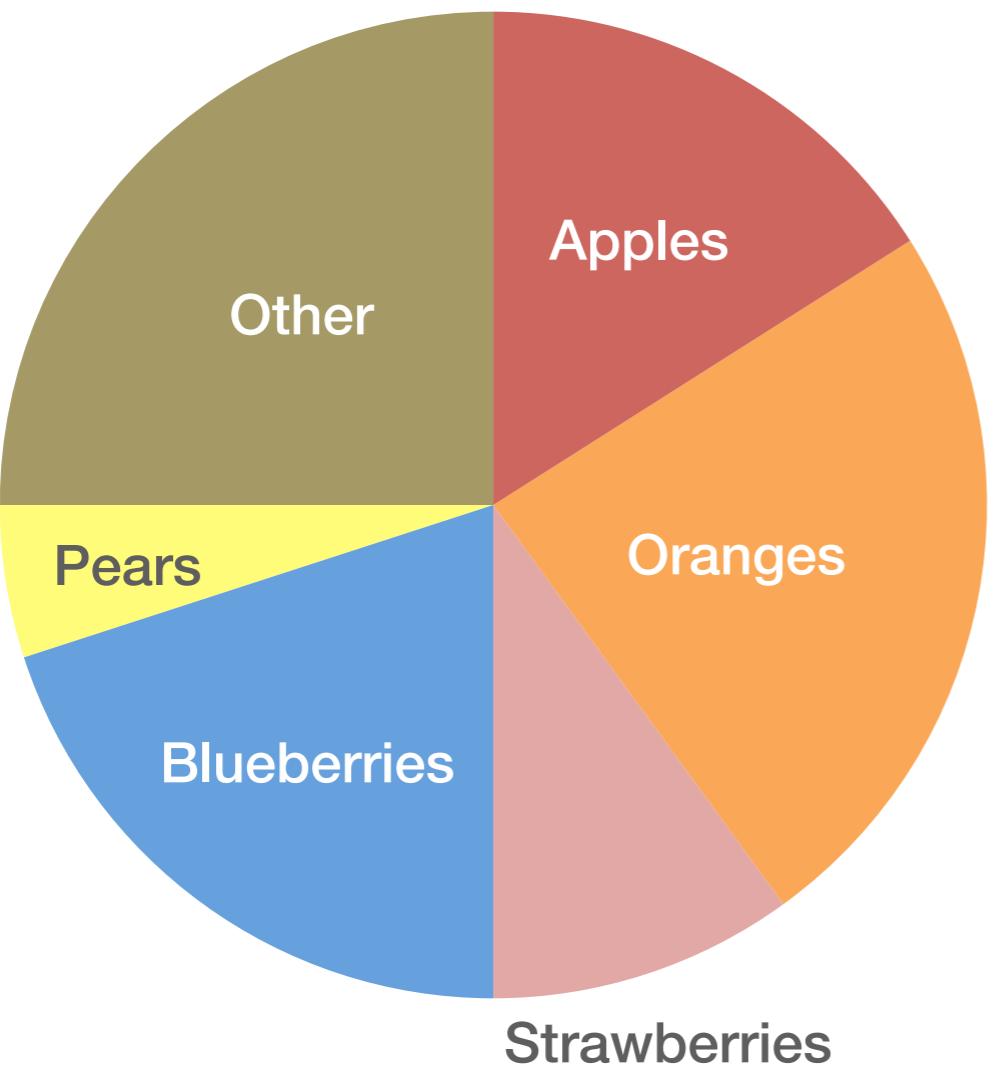
NEVER Use 3D



Parts of the whole

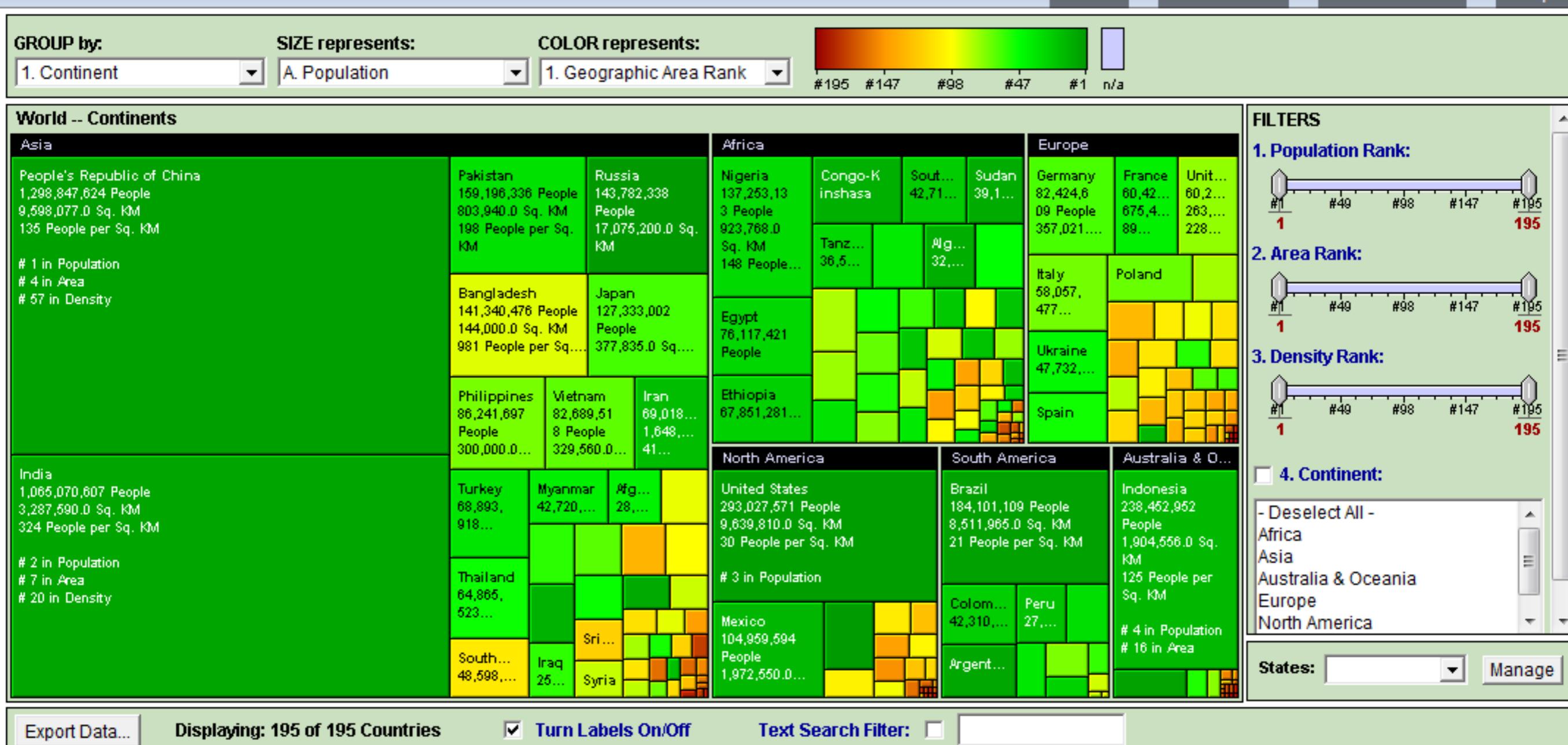


Order



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World Population Statistics

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Bullet Graphs

Bullet Graphs

2005 YTD



Text Values

I Know You Can't Read This, But...

2010 Tax Table



See the instructions for line 44 on page 35 to see if you must use the Tax Table below to figure your tax.

Example. Mr. and Mrs. Brown are filing a joint return. Their taxable income on Form 1040, line 43, is \$25,300. First, they find the \$25,300–25,350 taxable income line. Next, they find the column for married filing jointly and read down the column. The amount shown where the taxable income line and filing status column meet is \$2,961. This is the tax amount they should enter on Form 1040, line 44.

Sample Table

At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household
Your tax is—					
25,200	25,250	3,365	2,946	3,365	3,186
25,250	25,300	3,373	2,954	3,373	3,194
25,300	25,350	3,380	2,961	3,380	3,201
25,350	25,400	3,388	2,969	3,388	3,209

If line 43 (taxable income) is—		And you are—				If line 43 (taxable income) is—		And you are—				If line 43 (taxable income) is—		And you are—			
At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household
		Your tax is—						Your tax is—						Your tax is—			
0	5	0	0	0	0	1,300	1,325	131	131	131	131	2,700	2,725	271	271	271	271
5	15	1	1	1	1	1,325	1,350	134	134	134	134	2,725	2,750	274	274	274	274
15	25	2	2	2	2	1,350	1,375	136	136	136	136	2,750	2,775	276	276	276	276
25	50	4	4	4	4	1,375	1,400	139	139	139	139	2,775	2,800	279	279	279	279
50	75	6	6	6	6	1,400	1,425	141	141	141	141	2,800	2,825	281	281	281	281
75	100	9	9	9	9	1,425	1,450	144	144	144	144	2,825	2,850	284	284	284	284
100	125	11	11	11	11	1,450	1,475	146	146	146	146	2,850	2,875	286	286	286	286
125	150	14	14	14	14	1,475	1,500	149	149	149	149	2,875	2,900	289	289	289	289
150	175	16	16	16	16	1,500	1,525	151	151	151	151	2,900	2,925	291	291	291	291
175	200	19	19	19	19	1,525	1,550	154	154	154	154	2,925	2,950	294	294	294	294
200	225	21	21	21	21	1,550	1,575	156	156	156	156	2,950	2,975	296	296	296	296
225	250	24	24	24	24	1,575	1,600	159	159	159	159	2,975	3,000	299	299	299	299
250	275	26	26	26	26	1,600	1,625	161	161	161	161	3,000					
275	300	29	29	29	29	1,625	1,650	164	164	164	164	3,000	3,050	303	303	303	303
300	325	31	31	31	31	1,650	1,675	166	166	166	166	3,050	3,100	308	308	308	308
325	350	34	34	34	34	1,675	1,700	169	169	169	169	3,100	3,150	313	313	313	313
350	375	36	36	36	36	1,700	1,725	171	171	171	171	3,150	3,200	318	318	318	318
375	400	39	39	39	39	1,725	1,750	174	174	174	174	3,200	3,250	322	322	322	322
400	425	41	41	41	41	1,750	1,775	176	176	176	176						

Now You Can Read This

2010 Tax Table



See the instructions for line 44 on page 35 to see if you must use the Tax Table below to figure your tax.

Example. Mr. and Mrs. Powers' taxable income is	1,325
Find the row for	1,325
Find the column for	1,350
Find the column for	1,375
Find the column for	1,400

At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household
131	131	131	131	131	131
134	134	134	134	134	134
136	136	136	136	136	136
139	139	139	139	139	139

If line 43 (taxable income) is —	And you are —				(Income) is —	Your tax is —				(Income) is —	And you are —				Your tax is —			
	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household
0	5	0	0	0	0	1,300	1,325	131	131	131	131	2,700	2,725	271	271	271	271	
5	15	1	1	1	1	1,325	1,350	134	134	134	134	2,725	2,750	274	274	274	274	
15	25	2	2	2	2	1,350	1,375	136	136	136	136	2,750	2,775	276	276	276	276	
25	50	4	4	4	4	1,375	1,400	139	139	139	139	2,775	2,800	279	279	279	279	
50	75	6	6	6	6	1,400	1,425	141	141	141	141	2,800	2,825	281	281	281	281	
75	100	9	9	9	9	1,425	1,450	144	144	144	144	2,825	2,850	284	284	284	284	
100	125	11	11	11	11	1,450	1,475	146	146	146	146	2,850	2,875	286	286	286	286	
125	150	14	14	14	14	1,475	1,500	149	149	149	149	2,875	2,900	289	289	289	289	
150	175	16	16	16	16	1,500	1,525	151	151	151	151	2,900	2,925	291	291	291	291	
175	200	19	19	19	19	1,525	1,550	154	154	154	154	2,925	2,950	294	294	294	294	
200	225	21	21	21	21	1,550	1,575	156	156	156	156	2,950	2,975	296	296	296	296	
225	250	24	24	24	24	1,575	1,600	159	159	159	159	2,975	3,000	299	299	299	299	
250	275	26	26	26	26	1,600	1,625	161	161	161	161	3,000						
275	300	29	29	29	29	1,625	1,650	164	164	164	164	3,000	3,050	303	303	303	303	
300	325	31	31	31	31	1,650	1,675	166	166	166	166	3,050	3,100	308	308	308	308	
325	350	34	34	34	34	1,675	1,700	169	169	169	169	3,100	3,150	313	313	313	313	
350	375	36	36	36	36	1,700	1,725	171	171	171	171	3,150	3,200	318	318	318	318	
375	400	39	39	39	39	1,725	1,750	174	174	174	174	3,200	3,250	322	322	322	322	
400	425	41	41	41	41	1,750	1,775	176	176	176	176	3,250	3,300	326	326	326	326	

Now You Can Really Read This

2010 Tax Table



See the instructions for line 44 on page 35 to see if you must use the Tax Table below to figure your tax.

Example: Mr. and Mrs.

1,325	1,350
1,350	1,375

134	134
136	136

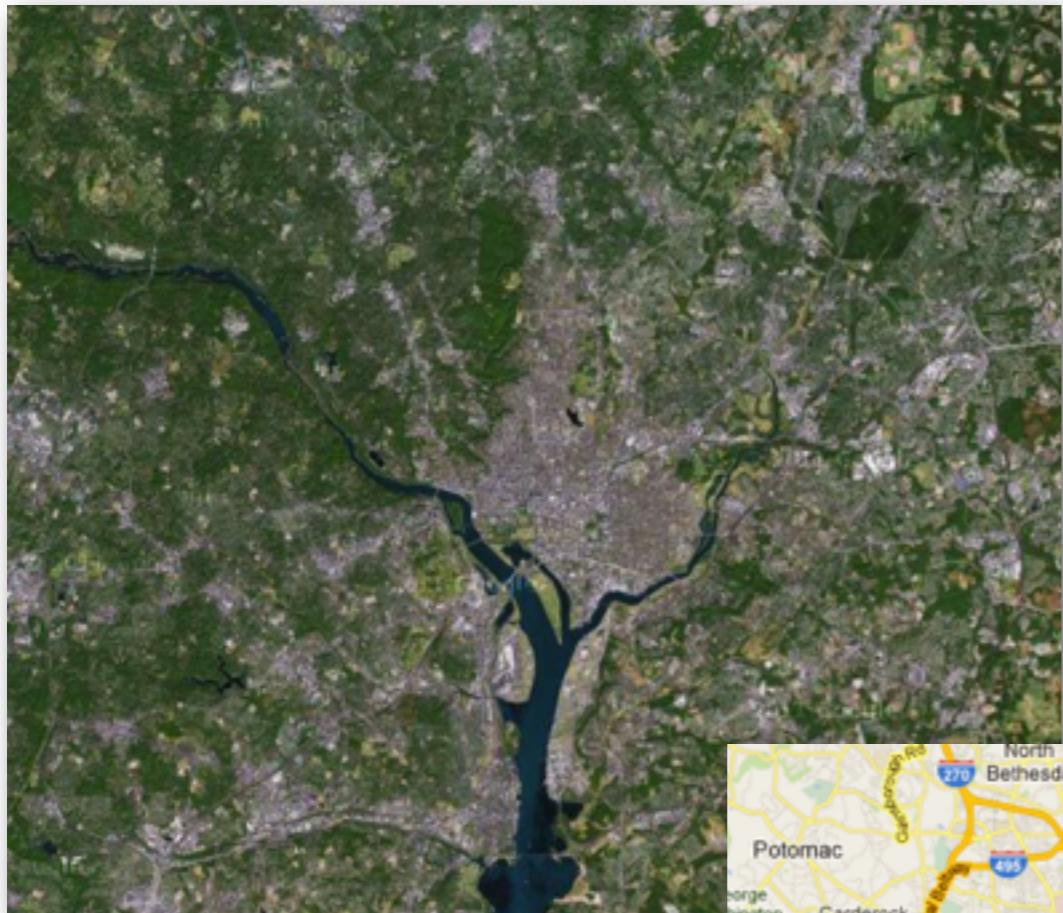
Sample Table

At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household

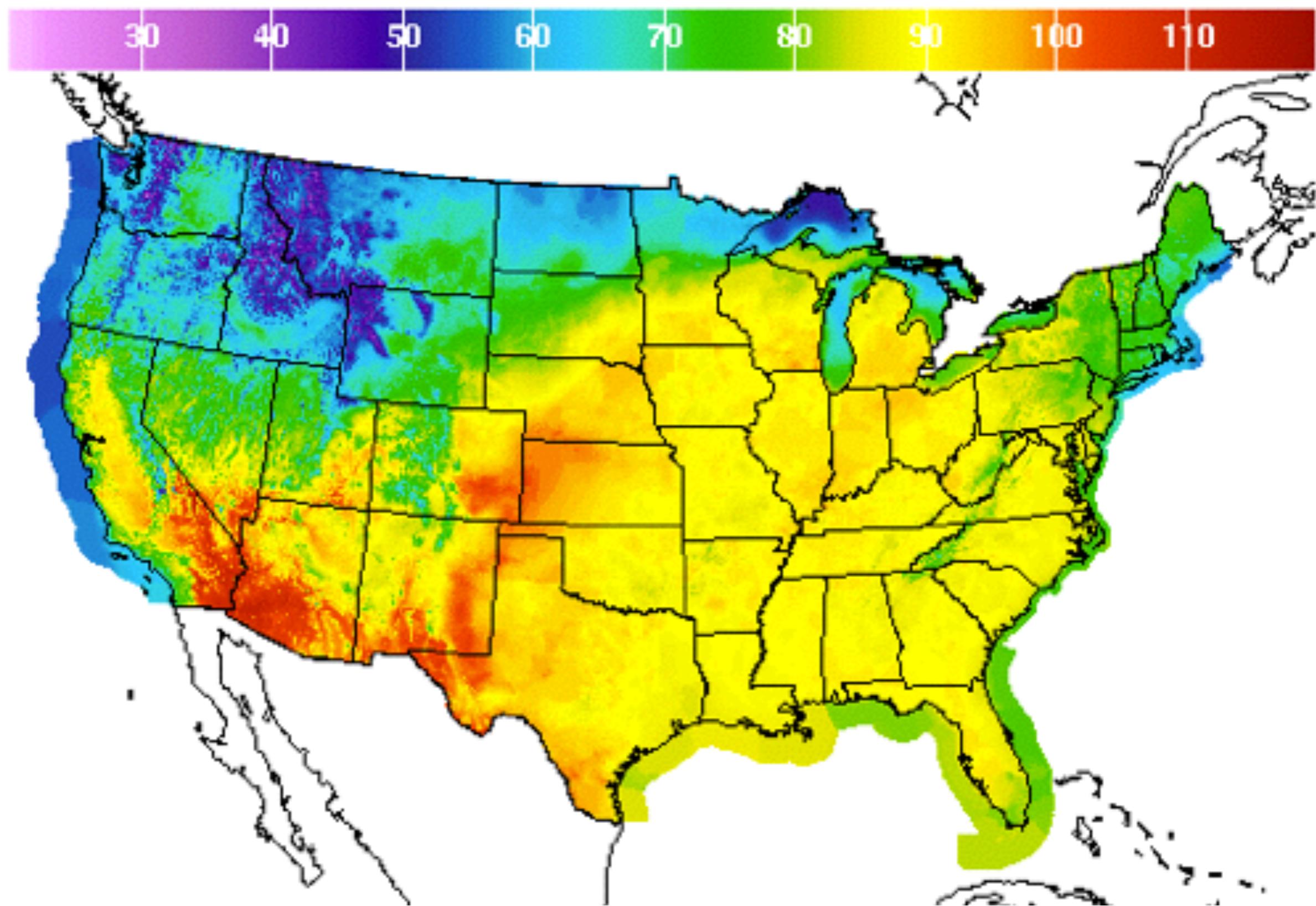
If line 43 (taxable income) is —		And you are —				Income —				And you are —				Income —			
At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household	At least	But less than	Single	Married filing jointly	Married filing separately	Head of a household
0	5	0	0	0	0	1,300	1,325	131	131	131	131	2,700	2,725	271	271	271	271
5	15	1	1	1	1	1,325	1,350	134	134	134	134	2,725	2,750	274	274	274	274
15	25	2	2	2	2	1,350	1,375	136	136	136	136	2,750	2,775	276	276	276	276
25	50	4	4	4	4	1,375	1,400	139	139	139	139	2,775	2,800	279	279	279	279
50	75	6	6	6	6	1,400	1,425	141	141	141	141	2,800	2,825	281	281	281	281
75	100	9	9	9	9	1,425	1,450	144	144	144	144	2,825	2,850	284	284	284	284
100	125	11	11	11	11	1,450	1,475	146	146	146	146	2,850	2,875	286	286	286	286
125	150	14	14	14	14	1,475	1,500	149	149	149	149	2,875	2,900	289	289	289	289
150	175	16	16	16	16	1,500	1,525	151	151	151	151	2,900	2,925	291	291	291	291
175	200	19	19	19	19	1,525	1,550	154	154	154	154	2,925	2,950	294	294	294	294
200	225	21	21	21	21	1,550	1,575	156	156	156	156	2,950	2,975	296	296	296	296
225	250	24	24	24	24	1,575	1,600	159	159	159	159	2,975	3,000	299	299	299	299
250	275	26	26	26	26	1,600	1,625	161	161	161	161						
275	300	29	29	29	29	1,625	1,650	164	164	164	164						
300	325	31	31	31	31	1,650	1,675	166	166	166	166						
325	350	34	34	34	34	1,675	1,700	169	169	169	169						
350	375	36	36	36	36	1,700	1,725	171	171	171	171						
375	400	39	39	39	39	1,725	1,750	174	174	174	174						
400	425	41	41	41	41	1,750	1,775	176	176	176	176						
												3,000					

Geographic Data

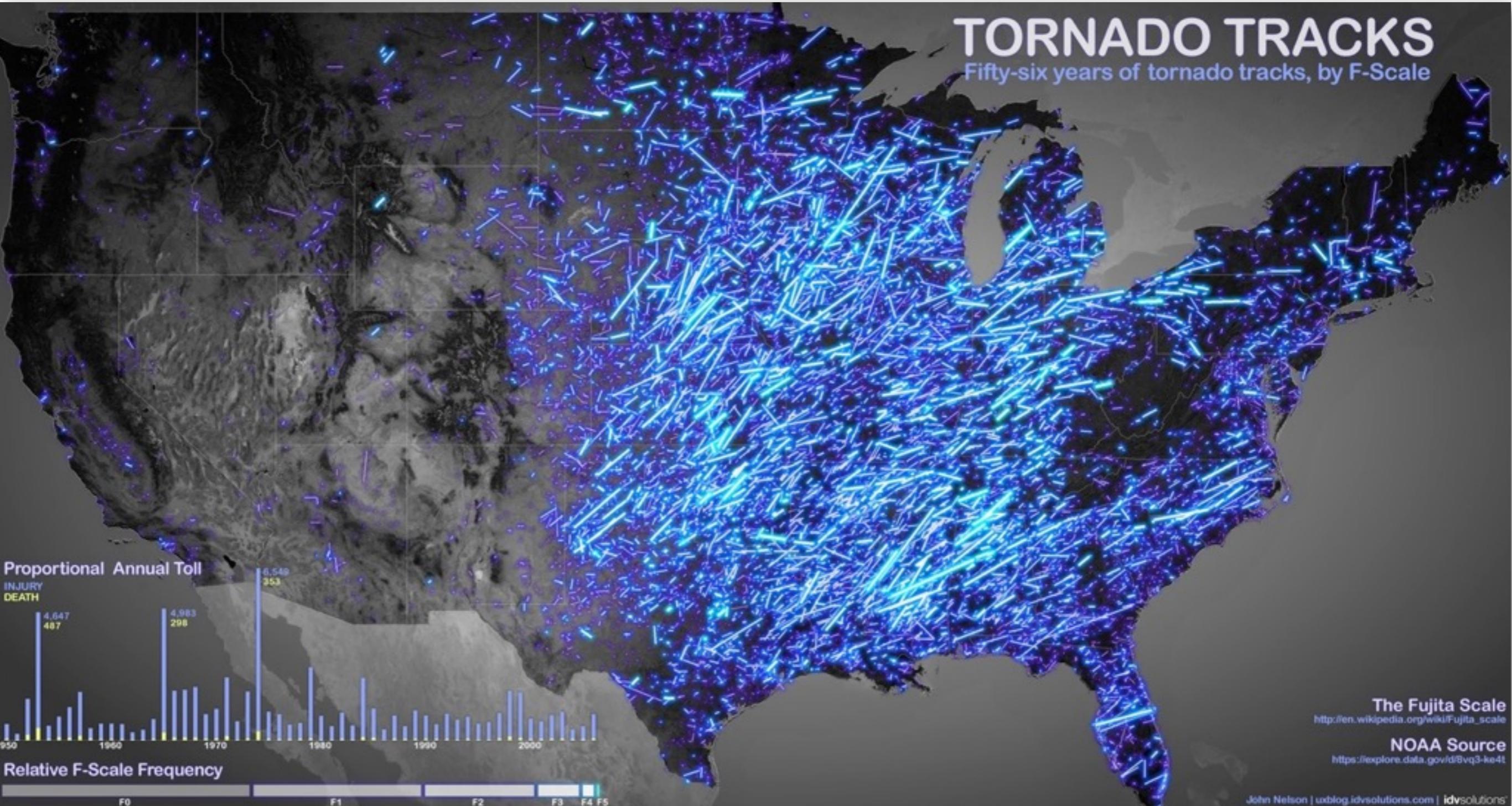
What Accuracy is Needed?



Spatial Data



Spatial Data



[All Shots](#)[3-Pointers](#)[Midrange](#)[Close Range](#)

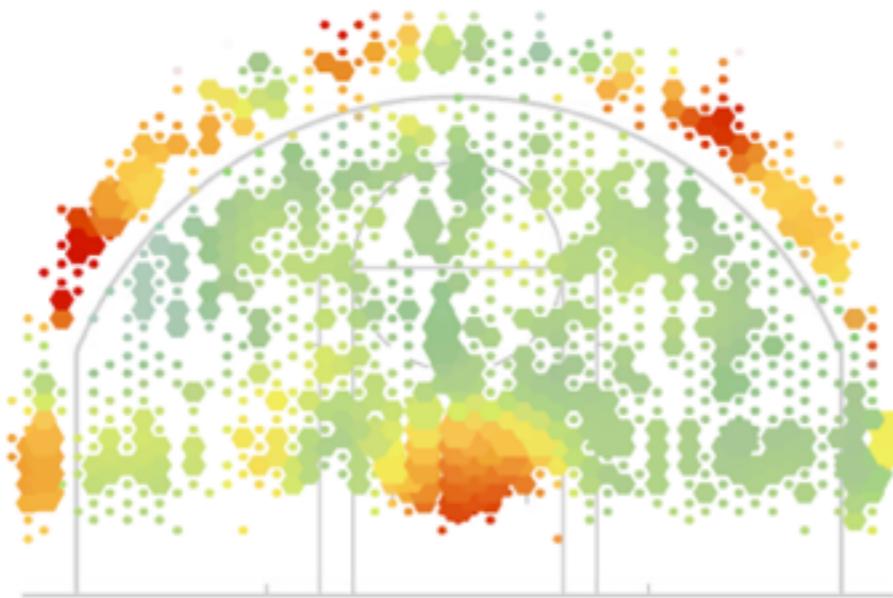
Number of attempts

Low ◦ ○ □ High

Points per region

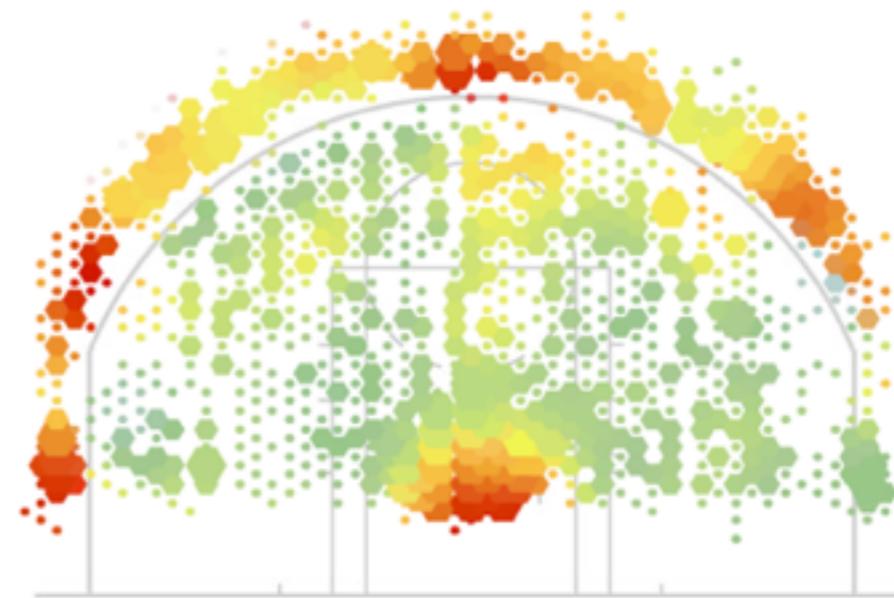
Low █ High

Miami Heat

TOTAL SHOTS **5,209** | POINTS PER SHOT **1.01** | F.G. PERCENT **47%**

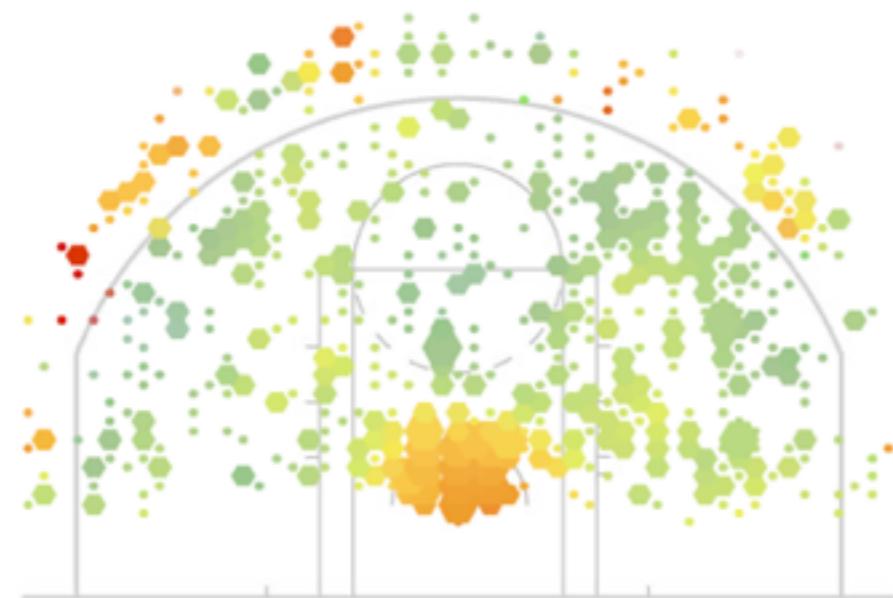
The Heat rely on player positioning to create isolation plays for LeBron James and Dwyane Wade, often on the left side. The Heat take many fewer 3-point shots than the Thunder.

Oklahoma City Thunder

TOTAL SHOTS **5,228** | POINTS PER SHOT **1.03** | F.G. PERCENT **47.1%**

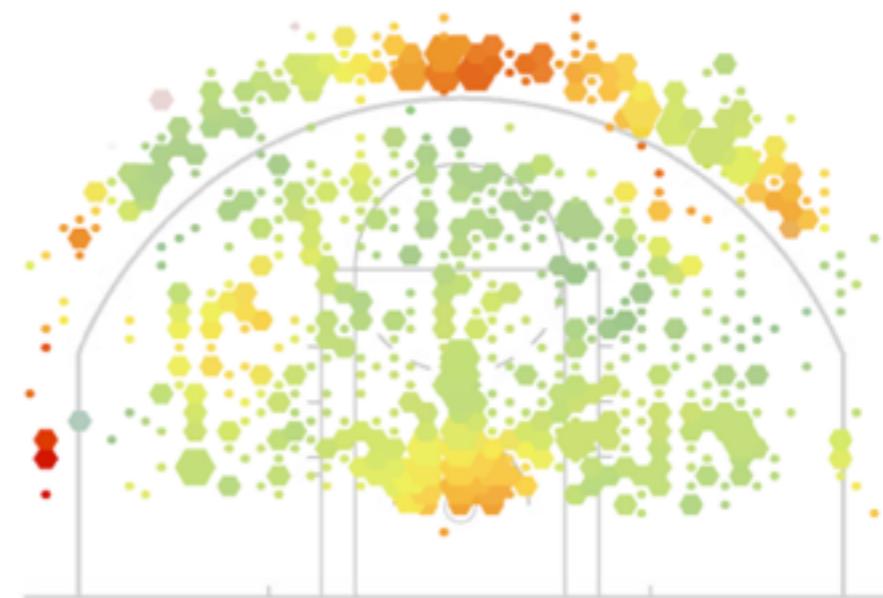
The Thunder are effective from almost any area on the court and shoot many more 3-point shots than the league average. Kevin Durant and James Harden are potent from the top of the arc.

LeBron James

[VIEW: PHOTO](#) | [GRAPH](#)TOTAL SHOTS **1,169** | POINTS PER SHOT **1.1** | F.G. PERCENT **53.1%**

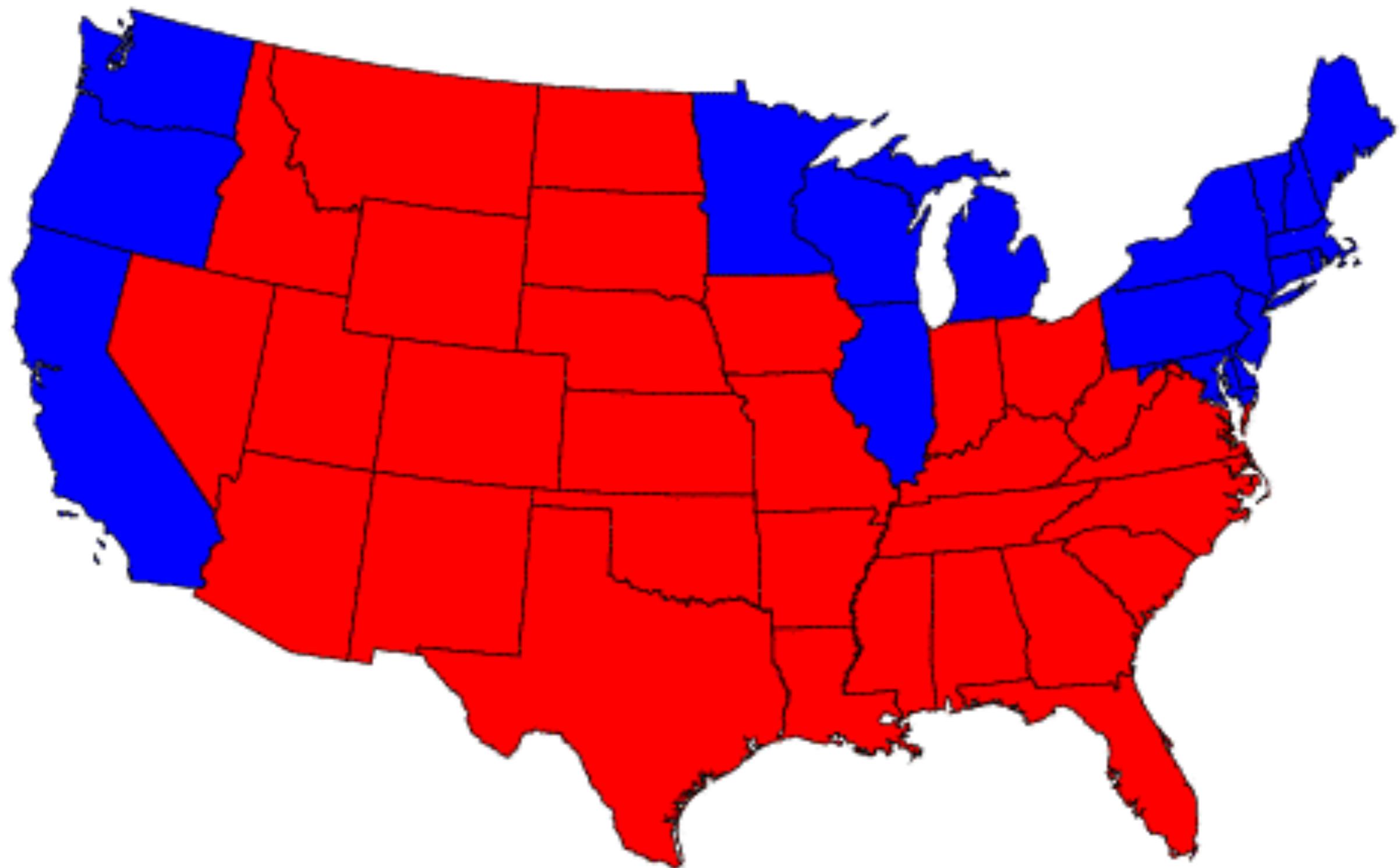
His athleticism and ball-handling create a lot of high-percentage shots near the basket. He prefers the wing locations beyond the 3-point line. His

Kevin Durant

[VIEW: PHOTO](#) | [GRAPH](#)TOTAL SHOTS **1,296** | POINTS PER SHOT **1.09** | F.G. PERCENT **49.6%**

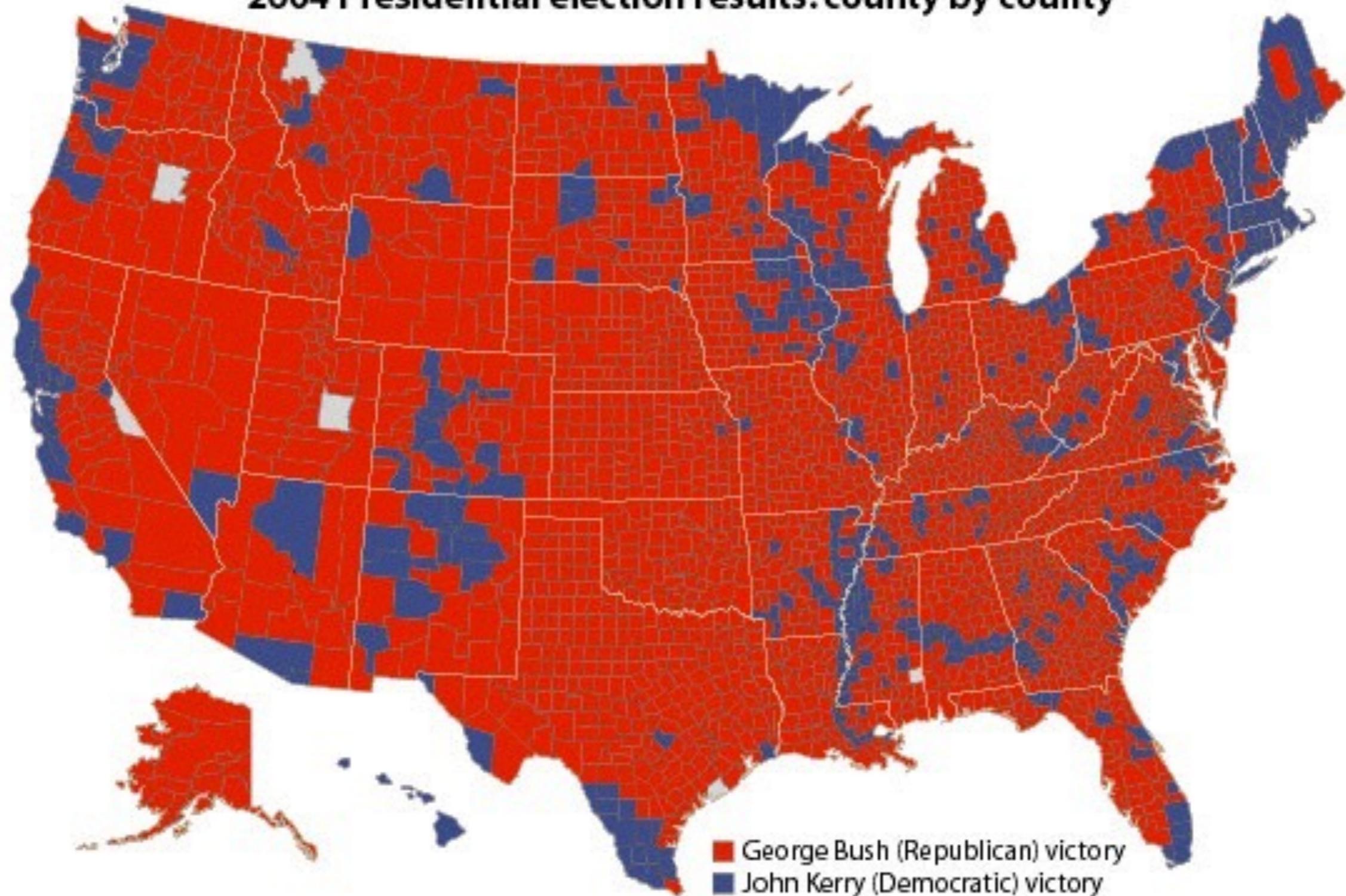
Despite his size, he is a very effective midrange shooter, taking nearly half his shots from that zone and another 25 percent from beyond the 3-point arc.

Non-Spatial Data

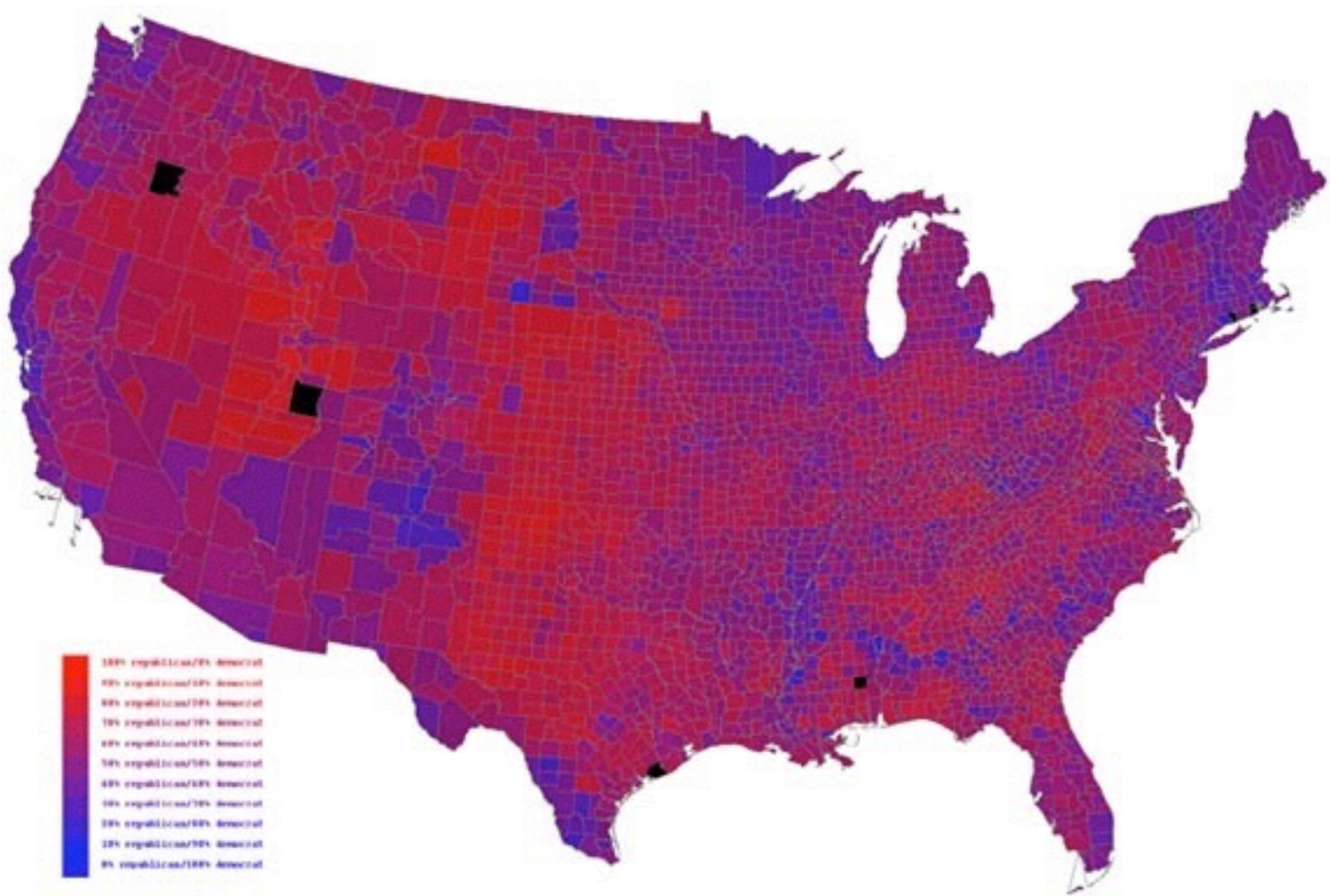


Non-Spatial Data

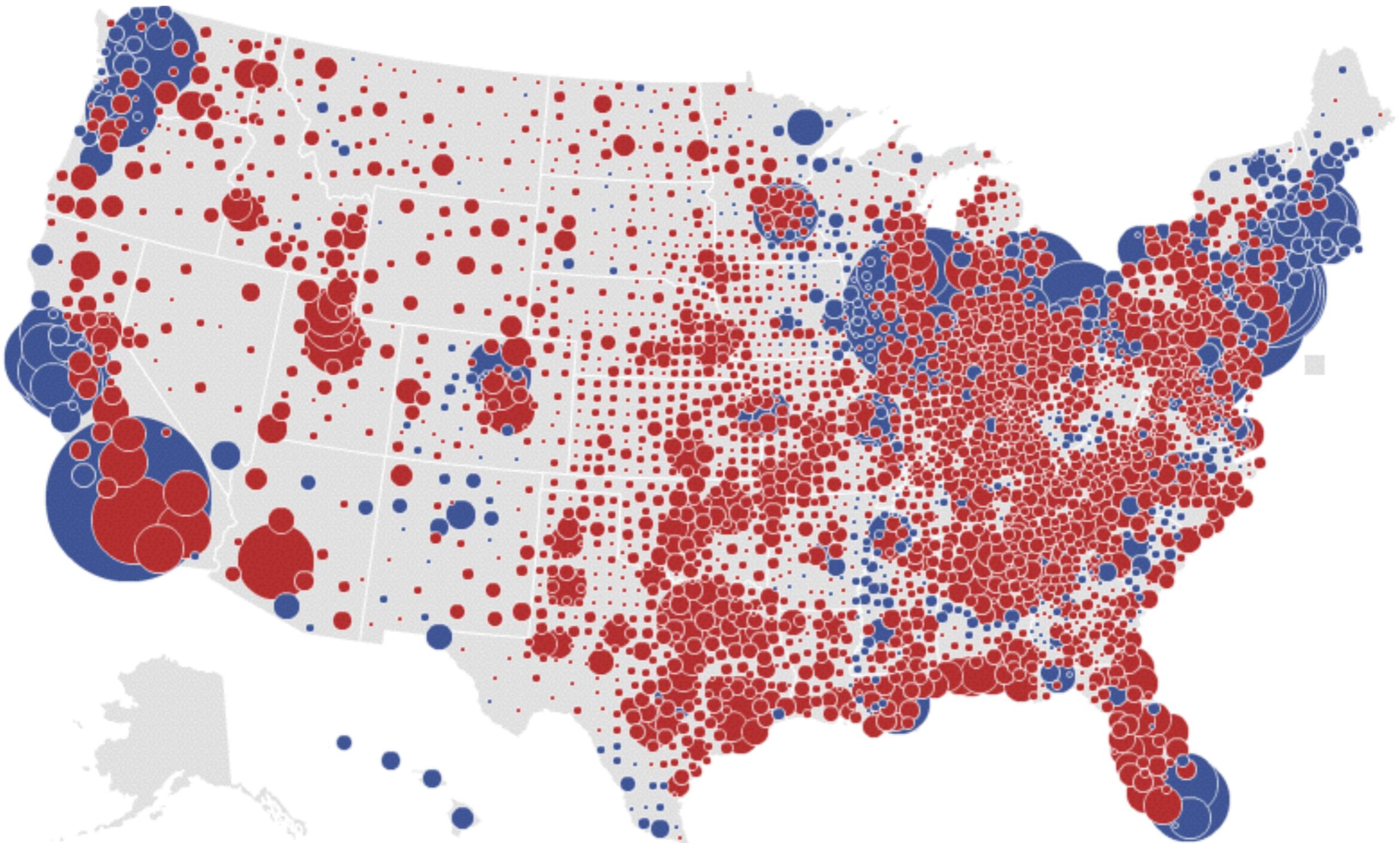
2004 Presidential election results: county by county



Non-Spatial Data

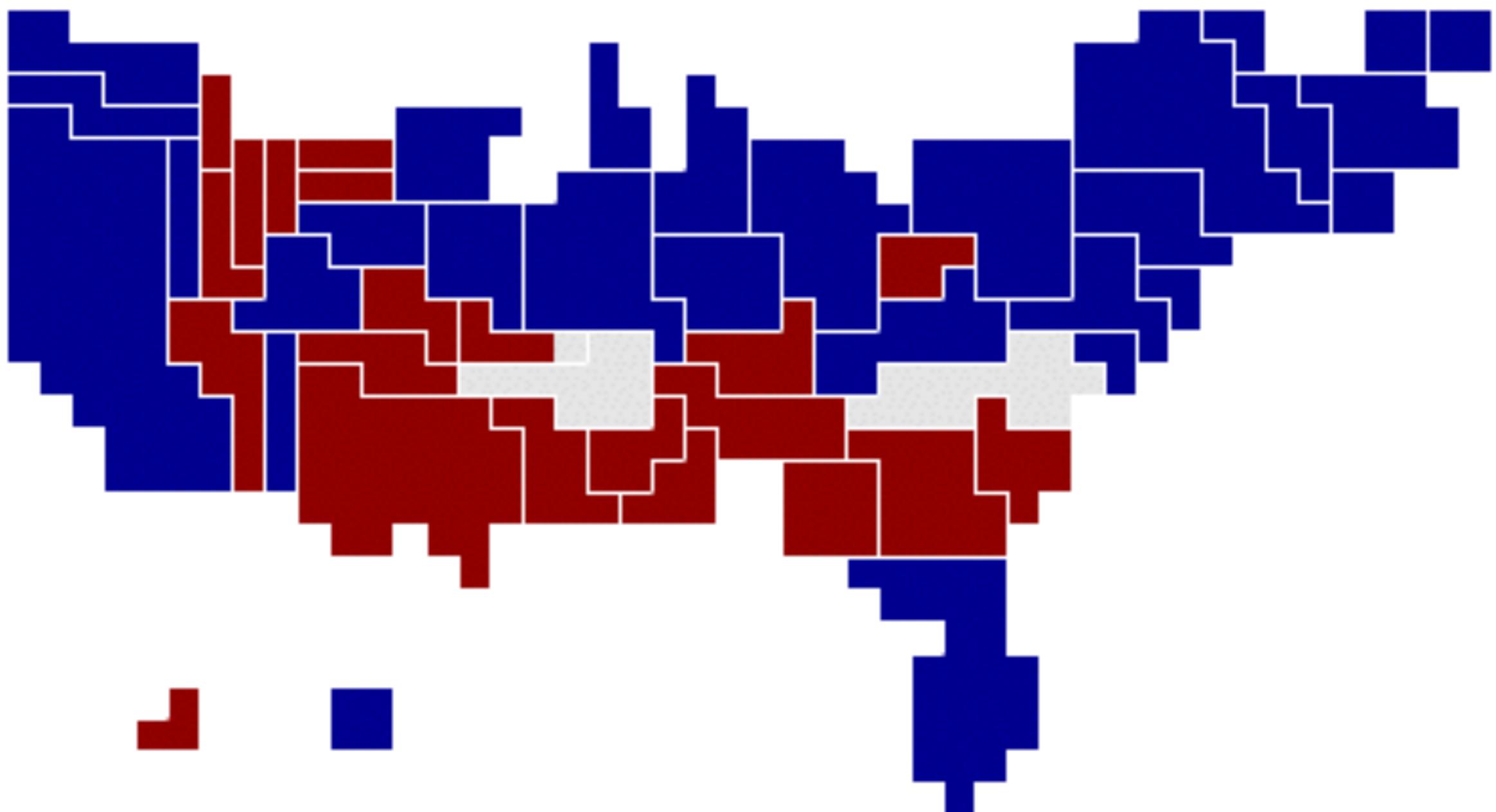


Non-Spatial Data



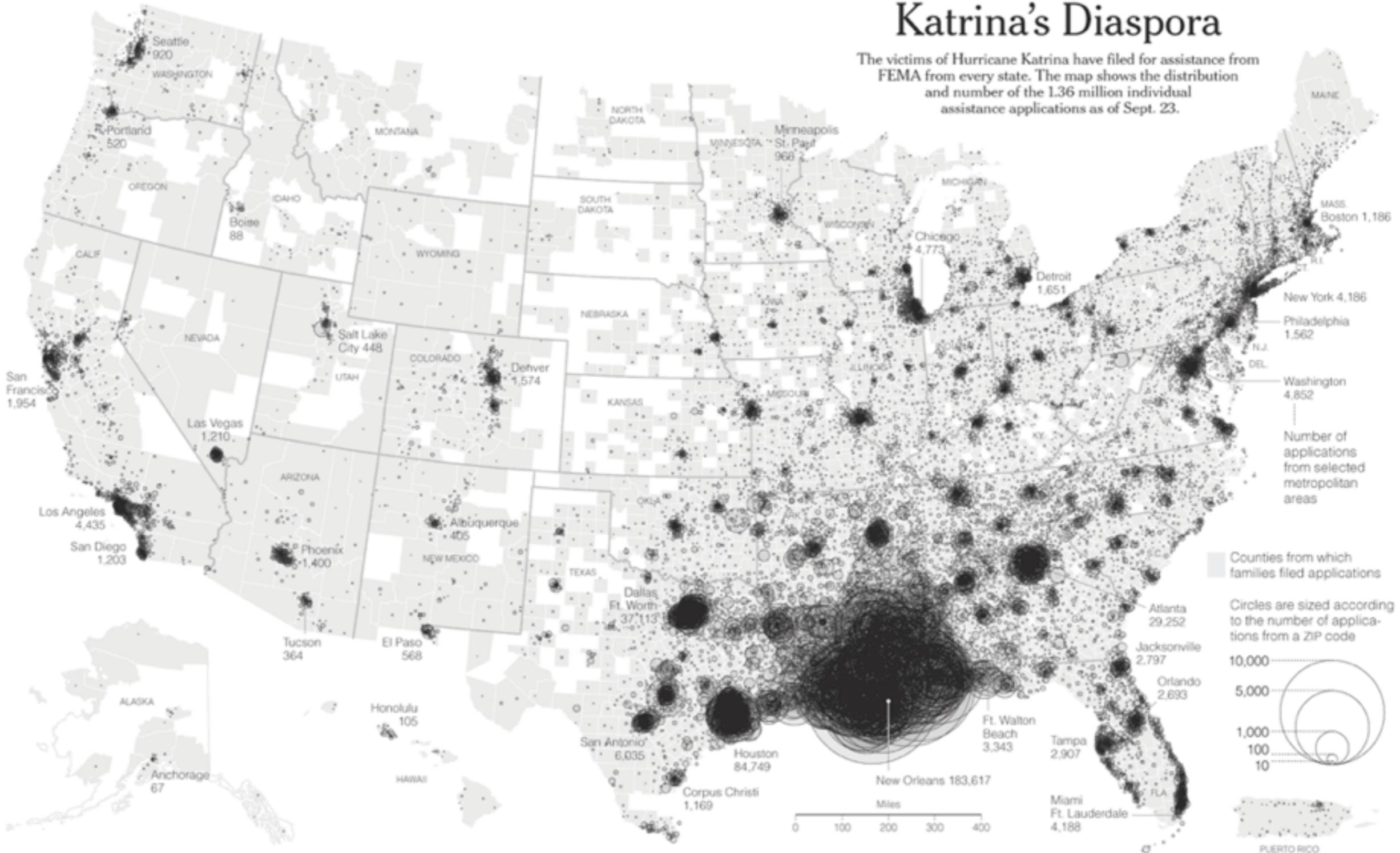
Non-Spatial Data

■ Rep ■ Dem ■ 3rd Party ■ Partial Result ○ % precincts counted



Katrina's Diaspora

The victims of Hurricane Katrina have filed for assistance from FEMA from every state. The map shows the distribution and number of the 1.36 million individual assistance applications as of Sept. 23.



They are scattered through all 50 states, the District of Columbia and Puerto Rico — 623 in Utah, 1,114 in Kansas, 101 way out in Alaska. They are clustered by the thousands in large Southern cities like Dallas, Atlanta and Memphis, and huddled in handfuls in unlikely hamlets like Shell Knob, Mo. (pop. 1,393) and Fountain Run, Ky. (pop. 236).

Evacuees fled Hurricane Katrina and the floods that followed in caravans of cars and fleets of buses, on helicopters and chartered planes, by boat and, a few, on foot. A month after the storm, a map

emerges of where they landed, based on ZIP codes from which applications for aid were submitted to the Federal Emergency Management Agency as of Sept. 23.

Of 1,356,704 applications, 86 percent came from Louisiana, Mississippi, Texas and Alabama. But 35,539 families were more than 1,000 miles from the Gulf — among the farthest: one in Nome, Alaska, 3,931 miles from the French Quarter and another in Lihue, Hawaii, 4,279 miles away.

Residents of New Orleans, a city that was two-thirds black, seem to have flocked to the nation's African-American population

centers. On average, the applicants came from counties where blacks were 28 percent of the population, more than twice the national average.

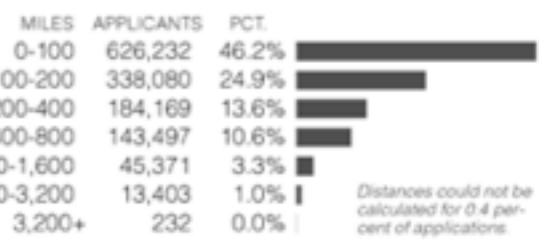
Baton Rouge, La., appears to be temporary home to 10 percent of evacuees, Houston 6.25 percent. But after the top 18 hubs, applicants are spread like the wind that whipped through their old neighborhoods: none of the other 900-plus metropolitan areas has even 1 percent of the total.

Some 4,000 ZIP codes — among them Pocahontas, Miss.; Promise City, Iowa; and Hope, Mich. — had just one applicant.

Applications by state

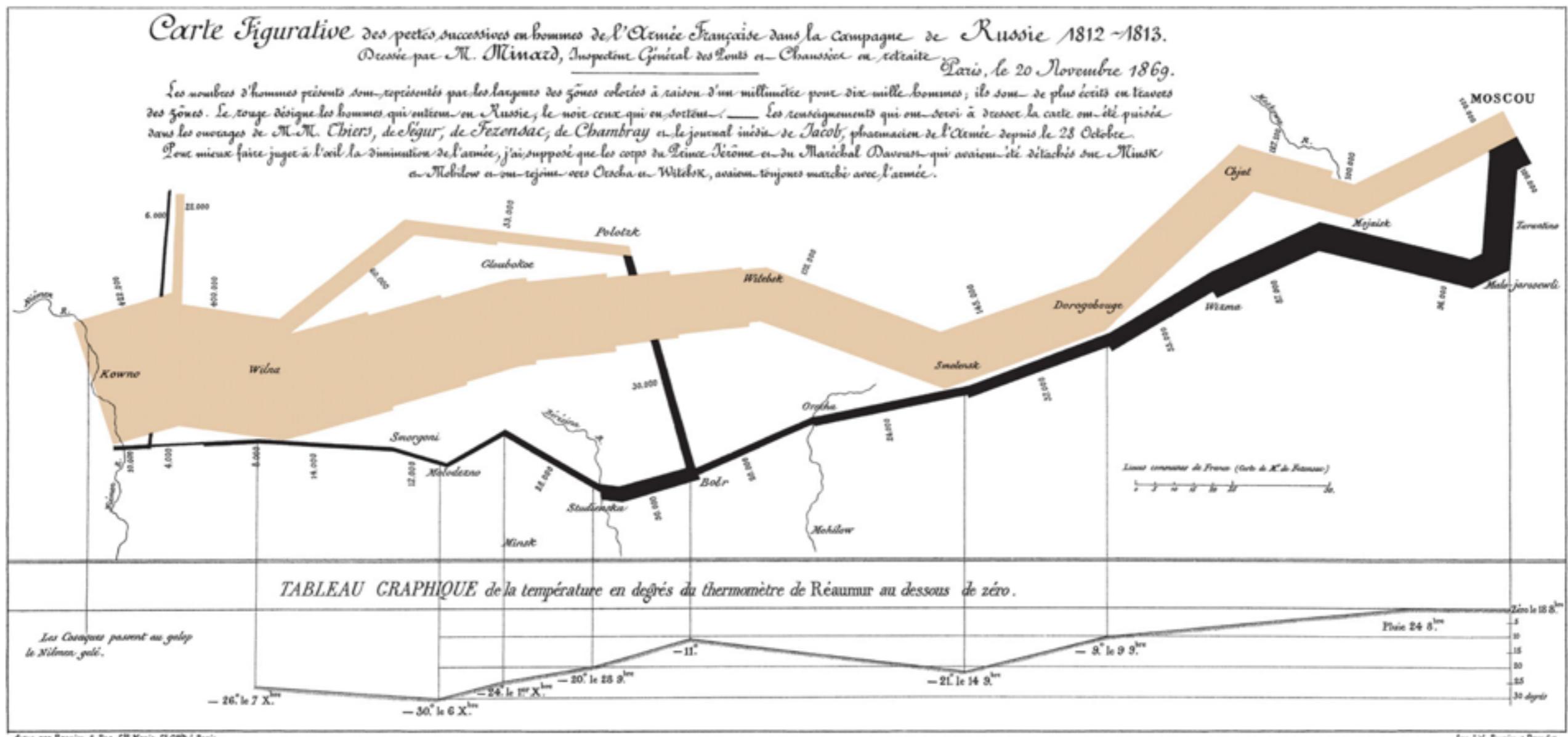
State	Applications	Pct.
Louisiana	523,149	38.6%
Mississippi	383,840	28.3%
Texas	156,895	11.6%
Alabama	109,469	8.1%
Georgia	35,342	2.6%
Florida	31,005	2.3%
Tennessee	15,529	1.1%
Arkansas	11,027	0.8%
California	10,953	0.8%
Illinois	6,430	0.5%
Others	73,065	5.4%

Applications by distance from New Orleans



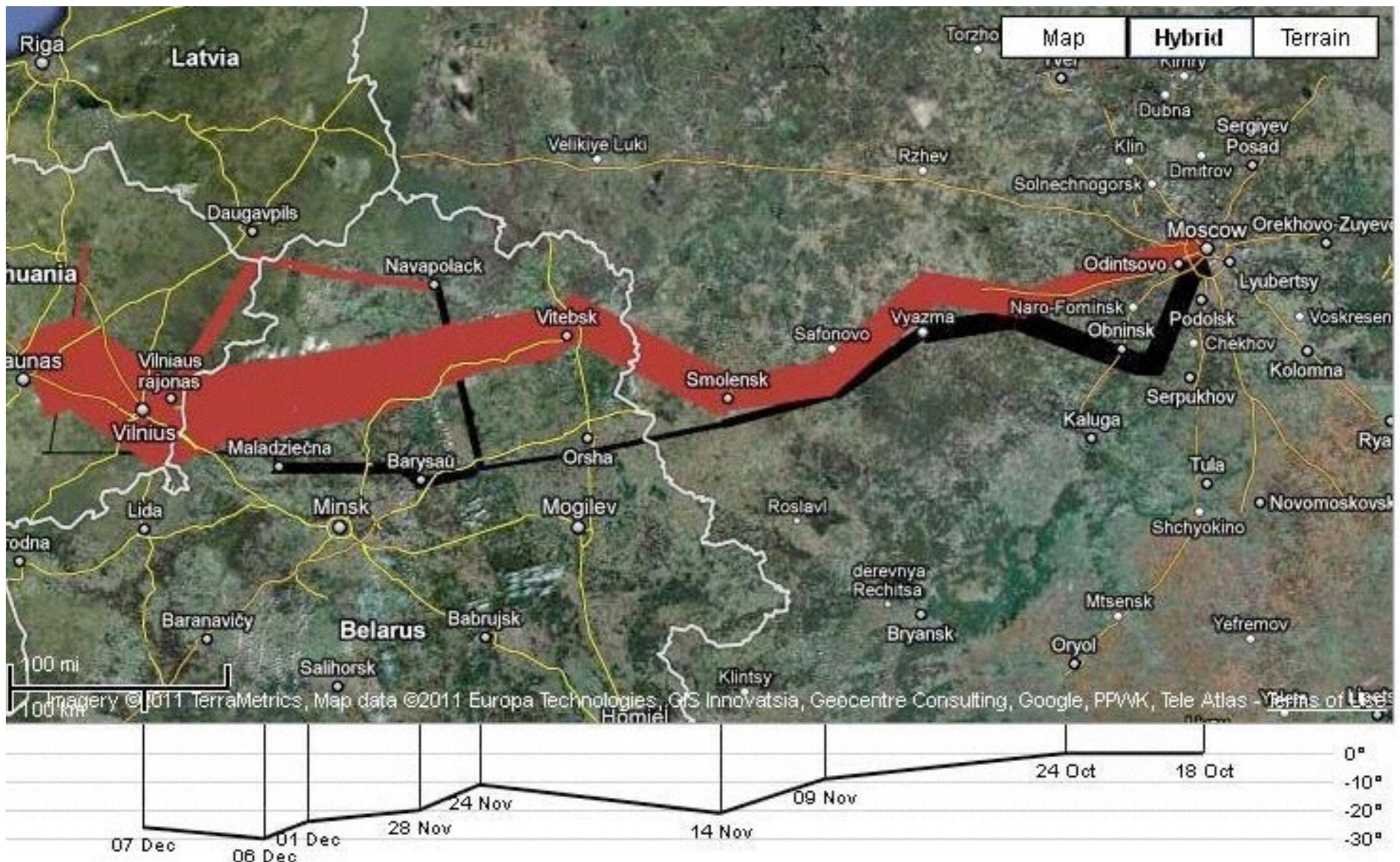
Sources: FEMA; Census Bureau; Queens College Sociology Department
Matthew Ericson, Archie Tse and Jodi Wilgoren/The New York Times

Time Series Data

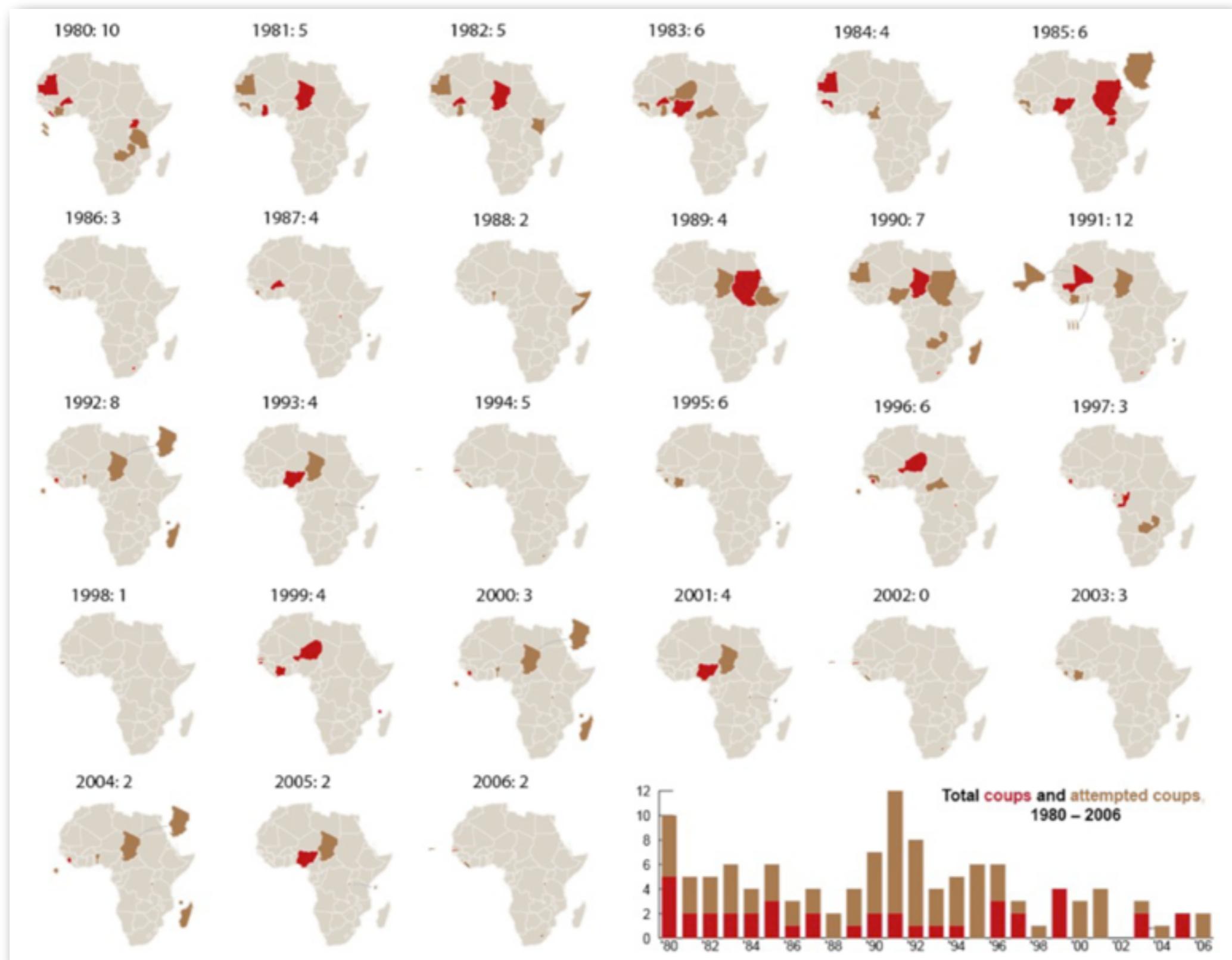


Source: Minard

Time Series Data



Time Series Data



Source: Karl Gude

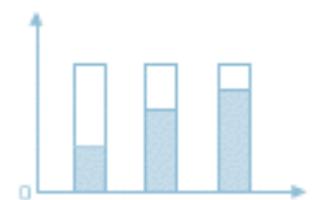
Concepts

Diagrams

Abstract Concepts



Realistic Concepts



Flow

Linear

Circular

Divergent/Convergent

Multidirectional

Structure

Matrices

Trees

Layers

Cluster

Overlapping

Closure

Enclosed

Linked

Radiate

From a point

With a core

Without a core

Pictorial

Direction

Location

Reveal

Process

Influence

Display Data

Comparison

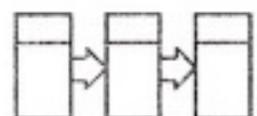
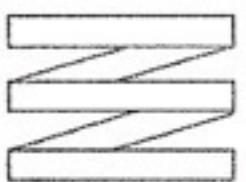
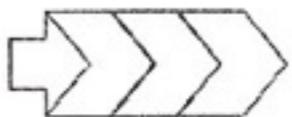
Trend

Distribution

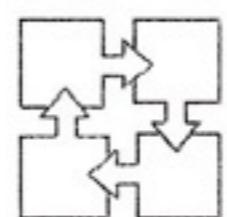
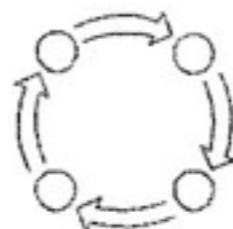
Flow Diagrams

Flow

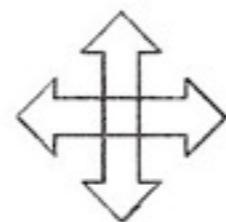
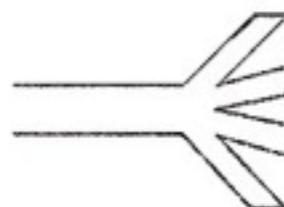
Linear



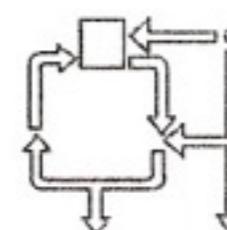
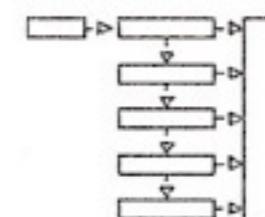
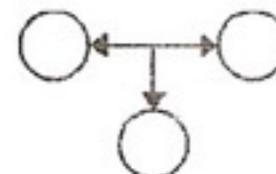
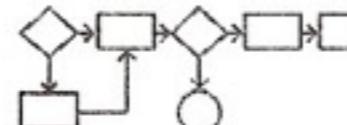
Circular



Convergent Divergent



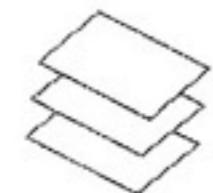
Multi-directional



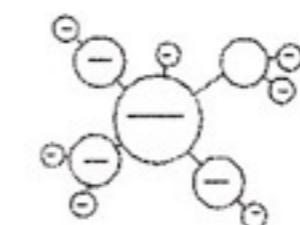
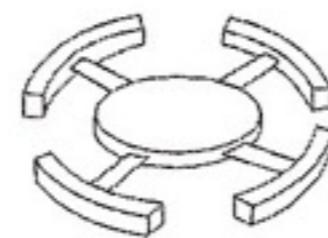
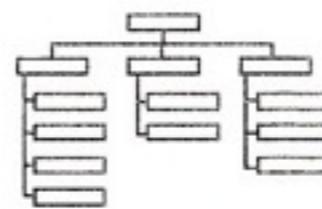
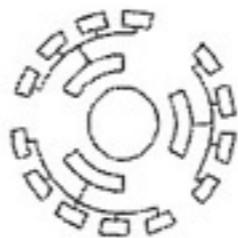
Structure Diagrams

Structure

Layers



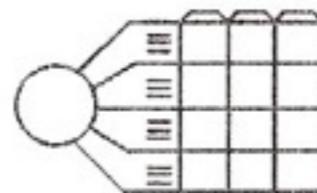
Trees



Matrices

-	-	-	-
-	•	•	•
-	•	•	•
-	•	•	•

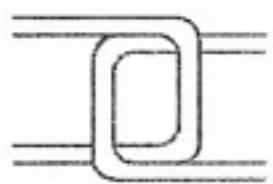
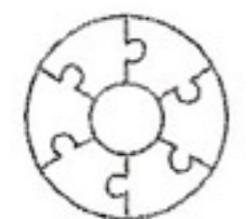
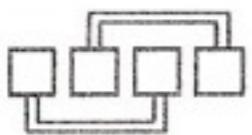
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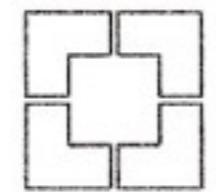
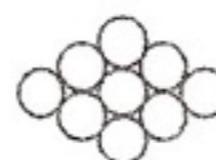
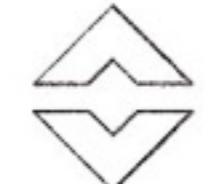
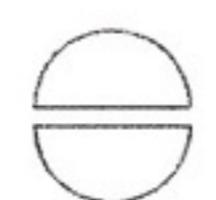
Cluster Diagrams

Cluster

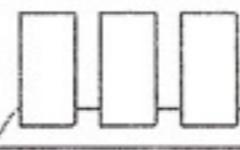
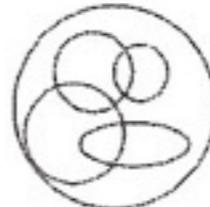
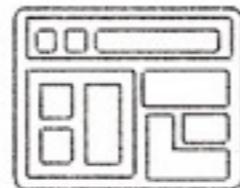
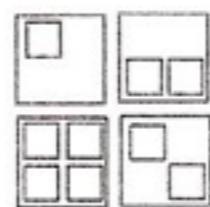
Linked



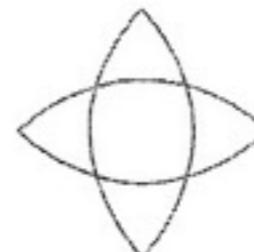
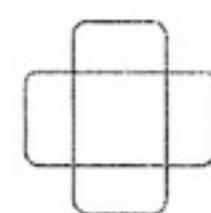
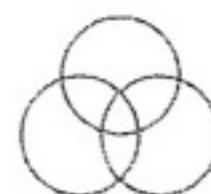
Closure



Enclosed



Overlapping

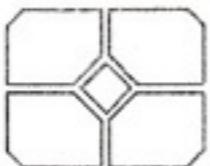
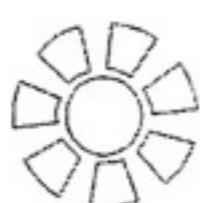
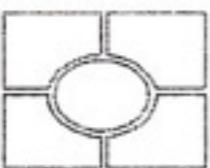
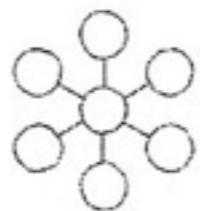


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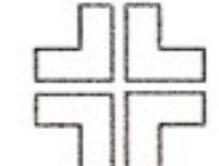
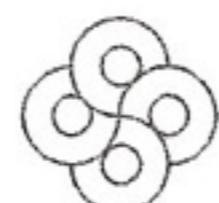
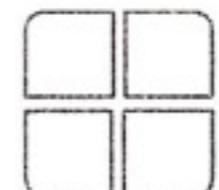
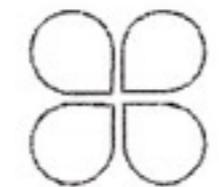
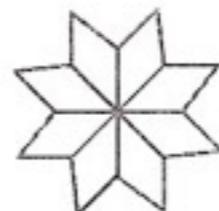
Radiate Diagrams

Radiate

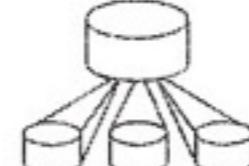
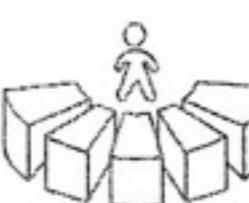
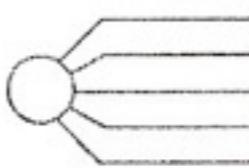
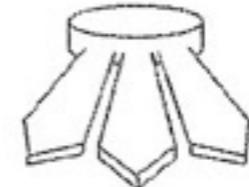
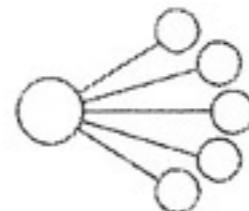
With
a Core



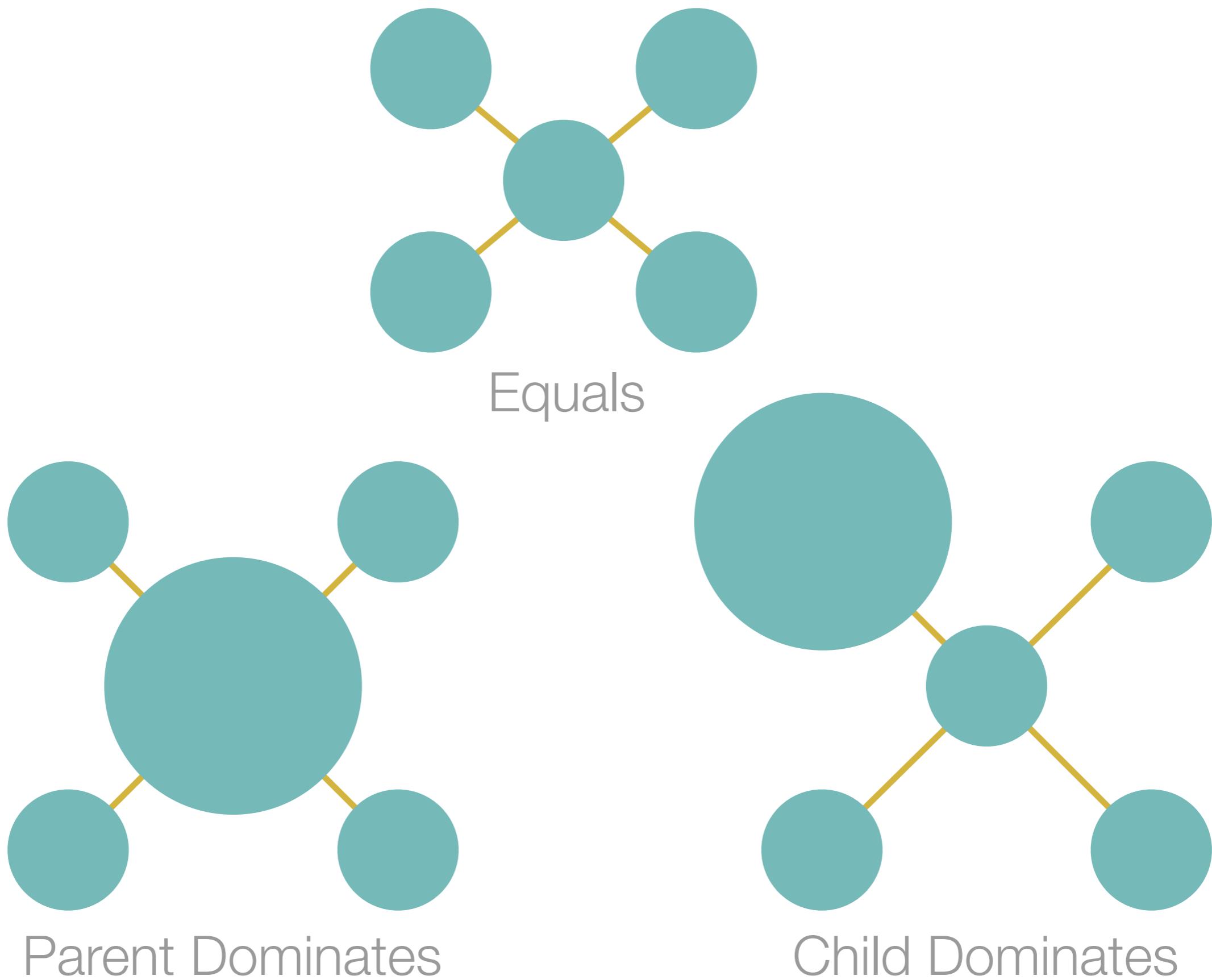
Without
a Core



From
a Point



Change the Story



Diagramming Tool

Identify the relationship.

Choose from five categories.

Flow >

Join

Network

Segment

Stack

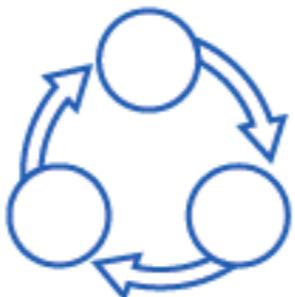
Represent the relationship.

Select the subcategory that fits best.



Linear

Shapes flow linearly but not necessarily straight



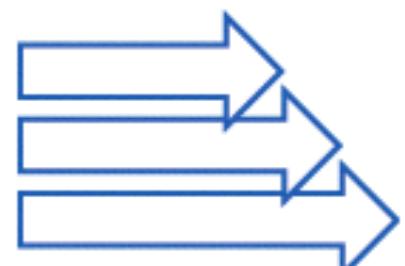
Loop

Shapes flow creating a closed loop



Merge/Divide

Shape separates from or combines with other shapes



Parallel

Shapes flow in a parallel direction where no shape intersects

Pick a number.

Each node is one piece of data.

View as: **Grid** List

Items per page: 16

1 Node (6)



2 Nodes (278)



3 Nodes (292)



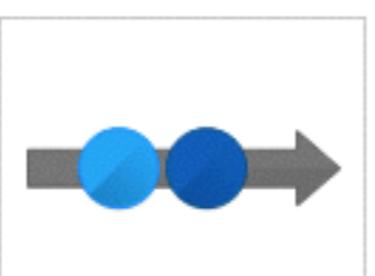
4 Nodes (280)



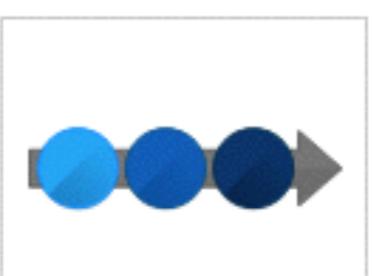
5 Nodes (274)



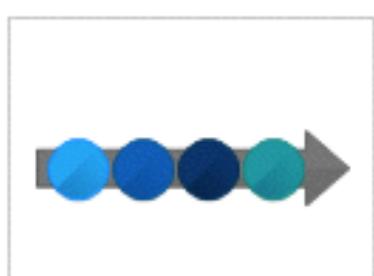
6 Nodes (255)



7 Nodes (0)



8 Nodes (2)



Words & Relationships

Word Cloud



Word Cloud

Visualizations : Obama's Speech to Congress, 022409 Tag Cloud of Two Words

Creator: VictoriaLHerring

Tags: speech obama

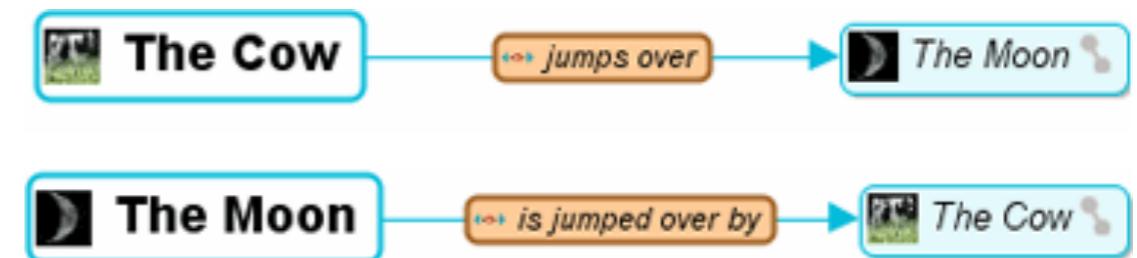
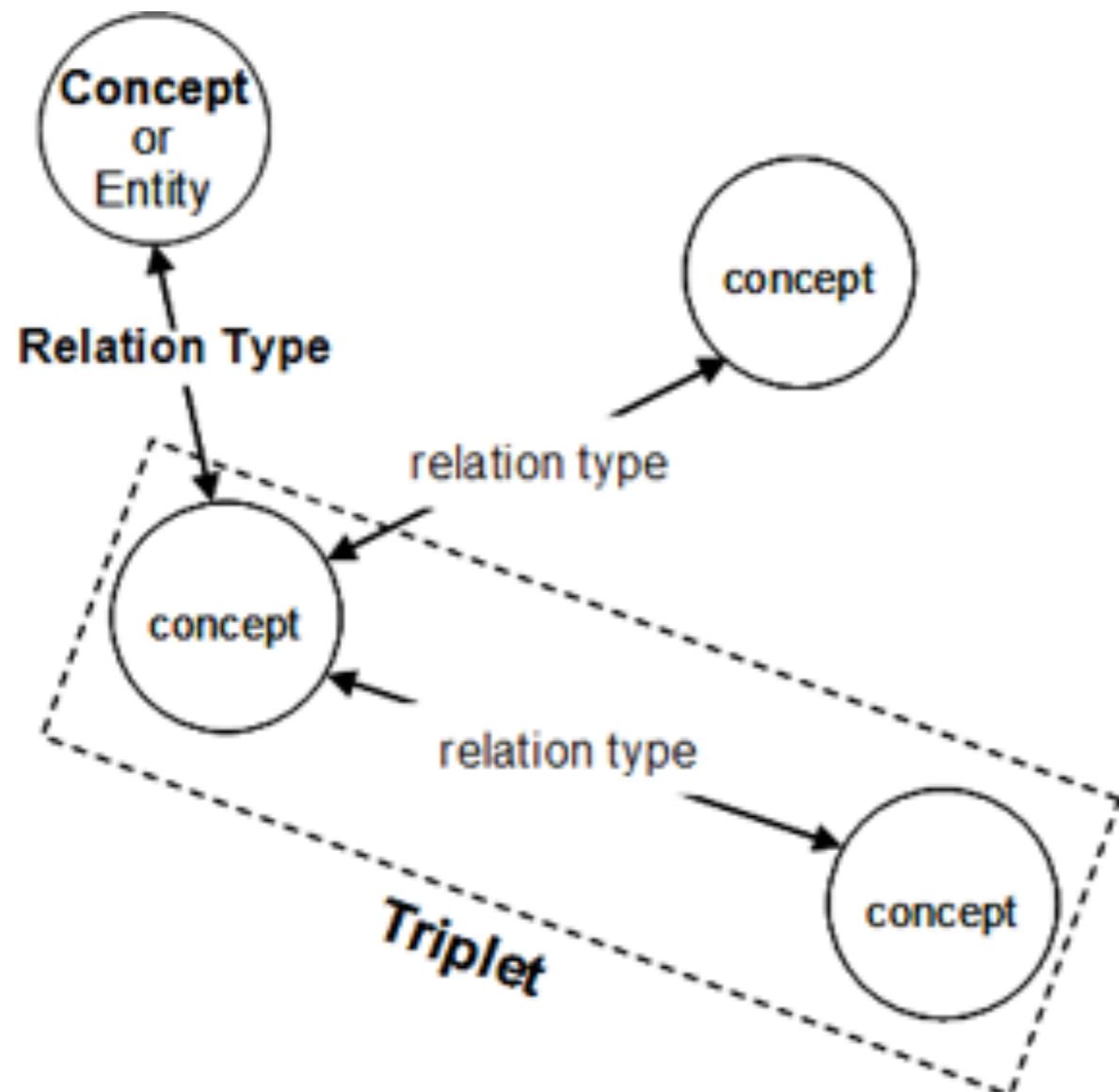
1 word 2 word Compare

Search:

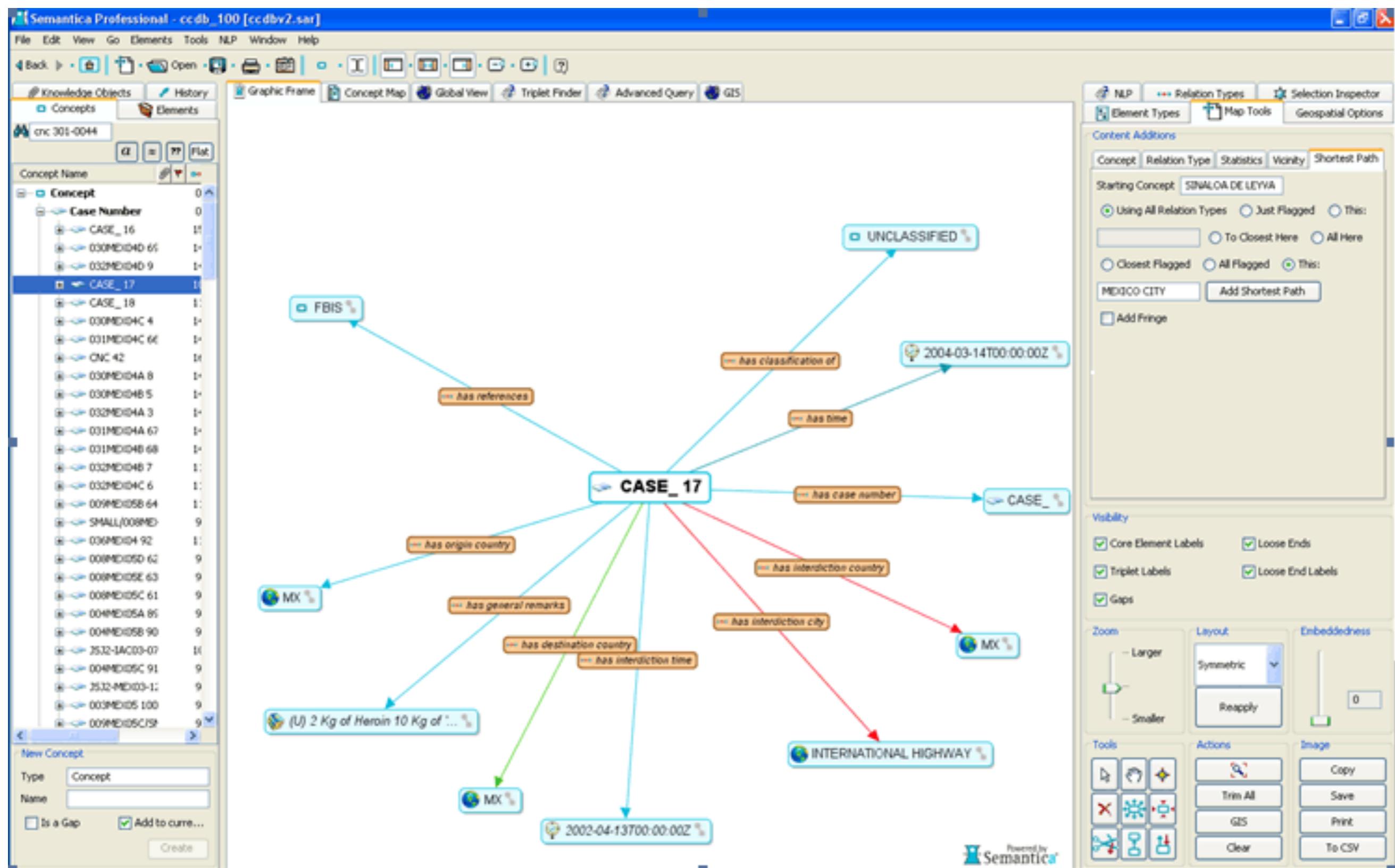
Showing 200 out of 1204

ability accountable act action address administration afford **america american americans** asked back bad banks begin begins bring budget build business businesses buy called **Care** century challenges chamber children clean college community compete comprehensive concern confidence confront congress cost costs country created credit **crisis** cut day days debt decade decisions **deficit** democrats depends difficult dollar dollars easy **economic economy education** effort end **energy** ensure entrepreneurs fact families family federal finally financial force forward foundation **future** global goal govern government great half **health** helping high higher history hold home homes hope housing inherited insurance invest investment iraq issue job **jobs** largest lay layoffs lead lending letter life loans long long-term longer lost made major **make** makes market medicare meet men million moment **money nation** national **new** opportunity part passed pay **people** place plan power president price private problem programs promise prosperity provide pushed **put** re-start receive recession **recovery reform** renewable republicans resources **responsibility** restore return **save school schools** sense serve simply single small solar solve speak **spend** spirit stand states step street struggling students support system **tax** taxpayer teacher technology **time times** today **tonight** training understand **united values** watching ways women words **work** workers working **world**

Concept Cloud

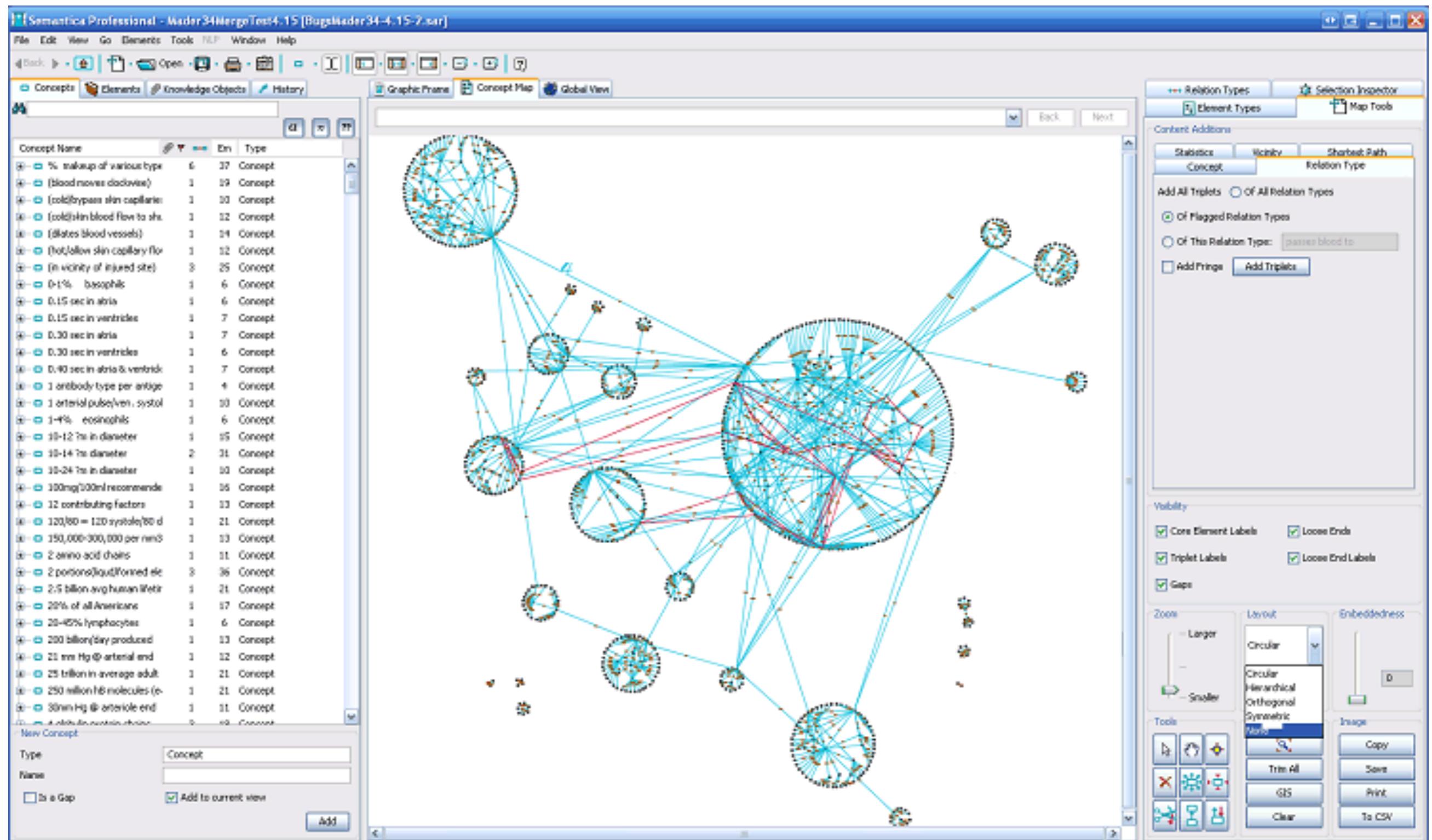


Concept Cloud



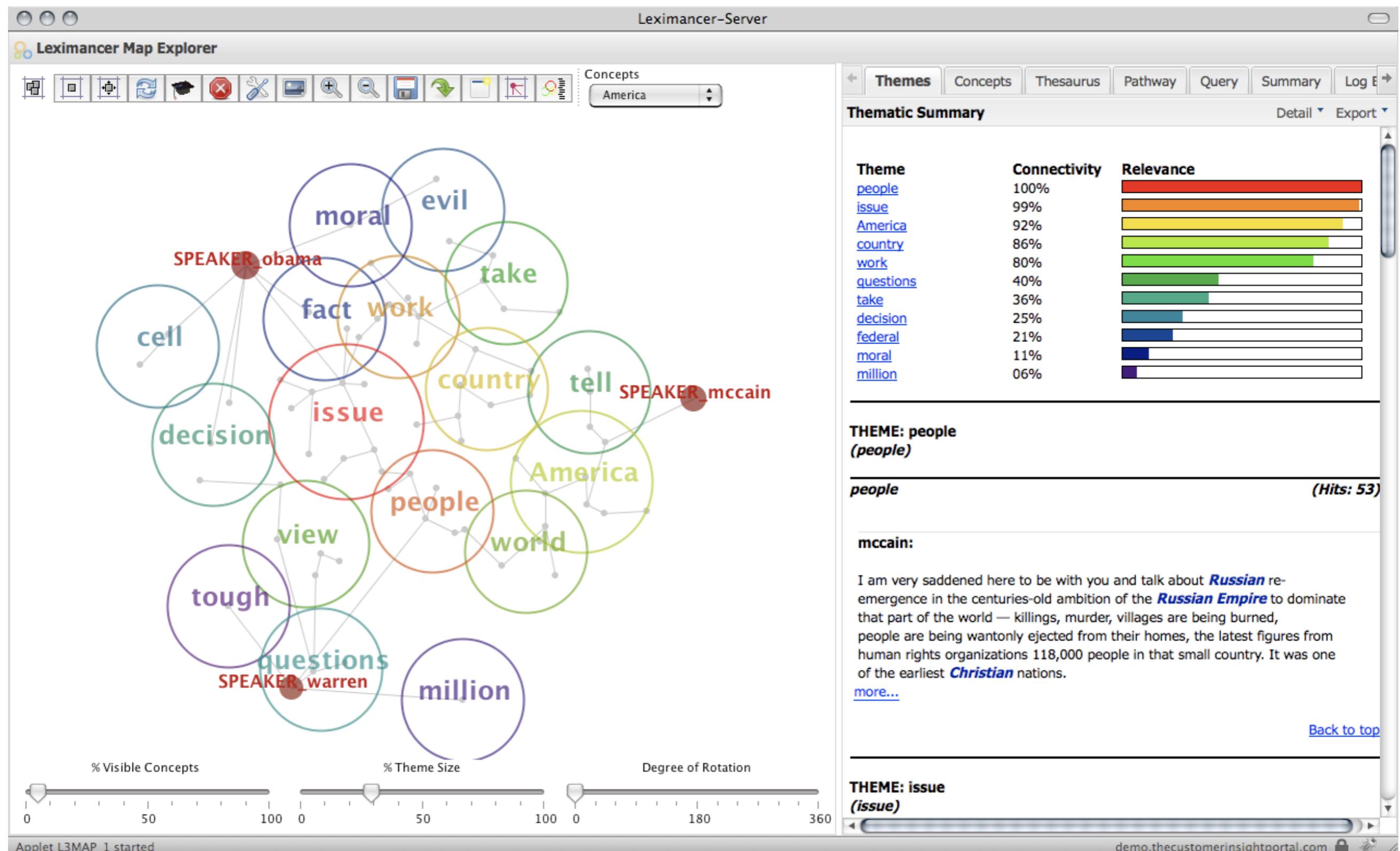
Source: Semantica

Concept Cloud



Source: Semantica

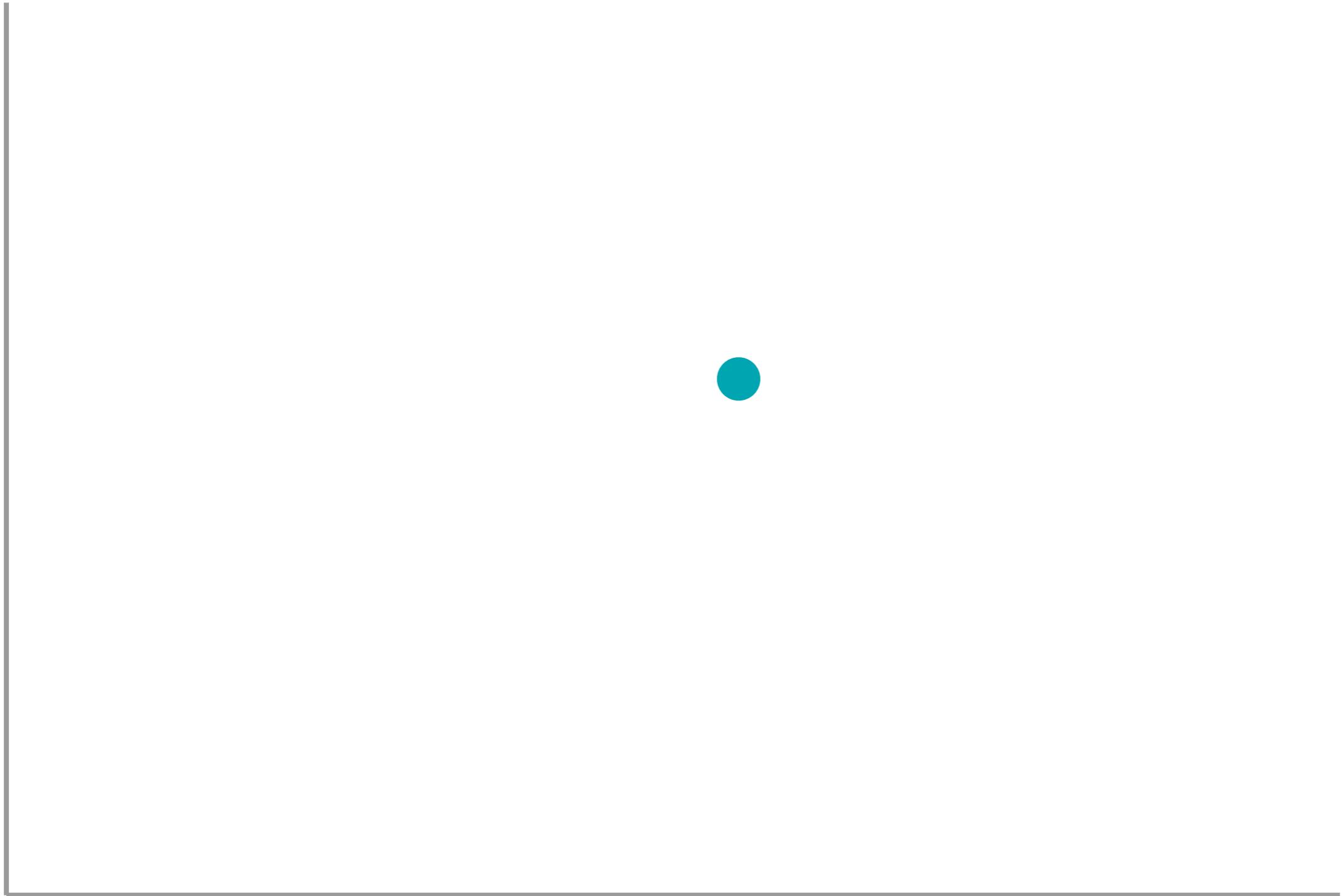
Concept Cloud



Source: Leximancer

Encoding Data

Position

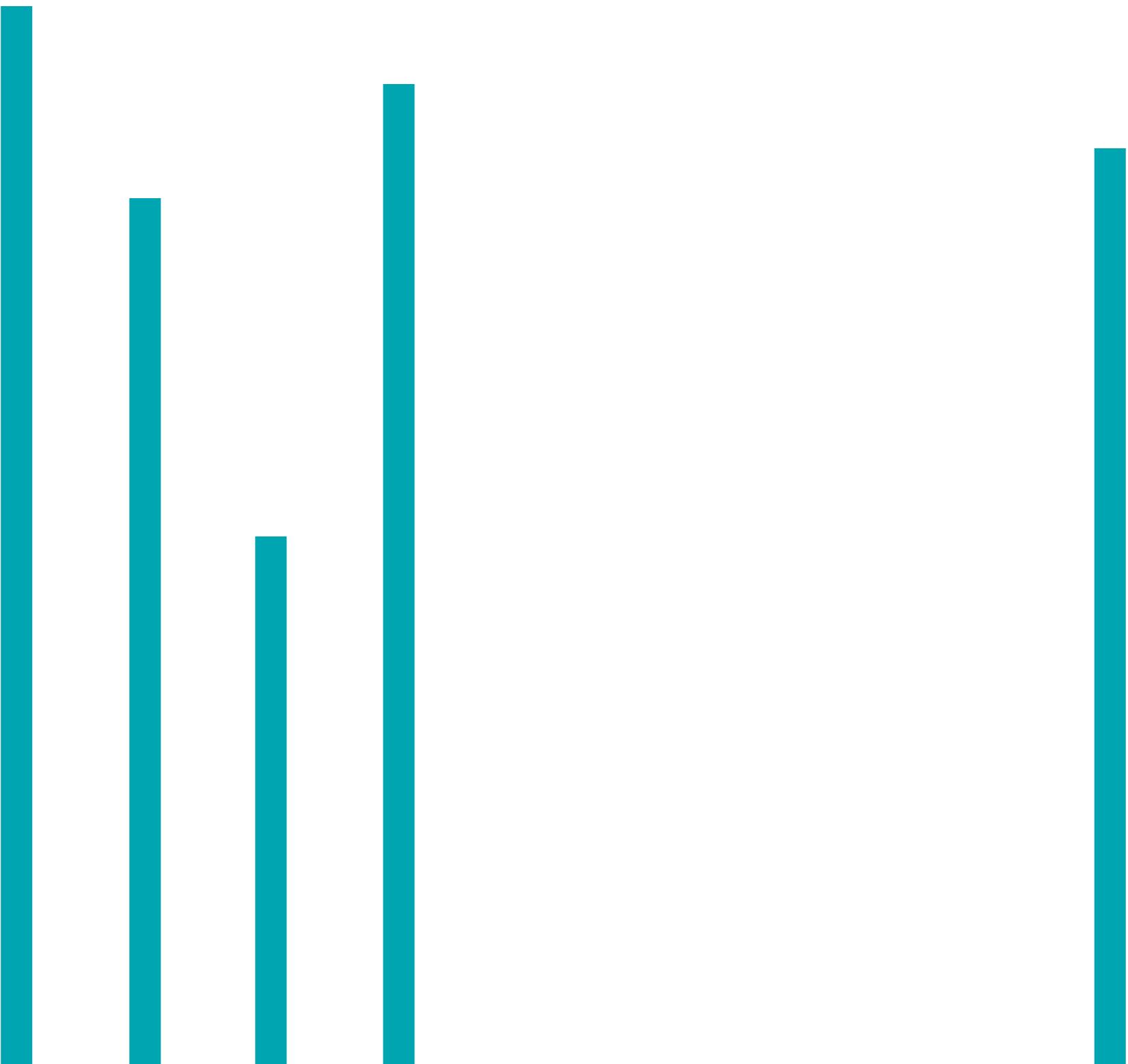


Variables: 1-4

Values: Infinite

Ordered: Yes

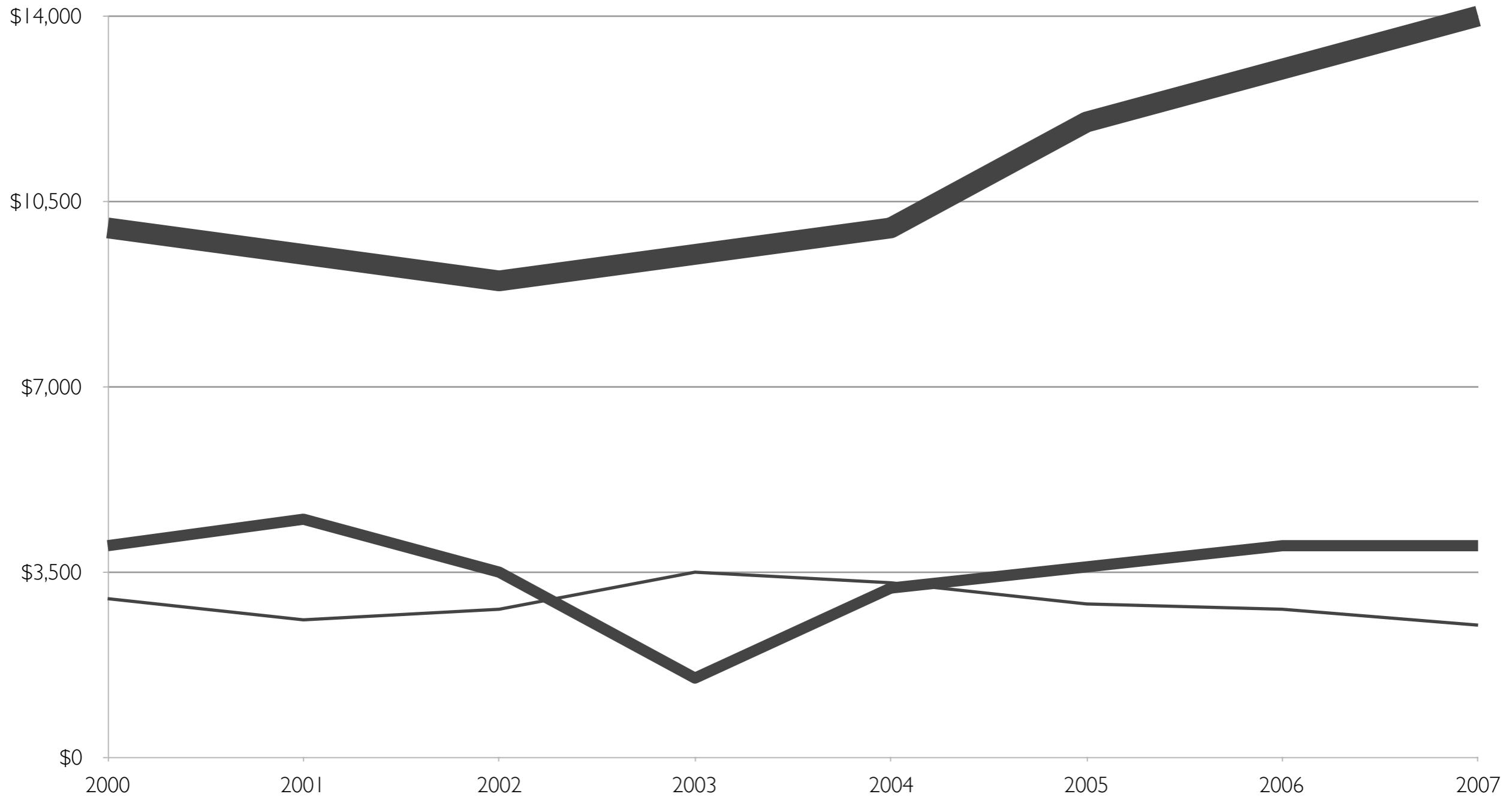
Length



Values: Infinite

Ordered: Yes

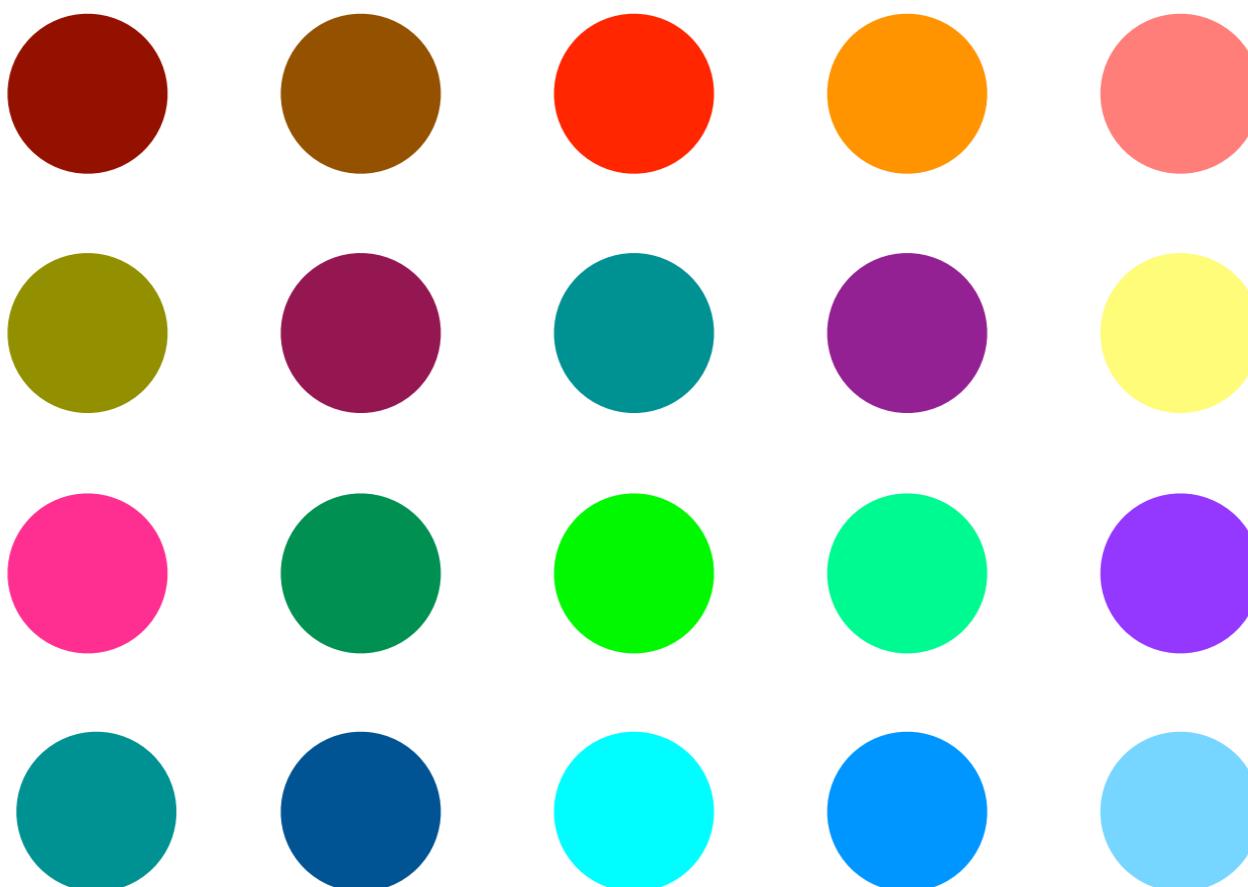
Width



Values: Practically Limited

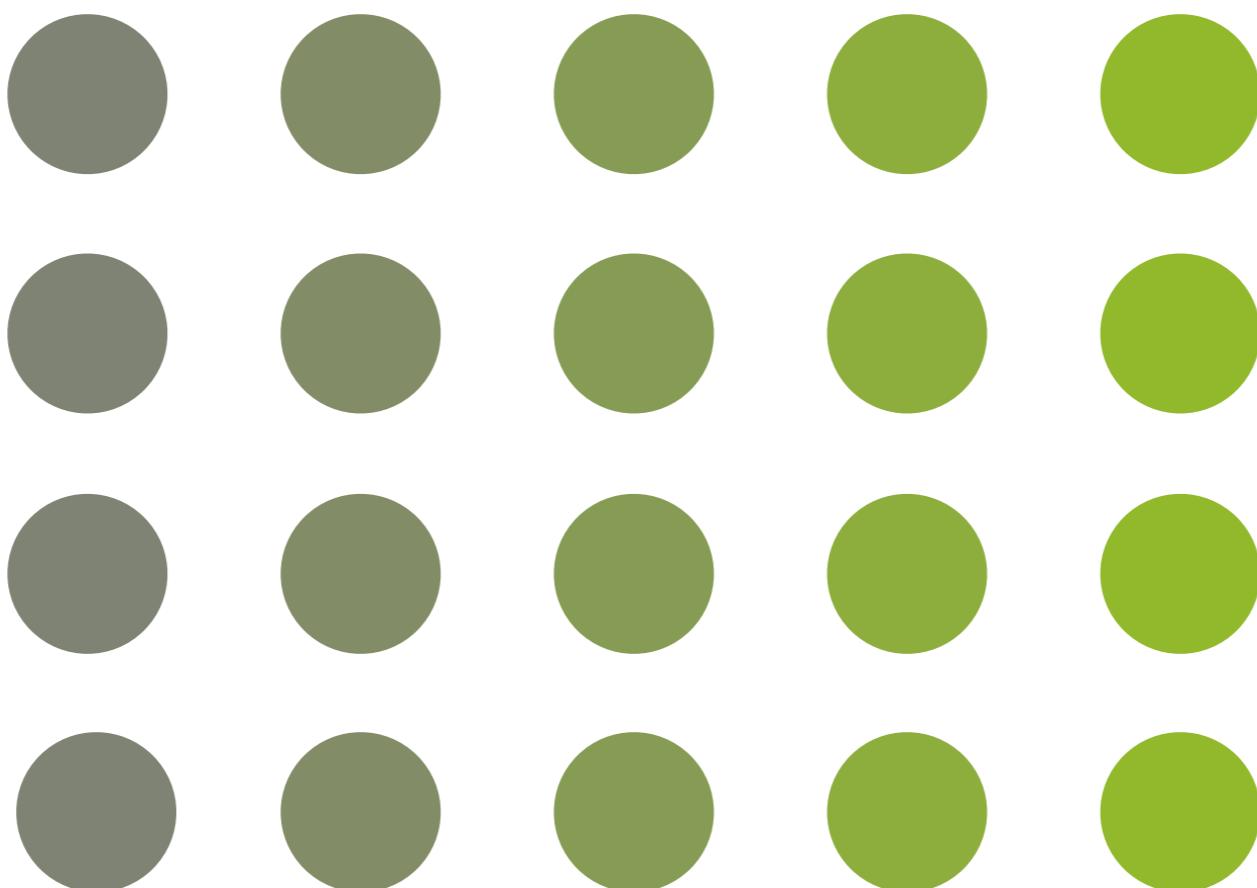
Ordered: Yes

Hue (Color)



Values: Practically Limited
Ordered: Not really

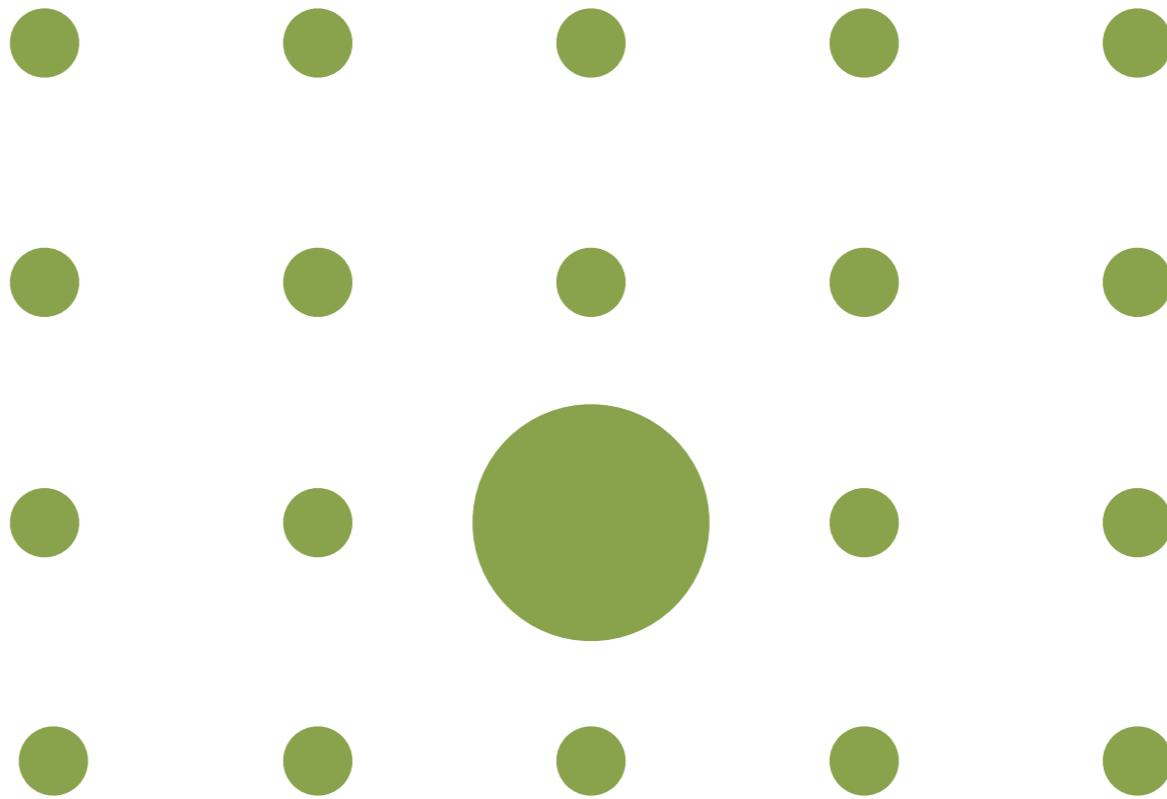
Saturation/Intensity



Values: Practically Limited

Ordered: Yes

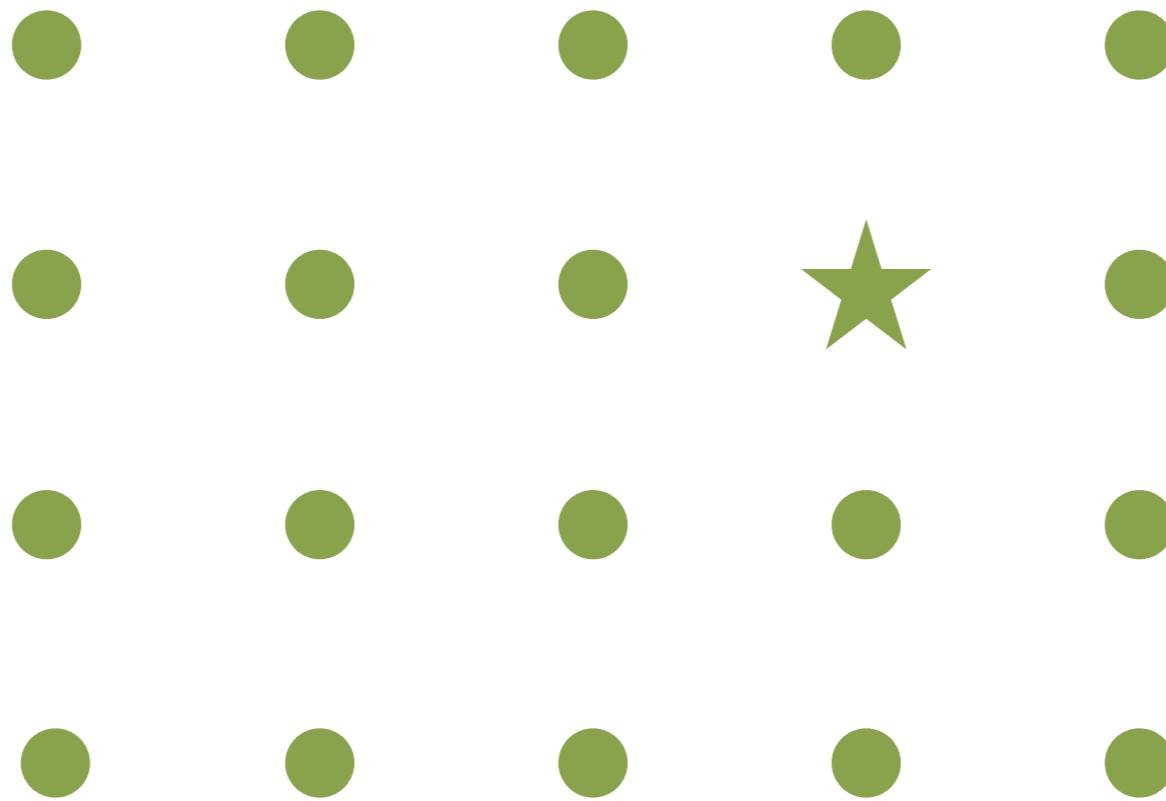
Size



Values: Practically Limited

Ordered: Yes

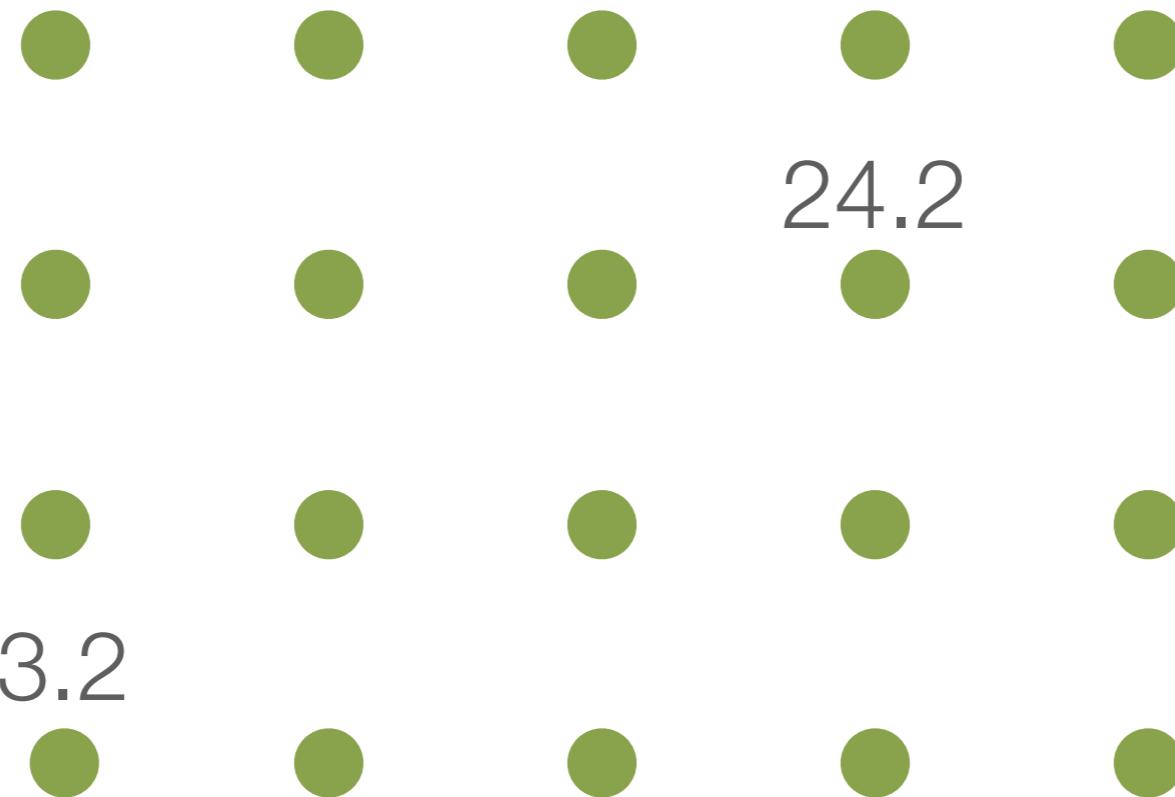
Shape



Values: Practically Limited

Ordered: No

Labels



Values: Infinite

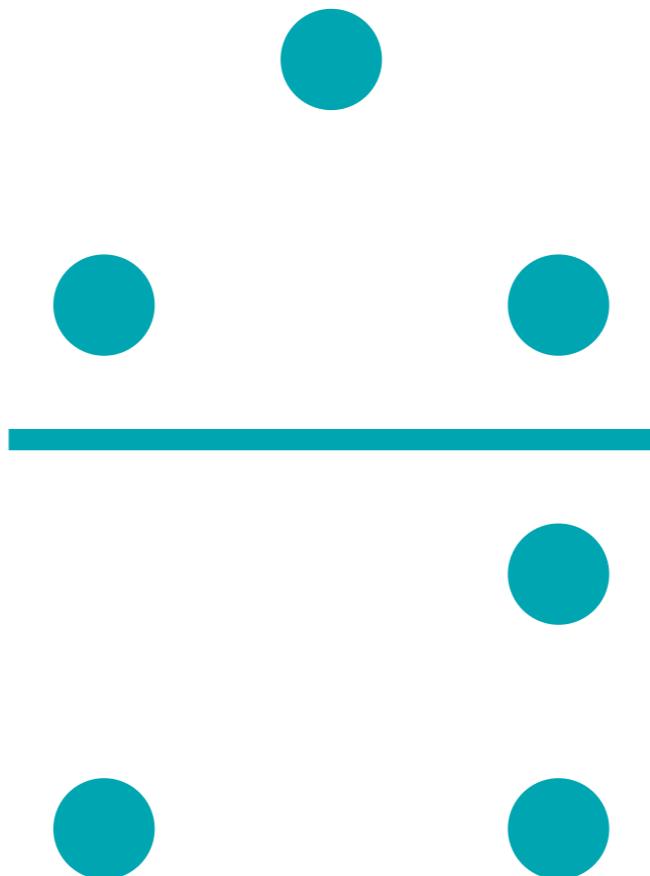
Ordered: Yes

Orientation



Values: Practically Limited Ordered: Possibly

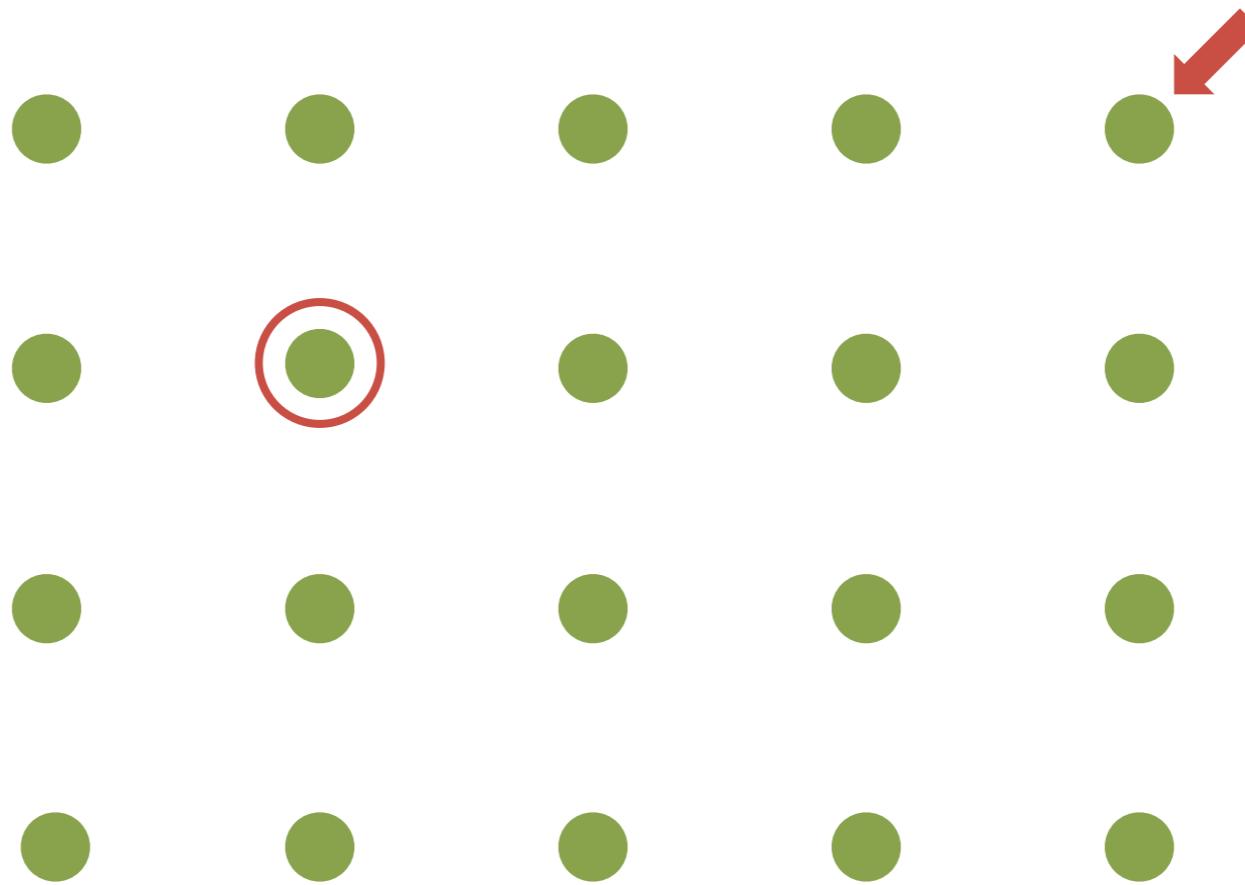
Grouping



Values: Infinite

Ordered: Possibly

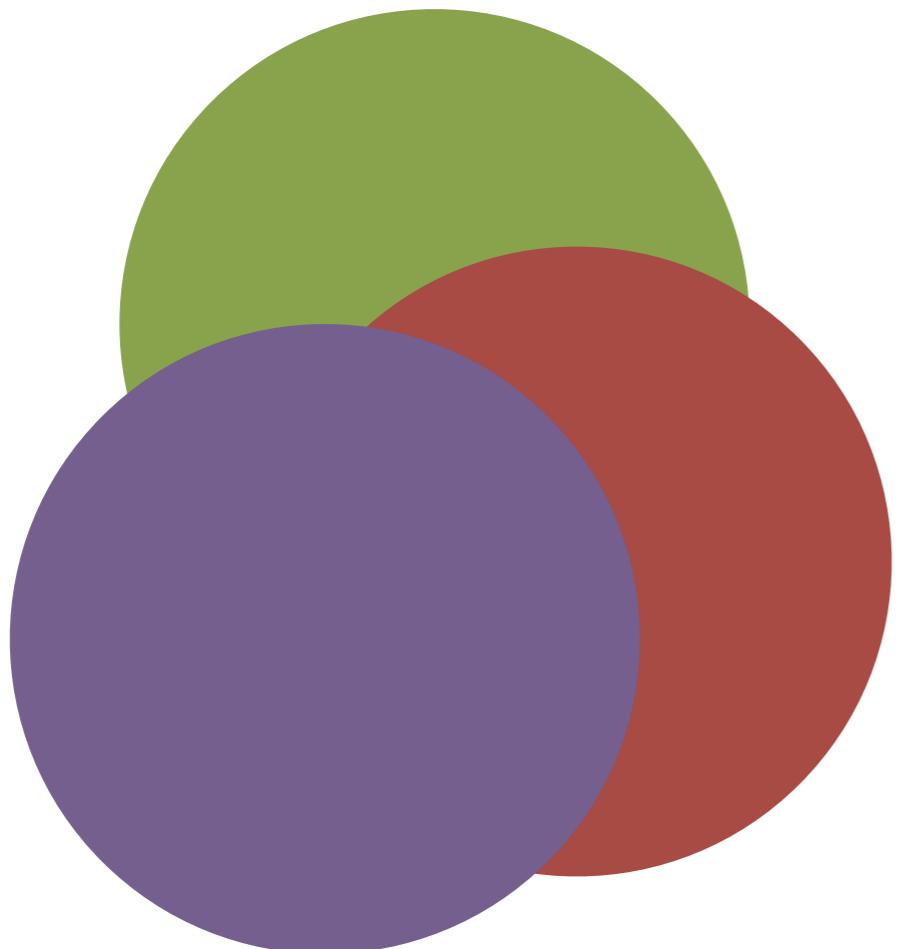
Highlighting



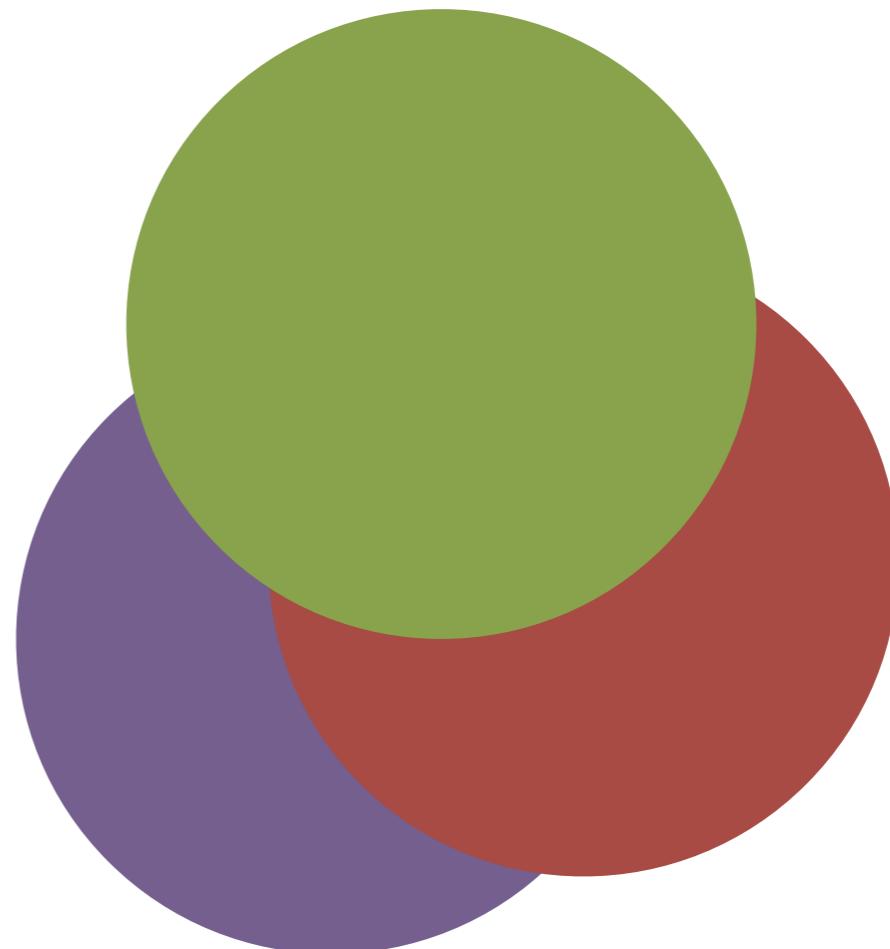
Values: Very Limited

Ordered: No

Layers

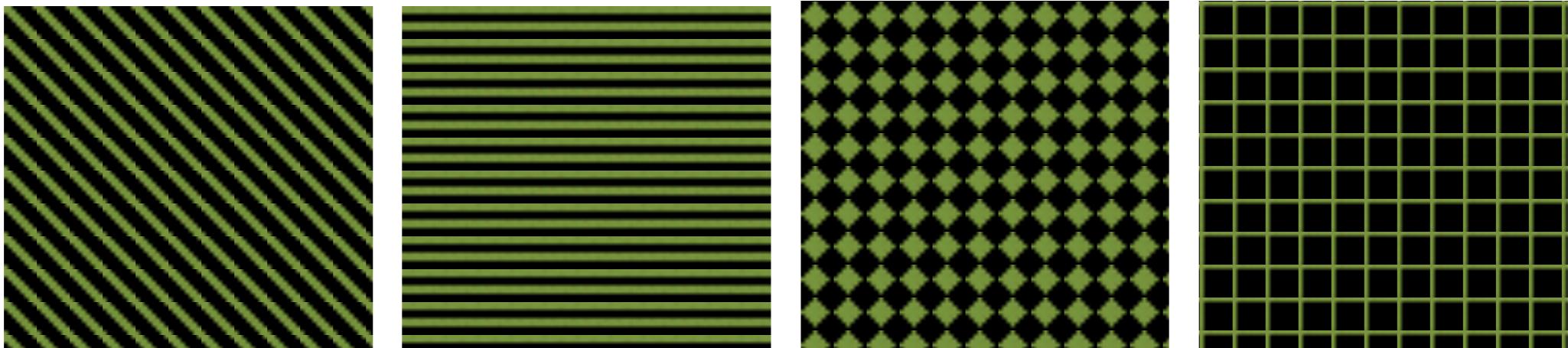
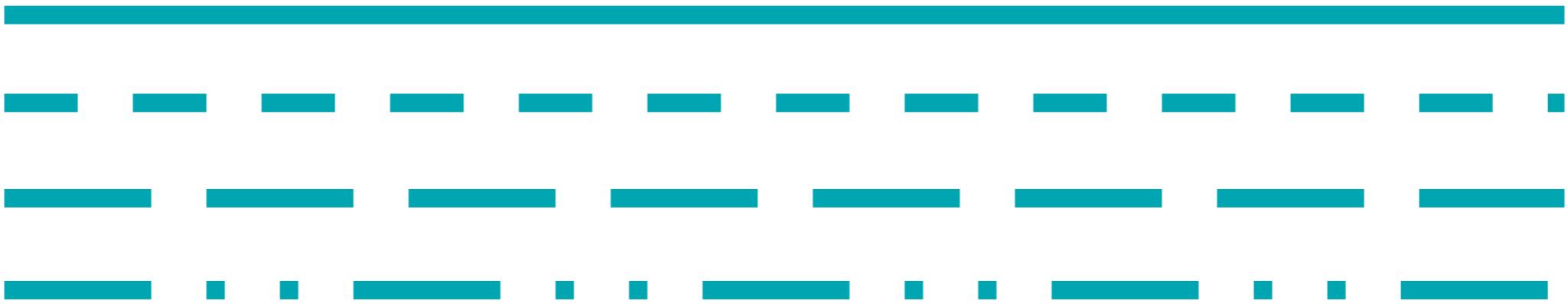


Values: Limited



Ordered: Yes

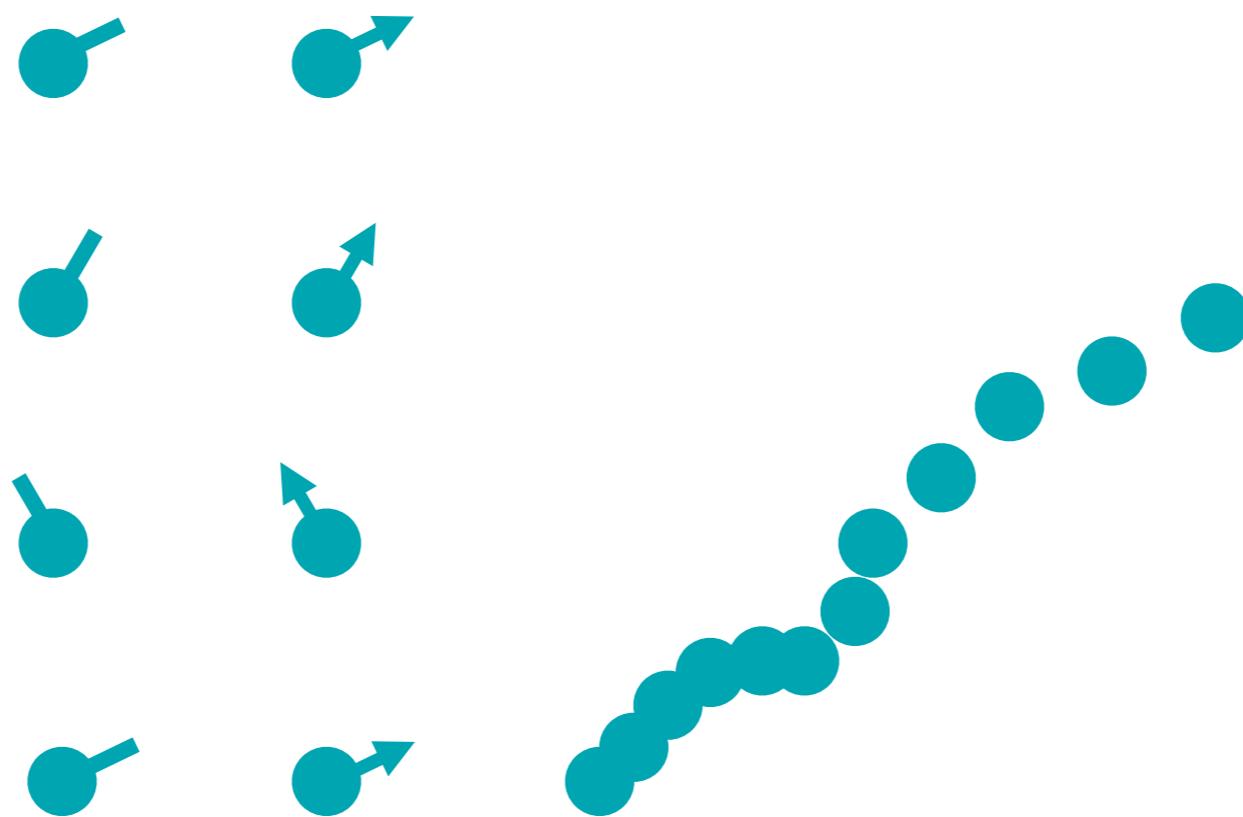
Patterns



Values: Practically Limited

Ordered: No

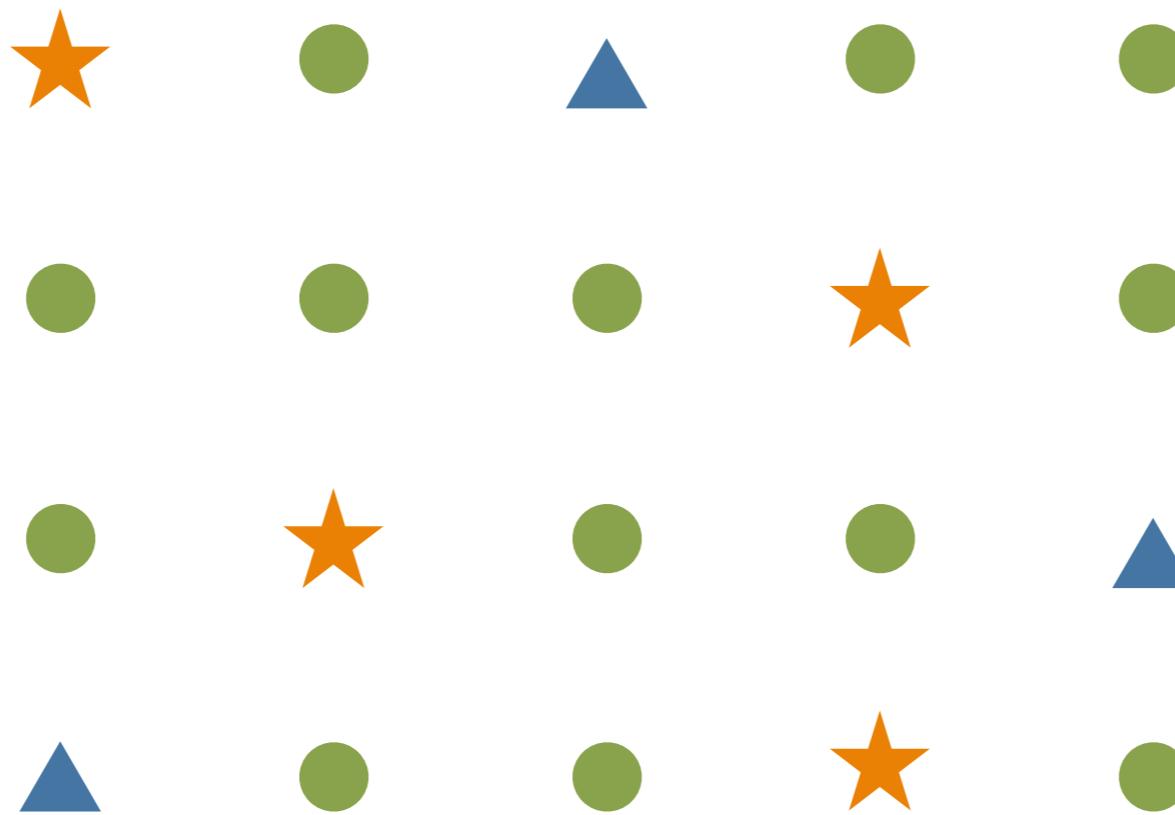
Motion



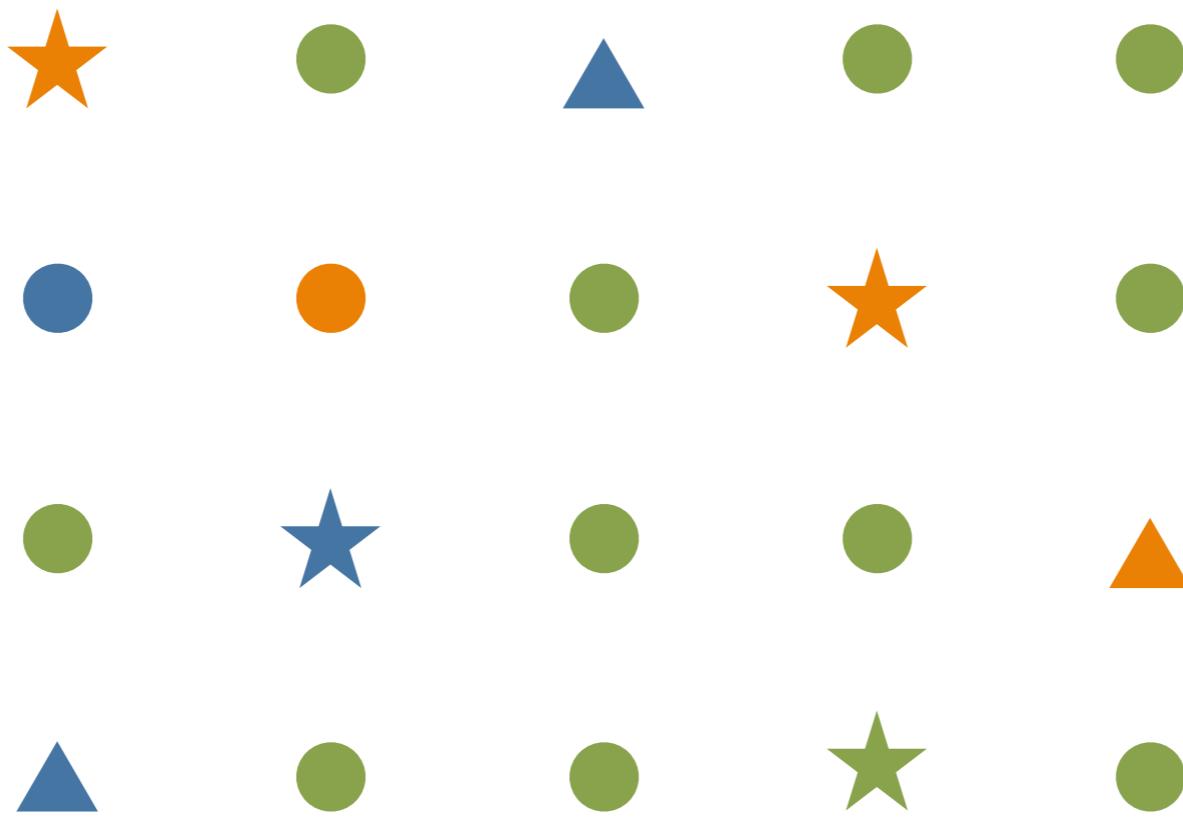
Values: Somewhat Limited

Ordered: Yes

Redundant Encoding



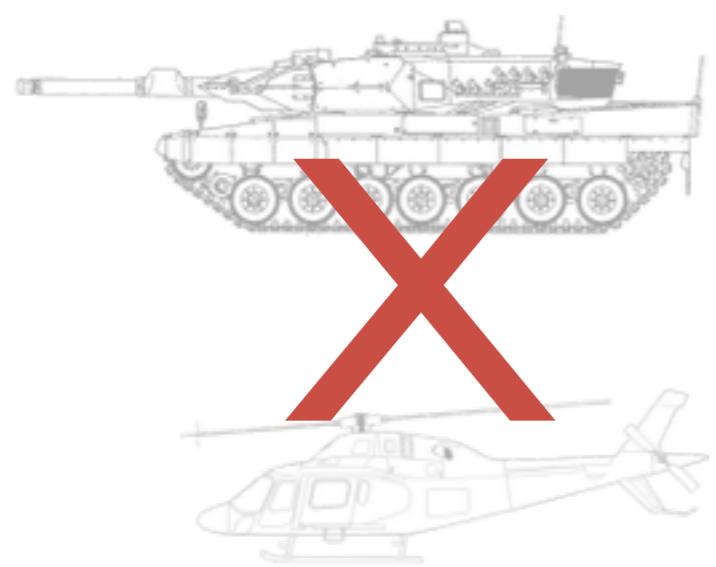
Consistency



Natural Encoding



VS



VS



Storytelling

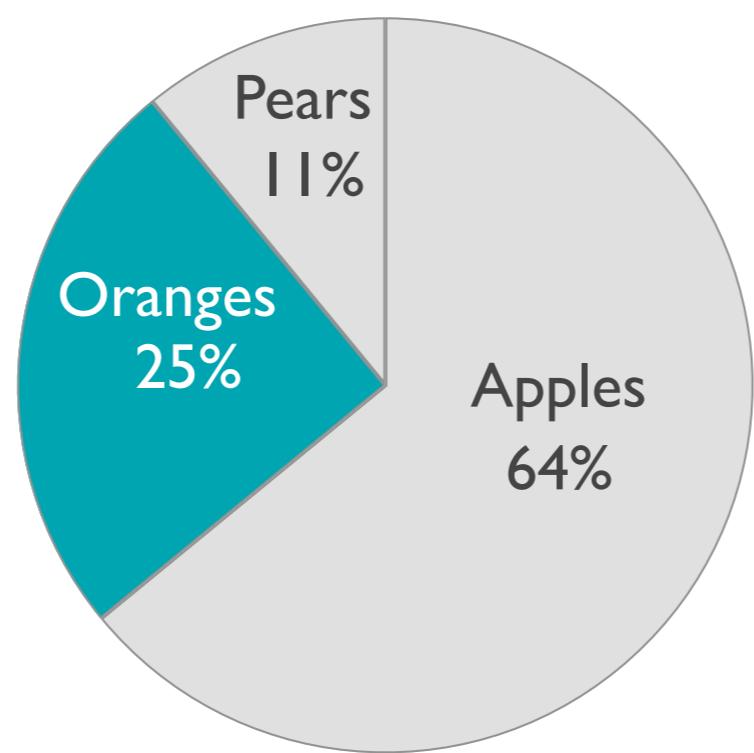
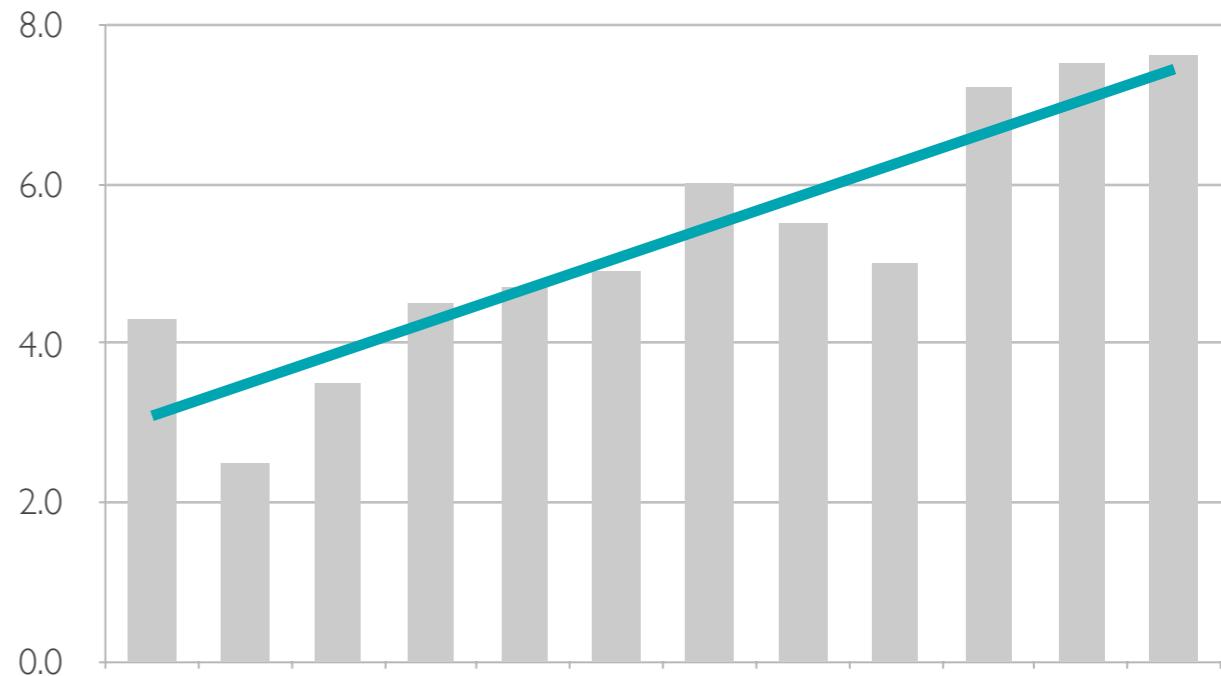
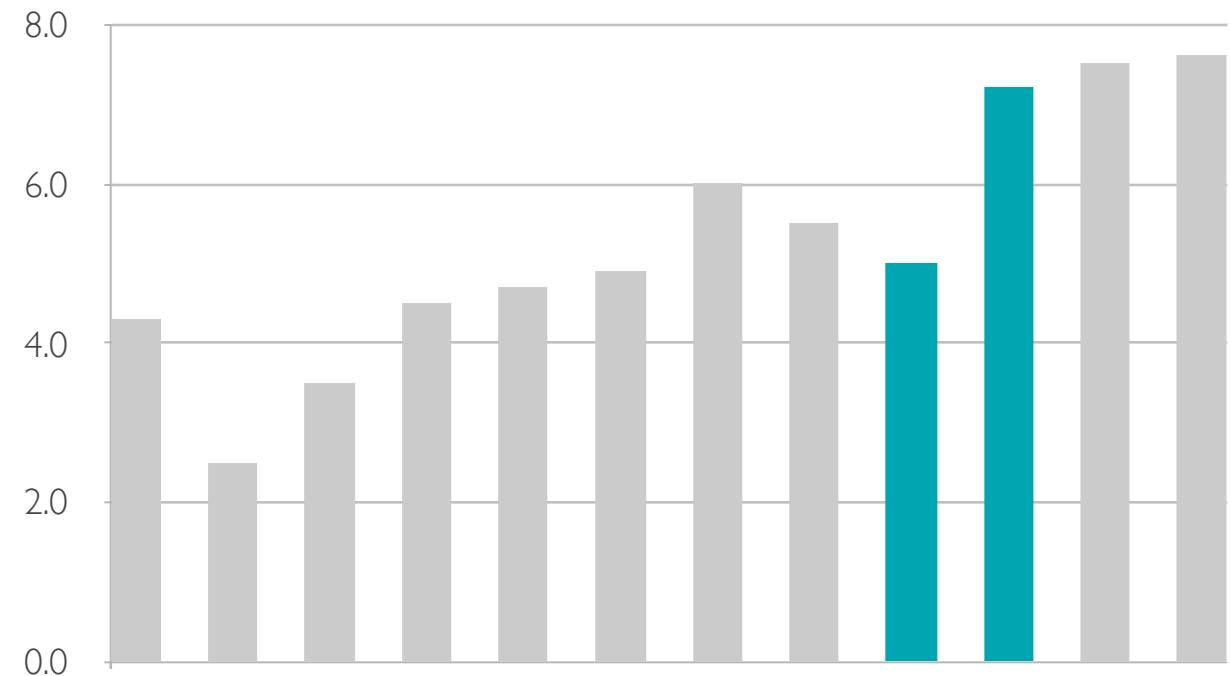
Tell Your Story

The screenshot shows a Microsoft Excel spreadsheet titled "Ratio Analysis" for "BURGER KING WORLDWIDE INC". The spreadsheet is organized into several sections:

- Ratio Analysis**: A yellow header row.
- Company Name**: BURGER KING WORLDWIDE INC.
- Fiscal Year End Date**: 2006/06/01, 2007/06/01, 2008/06/01, 2009/06/01, 2010/06/01, 2011/06/01, 2012/06/01, 2013/06/01, 2014/06/01, 2015/06/01, 2016/06/01, 2017/06/01, 2018/06/01, 2019/06/01, 2020/06/01, 2021/06/01, 2022/06/01.
- Annual Growth Rates**: Sales, Assets, Common Equity, Earnings, Free Cash Flow to Investors, Sustainable Growth Rate.
- Profitability**: Return on Equity, Return on Equity (b4 non-recurring), Return on Net Operating Assets.
- Basic Dupont Model**: Net Profit Margin, x Total Asset Turnover, x Total Leverage, = Return on Equity.
- Advanced Dupont Model**: Net Operating Margin, x Net Operating Asset Turnover, = Return on Net Operating Assets, Net Borrowing Cost (NBC), Spread (RNOA - NBC), Financial Leverage (LEV), ROE = RNOA + LEV*Spread.
- Margin Analysis**: Gross Margin, EBITDA Margin, EBIT Margin, Net Operating Margin (b4 non-rec.), Net Operating Margin.
- Turnover Analysis**: Net Operating Asset Turnover, Net Working Capital Turnover, Avge Days to Collect Receivables, Avge Inventory Holding Period, Avge Days to Pay Payables, PP&E Turnover.
- Analysis of Leverage**: Long-Term Capital Structure.

The spreadsheet uses conditional formatting to highlight specific cells in colors like green, orange, and red. The ribbon at the top shows tabs for Home, Layout, Tables, Charts, SmartArt, Formulas, Data, and Review. The formula bar at the bottom shows "fx".

Tell Your Story





80

60

40

20

0

1915

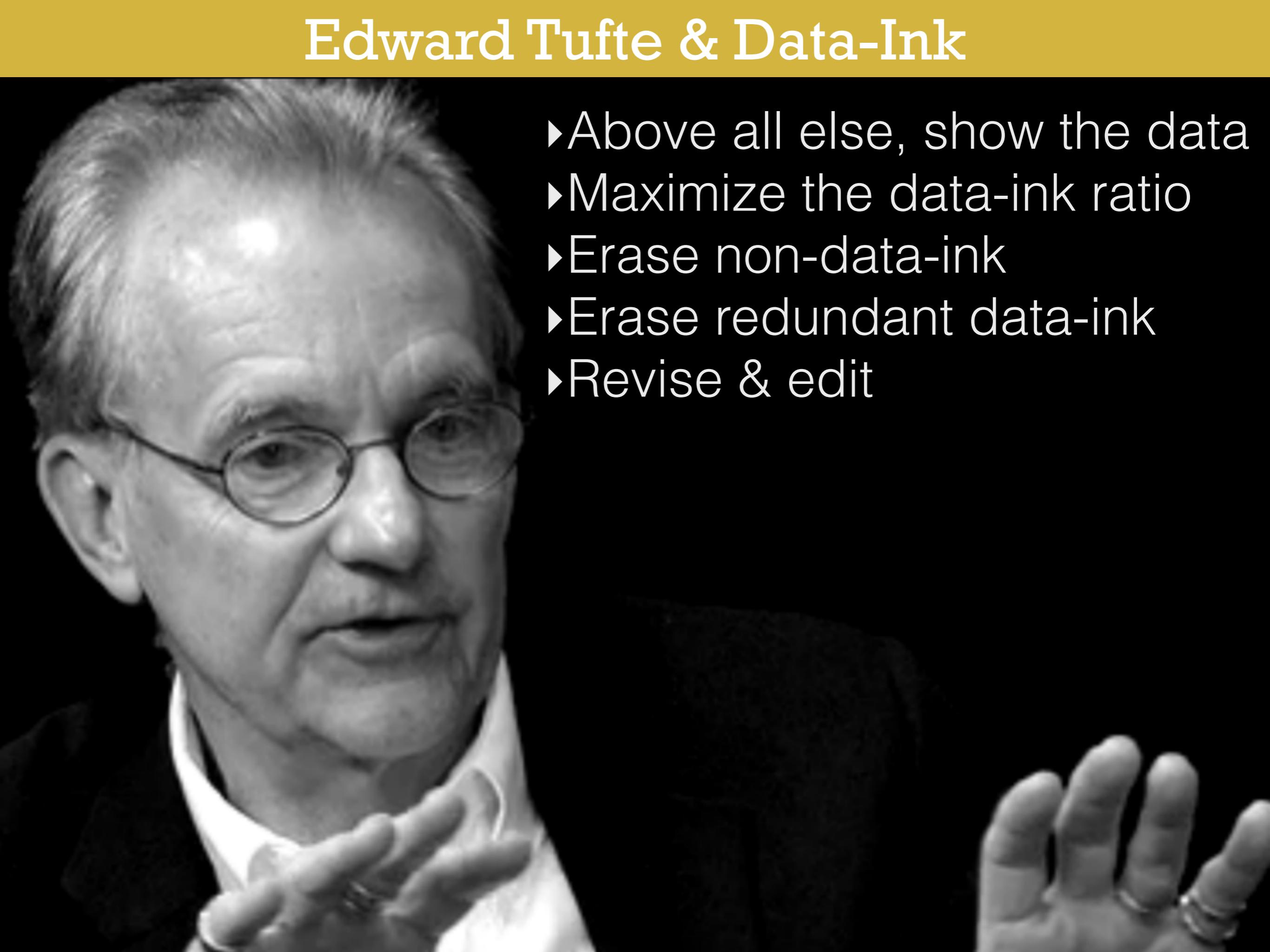
1945

1975

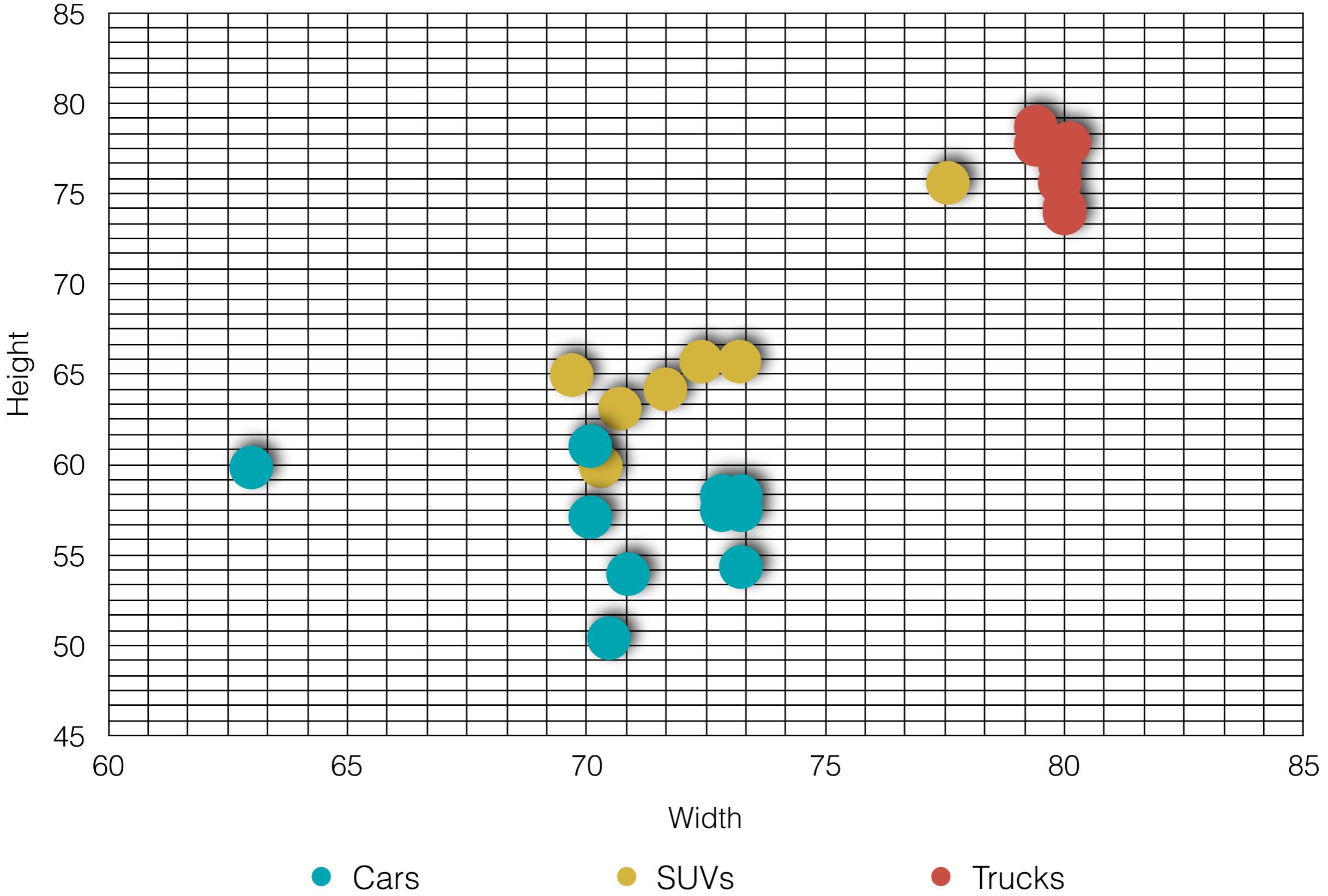
2000

Data-Ink

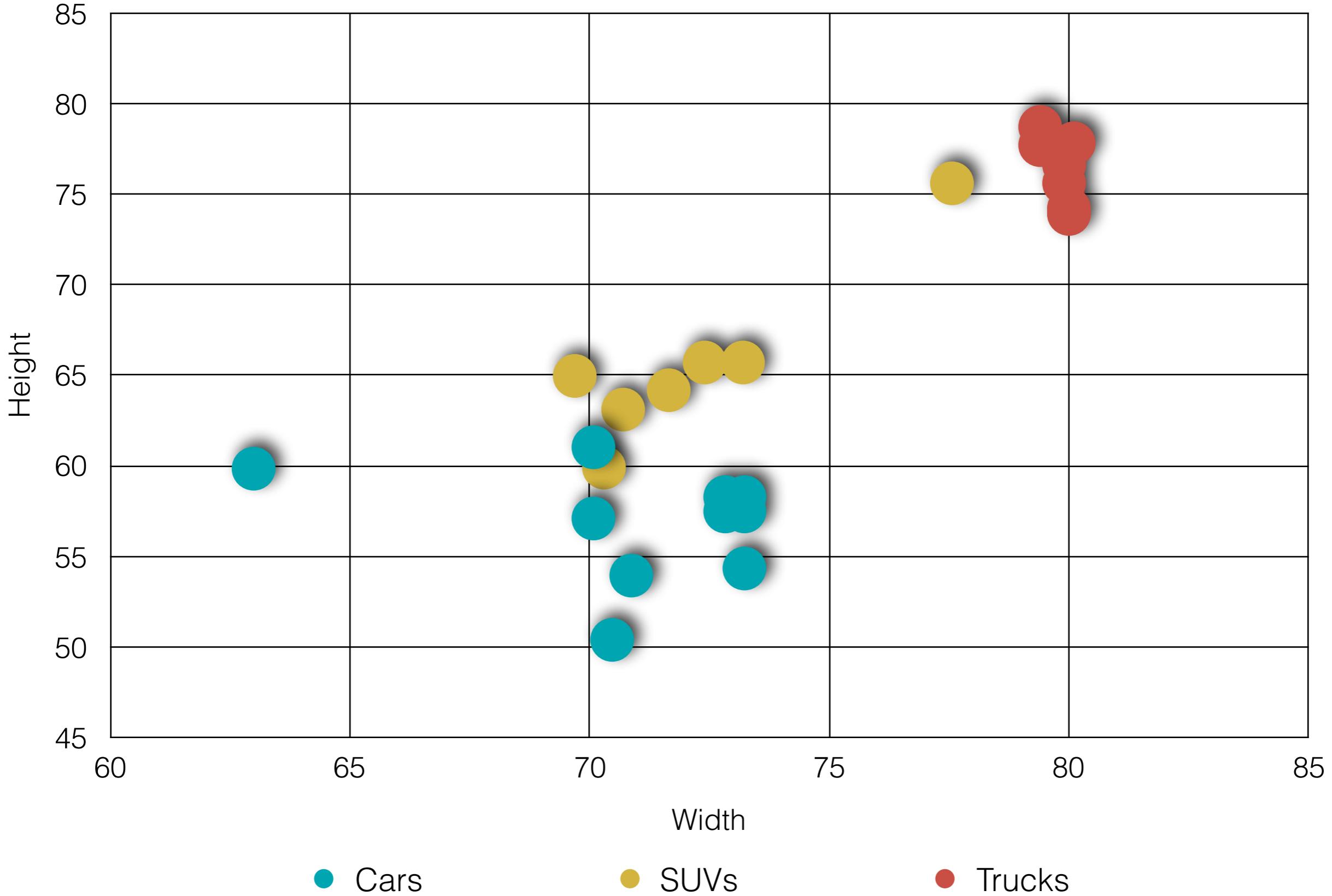
Edward Tufte & Data-Ink

- 
- A black and white close-up photograph of Edward Tufte. He is an elderly man with thinning hair and glasses, wearing a dark suit jacket over a white shirt. His right hand is resting against his chin, and his left hand is partially visible at the bottom right. The background is dark and out of focus.
- ▶ Above all else, show the data
 - ▶ Maximize the data-ink ratio
 - ▶ Erase non-data-ink
 - ▶ Erase redundant data-ink
 - ▶ Revise & edit

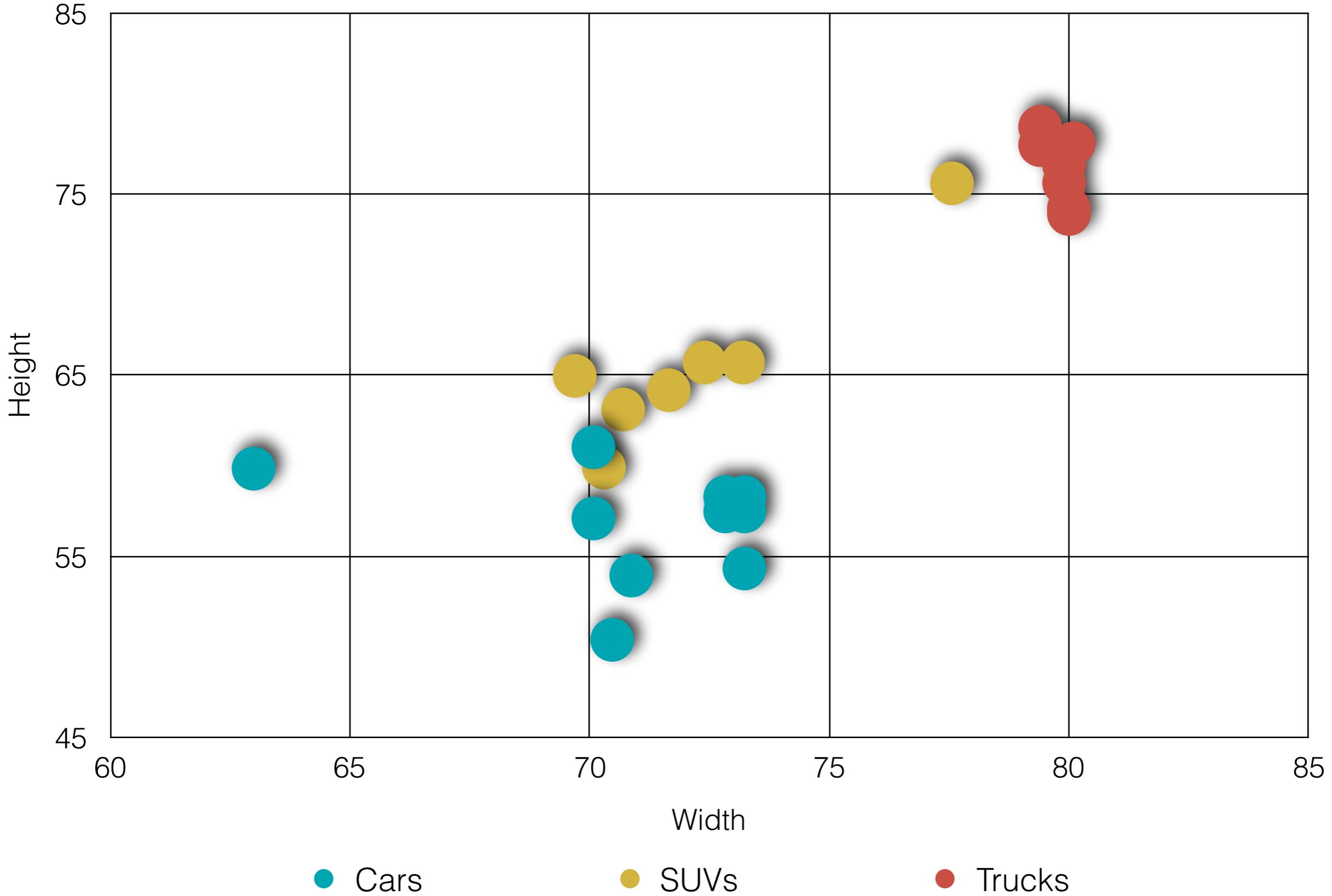
Vehicle Heights & Weights



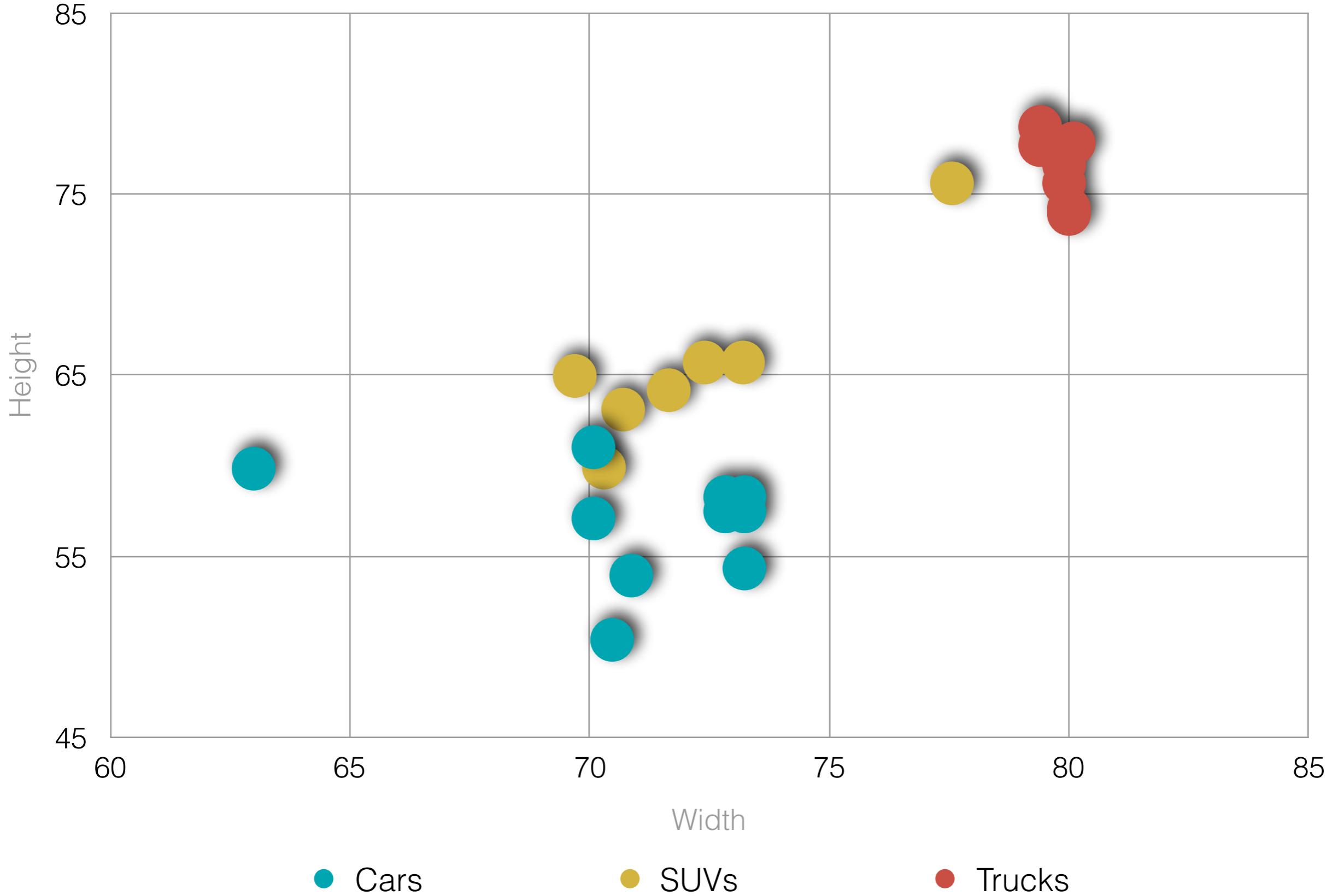
Vehicle Heights & Weights



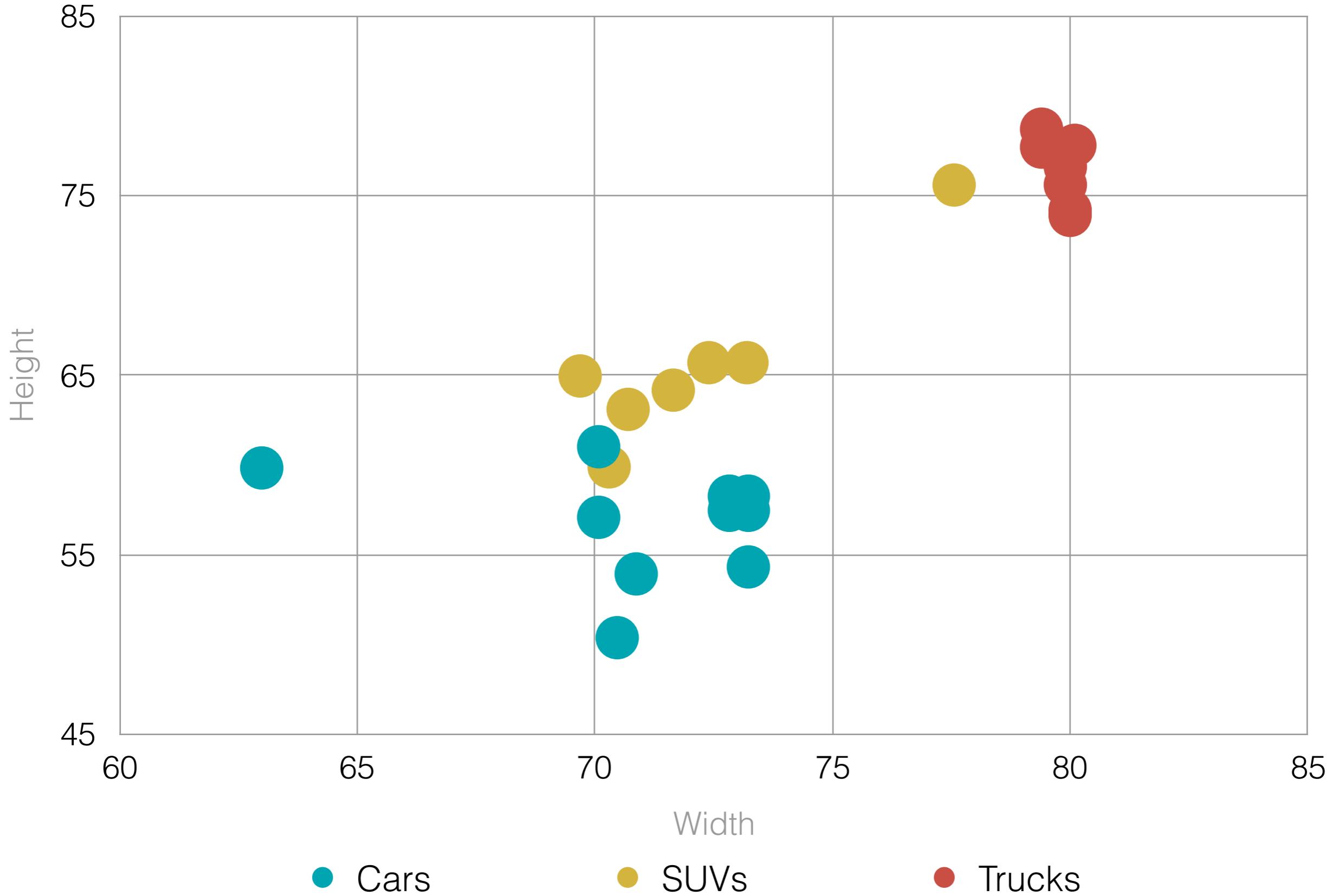
Vehicle Heights & Weights



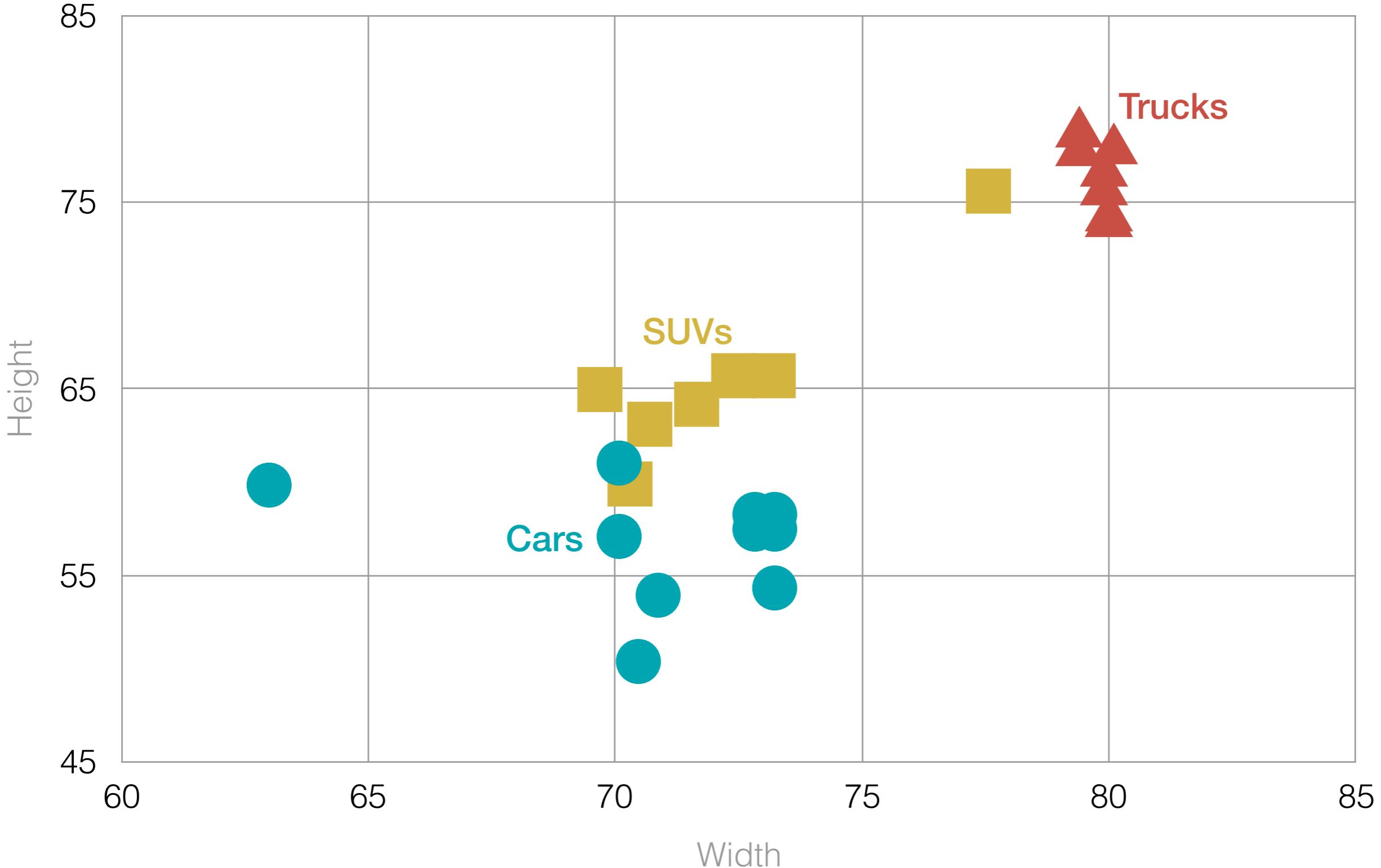
Vehicle Heights & Weights



Vehicle Heights & Weights



Vehicle Heights & Weights

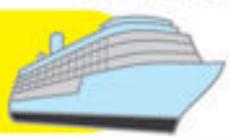


Icons

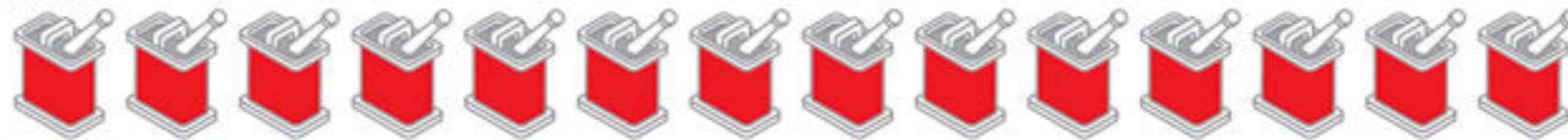
GETTING AROUND: FUEL USE OF VARIOUS MODES OF TRANSPORTATION

HOW MANY GALLONS OF FUEL PER PASSENGER DOES IT TAKE TO COVER A DISTANCE OF 350 MILES?

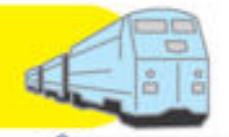
Cruise Ship



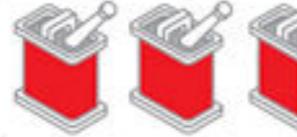
2915 Capacity
.009 Miles per gallon
121 Gallons per mile
10:56 Time to travel 350 miles at 32 mph



Amtrak



300 Capacity
.46 Miles per gallon
2.17 Gallons per mile
04:22 Time to travel 350 miles at 80 mph



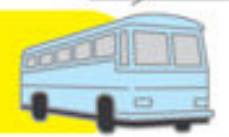
Boeing 737



175 Capacity
.42 Miles per gallon
2.4 Gallons per mile
00:37 Time to travel 350 miles at 566 mph



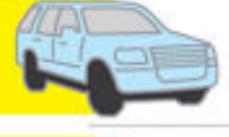
Motor Coach



50 Capacity
5 Miles per gallon
.2 Gallons per mile
05:50 Time to travel 350 miles at 60 mph



Average SUV



5 Capacity
21 Miles per gallon
.048 Gallons per mile
05:50 Time to travel 350 miles at 60 mph



Average Sedan



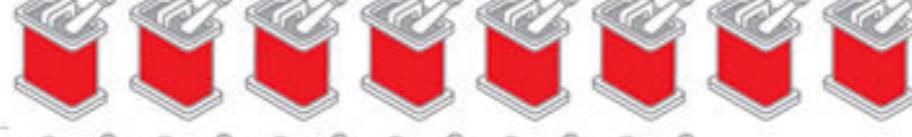
4 Capacity
27 Miles per gallon
.037 Gallons per mile
05:50 Time to travel 350 miles at 60 mph



Average Hybrid



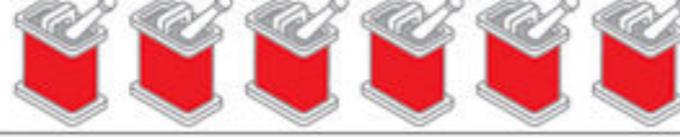
4 Capacity
46 Miles per gallon
.022 Gallons per mile
05:50 Time to travel 350 miles at 60 mph



Motorcycle



1 Capacity
56 Miles per gallon
.017 Gallons per mile
05:50 Time to travel 350 miles at 60 mph



Bicycle



1 Capacity
912 Miles per gallon (caloric conversion)
.001 Gallons per mile (caloric conversion)
23:20 Time to travel 350 miles at 15 mph



Walking



1 Capacity
211 Miles per gallon (caloric conversion)
.005 Gallons per mile (caloric conversion)
100 Time to travel 350 miles at 3.5 mph



----- FUEL USAGE for driver alone

----- FUEL USAGE for driver plus one passenger

----- FUEL USAGE for driver plus three passengers

WHOPPER with cheese is 770 calories.
EATMEN neither endorses or denounces the
consumption of Whoppers.

WE'RE EFFICIENT One gallon of gas equals
approximately 31,000 calories. We only need
about 2,000 calories a day.

CYCLIST A 175-pound rider, biking 15 miles
per hour, and burning .049 calories per
pound per minute.

WALKER A 175-pound pedestrian, walking at
3.5 miles per hour, and burning .035 calories
per pound per minute.

NOTE Capacity, fuel economy, and speed
numbers are, in some cases, averages or
estimates.

good.is
Transparency

REBUILDING PROGRESS IN NEW ORLEANS

BEFORE HURRICANE KATRINA 1 YEAR LATER 2 YEARS LATER

Households

Actively receiving mail in Orleans Parish



Labor force

In Orleans Parish



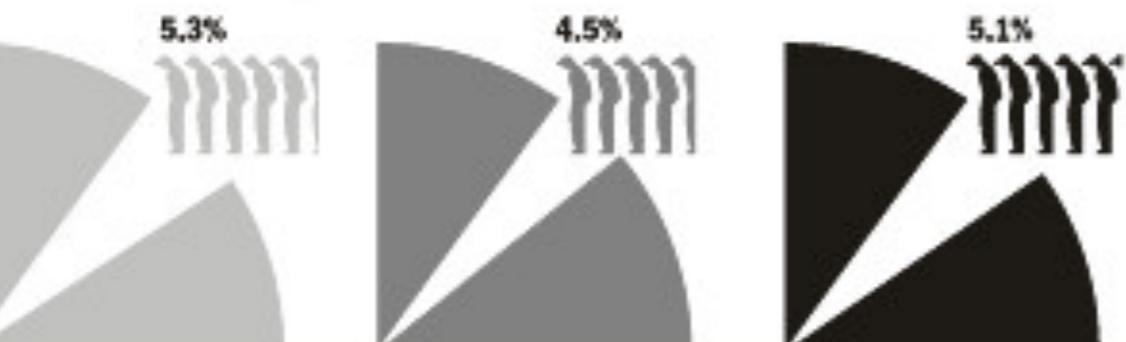
Buses

Operational in Orleans Parish



Unemployment

Rate in New Orleans metropolitan area



House prices

Average sale price, June, in Orleans Parish



Air passenger traffic

Arriving & departing at Louis Armstrong International Airport, June



Libraries

Open in Orleans Parish



Hospitals

Operational in Orleans Parish



Source: Nigel Holmes

NO ESCAPE FOR TENANTS

Average Manhattan rents in October

Non-doorman buildings

Doorman buildings

\$2,151

Studio

\$2,751

\$2,991

One-bedroom

\$3,787

\$4,069

Two-bedroom

\$5,627

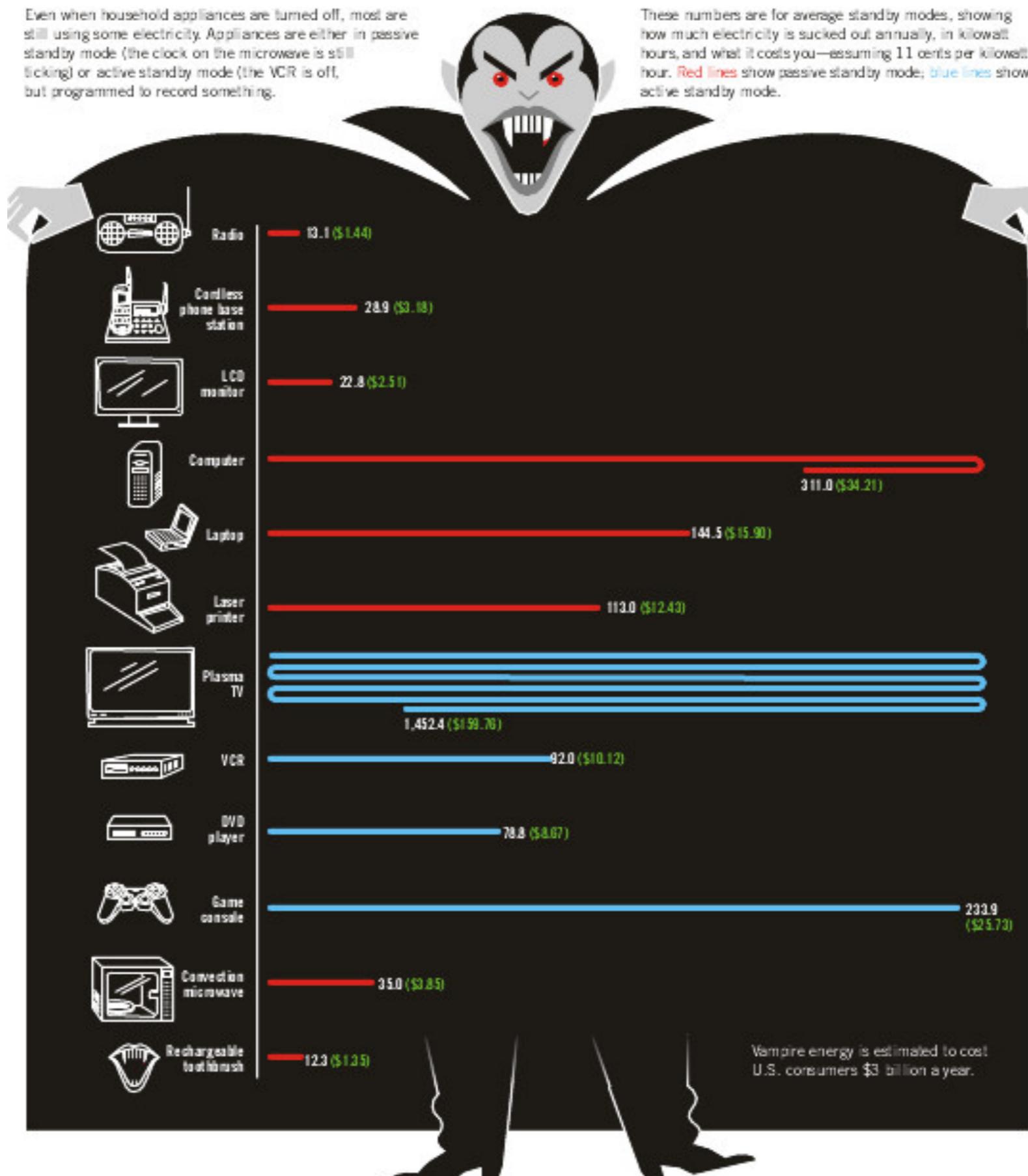


Source: Nigel Holmes

Vampire Energy

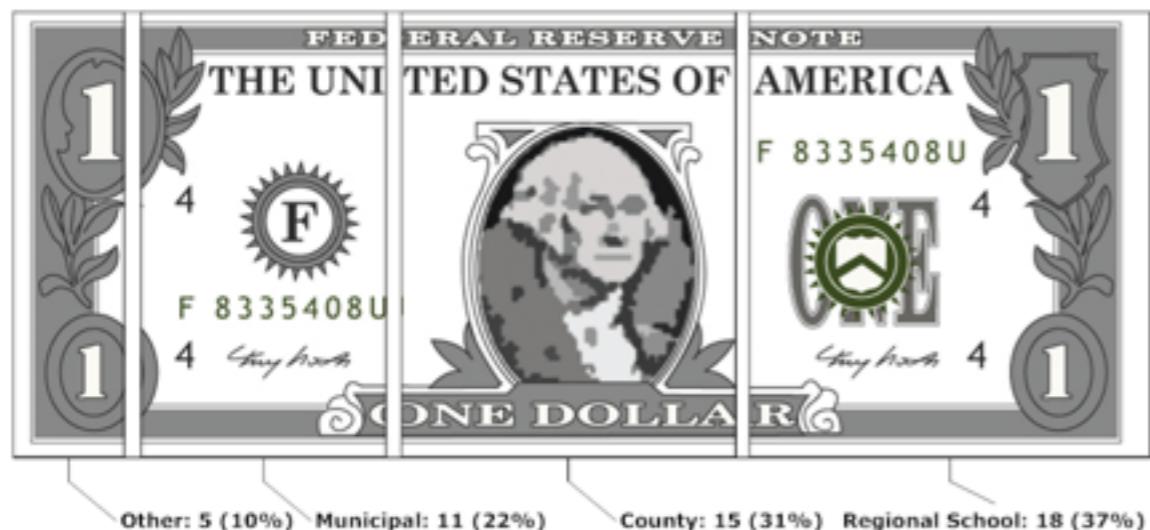
Even when household appliances are turned off, most are still using some electricity. Appliances are either in passive standby mode (the clock on the microwave is still ticking) or active standby mode (the VCR is off, but programmed to record something).

These numbers are for average standby modes, showing how much electricity is sucked out annually, in kilowatt hours, and what it costs you—assuming 11 cents per kilowatt hour. **Red lines** show passive standby mode; **blue lines** show active standby mode.

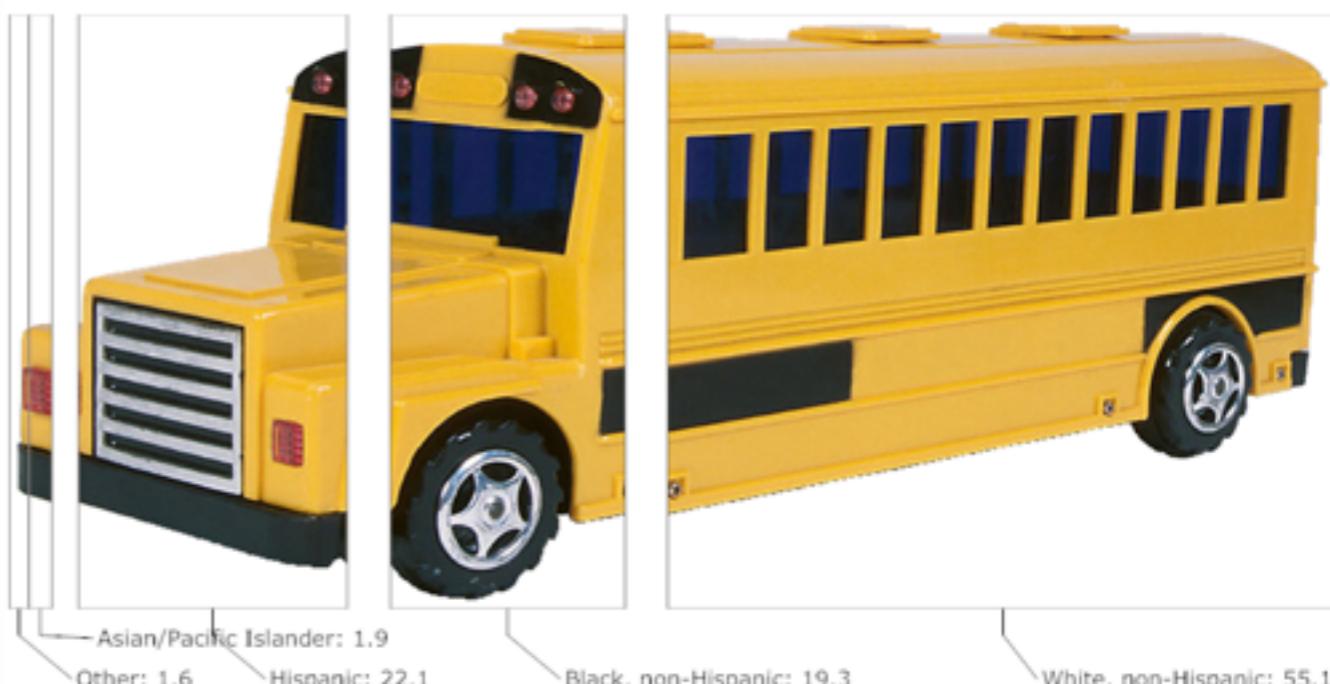


Source: Nigel Holmes

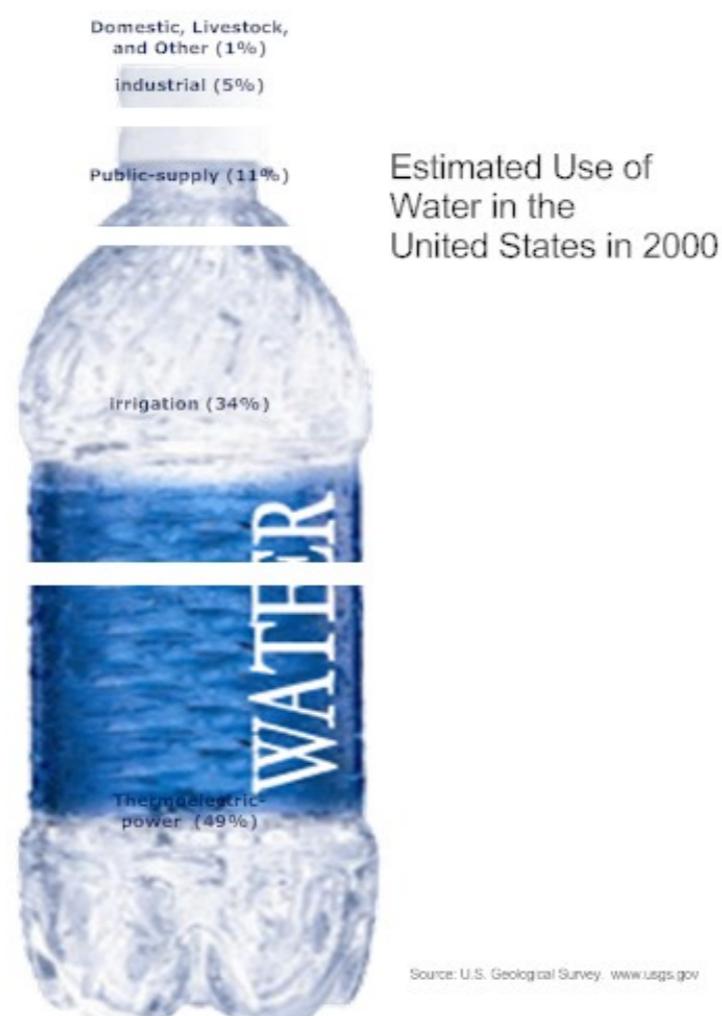
How Your Tax Dollars Are Spent



Dropout Rates of 15- through 24-year-olds
who dropped out of grades 10–12,
by background characteristics: October 2001

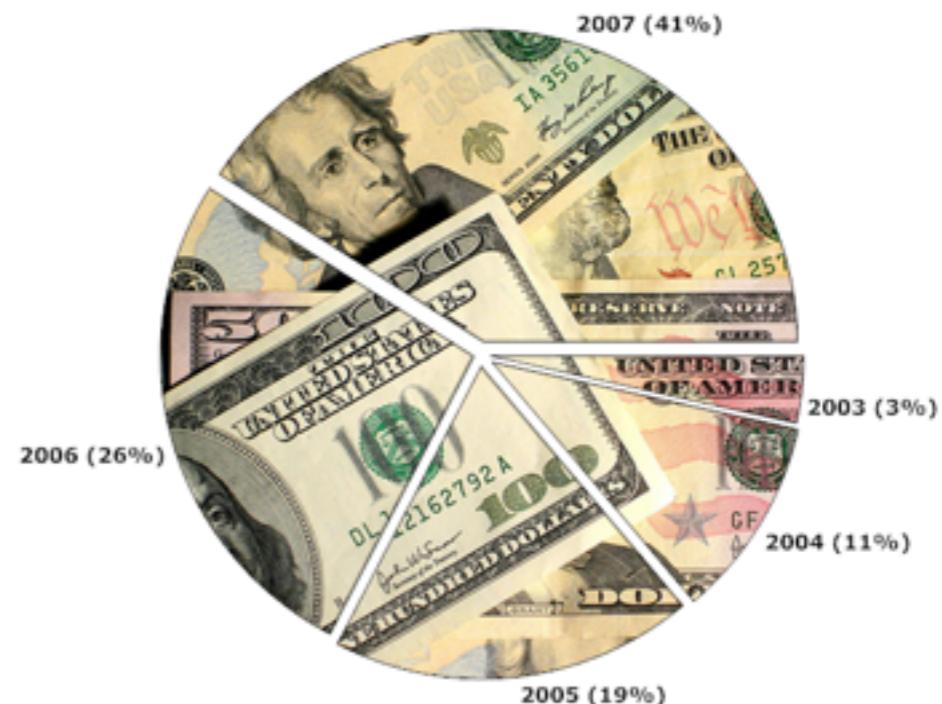


Source: National Center for Education Statistics. nces.ed.gov



Source: U.S. Geological Survey. www.usgs.gov

Assets Under Management



Source: SmartDraw

Color

Visual Cues: Color for Search



Visual Cues: Color for Emotion



Identity

(colourlovers.com)



Symbolism

(montyne.com)



Metaphor



Mood

High Contrast Colors

Very High
Contrast

Very High
Contrast

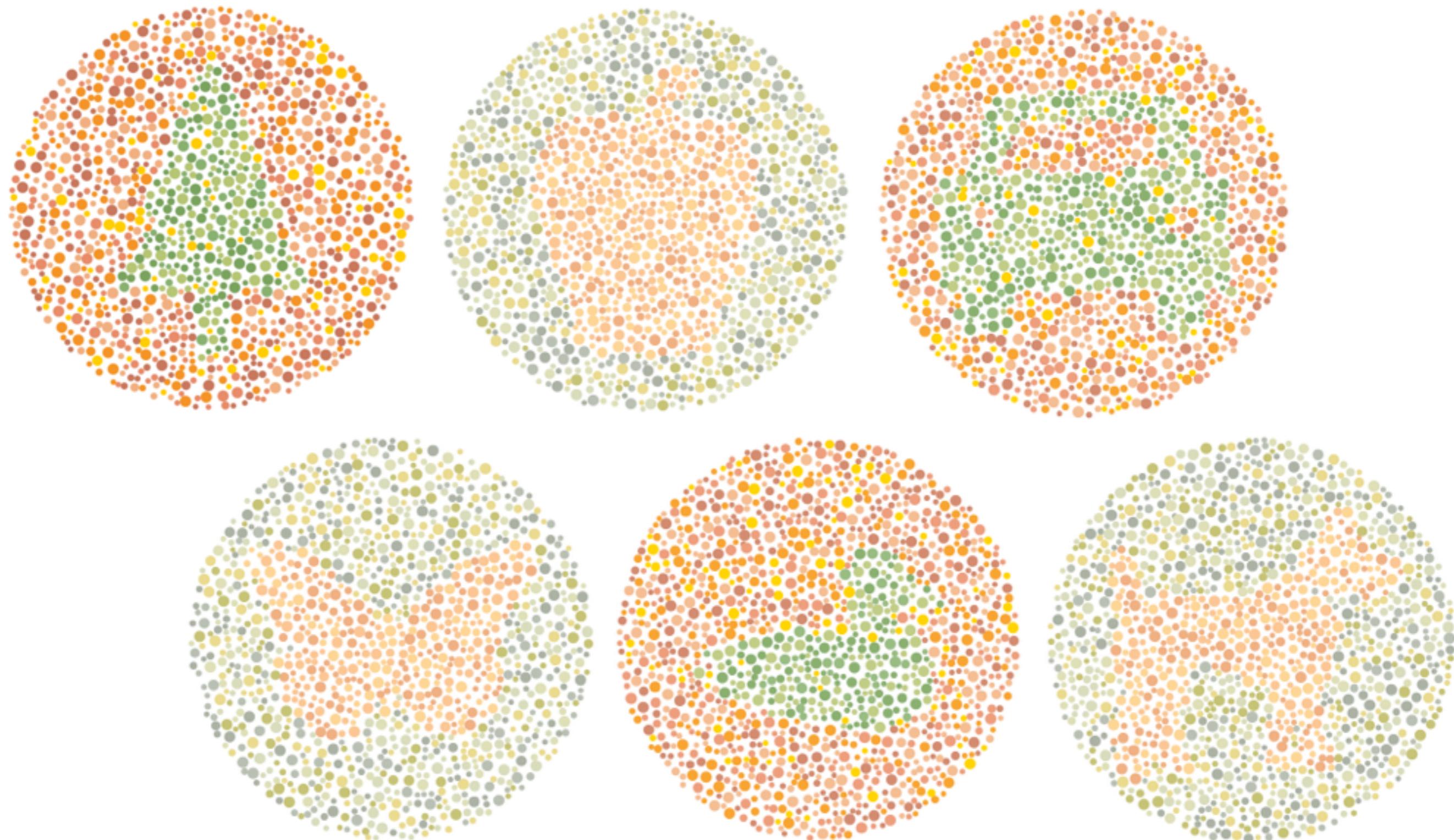
Medium
Contrast

Medium
Contrast

Low Contrast

Very Low
Contrast

Pay Attention to Color Blindness



Selecting Colors



Selecting Colors

English ▾

Like it? ▾

Paletton Live Colorizer

Mobile [scheduled]

More apps [scheduled]



< UNDO

REDO >

RESET

RANDOMIZE...

MORE INFO ▾



Adjacent colors (4-colors)

with complement

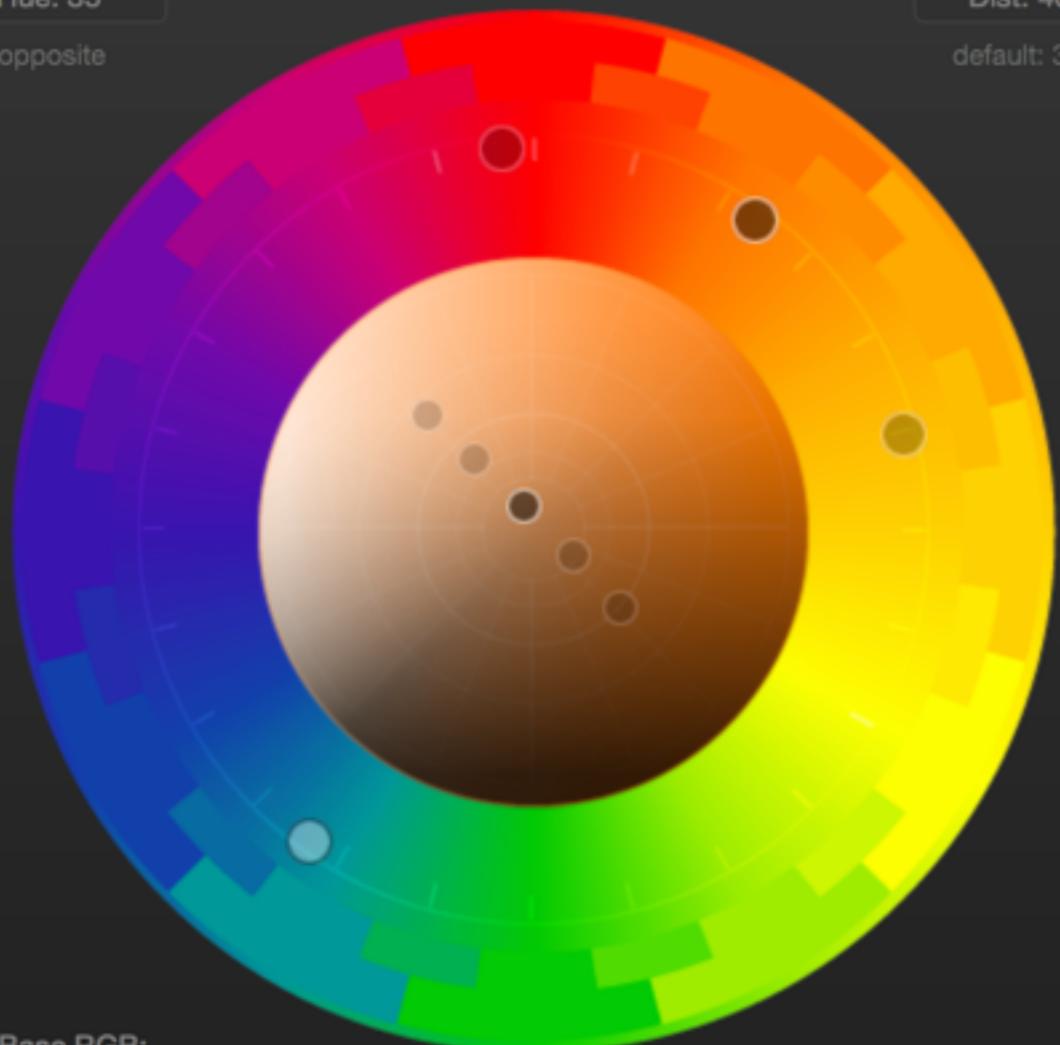
My Palette:



Share palette ▾

Hue: 35°

opposite



Dist: 40°

default: 30°



Base RGB:

BC8044

Fine Tune...

Vision simulation ▾

COLORS

PRESETS

PREVIEW ▾

EXAMPLES...

TABLES / EXPORT...

Selecting Colors

Adobe Color CC

Create

Explore

My Themes

SIGN IN

Save

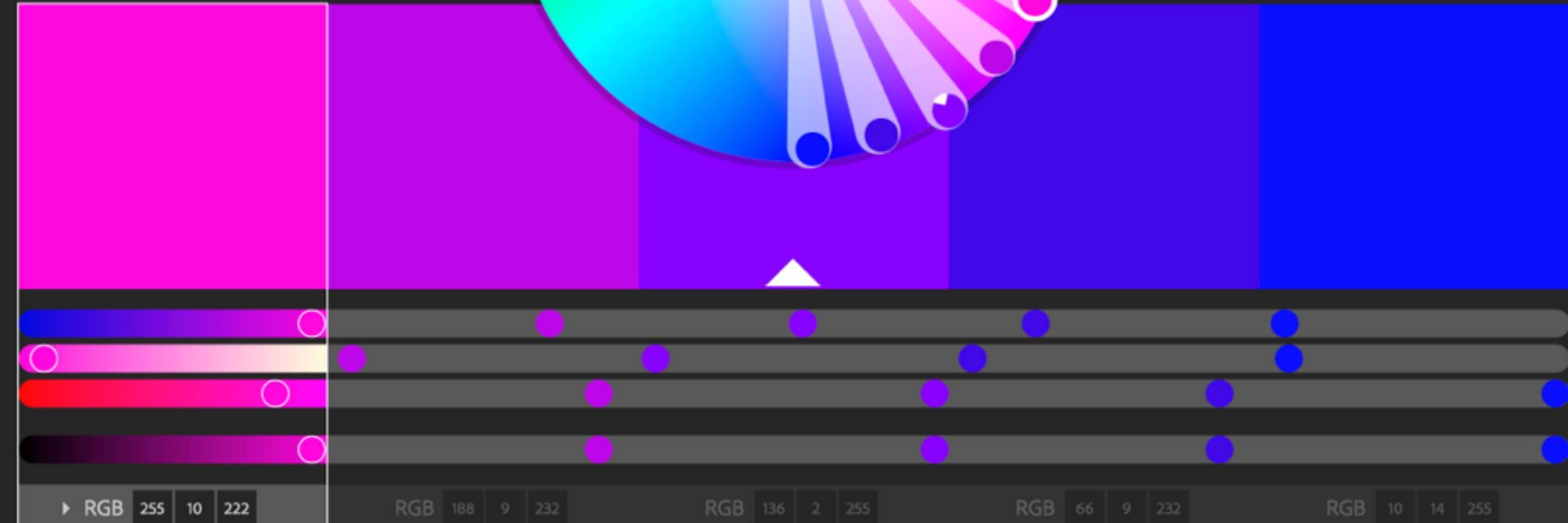
My Color Theme 



Color Rule



Analogous



Fonts

Slide Titles

Major Point

Minor point

If in doubt, use the monitor size rule

Font Type Face

Major Point

Major Point

Major Point

Major Point

Major Point

Font Type Face

Major Point

Major Point

Major Point

Major Point

Major Point

Font Combination

**Find the perfect font combo
for your next project.**

Select a starter font



Font Inspiration

typespiration

// treating typography with respect

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most recent / featured / designers

 51 824 78 537 18

#

PEAKS AND VALLEYS 18. 20

Snow White

White is her skin, not hint of sun
Black is her hair; that's coming undone
Green is her eyes; brighter than safaris
Red as a rose is her lips. Sweet as nectar

hy and Sweet, Innocent to the core.

She will mark you for shore
The queen of the realm.

—by LEXIE NIGHT

Anti-wrinkle Inje

Dermal Filler is an injection that gently restores facial structure. Facial tissue loss is one of the key factors in aging. Dermal fillers can help to rejuvenate the skin.

MY DEAR, MY DEAR, MY DEAR
YOU DO NOT KNOW ME BUT I KNOW YOU

NOW LET ME TELL YOU ABOUT THE FEELINGS
WHEN I TALK, OR MAKE SOME SORT OF AT-

DAMN I WISH I WASN'T SUCH A LIAR
'CAUSE THEN I WOULD LET YOU KNOW THAT

AND IF I WAS YOUR MAN THEN I WOULD
THE ONLY LYING I WOULD DO IS IN THE B

PS LOVE ME TENDER.

Fix the detective, ha
which Passepartout
delaying his departure f
consulted the priests of

Owing to the delay caused by Fix and the priests reached the town, and his servant, the magistrate

8
MINI Maecenas a orci sit amet i sagittis vestibulum

Ut eti nunc, iaculis egri vestibulum ut, volutpat vel lorem. Curabitur a augue enim! I
suade faecibus lectus at laoreet! Integer semper nisi non mauris ornare imperdiet, dignissim sagittis vehicula in, varius porta nisi. Fusce quis mauris eros. Praesent aliquam
pellentesque vestibulum cursus enim sit amet porttitor. Sed quis nisi nisi. Nullam sollicitudin
volutpat a porta tortor egestas. Sed non ante non diam consequuntur tempus. Vivamus
peritior nulla dictum ac pretium nibh adipiscing. Nulla convallis viverra placerat! Per
morto tristisque senectus et netus et malesuada famelis ac turpis egestas. [Read more](#)

In old time
helped on
whose daughter

But the youngest was s
has seen so much, was

“
The best and
most beautif
things in the

Animation

> 3,600 years old



1600BC

0AD

Today



Today

1440

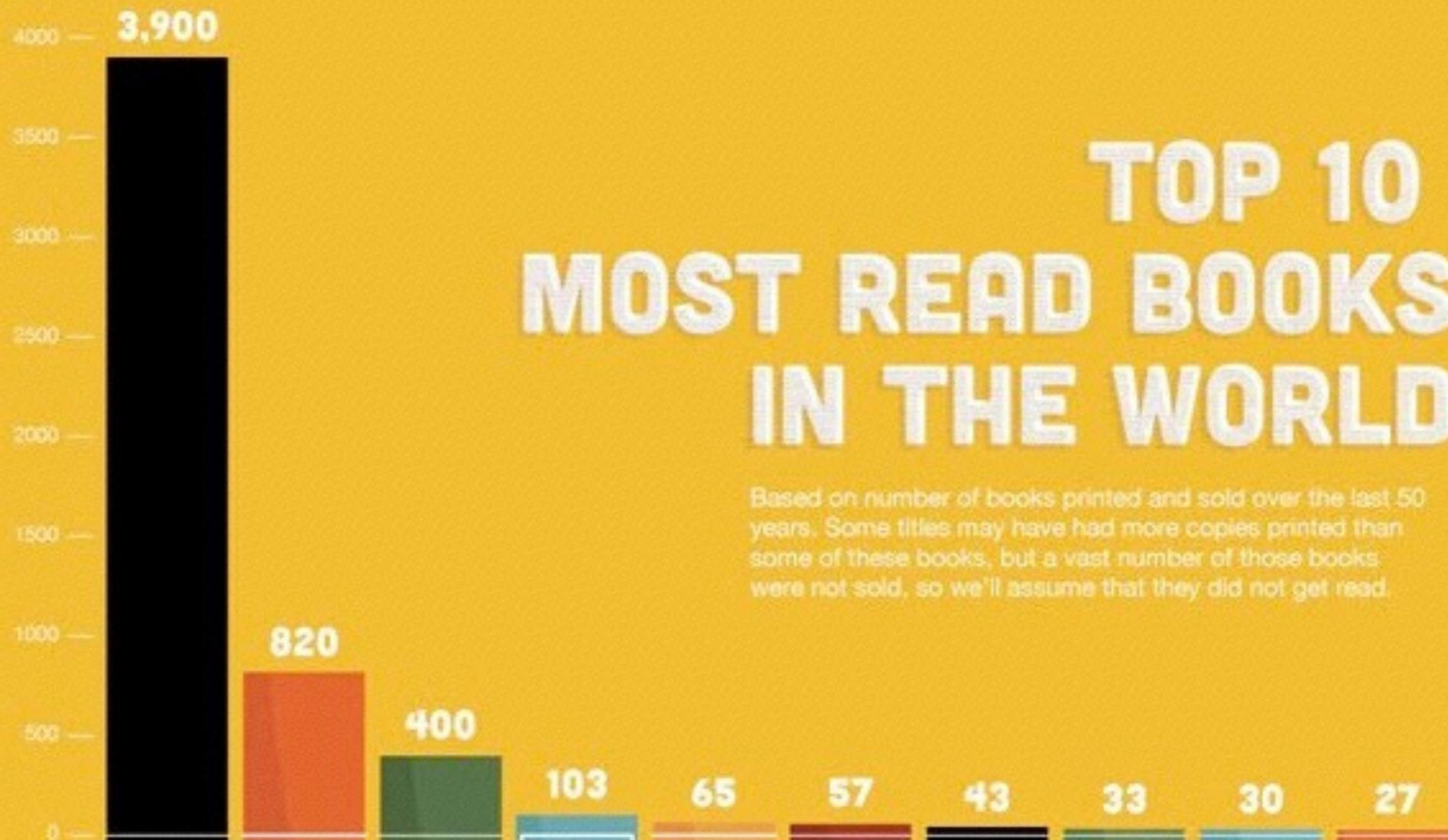


0AD

> 3,600 years old

1600BC

How to Lie with Charts & Graphs



Headline News

Headline News

25,255,000**

MSNBC

24,933,000**

Fox News

24,278,000**

Headline News is watched by more Adults 25-54 each month than MSNBC or Fox News.

Headline News

25,255,000

MSNBC

24,933,000

Fox News

24,278,000

Headline News

25,255,000

MSNBC

24,933,000

Fox News

24,278,000

OBAMACARE ENROLLMENT

7,100,000

**ACTUAL
ENROLLMENT**

7,000,000

GOAL



2012 PRESIDENTIAL RUN

GOP CANDIDATES



SOURCE: OPINIONS

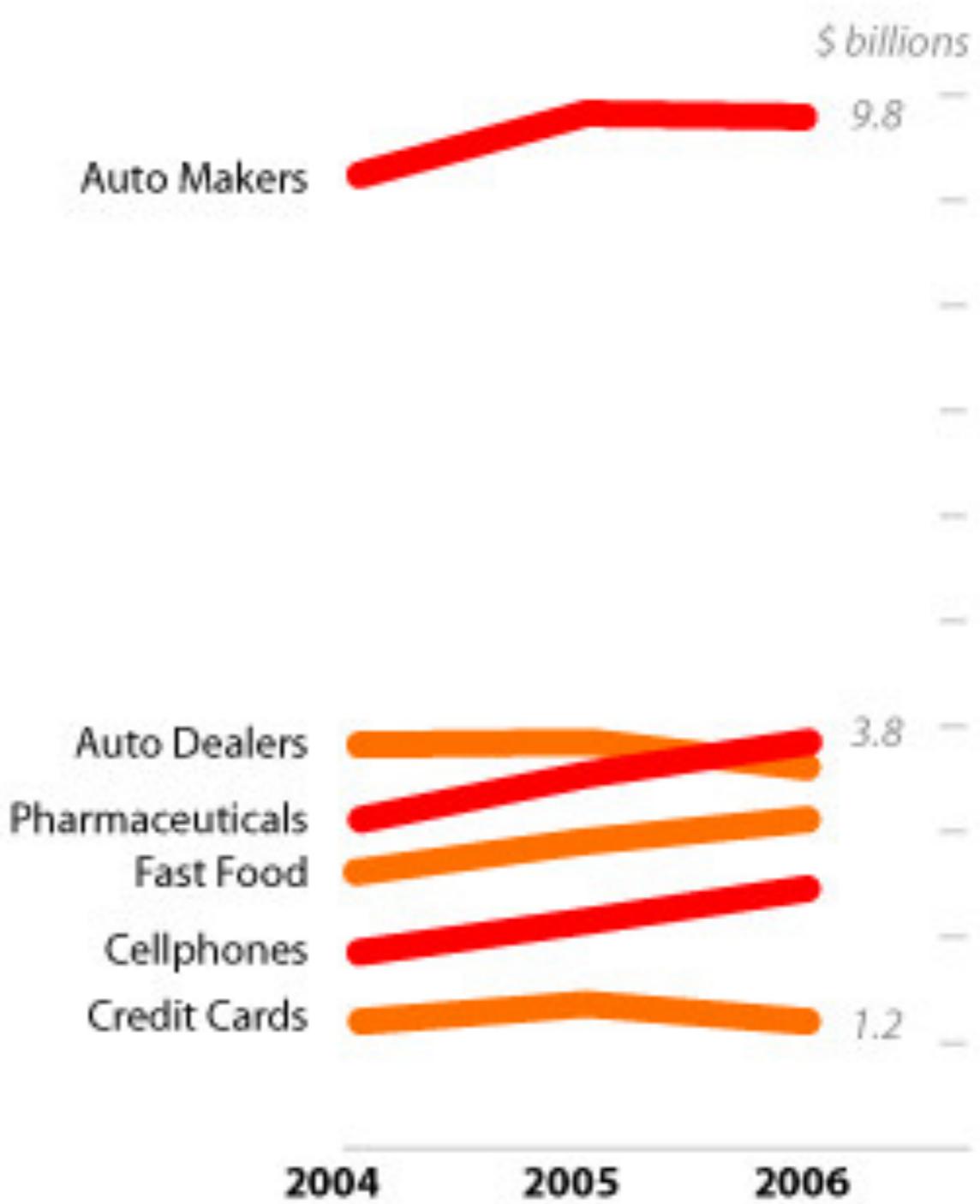
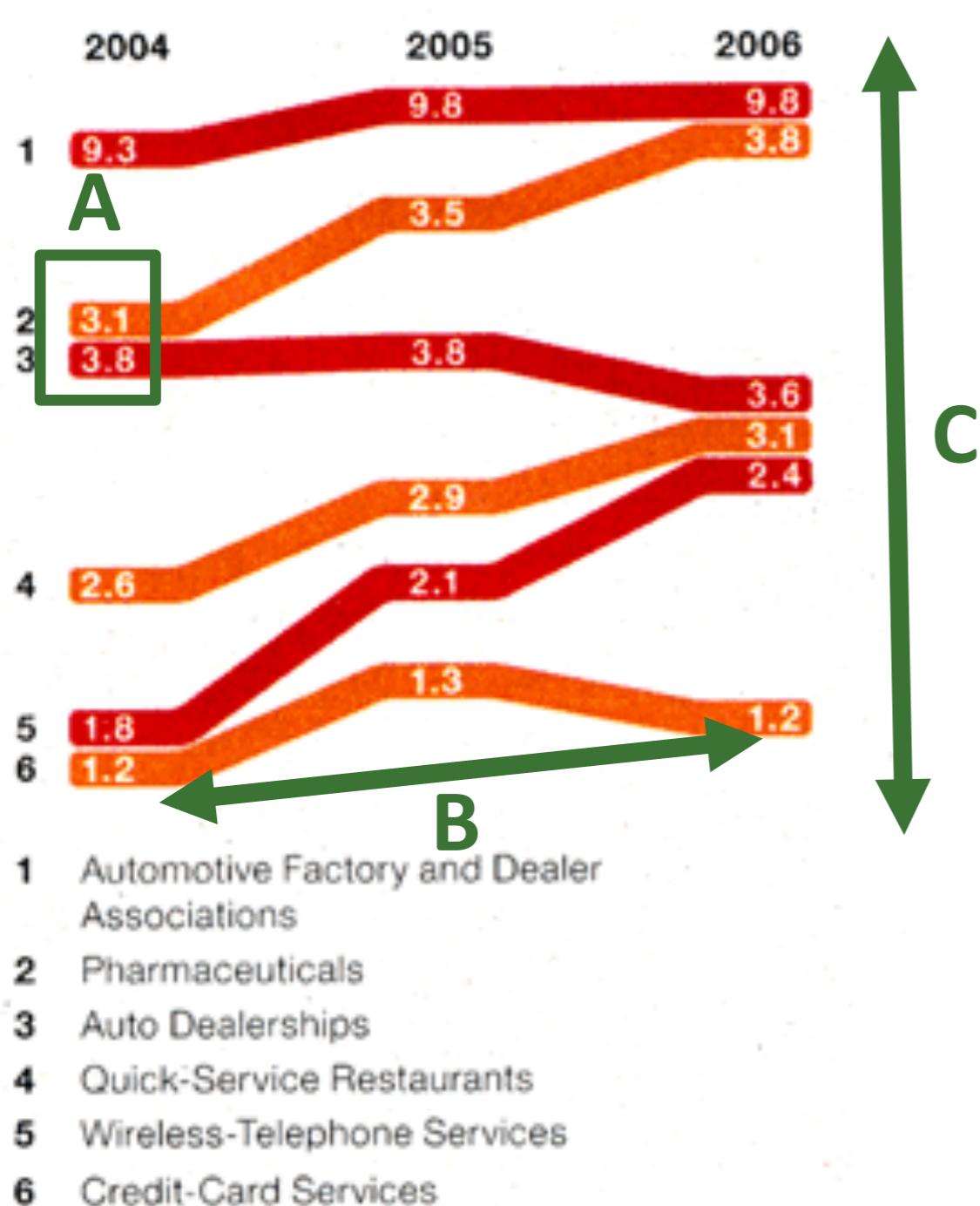
DYNAMIC

FOX

47°

THE AD BUYERS

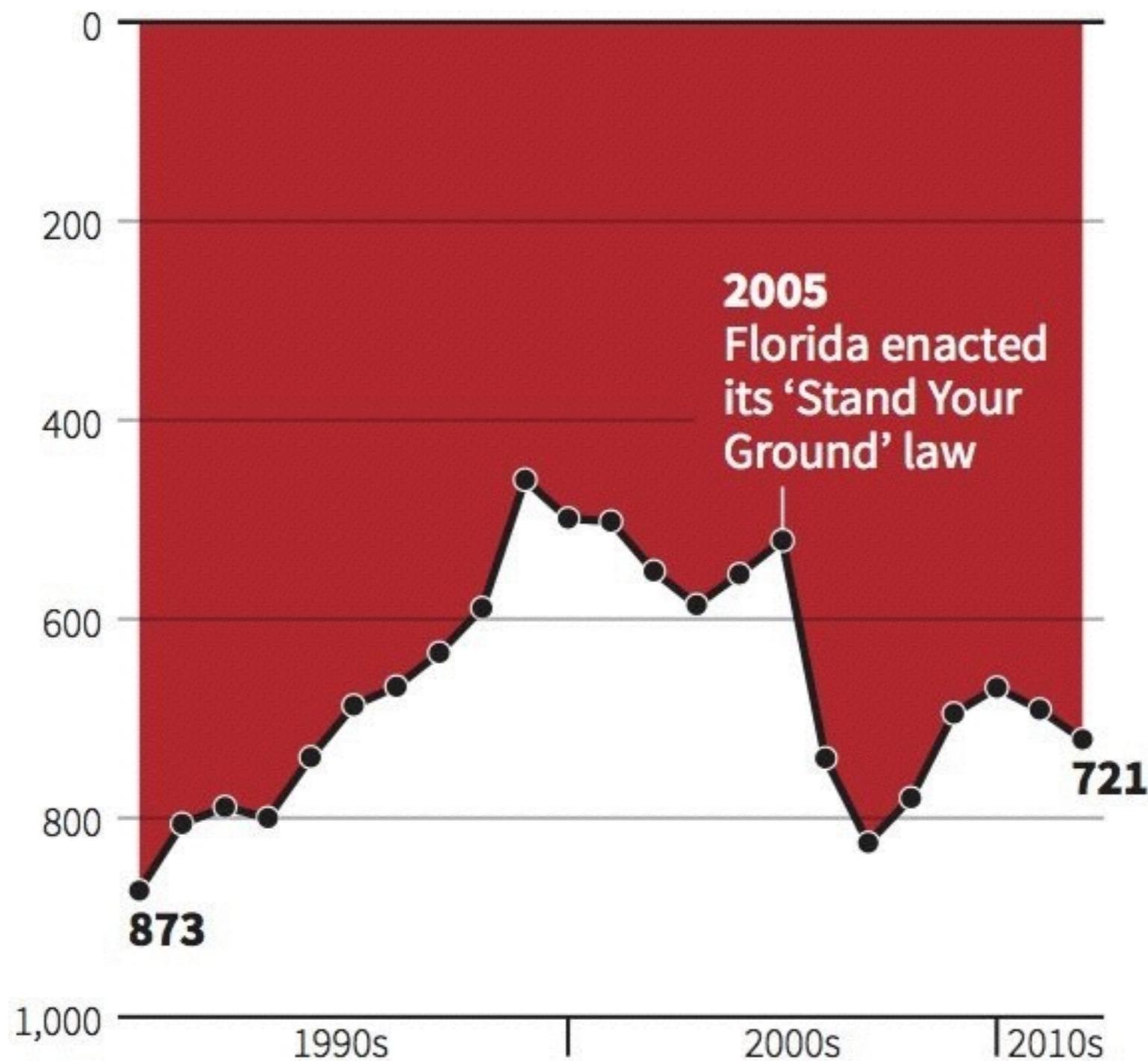
Advertising spending by selected major industries, in billions.



Source: Nielsen Monitor-Plus, a service of
Nielsen Media Research
Chart by Catalogtree

Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

Exercises

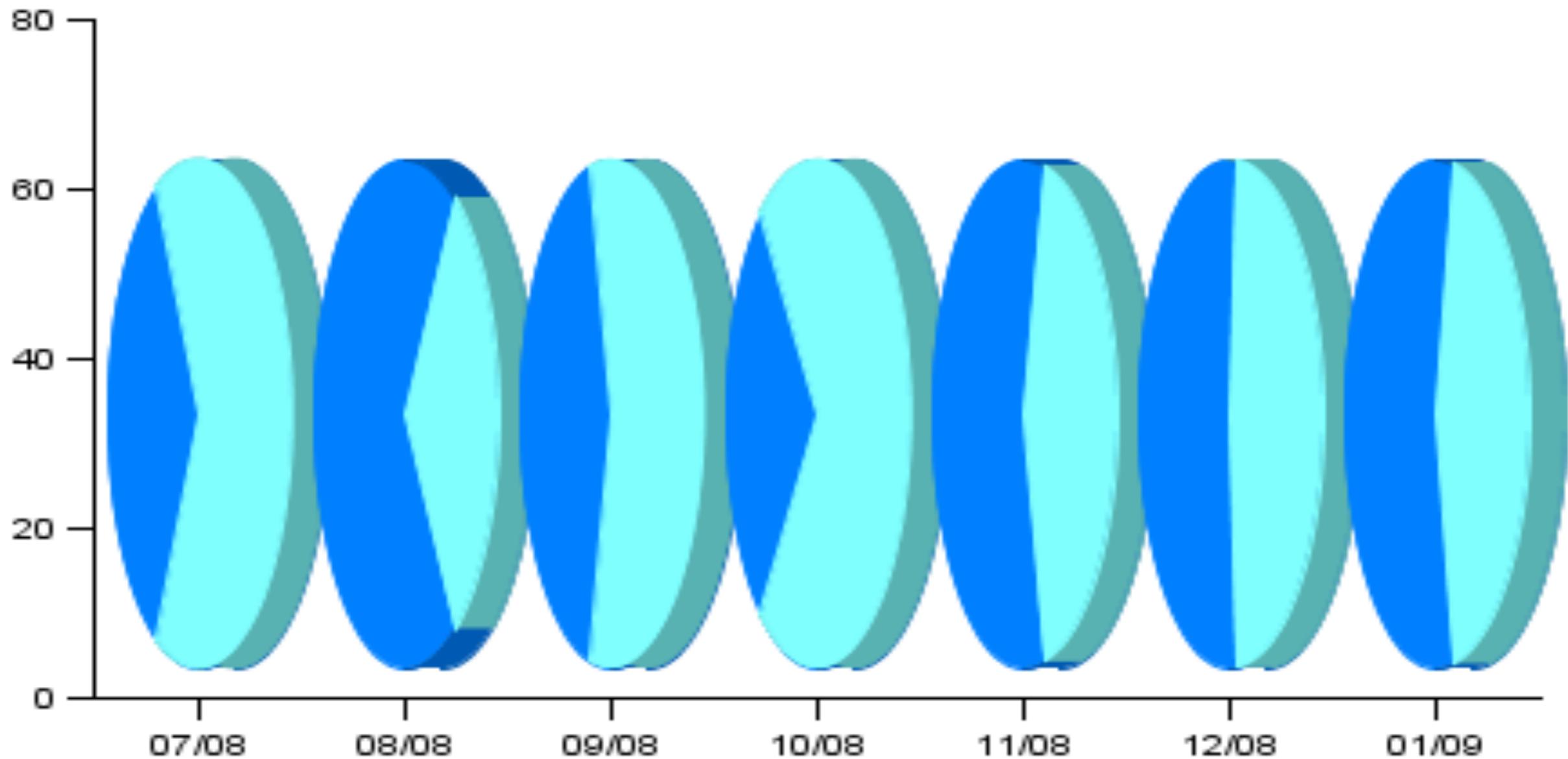
Exercise

Country
Corruption Ranking
Coups – Successful
Coups – Attempted
Debt % of GDP
College Graduates as % of Population
Health as % of Population
% Millionaires

...over 20 Years, all data is available,
accurate, and consistent

Exercise

Single Series - Vertical - 10 Pixel Depth w/Pie Vertical Bars



Tom Crawford

 thcrawford

 @thcrawford
@viznetwork

 viznetwork.com

